

Wrangell High School and Middle School Fire Alarm Replacement

ELECTRICAL SUBMITTALS

OWNER: *CITY & BOROUGH OF WRANGELL
PO Box 531, Wrangell, AK 99929*

CONTRACTOR: *SITKA ELECTRIC CO.
1314 SAWMILL CREEK ROAD SITKA,
AK 99835*

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**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

26 05 00

Common Work Results for
Electrical



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 (905) 428.2240

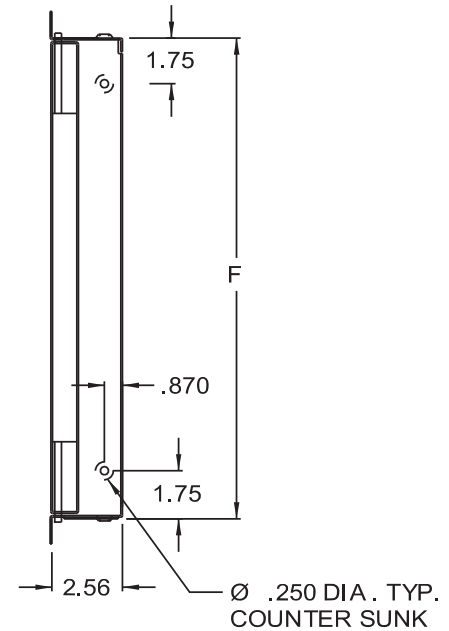
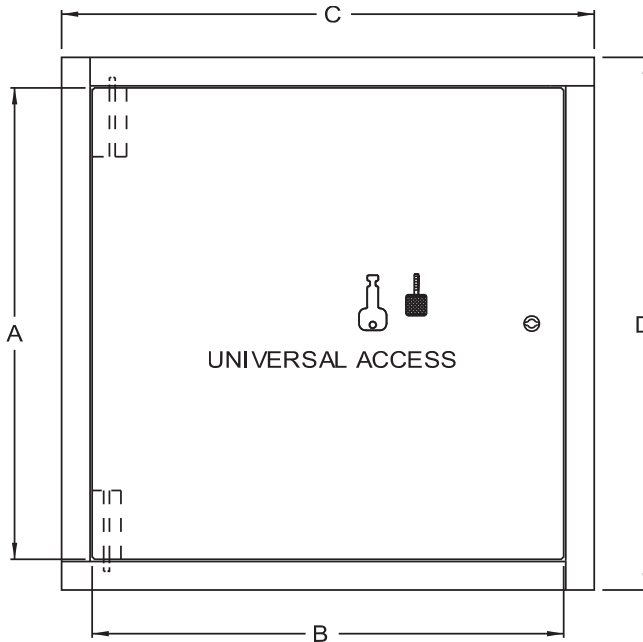
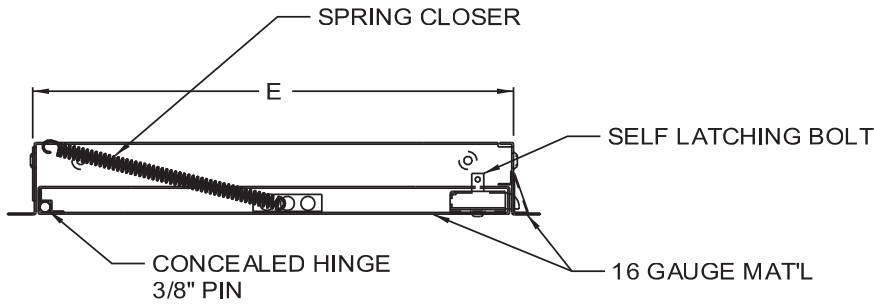
FB-5060

FIRE RATED - FOR WALLS

QTY.	NOMINAL SIZE	A	B	C	D	E	F	LOCK
	8 X 8 (203 X 203)	7.78 (198)	7.78 (198)	10 (254)	10 (254)	8.12 (206)	8.12 (206)	1
	10 x 10 (254 x 254)	9.78 (248)	9.78 (248)	12 (305)	12 (305)	10.12 (257)	10.12 (257)	1
	12 x 12 (305 x 305)	11.78 (299)	11.78 (299)	14 (356)	14 (356)	12.12 (308)	12.12 (308)	1
	14 x 14 (356 x 356)	13.78 (350)	13.78 (350)	16 (406)	16 (406)	14.12 (359)	14.12 (359)	1
	16 x 16 (406 x 406)	15.78 (401)	15.78 (401)	18 (457)	18 (457)	16.12 (409)	16.12 (409)	1
	18 x 18 (457 x 457)	17.78 (452)	17.78 (452)	20 (508)	20 (508)	18.12 (460)	18.12 (460)	1
	24 x 24 (610 x 610)	23.78 (604)	23.78 (604)	26 (660)	26 (660)	24.12 (613)	24.12 (613)	1

WALLS

Approved by Underwriters Laboratories (UL) for 1 1/2 hours "B" label in walls and ULC for 2 hours "B" label in walls.



STANDARD FEATURES: UNIVERSAL SELF LATCHING BOLT- OPERATED BY KNURLED KNOB / FLUSH KEY/ AND INSIDE TURN RELEASE.

OPTIONS: CARBON STEEL, PRIME COAT BAKED ENAMEL FINISH

LOCK TYPE

- RIM CYLINDER LOCK
- PREPARED FOR MORTISE CYLINDER LOCK

MATERIAL

- STAINLESS STEEL
- OTHER

FINISH

- #4 SATIN POLISH
- OTHER

ALL FIRE RATED:

SPECIAL SIZES CAN BE ORDERED, BUT BASIC CONSTRUCTION MUST REMAIN CONSTANT TO COMPLY WITH UL AND ULC REGULATIONS.

JOB NAME:

APPROVED BY:

CUSTOMER:

DATE:

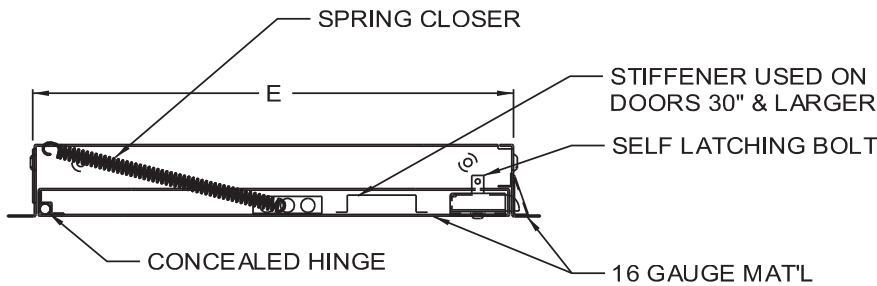


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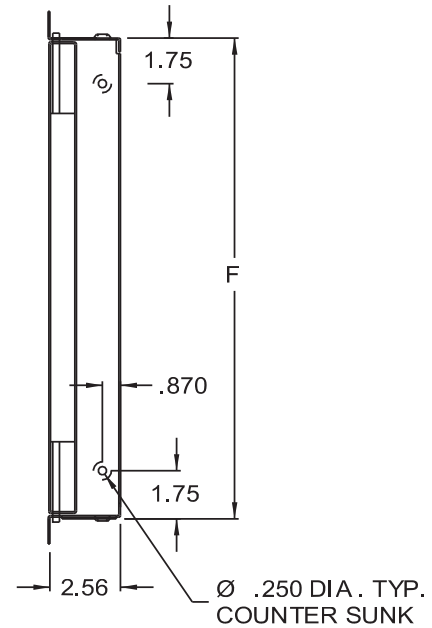
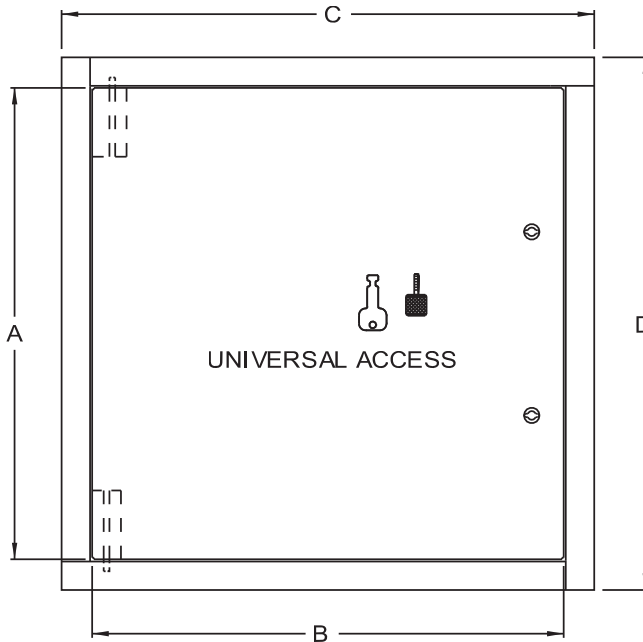
FIRE RATED - FOR WALLS

QTY.	NOMINAL SIZE	A	B	C	D	E	F	LOCK
	22 x 30 (559 x 762)	29.78 (756)	21.78 (553)	24 (610)	32 (813)	22.12 (562)	30.12 (765)	2
	22 x 36 (559 x 914)	35.78 (909)	21.78 (553)	24 (610)	38 (965)	22.12 (562)	36.12 (917)	2
	24 x 36 (610 x 914)	35.78 (909)	23.78 (604)	26 (660)	38 (965)	24.12 (613)	36.12 (917)	2
	24 x 48 (610 x 1219)	47.78 (1214)	23.78 (604)	26 (660)	50 (1270)	24.12 (613)	48.12 (1222)	2
	30 x 30 (762 x 762)	29.78 (756)	29.78 (756)	32 (813)	32 (813)	30.12 (765)	30.12 (765)	2
	36 x 36 (914 x 914)	35.78 (909)	35.78 (909)	38 (965)	38 (965)	36.12 (917)	36.12 (917)	2
	36 x 48 (914 x 1220)	47.78 (1214)	35.78 (909)	38 (965)	50 (1270)	36.12 (917)	48.12 (1222)	2



WALLS

Approved by Underwriters Laboratories (UL) for 1 1/2 hours "B" label in walls and ULC for 2 hours "B" label in walls.



STANDARD FEATURES: UNIVERSAL SELF LATCHING BOLT- OPERATED BY KNURLED KNOB / FLUSH KEY/ AND INSIDE TURN RELEASE.

OPTIONS: CARBON STEEL, PRIME COAT BAKED ENAMEL FINISH

- | | | |
|---|--|--|
| LOCK TYPE | MATERIAL | FINISH |
| <input type="checkbox"/> RIM CYLINDER LOCK | <input type="checkbox"/> STAINLESS STEEL | <input type="checkbox"/> #4 SATIN POLISH |
| <input type="checkbox"/> PREPARED FOR MORTISE CYLINDER LOCK | <input type="checkbox"/> OTHER | <input type="checkbox"/> OTHER |

ALL FIRE RATED:

SPECIAL SIZES CAN BE ORDERED, BUT BASIC CONSTRUCTION MUST REMAIN CONSTANT TO COMPLY WITH UL AND ULC REGULATIONS.

JOB NAME:

APPROVED BY:

CUSTOMER:

DATE:

**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

260519

Low Voltage Electrical
Power Conductors and Cables

Circuit Sized THHN/THWN

Vinylon® PVC/Nylon



90°C Dry / 75°C Wet

600 Volts

**Gasoline and Oil
Resistant**

APPLICATIONS

600-volt building wire for use in commercial and industrial applications as specified in the NEC®, including machine-tool and appliance wiring. Marked VW-1.

CONDUCTORS

Solid conductors: Uncoated copper per ASTM-B3.

Stranded conductors: Uncoated copper per ASTM-B3, ASTM-B787

INSULATION

Color-coded, heat- and moisture-resistant PVC (polyvinyl chloride)

JACKET

Nylon (polyamide), clear

INDUSTRY STANDARDS

UL 83: File No. E15119

UL 1063 (MTW): File No. E85964

AWM: File No. E11829

Canada Standard C22.2 No. 75 and CSA Bulletin No. 1451

ASTM Standards: B3, B8, B787

WC70/ICEA S-95-658

Federal Specification A-A-59544

NFPA-70: National Electrical Code®

SURFACE PRINT

Sample: CERROWIRE VINYLON-A 14 AWG (2.08 mm 2) (UL) THHN or THWN or MTW or AWM GR2 VW-1 600V - C(UL) TWN75 or T90 NYLON

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A Marmon Wire & Cable/
Berkshire Hathaway Company

Circuit Sized THHN/THWN

Vynlon® PVC/Nylon

PRODUCT CODE	CONDUCTORS		COVERING		APPROX. O.D. INCHES	ALLOWABLE AMPACITIES*			APPROX. NET. WT. LBS./M FT.	
	AWG SIZE	NO. OF STRANDS	PVC INS. MILS.	NYLON JKT. MILS.		60°C **	75°C ***	90°C ****		
112-1807J	10	SOLID	20	4	.151	30	30	30	37	048243225354
112-1807M	10	SOLID	20	4	.151	30	30	30	37	048243225361
112-1808J	10	SOLID	20	4	.151	30	30	30	37	048243225507
112-1808M	10	SOLID	20	4	.151	30	30	30	37	048243225514
112-1809J	10	SOLID	20	4	.151	30	30	30	37	048243225552
112-1809M	10	SOLID	20	4	.151	30	30	30	37	048243225569
112-1810J	10	SOLID	20	4	.151	30	30	30	37	048243225606
112-1810M	10	SOLID	20	4	.151	30	30	30	37	048243225620
112-1811J	10	SOLID	20	4	.151	30	30	30	37	048243225651
112-1811M	10	SOLID	20	4	.151	30	30	30	37	048243225668
112-1871C	10	SOLID	20	4	.151	30	30	30	37	048243983711
112-1871J	10	SOLID	20	4	.151	30	30	30	37	048243981816
112-1872C	10	SOLID	20	4	.151	30	30	30	37	048243983728
112-1872J	10	SOLID	20	4	.151	30	30	30	37	048243981823
112-1873C	10	SOLID	20	4	.151	30	30	30	37	048243983735
112-1873J	10	SOLID	20	4	.151	30	30	30	37	048243981830
112-1874J	10	SOLID	20	4	.151	30	30	30	37	048243981847
112-1875C	10	SOLID	20	4	.151	30	30	30	37	048243983759
112-1875J	10	SOLID	20	4	.151	30	30	30	37	048243981854
112-1876J	10	SOLID	20	4	.151	30	30	30	37	048243981861
112-1877J	10	SOLID	20	4	.151	30	30	30	37	048243981878
112-1878J	10	SOLID	20	4	.151	30	30	30	37	048243981885
112-1879J	10	SOLID	20	4	.151	30	30	30	37	048243981892
112-1880J	10	SOLID	20	4	.151	30	30	30	37	048243981908
112-1881J	10	SOLID	20	4	.151	30	30	30	37	048243981915
112-3401A	14	19	15	4	0.110	15	15	15	16	048243628131
112-3401BR	14	19	15	4	0.110	15	15	15	16	048243995202
112-3401M	14	19	15	4	0.110	15	15	15	16	048243228027
112-3402A	14	19	15	4	0.110	15	15	15	16	048243628148
112-3402BR	14	19	15	4	0.110	15	15	15	16	048243995219
112-3402M	14	19	15	4	0.110	15	15	15	16	048243228126
112-3403A	14	19	15	4	0.110	15	15	15	16	048243628223
112-3403BR	14	19	15	4	0.110	15	15	15	16	048243995226
112-3403M	14	19	15	4	0.110	15	15	15	16	048243228225
112-3404M	14	19	15	4	0.110	15	15	15	16	048243228324
112-3405A	14	19	15	4	0.110	15	15	15	16	048243126415

Circuit Sized THHN/THWN

Vynlon® PVC/Nylon

PRODUCT CODE	CONDUCTORS		COVERING		APPROX. O.D. INCHES	ALLOWABLE AMPACITIES*			APPROX. NET. WT. LBS./M FT.	
	AWG SIZE	NO. OF STRANDS	PVC INS. MILS.	NYLON JKT. MILS.		60°C **	75°C ***	90°C ****		
112-3405BR	14	19	15	4	0.110	15	15	15	16	048243995233
112-3405M	14	19	15	4	0.110	15	15	15	16	048243228423
112-3406M	14	19	15	4	0.110	15	15	15	16	048243228478
112-3407M	14	19	15	4	0.110	15	15	15	16	048243228379
112-3408M	14	19	15	4	0.110	15	15	15	16	048243228522
112-3409M	14	19	15	4	0.110	15	15	15	16	048243228577
112-3410M	14	19	15	4	0.110	15	15	15	16	048243228621
112-3411M	14	19	15	4	0.110	15	15	15	16	048243228669
112-3431J	14	19	15	4	0.110	15	15	15	16	048243992317
112-3432J	14	19	15	4	0.110	15	15	15	16	048243992324
112-3433J	14	19	15	4	0.110	15	15	15	16	048243992331
112-3434J	14	19	15	4	0.110	15	15	15	16	048243992348
112-3435J	14	19	15	4	0.110	15	15	15	16	048243992355
112-3436J	14	19	15	4	0.110	15	15	15	16	048243992362
112-3437J	14	19	15	4	0.110	15	15	15	16	048243992379
112-3438J	14	19	15	4	0.110	15	15	15	16	048243992416
112-3439J	14	19	15	4	0.110	15	15	15	16	048243992423
112-3440J	14	19	15	4	0.110	15	15	15	16	048243992409
112-3441J	14	19	15	4	0.110	15	15	15	16	048243992430
112-3451J	14	19	15	4	0.110	15	15	15	16	048243989911
112-3452J	14	19	15	4	0.110	15	15	15	16	048243989928
112-3453J	14	19	15	4	0.110	15	15	15	16	048243989935
112-3454J	14	19	15	4	0.110	15	15	15	16	048243989942
112-3455J	14	19	15	4	0.110	15	15	15	16	048243989959
112-3456J	14	19	15	4	0.110	15	15	15	16	048243989966
112-3457J	14	19	15	4	0.110	15	15	15	16	048243989973
112-3458J	14	19	15	4	0.110	15	15	15	16	048243989980
112-3459J	14	19	15	4	0.110	15	15	15	16	048243989997
112-3460J	14	19	15	4	0.110	15	15	15	16	048243990009
112-3461J	14	19	15	4	0.110	15	15	15	16	048243990016
112-3471CR	14	19	15	4	0.110	15	15	15	16	048243995240
112-3472CR	14	19	15	4	0.110	15	15	15	16	048243995257
112-3473CR	14	19	15	4	0.110	15	15	15	16	048243995264
112-3475CR	14	19	15	4	0.110	15	15	15	16	048243995271
112-3601A	12	19	15	4	0.130	20	20	20	24	048243628995
112-3602A	12	19	15	4	0.130	20	20	20	24	048243629497

Circuit Sized THHN/THWN

Vynlon® PVC/Nylon

PRODUCT CODE	CONDUCTORS		COVERING		APPROX. O.D. INCHES	ALLOWABLE AMPACITIES*			APPROX. NET. WT. LBS./M FT.	
	AWG SIZE	NO. OF STRANDS	PVC INS. MILS.	NYLON JKT. MILS.		60°C **	75°C ***	90°C ****		
112-3603A	12	19	15	4	0.130	20	20	20	24	048243629749
112-3605A	12	19	15	4	0.130	20	20	20	24	048243629770
112-3601BR	12	19	15	4	0.130	20	20	20	24	048243995288
112-3601M	12	19	15	4	0.130	20	20	20	24	048243229024
112-3602BR	12	19	15	4	0.130	20	20	20	24	048243995295
112-3602M	12	19	15	4	0.130	20	20	20	24	048243229123
112-3603BR	12	19	15	4	0.130	20	20	20	24	048243995301
112-3603M	12	19	15	4	0.130	20	20	20	24	048243229222
112-3604M	12	19	15	4	0.130	20	20	20	24	048243229321
112-3605BR	12	19	15	4	0.130	20	20	20	24	048243995318
112-3605M	12	19	15	4	0.130	20	20	20	24	048243229420
112-3606M	12	19	15	4	0.130	20	20	20	24	048243229475
112-3607M	12	19	15	4	0.130	20	20	20	24	048243229376
112-3608M	12	19	15	4	0.130	20	20	20	24	048243229529
112-3609M	12	19	15	4	0.130	20	20	20	24	048243229574
112-3610M	12	19	15	4	0.130	20	20	20	24	048243229628
112-3611M	12	19	15	4	0.130	20	20	20	24	048243229666
112-3631J	12	19	15	4	0.130	20	20	20	24	048243993314
112-3632J	12	19	15	4	0.130	20	20	20	24	048243993321
112-3633J	12	19	15	4	0.130	20	20	20	24	048243993338
112-3634J	12	19	15	4	0.130	20	20	20	24	048243993345
112-3635J	12	19	15	4	0.130	20	20	20	24	048243993352
112-3636J	12	19	15	4	0.130	20	20	20	24	048243993369
112-3637J	12	19	15	4	0.130	20	20	20	24	048243993376
112-3638J	12	19	15	4	0.130	20	20	20	24	048243993383
112-3639J	12	19	15	4	0.130	20	20	20	24	048243993390
112-3640J	12	19	15	4	0.130	20	20	20	24	048243993406
112-3641J	12	19	15	4	0.130	20	20	20	24	048243993413
112-3651J	12	19	15	4	0.130	20	20	20	24	048243990115
112-3652J	12	19	15	4	0.130	20	20	20	24	048243990122
112-3653J	12	19	15	4	0.130	20	20	20	24	048243990139
112-3654J	12	19	15	4	0.130	20	20	20	24	048243990146
112-3655J	12	19	15	4	0.130	20	20	20	24	048243990153
112-3656J	12	19	15	4	0.130	20	20	20	24	048243990160
112-3657J	12	19	15	4	0.130	20	20	20	24	048243990177
112-3658J	12	19	15	4	0.130	20	20	20	24	048243990184

Circuit Sized THHN/THWN

Vynylon® PVC/Nylon

PRODUCT CODE	CONDUCTORS		COVERING		APPROX. O.D. INCHES	ALLOWABLE AMPACITIES*			APPROX. NET. WT. LBS./M FT.	
	AWG SIZE	NO. OF STRANDS	PVC INS. MILS.	NYLON JKT. MILS.		60°C **	75°C ***	90°C ****		
112-3659J	12	19	15	4	0.130	20	20	20	24	048243990191
112-3660J	12	19	15	4	0.130	20	20	20	24	048243990207
112-3661J	12	19	15	4	0.130	20	20	20	24	048243990214
112-3671CR	12	19	15	4	0.130	20	20	20	24	048243995493
112-3672CR	12	19	15	4	0.130	20	20	20	24	048243995509
112-3673CR	12	19	15	4	0.130	20	20	20	24	048243995516
112-3675CR	12	19	15	4	0.130	20	20	20	24	048243995523
112-3801A	10	19	20	4	0.165	30	30	30	39	048243630820
112-3802A	10	19	20	4	0.165	30	30	30	39	048243630172
112-3803A	10	19	20	4	0.165	30	30	30	39	048243630226
112-3805A	10	19	20	4	0.165	30	30	30	39	048243290390
112-3801BR	10	19	20	4	0.165	30	30	30	39	048243995325
112-3801C	10	19	20	4	0.165	30	30	30	39	048243229994
112-3801J	10	19	20	4	0.165	30	30	30	39	048243230006
112-3801M	10	19	20	4	0.165	30	30	30	39	048243230020
112-3802BR	10	19	20	4	0.165	30	30	30	39	048243995332
112-3802C	10	19	20	4	0.165	30	30	30	39	048243230099
112-3802J	10	19	20	4	0.165	30	30	30	39	048243230105
112-3802M	10	19	20	4	0.165	30	30	30	39	048243230129
112-3803BR	10	19	20	4	0.165	30	30	30	39	048243995349
112-3803C	10	19	20	4	0.165	30	30	30	39	048243230198
112-3803J	10	19	20	4	0.165	30	30	30	39	048243230204
112-3803M	10	19	20	4	0.165	30	30	30	39	048243230228
112-3804J	10	19	20	4	0.165	30	30	30	39	048243230303
112-3804M	10	19	20	4	0.165	30	30	30	39	048243230327
112-3805BR	10	19	20	4	0.165	30	30	30	39	048243995356
112-3805C	10	19	20	4	0.165	30	30	30	39	048243230440
112-3805J	10	19	20	4	0.165	30	30	30	39	048243230402
112-3805M	10	19	20	4	0.165	30	30	30	39	048243230426
112-3806J	10	19	20	4	0.165	30	30	30	39	048243230457
112-3806M	10	19	20	4	0.165	30	30	30	39	048243230471
112-3807J	10	19	20	4	0.165	30	30	30	39	048243230358
112-3807M	10	19	20	4	0.165	30	30	30	39	048243230372
112-3808J	10	19	20	4	0.165	30	30	30	39	048243230501
112-3808M	10	19	20	4	0.165	30	30	30	39	048243230525
112-3809J	10	19	20	4	0.165	30	30	30	39	048243230556

Circuit Sized THHN/THWN

Vynylon® PVC/Nylon

PRODUCT CODE	CONDUCTORS		COVERING		APPROX. O.D. INCHES	ALLOWABLE AMPACITIES*			APPROX. NET. WT. LBS./M FT.	
	AWG SIZE	NO. OF STRANDS	PVC INS. MILS.	NYLON JKT. MILS.		60°C **	75°C ***	90°C ****		
112-3809M	10	19	20	4	0.165	30	30	30	39	048243230563
112-3810J	10	19	20	4	0.165	30	30	30	39	048243230600
112-3810M	10	19	20	4	0.165	30	30	30	39	048243230617
112-3811J	10	19	20	4	0.165	30	30	30	39	048243230655
112-3811M	10	19	20	4	0.165	30	30	30	39	048243230662
112-3871C	10	19	20	4	0.165	30	30	30	39	048243988716
112-3871J	10	19	20	4	0.165	30	30	30	39	048243983810
112-3872C	10	19	20	4	0.165	30	30	30	39	048243988723
112-3872J	10	19	20	4	0.165	30	30	30	39	048243983827
112-3873C	10	19	20	4	0.165	30	30	30	39	048243988730
112-3873J	10	19	20	4	0.165	30	30	30	39	048243983834
112-3874J	10	19	20	4	0.165	30	30	30	39	048243983841
112-3875C	10	19	20	4	0.165	30	30	30	39	048243988754
112-3875J	10	19	20	4	0.165	30	30	30	39	048243983858
112-3876J	10	19	20	4	0.165	30	30	30	39	048243983865
112-3877J	10	19	20	4	0.165	30	30	30	39	048243983872
112-3878J	10	19	20	4	0.165	30	30	30	39	048243983889
112-3879J	10	19	20	4	0.165	30	30	30	39	048243983896
112-3880J	10	19	20	4	0.165	30	30	30	39	048243983902
112-3881J	10	19	20	4	0.165	30	30	30	39	048243983919

XX Color Add Code (see chart)

* Per Table 310-16 NEC

** For termination to equipment for circuits rated 100 amperes or less or marked for size 14 through 1 AWG conductors. Also for MTW used in wet locations or exposed to oil or coolant.

*** For termination to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG. Also for THWN-2 exposed to oil or coolant and MTW in dry locations.

**** For THHN used in dry locations and THWN-2 used in wet or dry locations. For ampacity derating purposes.

Circuit Sized THHN/THWN

Vinylon® PVC/Nylon

Color Available (Product Code 6th and 7th Digits)

AWG SIZE	BLACK 01	WHITE 02	RED 03	BLUE 04	GREEN 05	ORANGE 06	YELLOW 07	BROWN 08	PURPLE 09	GREY 10	PINK 11
14 SOLID	X	X	X	X	X	X	X	X	X	X	X
12 SOLID	X	X	X	X	X	X	X	X	X	X	X
10 SOLID	X	X	X	X	X	X	X	X	X	X	X
14 STRAND	X	X	X	X	X	X	X	X	X	X	X
12 STRAND	X	X	X	X	X	X	X	X	X	X	X
10 STRAND	X	X	X	X	X	X	X	X	X	X	X

PACKAGE CODE	A	B	C	J	M
SIZE	25' SPOOL	50' SPOOL	100' SPOOL	500' SPOOL	2,500' REEL
14, 12 SOLID & STRAND	X	X	X	X	X
10 SOLID & STRAND	X	X	X	X	X

**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

260526

Grounding and Bonding for
Electrical System

Bare Copper Conductor Solid or Stranded

Hard, Medium Hard, or Soft Drawn



A Viakable Company

Features

For grounding electrical systems where high conductivity and flexibility is required.

Suitable for numerous other applications.

Application

Bare Copper conductors are primarily used for grounding purposes as specified in the National Electrical Code.

Soft-drawn solid or stranded conductors, for use as grounding connections in circuits, and grounding for machinery or equipment.

Hard-drawn conductors for overhead transmission and distribution lines, as grounding connections in circuits, and grounding for machinery or equipment.

Standards

ASTM B1:

Standard Specification for Hard-Drawn Copper Wire

ASTM B2:

Standard Specification for Medium Hard-Drawn Copper Wire

ASTM B3:

Standard Specification for Soft or Annealed Copper Wire

ASTM B8:

Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

Engineering Information

Conductor: Soft bare copper Solid or Classes A or B stranding per ASTM B-3 and B-8.

On request: Hard-drawn and Medium Hard-drawn per ASTM B-1, B-2.

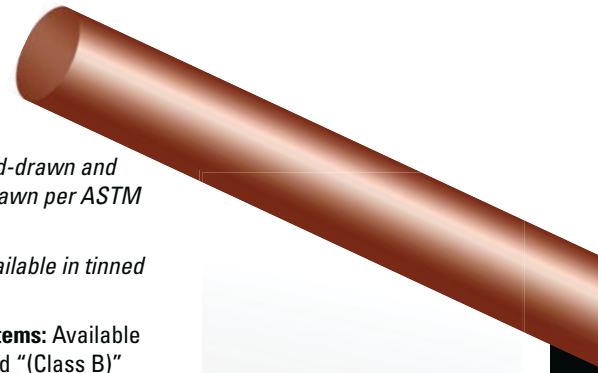
Options: Also available in tinned copper.

Common Stock Items: Available in soft copper and "(Class B)" stranding.

Sizes:

Solid—14 AWG to 2 AWG
Class A—4 AWG to 1000 kcmil
Class B—6 AWG to 2000 kcmil

Stranding: Soft, Medium Hard-drawn or Hard-drawn copper wires concentrically stranded, consisting of one or more layers of wires helically wrapped around a central wire.



Solid Conductor



Stranded Conductor

Technical Data

Bare Copper Conductors Solid

Size	Area	Wire OD	Net Weight	Breaking Strength					
				Hard Drawn Rated Strength	dc Resistance @ 20 °C	Medium-Hard Drawn Rated Strength	dc Resistance @ 20 °C	Soft Drawn (Annealed) Rated Strength	dc Resistance @ 20 °C
AWG	cmil	in	lb/kft	lb	Ω/kft	lb	Ω/kft	lb	Ω/kft
14	4110	0.0641	12	214	2.626	167	2.613	124	2.525
12	6530	0.0808	20	337	1.652	261	1.643	198	1.588
10	10380	0.1019	31	529	1.039	410	1.033	314	0.999
8	16510	0.1285	50	826	0.653	644	0.650	480	0.628
6	26240	0.1620	79	1280	0.411	1010	0.409	763	0.395
4	41740	0.2043	126	1970	0.258	1584	0.257	1213	0.249
3	52620	0.2294	159	2439	0.205	1984	0.204	1530	0.197
2	66360	0.2576	201	3003	0.163	2450	0.162	1929	0.156

The above data are approximate and subject to normal manufacturing tolerances. Where required, the compatibility with glands, connectors and accessories should be verified using actual dimensions of the product. Other sizes available upon request.

Technical Data *continued*

Bare Copper Conductors Stranded

Size		Area cmil	Class A		Class B		Net Weight lb/kft	dc Resistance* 20 °C
AWG	kemil		Number of Strands	OD in	Number of Strands	OD in		
14	—	4110	—	—	7	0.0726	13	2.5800
12	—	6530	—	—	7	0.0915	20	1.6300
10	—	10380	—	—	7	0.1160	32	1.0200
8	—	16510	—	—	7	0.1460	51	0.6400
6	—	26240	—	—	7	0.1840	81	0.4030
4	—	41740	7	0.232	7	0.2320	129	0.2530
3	—	52620	7	0.260	7	0.2600	163	0.2010
2	—	66360	7	0.292	7	0.2920	205	0.1590
1	—	83690	7	0.328	19	0.3320	258	0.1270
1/0	—	105600	7	0.368	19	0.3730	326	0.1000
2/0	—	133100	7	0.414	19	0.4190	411	0.7950
3/0	—	167800	7	0.464	19	0.4700	518	0.0630
4/0	—	211600	7	0.522	19	0.5280	653	0.0500
—	250	250000	19	0.574	37	0.5750	772	0.0423
—	300	300000	19	0.629	37	0.6300	926	0.0353
—	350	350000	19	0.679	37	0.6810	1081	0.0302
—	400	400000	19	0.726	37	0.7280	1235	0.0264
—	450	450000	37	0.772	37	0.7720	1389	0.0235
—	500	500000	37	0.813	37	0.8130	1544	0.0192
—	600	600000	37	0.891	61	0.8930	1883	0.0177
—	750	750000	61	0.998	61	0.9980	2316	0.0141
—	1000	1000000	61	1.152	61	1.1520	3088	0.0106
—	1250	1250000	61	1.288	91	1.2890	3859	0.0085
—	1500	1500000	61	1.411	91	1.4120	4631	0.0071
—	1750	1750000	91	1.526	127	1.5260	5403	0.0060
—	2000	2000000	91	1.630	127	1.6320	6175	0.0053

The above data are approximate and subject to normal manufacturing tolerances. Where required, the compatibility with glands, connectors and accessories should be verified using actual dimensions of the product. Other sizes available upon request.

* Direct current resistances apply to Class B, C, and D stranding.

Technical Data *continued*

Bare Copper Conductors Stranded

Size	Size	Strands	Breaking Strength						Allowable Ampacity †
			Hard Drawn Rated Strength	dc Resistance @ 20 °C	Medium-Hard Drawn Rated Strength	dc Resistance @ 20 °C	Soft Drawn (Annealed) Rated Strength	dc Resistance @ 20 °C	
AWG	kcmil		lb	Ω/kft	lb	Ω/kft	lb	Ω/kft	
14	—	7	197	2.67900	158	2.66500	—	—	—
12	—	7	311	1.68500	248	1.67600	—	—	—
10	—	7	492	1.06000	389	1.05400	—	—	—
8	—	7	777	0.66630	610	0.66290	499	.6408	98
6	—	7	1228	0.41910	959	0.41690	794	.40300	124
4	—	7	1938	0.26360	1505	0.26220	1320	.25340	155
3	—	7	2433	0.20900	1885	0.20790	1670	.20100	—
2	—	7	3050	0.16600	2360	0.16500	2110	.15780	209
1	—	7	3801	0.13160	2955	0.13090	2552	.12520	—
1/0	—	7	4752	0.10420	3705	0.10370	3221	.10020	282
2/0	—	7	5926	0.08267	4640	0.08224	4062	.07949	329
3/0	—	7	7366	0.06556	5812	0.06522	5118	.06304	382
4/0	—	7	9154	0.05199	7278	0.05172	6459	.04999	444
4/0	—	19	9617	0.05199	7479	0.05172	6453	.04999	444
—	250	19	11360	0.04400	8836	0.04378	7627	.04231	494
—	250	37	11600	0.04400	8952	0.04378	7940	.04231	494
—	300	19	13510	0.03667	10530	0.03648	9160	.03526	556
—	350	19	15590	0.03143	12200	0.03127	10680	.03022	—
—	500	37	22510	0.02200	17550	0.02189	15240	.02116	773
—	600	37	27020	0.01834	21060	0.01825	18300	.01763	—
—	750	61	34090	0.01467	26510	0.01459	22890	.01410	1000
—	1000	61	45030	0.01100	35100	0.01094	30500	.01058	1193

† Ampacity per NEC table 310.15 (B) (21) based on 80 °C Conductor Temperature, 40 °C Ambient Temperature, 2ft/s Wind in Sun.

**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

26 05 29

Hangers and Supports
for Electrical Systems

Metal Framing Channels

Channel

Metal framing channel is cold formed on our modern rolling mills from 12 Ga. (2.6mm), 14 Ga. (1.9mm), and 16 Ga. (1.5mm) low carbon steel strips. A continuous slot with turned lips provides the ability to make attachments at any point.

Lengths & Tolerances

All channels excluding 'SH' style
 ± 1/8" (3.2mm) on 10' (3.05m) and
 ± 3/16" (4.76mm) on 20' (6.09m)

All 'SH' channels only
 ± 1/4" (6.35mm) on 10' (3.05m) and
 ± 1/2" (12.70mm) on 20' (6.09m)

Custom lengths are available upon request.

Slots

Slotted series of channels offer full flexibility. A variety of pre-punched slot patterns eliminate the need for precise field measuring for hole locations. Slots offer wide adjustments in the alignment and bolt sizing.

Holes

A variety of pre-punched 9/16" (14.3 mm) diameter hole patterns are available in our channels. These hole patterns provide an economical alternative to costly field drilling required for many applications.

Knockouts

When used with series B217-20 Closure Strips, knockout channels can be used to provide an economical U.L. listed surface raceway. Channels are furnished with 7/8" (22.2 mm) knockouts on 6" (152 mm) centers, allowing for perfect fixture alignment on spans up to 20' (6.09 m).

Materials & Finishes (Unless otherwise noted)

Steel: Plain & Pre-galvanized

12 Ga. (2.6), 14 Ga. (1.9) and 16 Ga. (1.5)



Channel & Combinations

Finish Code	Finish	Specification
PLN	Plain	ASTM A1011, 33,000 PSI min. yield
GRN	DURA-GREEN™	
GLV	Pre-Galvanized	ASTM A653 33,000 PSI min. yield
HDG	Hot-Dipped Galvanized	ASTM A123
YZN	Yellow Zinc Chromate	ASTM B633 SC3 Type II
SS4	Stainless Steel Type 304	ASTM A240
SS6	Stainless Steel Type 316	ASTM A240
AL	Aluminum	Aluminum 6063-T6

Note: A minimum order may apply on special material and finishes.

Design Load (Steel & Stainless Steel)

The design loads given for strut beam loads are based on a simple beam condition using an allowable stress of 25,000 psi. This allowable stress results in a safety factor of 1.68. This is based upon virgin steel minimum yield strength of 33,000 psi cold worked during rolling to an average yield stress of 42,000 psi. For aluminum channel loading multiply steel loading by a factor of 0.38.

Welding

Weld spacing is maintained between 2 1/2 inches (63.5 mm) and 4 inches (101.6 mm) on center. Through high quality control testing of welded channels and continuous monitoring of welding equipment, B-Line provides the most consistent combination channels available today.

Metric

Metric dimensions are shown in parentheses. Unless noted, all metric dimensions are in millimeters.

SELECTION CHART

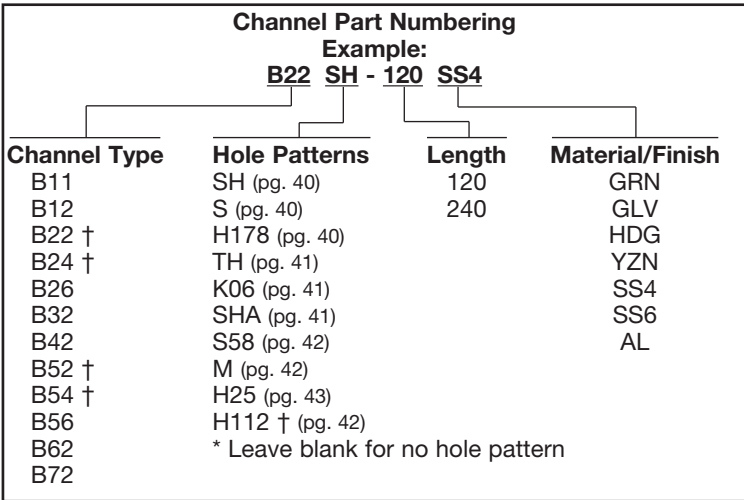
for Channels, Materials and Hole Patterns

Channel Type	Channel Dimensions				Material & Thickness *				Channel Hole Pattern **				
					Stainless Steel				SH	S	H17/8	TH	KO6
	Height		Width		Steel	Alum.	Type 304	Type 316	9/16" x 1 1/8" slots on 2" centers	13/32" x 3" slots	9/16" diameter holes	9/16" diameter on 1 7/8" centers	7/8" diameter knockouts
				<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>						
B11	3 1/4"	(82.5)	1 5/8"	(41.3)	12 Ga.	.105	-	-	<u>1</u>	<u>1</u>	<u>1</u>	-	<u>1</u>
B12	2 7/16"	(61.9)	1 5/8"	(41.3)	12 Ga.	.105	-	-	<u>1 2</u>	<u>1</u>	<u>1 2</u>	-	<u>1 2</u>
B22	1 5/8"	(41.3)	1 5/8"	(41.3)	12 Ga.	.105	12 Ga.	12 Ga.	<u>1 2 3 4</u>	<u>1 3</u>	<u>1 2 3</u>	<u>1</u>	<u>1 2</u>
B24	1 5/8"	(41.3)	1 5/8"	(41.3)	14 Ga.	.080	14 Ga.	14 Ga.	<u>1 2 3 4</u>	<u>1</u>	<u>1 2 3</u>	-	<u>1 2</u>
B26	1 5/8"	(41.3)	1 5/8"	(41.3)	16 Ga.	-	-	-	<u>1</u>	<u>1</u>	<u>1</u>	-	<u>1</u>
B32	1 3/8"	(34.9)	1 5/8"	(41.3)	12 Ga.	-	12 Ga.	-	<u>1 3</u>	<u>1</u>	<u>1 3</u>	-	<u>1</u>
B42	1"	(25.4)	1 5/8"	(41.3)	12 Ga.	-	12 Ga.	-	<u>1 3</u>	<u>1</u>	<u>1 3</u>	-	<u>1</u>
B52	1 3/16"	(20.6)	1 5/8"	(41.3)	12 Ga.	-	12 Ga.	12 Ga.	<u>1 3 4</u>	<u>1</u>	<u>1</u>	-	<u>1</u>
B54	1 3/16"	(20.6)	1 5/8"	(41.3)	14 Ga.	.080	14 Ga.	14 Ga.	<u>1 2 3 4</u>	<u>1</u>	<u>1 2 3 4</u>	-	<u>1 2</u>
B56	1 3/16"	(20.6)	1 5/8"	(41.3)	16 Ga.	-	-	-	<u>1</u>	<u>1</u>	<u>1</u>	-	<u>1</u>
B62	1 3/16"	(20.6)	1 3/16"	(20.6)	18 Ga.	-	-	-	-	-	-	-	-
B72	1 3/32"	(10.3)	1 3/16"	(20.6)	18 Ga.	-	-	-	-	-	-	-	-

The selection has been prepared to provide a reference for available channel, materials and hole patterns. Material types available for various hole patterns are defined by numbers 1 thru 4. Some stainless steel channels with hole patterns are available on special order only.

*Metric equivalent for thicknesses shown in chart. **1 - Steel
 12 Ga. = 2.6 mm 18 Ga. = 1.2 mm 2 - Aluminum
 14 Ga. = 1.9 mm .105 = 2.6 mm 3 - Type 304 Stainless Steel
 16 Ga. = 1.5 mm .080 = 2.0 mm 4 - Type 316 Stainless Steel

Properties may vary due to commercial tolerances of the material.



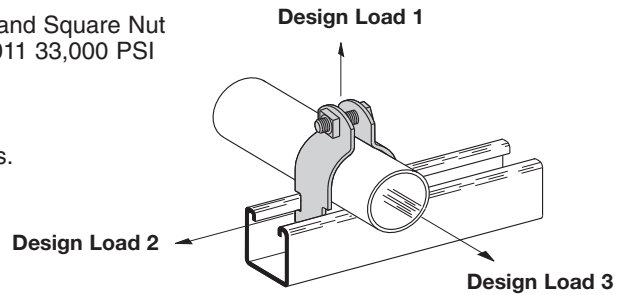
Reference page 14 for general fitting and standard finish specifications.

Pipe Clamps

B2000 SERIES PIPE AND CONDUIT CLAMPS

- Safety Factor of 5
- Add PA to suffix for pre-assembled pipe clamps
- Includes Combination Recess Hex Head Machine Screw and Square Nut
- Material: 16 Ga. (1.5), 14 Ga. (1.9), 12 Ga. (2.6) ASTM A1011 33,000 PSI min. yield and 11 Ga. (3.0) ASTM A1011HSLA Gr. 50
- Standard finishes: ZN, HDG, SS4, SS6, AL

Note: For EMT sizes 2¹/₂" and larger use rigid conduit sizes.



THINWALL CONDUIT (EMT) CLAMPS

Part No.	Conduit Size		Material Thickness		Design Load 1		Design Load 2		Design Load 3		Wt./C	
					Lbs.	kN	Lbs.	kg	Lbs.	kg	Lbs.	kg
B2000	3/8"	(10)	16 Ga.	(1.5)	400	(1.78)	50	(.22)	50	(.22)	10	(4.5)
B2001	1/2"	(15)	16 Ga.	(1.5)	400	(1.78)	50	(.22)	50	(.22)	10	(4.5)
B2002	3/4"	(20)	16 Ga.	(1.9)	400	(1.78)	50	(.22)	50	(.22)	11	(5.0)
B2003	1"	(25)	14 Ga.	(1.9)	600	(2.67)	75	(.33)	75	(.33)	16	(7.2)
B2004	1 1/4"	(32)	14 Ga.	(1.9)	600	(2.67)	75	(.33)	75	(.33)	19	(8.6)
B2005	1 1/2"	(40)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	28	(12.7)
B2006	2"	(50)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	33	(14.9)

RIGID CONDUIT OR PIPE CLAMPS

Part No.	Conduit Size		Material Thickness		Design Load 1		Design Load 2		Design Load 3		Wt./C	
					Lbs.	kN	Lbs.	kg	Lbs.	kg	Lbs.	kg
B2001	3/8"	(10)	16 Ga.	(1.5)	400	(1.78)	50	(.22)	50	(.22)	10	(4.5)
B2008	1/2"	(15)	16 Ga.	(1.5)	400	(1.78)	50	(.22)	50	(.22)	11	(5.0)
B2009	3/4"	(20)	14 Ga.	(1.9)	600	(2.67)	75	(.33)	75	(.33)	15	(6.8)
B2010	1"	(25)	14 Ga.	(1.9)	600	(2.67)	75	(.33)	75	(.33)	16	(7.2)
B2011	1 1/4"	(32)	14 Ga.	(1.9)	600	(2.67)	75	(.33)	75	(.33)	20	(9.1)
B2012	1 1/2"	(40)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	30	(13.6)
B2013	2"	(50)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	34	(15.4)
B2014	2 1/2"	(65)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	38	(17.2)
B2015	3"	(80)	12 Ga.	(2.6)	800	(3.56)	125	(.56)	125	(.56)	44	(19.9)
B2016	3 1/2"	(90)	11 Ga.	(3.0)	1000	(4.45)	200	(.89)	150	(.67)	61	(27.6)
B2017	4"	(100)	11 Ga.	(3.0)	1000	(4.45)	200	(.89)	150	(.67)	66	(29.9)
B2018	4 1/2"	(115)	11 Ga.	(3.0)	1000	(4.45)	200	(.89)	150	(.67)	70	(31.7)
B2019	5"	(125)	11 Ga.	(3.0)	1000	(4.45)	200	(.89)	150	(.67)	77	(34.9)
B2020	6"	(150)	11 Ga.	(3.0)	1000	(4.45)	200	(.89)	150	(.67)	100	(45.3)
B2021	7"	(175)	11 Ga.	(3.0)	1000	(4.45)	250	(1.11)	200	(.89)	115	(52.1)
B2022	8"	(200)	11 Ga.	(3.0)	1000	(4.45)	250	(1.11)	200	(.89)	128	(58.0)
B2130	10"	(254)	11 Ga.	(3.0)	1000	(4.45)	250	(1.11)	200	(.89)	160	(72.6)
B2132	12"	(305)	11 Ga.	(3.0)	1000	(4.45)	250	(1.11)	200	(.89)	185	(83.9)

Reference page 126 for general fitting and standard finish specifications.

Channel Nuts & Hardware

Channel Nuts

Cooper B-Line's channel nut is one of the main components of our metal framing system. It is designed to provide essential gripping power and ease during installation. Channel nuts are press formed, machined and hardened from steel which meets the requirements of ASTM A108 or ASTM A36 for our larger sizes.

Bolts, Screws, and Nuts

All bolts, screws and nuts meet the physical and chemical requirements of ASTM A307, SAE J429 or ASTM A563, and have unified inch screw threads (coarse, UNC). ISO metric threads are also available on special request.

Recommended Torque

Bolt Size	1/4"-20	5/16"-18	3/8"-16	1/2"-13
Foot/Lbs.	6	11	19	50
Nm	8	15	26	68

Bolt Size	M6x1	M8 x1.25	M10 x 1.5	M12x1.75
NM	12	17	36	62
Foot/Lbs.	9	13	27	46

Materials & Finishes*

Finish Code	Finish	Specification
PLN	Plain	ASTM A108/A307 Gr. A, ASTM A563, SAE J429
ZN	Electro-Plated Zinc	ASTM B633 SC1 Type III
CZ	Chromium Zinc	ASTM F1136 Gr. 3
HDG	Hot-Dipped Galvanized	ASTM A153
SS4	Stainless Steel Type 304	ASTM F593
SS6	Stainless Steel Type 316	MPIF 35/ASTM A593
AL	Aluminum	ASTM F468 S4

*Unless otherwise noted.

Note: Channel nuts are not available in HDG or Aluminum

Metric

Metric dimensions are shown in parentheses. Unless noted, all metric dimensions are in millimeters.



STANDARD CHANNEL NUTS

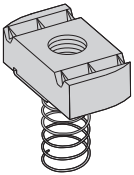
Numbering Example: **N 7 25 (*) WO**

Nut Type	Channel Type	Thread Size	Stud Length	Suffix
N = Standard Nut	7 = Tall Channels	21 = #8-32	* = Specify Length of stud below for Stud Nut or Twirl Stud Nuts	WO = Without Spring
TN = Twirl Nut	B11	22 = #10-24	$\frac{3}{4}$ = $\frac{3}{4}$ "	** = Twirl Nuts or nuts with springs have blank suffix
SN = Stud Nut	B12	27 = #10-32	1 = 1"	
STN = Stud Twirl Nut	2 = Medium Channels	24 = $\frac{1}{4}$ -20	$1\frac{1}{4}$ = $1\frac{1}{4}$ "	
NW = Combo Nut Washer	B22	23 = $\frac{5}{16}$ -18	$1\frac{1}{2}$ = $1\frac{1}{2}$ "	
	B24	28 = $\frac{3}{8}$ -16		
	B26	26 = $\frac{7}{16}$ -14		
	B32	25 = $\frac{1}{2}$ -13		
	5 = Short Channels	55 = $\frac{5}{8}$ -11		
	B42	75 = $\frac{5}{8}$ -11		
	B52	78 = $\frac{7}{8}$ -9		
	B54			
	B56			

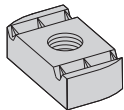
METRIC CHANNEL NUTS

Numbering Example: **BMS 6 M**

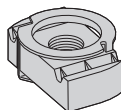
Nut Type	Metric Thread Size	Suffix
BMS = Spring Nut	3 = M3.5	S = Short Spring
BMS-D = Spring Nut ($\frac{1}{2}$ " thick)	4 = M4	M = Medium Spring
BMT = Twirl Nut	5 = M5	L = Long Spring
BMT-D = Twirl Nut ($\frac{1}{2}$ " thick)	6 = M6	* = Twirl Nuts and nuts without springs have blank suffix
BMM = Spring Nut (Mini channel)	8 = M8	
	10 = M10	
	12 = M12	



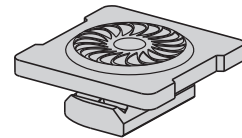
SPRING NUT



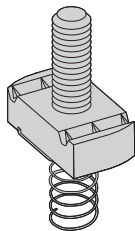
NUT WITHOUT SPRING



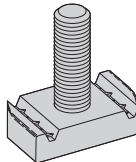
TWIRL-NUT™



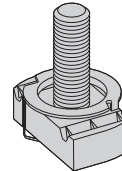
COMBO NUT WASHER



STUD NUT WITH SPRING



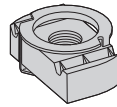
STUD NUT WITHOUT SPRING



TWIRL STUD NUT

Reference page 44 for general fitting and standard finish specifications.

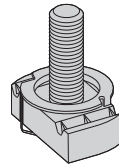
Channel Nuts



Note: See page 50 for resistance to slip & page 51 for pull-out strength.

TWIRL-NUT™ Patented

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C		
					Lbs.	kg	
TN221	#8-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN227	#10-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN222	#10-24	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN224	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)	
TN223	5/16-18	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)	
TN228	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	9.3	(4.22)	
TN226	7/16-14	All sizes except B62 & B72	3/8"	(9.5)	8.8	(3.99)	
TN225	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	11.6	(5.26)	
TN525	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)	
TN255	5/8-11	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	11.0	(4.99)	
Metric Threads	BMT-6	M6 x 1	All sizes except B62 & B72	1/4"	(6.3)	6.9	(3.13)
	BMT-8	M8 x 1.25	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)
	BMT-10	M10 x 1.5	All sizes except B62 & B72	3/8"	(9.5)	9.6	(4.35)
	BMT-12	M12 x 1.75	All sizes except B62 & B72	3/8"	(9.5)	9.2	(4.17)
	BMT-D-12	M12 x 1.75	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	12.2	(5.53)



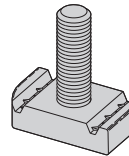
Note: See page 50 for resistance to slip & page 51 for pull-out strength.

TWIRL STUD NUT

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
STN224-*	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	8.1	(3.66)
STN228-*	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	12.9	(5.85)
STN225-*	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	18.2	(8.23)
STN525-*	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	15.4	(6.96)

*Note: Add stud length in inches (3/4, 1, 1 1/4, 1 1/2)

Note: See page 50 for resistance to slip & page 51 for pull-out strength.



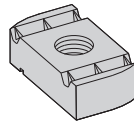
STUD NUT WITHOUT SPRING

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
SN224-*WO	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	8.1	(3.66)
SN228-*WO	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	12.9	(5.85)
SN225-*WO	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	18.2	(8.23)
SN525-*WO	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	15.4	(6.96)

*Note: Add stud length in inches (3/4, 1, 1 1/4, 1 1/2)

Reference page 44 for general fitting and standard finish specifications.

Channel Nuts



Note: See page 50 for resistance to slip & page 51 for pull-out strength.

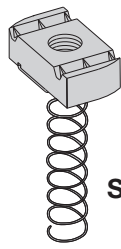
NUT WITHOUT SPRING

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
N221WO	#8-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)
N227WO	#10-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)
N222WO	#10-24	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)
N224WO	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)
N223WO	5/16-18	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)
N228WO	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	9.3	(4.22)
N226WO	7/16-14	All sizes except B62 & B72	3/8"	(9.5)	8.8	(3.99)
N225WO	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	11.6	(5.26)
N525WO	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)
N255WO	5/8-11	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	16.4	(7.44)
N555WO	5/8-11	B42, B52, B54, B56	3/8"	(9.5)	10.2	(4.62)
N275WO	3/4-10	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	14.5	(6.58)
N575WO	3/4-10	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)
N278WO	7/8-9	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	12.5	(5.67)
Metric Threads						
BMS-6	M6 x 1	All sizes except B62 & B72	1/4"	(6.3)	6.9	(3.13)
BMS-8	M8 x 1.25	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)
BMS-10	M10 x 1.5	All sizes except B62 & B72	3/8"	(9.5)	9.6	(4.35)
BMS-12	M12 x 1.75	All sizes except B62 & B72	3/8"	(9.5)	9.2	(4.17)
BMS-D-12	M12 x 1.75	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	12.2	(5.53)

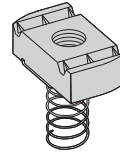
Note: For mini channel nut information see page 195.

Reference page 44 for general fitting and standard finish specifications.

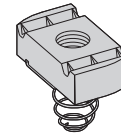
Note: See page 50 for resistance to slip & page 51 for pull-out strength.



700 Series



200 Series



500 Series

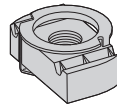
SPRING NUT

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
N721	#8-32	B11 & B12	1/4"	(6.3)	7.0	(3.17)
N221	#8-32	B22, B24, B26, B32	1/4"	(6.3)	7.0	(3.17)
N521	#8-32	B42, B52, B54, B56	1/4"	(6.3)	7.0	(3.17)
N727	#10-32	B11 & B12	1/4"	(6.3)	7.0	(3.17)
N227	#10-32	B22, B24, B26, B32	1/4"	(6.3)	7.0	(3.17)
N527	#10-32	B42, B52, B54, B56	1/4"	(6.3)	7.0	(3.17)
N722	#10-24	B11 & B12	1/4"	(6.3)	7.0	(3.17)
N222	#10-24	B22, B24, B26, B32	1/4"	(6.3)	7.0	(3.17)
N522	#10-24	B42, B52, B54, B56	1/4"	(6.3)	7.0	(3.17)
N724	1/4-20	B11 & B12	1/4"	(6.3)	6.7	(3.04)
N224	1/4-20	B22, B24, B26, B32	1/4"	(6.3)	6.7	(3.04)
N524	1/4-20	B42, B52, B54, B56	1/4"	(6.3)	6.7	(3.04)
N723	5/16-18	B11 & B12	1/4"	(6.3)	6.7	(3.04)
N223	5/16-18	B22, B24, B26, B32	1/4"	(6.3)	6.7	(3.04)
N523	5/16-18	B42, B52, B54, B56	1/4"	(6.3)	6.7	(3.04)
N728	3/8-16	B11 & B12	3/8"	(9.5)	9.3	(4.22)
N228	3/8-16	B22, B24, B26, B32	3/8"	(9.5)	9.3	(4.22)
N528	3/8-16	B42, B52, B54, B56	3/8"	(9.5)	9.3	(4.22)
N726	7/16-14	B11 & B12	3/8"	(9.5)	8.8	(3.99)
N226	7/16-14	B22, B24, B26, B32	3/8"	(9.5)	8.8	(3.99)
N526	7/16-14	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)
N725	1/2-13	B11 & B12	1/2"	(12.7)	11.6	(5.26)
N225	1/2-13	B22, B24, B26, B32	1/2"	(12.7)	11.6	(5.26)
N525	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)
N755	5/8-11	B11 & B12	1/2"	(12.7)	16.4	(7.44)
N255	5/8-11	B22, B24, B26, B32	1/2"	(12.7)	16.4	(7.44)
N555	5/8-11	B42, B52, B54, B56	3/8"	(9.5)	10.2	(4.62)
N775	3/4-10	B11 & B12	1/2"	(12.7)	14.5	(6.58)
N275	3/4-10	B22, B24, B26, B32	1/2"	(12.7)	14.5	(6.58)
N575	3/4-10	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)
N778	7/8-9	B11 & B12	1/2"	(12.7)	12.5	(5.67)
N278	7/8-9	B22, B24, B26, B32	1/2"	(12.7)	12.5	(5.67)
Metric Threads						
BMS-6L	M6 x 1	B11 & B12	1/4"	(6.3)	6.9	(3.13)
BMS-6M	M6 x 1	B22, B24, B26, B32	1/4"	(6.3)	6.9	(3.13)
BMS-6S	M6 x 1	B42, B52, B54, B56	1/4"	(6.3)	6.9	(3.13)
BMS-8L	M8 x 1.25	B11 & B12	1/4"	(6.3)	6.7	(3.04)
BMS-8M	M8 x 1.25	B22, B24, B26, B32	1/4"	(6.3)	6.7	(3.04)
BMS-8S	M8 x 1.25	B42, B52, B54, B56	1/4"	(6.3)	6.7	(3.04)
BMS-10L	M10 x 1.5	B11 & B12	3/8"	(9.5)	9.6	(4.35)
BMS-10M	M10 x 1.5	B22, B24, B26, B32	3/8"	(9.5)	9.6	(4.35)
BMS-10S	M10 x 1.5	B42, B52, B54, B56	3/8"	(9.5)	9.6	(4.35)
BMS-12M	M12 x 1.75	B22, B24, B26, B32	3/8"	(9.5)	9.2	(4.17)
BMS-12S	M12 x 1.75	B42, B52, B54, B56	3/8"	(9.5)	9.2	(4.17)
BMS-D-12L	M12 x 1.75	B11 & B12	1/2"	(12.7)	12.2	(5.53)
BMS-D-12M	M12 x 1.75	B22, B24, B26, B32	1/2"	(12.7)	12.2	(5.53)

Note: For mini channel nut information see page 195.

Reference page 44 for general fitting and standard finish specifications.

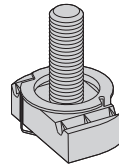
Channel Nuts



Note: See page 50 for resistance to slip & page 51 for pull-out strength.

TWIRL-NUT™ Patented

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C		
					Lbs.	kg	
TN221	#8-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN227	#10-32	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN222	#10-24	All sizes except B62 & B72	1/4"	(6.3)	7.0	(3.17)	
TN224	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)	
TN223	5/16-18	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)	
TN228	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	9.3	(4.22)	
TN226	7/16-14	All sizes except B62 & B72	3/8"	(9.5)	8.8	(3.99)	
TN225	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	11.6	(5.26)	
TN525	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	8.8	(3.99)	
TN255	5/8-11	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	11.0	(4.99)	
Metric Threads	BMT-6	M6 x 1	All sizes except B62 & B72	1/4"	(6.3)	6.9	(3.13)
	BMT-8	M8 x 1.25	All sizes except B62 & B72	1/4"	(6.3)	6.7	(3.04)
	BMT-10	M10 x 1.5	All sizes except B62 & B72	3/8"	(9.5)	9.6	(4.35)
	BMT-12	M12 x 1.75	All sizes except B62 & B72	3/8"	(9.5)	9.2	(4.17)
	BMT-D-12	M12 x 1.75	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	12.2	(5.53)



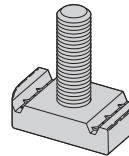
Note: See page 50 for resistance to slip & page 51 for pull-out strength.

TWIRL STUD NUT

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
STN224-*	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	8.1	(3.66)
STN228-*	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	12.9	(5.85)
STN225-*	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	18.2	(8.23)
STN525-*	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	15.4	(6.96)

*Note: Add stud length in inches (3/4, 1, 1 1/4, 1 1/2)

Note: See page 50 for resistance to slip & page 51 for pull-out strength.



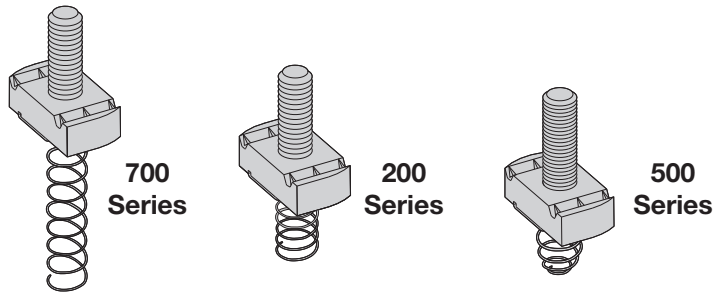
STUD NUT WITHOUT SPRING

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
SN224-*WO	1/4-20	All sizes except B62 & B72	1/4"	(6.3)	8.1	(3.66)
SN228-*WO	3/8-16	All sizes except B62 & B72	3/8"	(9.5)	12.9	(5.85)
SN225-*WO	1/2-13	B11, B12, B22, B24, B26, B32	1/2"	(12.7)	18.2	(8.23)
SN525-*WO	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	15.4	(6.96)

*Note: Add stud length in inches (3/4, 1, 1 1/4, 1 1/2)

Reference page 44 for general fitting and standard finish specifications.

Note: See page 50 for resistance to slip & page 51 for pull-out strength.

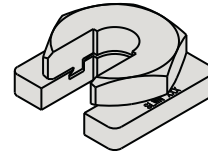


STUD NUT WITH SPRING

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
SN724-*	1/4-20	B11 & B12	1/4"	(6.3)	8.1	(3.66)
SN224-*	1/4-20	B22, B24, B26, B32	1/4"	(6.3)	8.1	(3.66)
SN524-*	1/4-20	B42, B52, B54, B56	1/4"	(6.3)	8.1	(3.66)
SN728-*	3/8-16	B11 & B12	3/8"	(9.5)	12.9	(5.85)
SN228-*	3/8-16	B22, B24, B26, B32	3/8"	(9.5)	12.9	(5.85)
SN528-*	3/8-16	B42, B52, B54, B56	3/8"	(9.5)	12.9	(5.85)
SN725-*	1/2-13	B11 & B12	1/2"	(12.7)	18.2	(8.23)
SN225-*	1/2-13	B22, B24, B26, B32	1/2"	(12.7)	18.2	(8.23)
SN525-*	1/2-13	B42, B52, B54, B56	3/8"	(9.5)	15.4	(6.96)

*Note: Add stud length in inches (3/4, 1, 1 1/4, 1 1/2)

- Can be installed at any desired position on the ATR, eliminating the need to thread hex nuts up along ATR.
- Loading Safety Factor of 3.
- Torque: 6 ft./lbs (8 Nm)
- Available in Zinc Plated or 316 stainless steel.



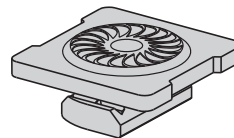
Buzznut™

Part No.	Thread Size	Loading		Wt./C	
		Lbs.	kN	Lbs.	kg
SLWN1/4	1/4-20	240	(1.07)	14.4	(6.5)
SLWN3/8	3/8-16	730	(3.24)	15.4	(7.0)
SLWN1/2	1/2-13	1350	(6.00)	18.8	(8.5)
SLWN5/8	5/8-11	2100	(9.33)	25.4	(11.5)

- Finish: Electrodeposited zinc ASTM B633 SC1
- Available in 316 stainless steel - add SS6 to part number

Note: See page 50 for resistance to slip & page 51 for pull-out strength.

Patent Number
7,604,444



COMBO NUT WASHER

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness		Wt./C	
					Lbs.	kg
NW524	1/4-20	All Channel Sizes	1/4"	(6.3)	11.9	(5.40)
NW528	3/8-16	All Channel Sizes	3/8"	(9.5)	13.8	(6.26)
NW525	1/2-13	All Channel Sizes	3/8"	(9.5)	13.1	(5.94)

Reference page 44 for general fitting and standard finish specifications.

Channel Nuts

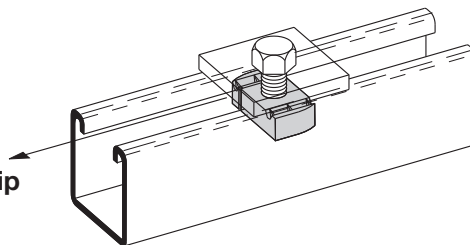
RESISTANCE TO SLIP

• With Safety Factor of 3

Thread Size	Nut Part Numbers	Resistance to Slip					
		12 ga. Channel		14 ga. Channel		16 ga. Channel	
		Lbs.	N	Lbs.	N	Lbs.	N
#8-32	N221, N221WO, N521, N721, TN221	50	220	50	220	50	220
#10-24	N222, N222WO, N522, N722, TN222	100	440	100	440	100	440
#10-32	N227, N227WO, N527, N727, TN227	100	440	100	440	100	440
1/4"-20	NW524*, N224, N224WO, N524, N724, TN224, STN224, SN224WO, SN224, SN524, SN724	300	1330	300	1330	300	1330
5/16"-18	N223, N223WO, N523, N723, TN223	450	2000	450	2000	450	2000
3/8"-16	NW528*, N228, N228WO, N528, N728 TN228, STN228, SN228WO, SN228, SN528, SN728	800	3560	600	2670	600	2670
7/16"-14	N226, N226WO, N526, N726, TN226	1000	4450	800	3560	800	3560
1/2"-13	N225, N225WO, N725, TN225, STN225, SN225WO, SN225, SN725	1500	6670	1000	4450	1000	4450
	NW525*, N525, N525WO, TN525, STN525, SN525WO, SN525	1500	6670	1000	4450	1000	4450
5/8"-11	N255, N255WO, N755, TN255	1500	6670	1000	4450	1000	4450
	N555, N555WO	1500	6670	1000	4450	1000	4450
3/4"-10	N275, N275WO, N775	1500	6670	1000	4450	1000	4450
	N575, N575WO	1500	6670	1000	4450	1000	4450
7/8"-9	N278, N278WO, N778	1500	6670	1000	4450	1000	4450
M6 x 1	BMS-6, BMS-6L, BMS-6M, BMS-6S, BMT-6	300	1330	300	1330	300	1330
M8 x 1.25	BMS-8, BMS-8L, BMS-8M, BMS-8S, BMT-8	450	2000	450	2000	450	2000
M10 x 1.50	BMS-10, BMS-10L, BMS-10M, BMS-10S, BMT-20	800	3560	600	2760	600	2760
M12 x 1.75	BMS-D-12, BMS-D-12L, BMS-D-12M, BMT-D-12	1500	6670	1000	4450	1000	4450
	BMS-12, BMS-12M, BMS-12S, BMT-12	1500	6670	1000	4450	1000	4450

* Combo Nut Washer (see page 49)

Resistance to Slip
of Channel Nut



Note: For mini channel nut information see page 195.

Reference page 44 for general fitting and standard finish specifications.

PULL-OUT STRENGTH

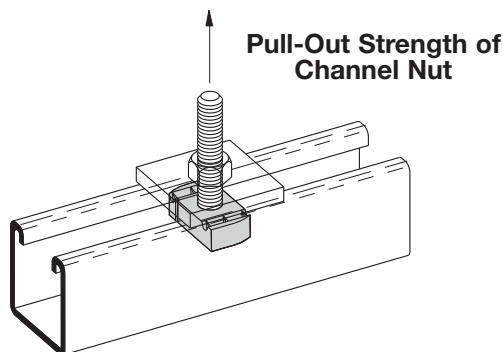
- With Safety Factor of 3
- Maximum pullout strength for B11 & B12 channels is limited to 1500 lbs. (6670 N).

Thread Size	Nut Part Numbers	Pull-Out Strength					
		12 ga. Channel		14 ga. Channel		16 ga. Channel	
		Lbs.	N	Lbs.	N	Lbs.	N
#8-32	N221, N221WO, N521, N721, TN221	200	890	200	890	200	890
#10-24	N222, N222WO, N522, N722, TN222	250	1110	250	1110	250	1110
#10-32	N227, N227WO, N527, N727, TN227	250	1110	250	1110	250	1110
1/4"-20	NW524*, N224, N224WO, N524, N724, TN224, STN224, SN224WO, SN224, SN524, SN724	450	2000	450	2000	450	2000
5/16"-18	N223, N223WO, N523, N723, TN223	750	3330	750	3330	750	3330
3/8"-16	NW528*, N228, N228WO, N528, N728, TN228, STN228, SN228WO, SN228, SN528, SN728	1100	4890	1000	4450	1000	4450
7/16"-14	N226, N226WO, N526, N726, TN226	1500	6670	1200	5340	1000	4450
1/2"-13	N225, N225WO, N725, TN225, STN225, SN225WO, SN225, SN725	2000	8900	1400	6230	1000	4450
	NW525*, N525, N525WO, TN525, STN525, SN525WO, SN525	1500	6670	1400	6230	1000	4450
5/8"-11	N255, N255WO, N755, TN255	2000	8900	1400	6230	1000	4450
	N555, N555WO	1500	6670	1400	6230	1000	4450
3/4"-10	N275, N275WO, N775	2000	8900	1400	6230	1000	4450
	N575, N575WO	1500	6670	1400	6230	1000	4450
7/8"-9	N278, N278WO, N778	1500	6670	1400	6230	1000	4450
M6 x 1	BMS-6, BMS-6L, BMS-6M, BMS-6S, BMT-6	450	2000	450	2000	450	2000
M8 x 1.25	BMS-8, BMS-8L, BMS-8M, BMS-8S, BMT-8	750	3330	750	3330	750	3330
M10 x 1.50	BMS-10, BMS-10L, BMS-10M, BMS-10S, BMT-20	1100	4890	1000	4450	1000	4450
M12 x 1.75	BMS-D-12, BMS-D-12L, BMS-D-12M, BMT-D-12	2000	8900	1400	6230	1000	4450
	BMS-12, BMS-12M, BMS-12S, BMT-12	1500	6670	1400	6230	1000	4450

 Channel Nuts & Hardware
Metric Threads

* Combo Nut Washer (see page 49)

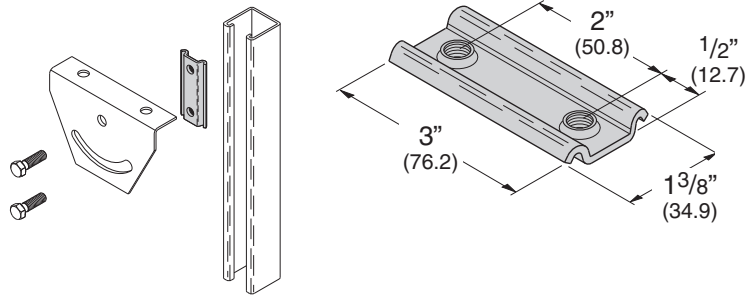
Note: For mini channel nut information see page 195.



Reference page 44 for general fitting and standard finish specifications.

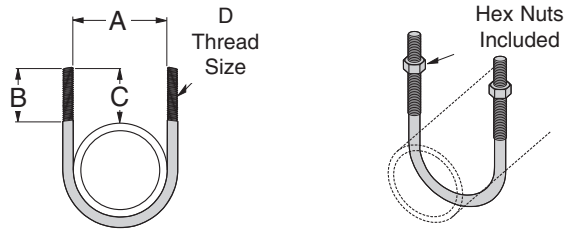
DCN 3/8 DOUBLE CONVEYOR NUT

- Recommended torque - 19 ft./Lbs.
- Allowable slip loading - 700 Lbs.(3.11kN)
- Safety Factor of 3
- Material: ASTM 1011SS Gr. 33
- Finish: Electrodeposited zinc ASTM B633 SC1
- Strut ordered separately



B501 SERIES U-BOLT

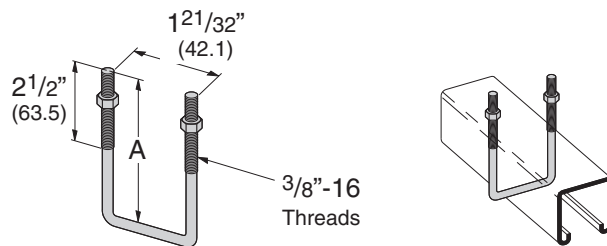
- Designed for use with Rigid Conduit or Iron Pipe
- Dimension "C" is dependent on the type of pipe or conduit supported and is a reference only



Part No.	A		B		C		D	Design Load		Wt./C	
	Lbs.	mm	Lbs.	mm	Lbs.	mm		Lbs.	kN	Lbs.	kg
B501-1/2	15/16"	(23.8)	1 3/4"	(44.4)	1 1/2"	(38.1)	5/16"-18	600	(2.67)	12	(5.4)
B501-3/4	1 1/8"	(28.6)	1 3/4"	(44.4)	1 5/8"	(41.3)	5/16"-18	600	(2.67)	13	(5.9)
B501-1	1 3/8"	(29.9)	1 7/8"	(47.6)	1 5/8"	(41.3)	5/16"-18	900	(4.00)	14	(6.3)
B501-1 1/4	1 23/32"	(43.6)	1 3/4"	(44.4)	1 15/32"	(37.3)	5/16"-18	900	(4.00)	15	(6.8)
B501-1 1/2	2"	(50.8)	1 3/4"	(44.4)	1 7/16"	(36.5)	5/16"-18	900	(4.00)	16	(7.2)
B501-2	2 7/16"	(61.9)	2 1/16"	(52.4)	1 7/8"	(47.6)	3/8"-16	1200	(5.34)	27	(12.2)
B501-2 1/2	2 15/16"	(74.6)	2 1/16"	(52.4)	1 13/16"	(46.0)	3/8"-16	1200	(5.34)	32	(14.5)
B501-3	3 9/16"	(90.5)	2"	(50.8)	1 3/4"	(44.4)	3/8"-16	1800	(8.00)	36	(16.3)
B501-3 1/2	4 3/32"	(94.6)	2"	(50.8)	1 23/32"	(43.6)	3/8"-16	1800	(8.00)	38	(17.2)
B501-4	4 19/32"	(116.7)	2 1/4"	(57.1)	1 21/32"	(50.0)	3/8"-16	1800	(8.00)	42	(19.0)
B501-5	5 21/32"	(143.6)	2 1/4"	(57.1)	2"	(50.8)	1/2"-13	2400	(10.70)	92	(41.7)
B501-6	6 3/4"	(171.4)	2 5/8"	(66.7)	2 3/8"	(60.3)	5/8"-11	2400	(10.70)	176	(79.8)
B501-8	8 3/4"	(222.2)	2 5/8"	(66.7)	2 3/8"	(60.3)	5/8"-11	2400	(10.70)	191	(86.6)

B500 SERIES SQUARE U-BOLT

- Includes:
 - 1 pc. U-Bolt only
 - 2 pcs. 3/8"-16 Hex Nuts
- Additional sizes available
- Standard finish: ZN, SS4



Part No.	A		Channel Size	Wt./C	
	Lbs.	mm		Lbs.	kg
B500-3-3/8	3 3/8"	(85.7)	1 5/8" x 1 5/8"	25	(11.3)
B500-5	5"	(127.0)	3 1/4" x 1 5/8"	33	(14.9)

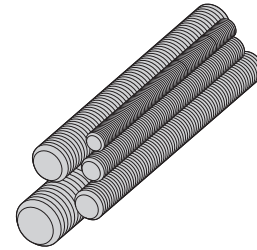
Reference page 44 for general fitting and standard finish specifications.

ATR

ALL THREADED ROD

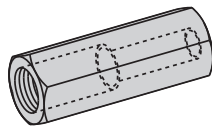
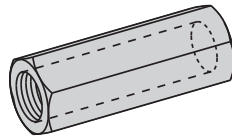
- Available in 36" (91.4 cm), 72" (182.9 cm), 120" (304.8 cm), 144" (365.7 cm) lengths
- Safety Factor of 5 on recommended load
- Standard finish: Zinc-Plated, Stainless Steel Type 304

Part No. & Size	Threads Per Inch	Recommended Load		Wt./C Ft. (3048.0 cm)	
		Lbs.	kN	Lbs.	kg
ATR 1/4"	20	240	(1.07)	12	(5.44)
ATR 5/16"	18	400	(1.78)	19	(8.62)
ATR 3/8"	16	730	(3.24)	29	(13.15)
ATR 1/2"	13	1350	(6.00)	53	(24.04)
ATR 5/8"	11	2160	(9.60)	89	(40.37)
ATR 3/4"	10	3230	(14.37)	123	(55.79)
ATR 7/8"	9	4480	(19.93)	170	(77.11)
ATR 1"	8	5900	(26.24)	225	(102.06)



B655 ROD COUPLING B656 REDUCER ROD COUPLING

- Load rating for each coupler meets All Threaded Rod value
- Standard finish: Zinc-Plated, Stainless Steel Type 304



Part No.	Size	Recommended Load		Length	Wt./C	
		Lbs.	kN		Lbs.	kg
B655-1/4	1/4"-20	240	(1.07)	7/8" (22.2)	1.9	(.86)
B655-5/16	5/16"-18	380	(1.69)	7/8" (22.2)	1.8	(.81)
B655-3/8	3/8"-16	730	(3.24)	1 1/8" (28.6)	3.6	(1.63)
B655-1/2	1/2"-13	1350	(6.00)	1 3/4" (44.4)	11.3	(5.12)
B655-5/8	5/8"-11	1810	(8.05)	2 1/8" (54.0)	17.6	(7.98)
B655-3/4	3/4"-10	2710	(12.05)	2 1/4" (57.1)	28.1	(12.74)
B655-7/8	7/8"-9	3770	(16.77)	2 1/2" (63.5)	57.2	(25.94)
B655-1	1"-8	4960	(22.06)	2 3/4" (69.8)	73.7	(33.43)

Part No.	Size	Recommended Load		Length	Wt./C	
		Lbs.	kN		Lbs.	kg
B656-3/8 x 1/4	3/8"-16 & 1/4"-20	240	(1.07)	1" (25.4)	3.7	(1.68)
B656-1/2 x 3/8	1/2"-13 & 3/8"-16	610	(2.71)	1 1/4" (31.7)	6.6	(2.99)
B656-5/8 x 1/2	5/8"-11 & 1/2"-13	1130	(5.02)	1 1/4" (31.7)	11.6	(5.26)
B656-3/4 x 5/8	3/4"-10 & 5/8"-11	1810	(8.05)	1 1/2" (38.1)	20.6	(9.34)
B656-7/8 x 3/4	7/8"-9 & 3/4"-10	2710	(12.05)	1 3/4" (44.4)	39.4	(17.87)

BHR SERIES HOT RODS FOR TRAPEZE HANGERS

- 12" length of threaded rod completely assembled with rod coupling, locking hex nuts, square washer, and channel nut.
- Standard finish: Zinc-Plated

Part No.	Rod Size	Recommended Load		Wt./C	
		Lbs.	kN	Lbs.	kg
BHR1225ZN	1/4"-20	240	(1.07)	41	(18.6)
BHR1238ZN	3/8"-16	730	(3.24)	63	(28.6)
BHR1250ZN	1/2"-13	1350	(6.00)	98	(44.4)
BHR1262ZN	5/8"-11	1500	(6.67)	148	(67.1)

Note: Based on use with 12 ga. channel.

(BHR1225, BHR1238, and BHR1250 use combo nut washers instead of square washers and channel nuts)

Reference page 44 for general fitting and standard finish specifications.

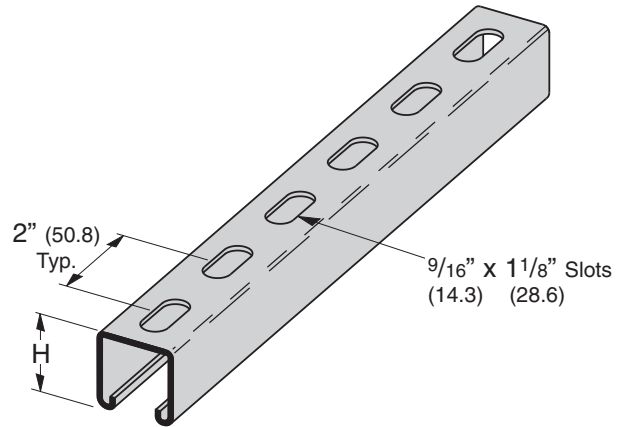


Channel Hole Patterns

B11SH THRU B56SH SH TYPE CHANNEL

• For beam loads use 90% of Channel Loading Chart

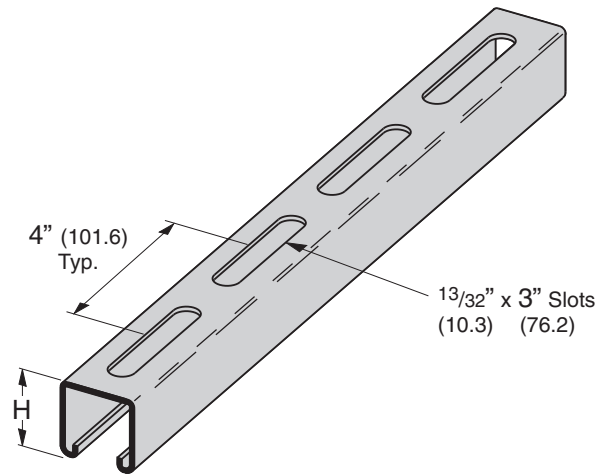
Part No.	Thickness		Height H		Weight	
	In.	mm	In.	mm	Lbs./Ft.	kg/m
B11SH	12 Ga.	(2.6)	3 ¹ / ₄ "	(82.5)	2.97	(4.42)
B12SH	12 Ga.	(2.6)	27 ¹ / ₁₆ "	(61.9)	2.39	(3.55)
B22SH	12 Ga.	(2.6)	1 ⁵ / ₈ "	(41.3)	1.82	(2.71)
B24SH	14 Ga.	(1.9)	1 ⁵ / ₈ "	(41.3)	1.34	(1.99)
B26SH	16 Ga.	(1.5)	1 ⁵ / ₈ "	(41.3)	1.07	(1.59)
B32SH	12 Ga.	(2.6)	1 ³ / ₈ "	(34.9)	1.62	(2.41)
B42SH	12 Ga.	(2.6)	1"	(25.4)	1.36	(2.02)
B52SH	12 Ga.	(2.6)	1 ³ / ₁₆ "	(20.6)	1.19	(1.77)
B54SH	14 Ga.	(1.9)	1 ³ / ₁₆ "	(20.6)	.91	(1.35)
B56SH	16 Ga.	(1.5)	1 ³ / ₁₆ "	(20.6)	.80	(1.19)



B11S THRU B56S S TYPE CHANNEL

• For beam loads use 90% of Channel Loading Chart

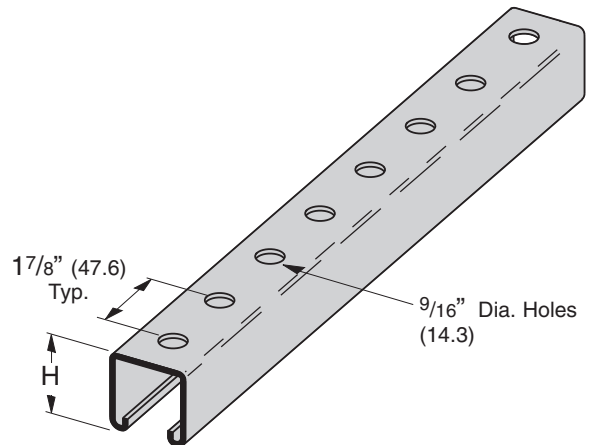
Part No.	Thickness		Height H		Weight	
	In.	mm	In.	mm	Lbs./Ft.	kg/m
B11S	12 Ga.	(2.6)	3 ¹ / ₄ "	(82.5)	2.94	(4.37)
B12S	12 Ga.	(2.6)	27 ¹ / ₁₆ "	(61.9)	2.36	(3.51)
B22S	12 Ga.	(2.6)	1 ⁵ / ₈ "	(41.3)	1.79	(2.66)
B24S	14 Ga.	(1.9)	1 ⁵ / ₈ "	(41.3)	1.32	(1.96)
B26S	16 Ga.	(1.5)	1 ⁵ / ₈ "	(41.3)	1.06	(1.58)
B32S	12 Ga.	(2.6)	1 ³ / ₈ "	(34.9)	1.59	(2.36)
B42S	12 Ga.	(2.6)	1"	(25.4)	1.33	(1.98)
B52S	12 Ga.	(2.6)	1 ³ / ₁₆ "	(20.6)	1.16	(1.72)
B54S	14 Ga.	(1.9)	1 ³ / ₁₆ "	(20.6)	.89	(1.32)
B56S	16 Ga.	(1.5)	1 ³ / ₁₆ "	(20.6)	.79	(1.17)



B11H17/8 THRU B56H17/8 H17/8 TYPE CHANNEL

• For beam loads use 90% of Channel Loading Chart

Part No.	Thickness		Height H		Weight	
	In.	mm	In.	mm	Lbs./Ft.	kg/m
B11H17/8	12 Ga.	(2.6)	3 ¹ / ₄ "	(82.5)	3.00	(4.46)
B12H17/8	12 Ga.	(2.6)	27 ¹ / ₁₆ "	(61.9)	2.42	(3.60)
B22H17/8	12 Ga.	(2.6)	1 ⁵ / ₈ "	(41.3)	1.85	(2.75)
B24H17/8	14 Ga.	(1.9)	1 ⁵ / ₈ "	(41.3)	1.36	(2.02)
B26H17/8	16 Ga.	(1.5)	1 ⁵ / ₈ "	(41.3)	1.09	(1.62)
B32H17/8	12 Ga.	(2.6)	1 ³ / ₈ "	(34.9)	1.65	(2.45)
B42H17/8	12 Ga.	(2.6)	1"	(25.4)	1.39	(2.07)
B52H17/8	12 Ga.	(2.6)	1 ³ / ₁₆ "	(20.6)	1.22	(1.81)
B54H17/8	14 Ga.	(1.9)	1 ³ / ₁₆ "	(20.6)	.93	(1.38)
B56H17/8	16 Ga.	(1.5)	1 ³ / ₁₆ "	(20.6)	.82	(1.22)



Reference page 14 for general fitting and standard finish specifications.

KWIKWIRE™ HANGING SYSTEM



- KwikWire system replaces jack chain or ATR to support lighting, ductwork, and Flextray™.
- Can be quickly installed around beams - No drilling required.
- Ideal for sloped ceilings - can hang objects at up to 60° angles.
- Simple height adjustments are made by releasing locking tab, no tools required.
- Spools of wire can be cut to length in field, reducing waste and up front planning.

KWIKWIRE™ CLAMPS



Part Number	Clamp Description For Use With Rope Diameter	Qty./Box
BKC100	1/32", 1/16" & 3/32"	100
BKC200	3/32", 1/8" & 3/16"	50



KWIKWIRE™ WIRE ROPE & CUTTER

Part Number	Rope Diameter - Working Load	Qty./Spool
BKW063 (1)	1/16" - 96 lbs.	500 ft.
BKW094 (1)	3/32" - 184 lbs.	500 ft.
BKW125 (1)	1/8" - 340 lbs.	500 ft.
BKW188 (2)	3/16" - 840 lbs.	250 ft.
BKCC	Wire Rope Cutter	1



Wire Rope Construction



(1) 7 x 7



(2) 7 x 19

KwikWire™ Clamp Working Loads*

Clamp Part No.	Wire Rope Dia.	Lbs. Safety Factor 5
BKC100	1/32"	0-22
BKC100	1/16"	0-75
BKC100	3/32"	25-150
BKC200	3/32"	25-150
BKC200	1/8"	25-250
BKC200	3/16"	50-640

* Working loads shown are for hanging vertically. For suspending at 15°, 30°, 45° or 60° angles from vertical, use the following percentage of the working loads from the chart:

15° = 96%
 30° = 86%
 45° = 70%
 60° = 50%

KwikWire™ System Recommendations:

- Do not exceed the safe working load of the products shown in their charts
- KwikWire™ Clamp load ratings are guaranteed only when used in combination with B-Line/Cooper supplied wire rope
- Do not use for overhead lifting or hoisting
- Do not use if cable or components are visibly distorted or worn, remove damaged cable end prior to inserting in KwikWire™ Clamp
- Do not paint cable near working area of KwikWire Clamp connector
- Do not apply lubricant
- Keep product clean and free of dirt
- Do not use on coated wire rope
- Do not use in chlorinated or caustic atmospheres
- For use in dry locations
- Cooper's BKCC tool is recommended for cutting wire rope to prevent fraying

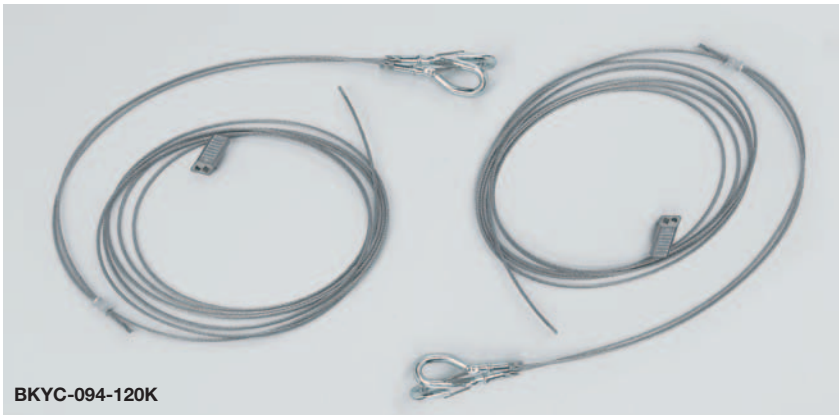
Reference page 44 for general fitting and standard finish specifications.

KWIKWIRE™ HANGING SYSTEM



KWIKWIRE™ CABLE ASSEMBLIES

- New KwikWire “Y” Cable Assemblies will simplify the installation of light fixtures and cable tray.
- “Y” Cables enable a single suspension point to provide two securement points.
- “Y” legs are 18” in length.
- “Y” Cable Assembly Kits include two (2) 10’-0” long cable assemblies and two (2) KwikWire clamps.
- Add-on cable assemblies can be field installed on KwikWire systems.



Part Number	Description	Qty./Box
BKYC-094	Carabiner	20
BKYC-094-120K	Carabiner	10

Reference page 44 for general fitting and standard finish specifications.

KWIKWIRE™ HANGING SYSTEM



KWIKWIRE™ STARTER KIT

- Starter Kit includes everything you need to get the job done.
- Kits are packaged in a 5-gallon bucket for easy transportation. The lid includes a built-in cable counter to simplify measuring and cutting the wire rope to length.
- Starter Kit includes KwikWire clamps, a spool of wire rope, and a cable cutter.



Part Number	Kit Includes - Working Load	Qty./Box
BKS10063	BKC100 (100 pcs.), Cable Cutter 1/16"Ø Wire Rope (500 ft.)	1
BKS10094	BKC100 (100 pcs.), Cable Cutter 3/32"Ø Wire Rope (500 ft.)	1
BKS15094	BKC150 (100 pcs.), Cable Cutter 3/32"Ø Wire Rope (500 ft.)	1
BKS15125	BKC150 (100 pcs.), Cable Cutter 1/8"Ø Wire Rope (500 ft.)	1
BKS20125	BKC200 (50 pcs.), Cable Cutter 1/8"Ø Wire Rope (500 ft.)	1
BKS20188	BKC200 (50 pcs.), Cable Cutter 3/16"Ø Wire Rope (250 ft.)	1



KWIKPAK™ WIRE ROPE & CLAMPS

KwikPak™ makes handling KwikWire™ a breeze!

- Refill your starter kit with a B-Line KwikPak™.
- KwikPaks include KwikWire clamps and a spool of wire rope.
- KwikPaks are shipped in a specially designed dispenser box to ease field cutting of wire.



Part Number	Kit Includes - Working Load	Qty./Box
BKP10063	BKC100 (100 pcs.), Cable Cutter 1/16"Ø Wire Rope (500 ft.)	1
BKP10094	BKC100 (100 pcs.), Cable Cutter 3/32"Ø Wire Rope (500 ft.)	1
BKP15094	BKC150 (100 pcs.), Cable Cutter 3/32"Ø Wire Rope (500 ft.)	1
BKP15125	BKC150 (100 pcs.), Cable Cutter 1/8"Ø Wire Rope (500 ft.)	1
BKP20125	BKC200 (50 pcs.), Cable Cutter 1/8"Ø Wire Rope (500 ft.)	1
BKP20188	BKC200 (50 pcs.), Cable Cutter 3/16"Ø Wire Rope (250 ft.)	1

Reference page 44 for general fitting and standard finish specifications.

**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

260533

Raceway and Boxes for
Electrical Systems

Steel RMC with Next-day Delivery



Wheatland Tube's steel RMC is readily available in common trade sizes, 10' length and 8 vivid colors (for trade sizes ½-4).

RIGID METAL CONDUIT WEIGHTS AND DIMENSIONS

TRADE SIZE	THREADS/INCH	WEIGHT/100 FT.		NOMINAL OUTSIDE DIAMETER		NOMINAL INSIDE DIAMETER*	
		lbs		in	mm	in	mm
½	14	82		0.840	21.34	0.632	16.05
¾	14	109		1.050	26.67	0.836	21.23
1	11½	161		1.315	33.40	1.063	27.00
1¼	11½	218		1.660	42.16	1.394	35.41
1½	11½	263		1.900	48.26	1.624	41.25
2	11½	350		2.375	60.33	2.083	52.91
2½	8	559		2.875	73.03	2.489	63.22
3	8	727		3.500	88.90	3.090	78.49
3½	8	880		4.000	101.60	3.570	90.68
4	8	1030		4.500	114.30	4.050	102.87
5	8	1400		5.563	141.30	5.073	128.85
6	8	1840		6.625	168.28	6.093	154.76

* For information only, not a UL-6 requirement.
Applicable tolerances: Outside Diameter ½-1½: ±0.015" (16-41: ±0.38 mm), 2-6: (53-155) ± 1%.

PACKAGING

TRADE SIZE	THREAD PROTECTOR COLOR	QUANTITY/BUNDLE		QUANTITY/LIFT*		WEIGHT/LIFT	
		ft.	Pieces	Bundles	ft.	lbs.	
½	Black	100	—	25	2500	2050	
¾	Red	50	—	40	2000	2180	
1	Blue	50	—	25	1250	2013	
1¼	Red	—	90	—	900	1962	
1½	Black	—	80	—	800	2104	
2	Blue	—	60	—	600	2100	
2½	Black	—	37	—	370	2068	
3	Blue	—	30	—	300	2181	
3½	Black	—	25	—	250	2200	
4	Blue	—	20	—	200	2060	
5	Blue	—	15	—	150	2100	
6	Blue	—	10	—	100	1840	

* The quantity per lift conforms to the National Electrical Manufacturers Association Standards Publication RN-2, Packaging of Master Bundles for Steel Rigid Metal Conduit, Intermediate Metal Conduit (IMC) and Electrical Metallic Tubing (EMT).
Pack quantities for Canadian distribution do not comply with NEMA RN-2.

For more information, call **800.257.8182** or visit **wheatland.com**

WEL-120622

Intermediate Metal Conduit (IMC) and Kwik-Couple® IMC



A PART OF **atkore**
TECHNICAL

NEC recognizes Allied IMC for same uses as RIGID

IMC Conduit

- Light-weight ductile steel conduit for long life and easy bending
- Weighs 1/3 less than rigid conduit
- Saves up to 30% in cost over GRC
- Hot galvanized exterior to increase corrosion resistance and protect against white rust
- Interior coating creates a smooth, continuous raceway for fast wire-pulling
- UL 1242 listed and manufactured in accordance with ANSI C80.6
- True Color IMC special orders available
- Available in trade sizes 1/2(16) thru 4(103)

Kwik-Release End Cap No Tools Needed!



Kwik-Couple® IMC Steel Conduit

- Factory-installed Kwik-Couple couplings are available on IMC rigid conduits
- No separate couplings to purchase, store, carry or install
Just line up the ends, spin the coupling forward onto the next piece and wrench tighten. It's that easy!
- Kwik-Release End Cap · Requires no tools
- Similar Benefits to IMC Conduit*
- True Color IMC special orders available
- Patented
- Trade Sizes 2-1/2(63) thru 4(103)



* Kwik-Couple IMC does not contain wet location listings and is not approved for Haz-Loc Class I Div 1 locations



IMC (Intermediate Metal Conduit) Weights and Dimensions

Trade Size	Metric Designator	Average Outside Diameter ¹		Average Wall Thickness ²		Approximate Weight Per 100 Ft. (30.5M)		Quantity in Master Bundle	
		in.	mm.	in.	mm.	lb.	kg.	ft.	m.
1/2	16	0.815	20.70	0.070	1.79	62	28.1	3500	1067.5
3/4	21	1.029	26.13	0.075	1.90	84	38.1	2500	762.5
1	27	1.290	32.76	0.085	2.16	119	54.0	1700	518.5
1-1/4	35	1.638	41.60	0.085	2.16	158	71.7	1350	411.8
1-1/2	41	1.883	47.82	0.090	2.29	194	88.0	1100	335.5
2	53	2.360	59.94	0.095	2.41	256	116.1	800	244.0
2-1/2	63	2.857	72.56	0.140	3.56	441	200.0	370	112.9
3	78	3.476	88.29	0.140	3.56	543	246.3	300	91.5
3-1/2	91	3.971	100.86	0.140	3.56	629	285.3	240	73.2
4	103	4.466	113.43	0.140	3.56	700	317.5	240	73.2

¹Outside diameter tolerances:

- +/- .005 in. (.13mm) for trade sizes 1/2 (16mm) through 1 (25mm)
- +/- .0075 in. (.19mm) for trade sizes 1-1/4 (36mm) through 2 (53mm)
- +/- 0.10 in. (.25mm) for trade sizes 2-1/2 (63mm) through 4 (103mm).

²Wall thickness tolerances:

- + 0.15 in. (.38mm) and - .000 for trade sizes 1/2 (13mm) through 2 (53mm)
- + 0.20 in. (.51mm) and - .000 for trade sizes 2-1/2 (63mm) through 4 (103mm).

NOTE: Length = 10 ft. (3.05m) with a tolerance of +/- .25 in. (6.35mm).

NEMA Standard

Project Information

Company Name: _____
 Address: _____
 City: _____
 State & Zip: _____
 Phone: _____
 Project Name: _____
 City: _____
 State: _____

Intermediate Metal Conduit (IMC) and Kwik-Couple® IMC



A PART OF **atkore**
INTERNATIONAL

FEATURES & SPECIFICATIONS

Allied IMC is precision manufactured for economical protection and long lasting value for the electrical raceway system. Manufactured from premium, work hardened steel combining electrical and mechanical performance with ductility. Allied IMC is resistant to impact and is easy to cut, bend and join for smooth, continuous raceways. Allied IMC is as strong, lighter in weight, and less expensive than Rigid. In fact, it can save you as much as 30% in overall costs. Intermediate Metal Conduit, covered by Article 342 in the National Electrical Code® (NEC®), is recognized as an equipment grounding conductor in Article 250 of the NEC and also provides excellent shielding from electromagnetic fields.

Kwik-Couple IMC Conduit

Innovation from the conduit leaders at Allied

Allied's patented Kwik-Couple IMC reduces threaded conduit installation time and cost significantly. Kwik-Couple has an integrated coupling on the conduit exactly where you need it.

The Allied Advantage

Allied IMC has a larger internal diameter than RIGID conduit to allow for easier fishing and wire-pulling. Allied IMC is also more "rigid" than RIGID to provide superior wiring protection in many applications.

The National Electrical Code recognizes standard Allied IMC for the same uses as RIGID, including all hazardous location (classified) applications.

Allied IMC uses the same threaded couplings and fittings as RIGID conduit, and the 3/4" NPT threads (ANSI B1.20.1) are also full cut and galvanized after cutting. Color-coded end-cap thread protectors keep the threads clean and sharp, and also help to provide instant trade size recognition. Even sizes are color-coded orange, 1/2 trade sizes are yellow, and 1/4 trade sizes are green.

Coatings

Allied's IMC is hot galvanized using Allied's patented inline Flo-Coat® process. This process combines zinc, a conversion coating, and a clear organic polymer topcoat to form a triple layer of protection against corrosion and abrasion. The interior of Allied IMC is coated with a highly corrosion-resistant

lubricating finish for easier wire-pulling. No need to worry about damage to the conduit system even when pulling through multiple 90° bends.

EMI Shielding

Allied IMC is very effective in reducing the effects of electromagnetic fields on encased power distribution circuits, shielding computers and other sensitive electronic equipment from the effects of electromagnetic interference.

Visit www.alliedeg.com to obtain the **GEMI** (Grounding and Electromagnetic Interference) software analysis program.

Codes & Standards Compliance

Standard IMC is covered by Article 342 of the National Electric Code (NEC). It can be installed in all occupancies and locations, including Class I, Division I hazardous locations. Allied IMC is listed to Underwriters Laboratories Safety Standard UL 1242 and meets ANSI C80.6. These standards have been adopted as Federal Specifications in lieu of WWC-581-Type 2. IMC is recognized as an equipment grounding conductor by NEC Section 250-118.

Kwik-Couple IMC is Listed to UL Safety Standard 1242 and UL 514-B. Kwik-Couple IMC is Listed for CONCRETE-TIGHT applications.

Installation of IMC conduit and elbows shall be in accordance with the National Electrical Code and the UL listing information. Allied IMC is listed in UL category DYBY. Master bundles conform to NEMA standard RN2.

Specification Data

To specify, IMC and Kwik-Couple IMC include the following: Intermediate Metal Conduit (IMC) conduit and elbows shall be equal to that manufactured by Allied Tube & Conduit Corporation. IMC shall be hot galvanized steel O.D. with an organic corrosion resistant I.D. coating and shall be Listed to UL Safety Standard 1242 and manufactured in accordance with ANSI C80.6. It shall be listed by a nationally recognized testing laboratory with follow-up service. Threads shall be hot galvanized after cutting.

It is noted that these U.L. standards have been adopted by the federal government and separate military specifications no longer exist.



Kwik-Couple IMC Conduit Weights and Dimensions

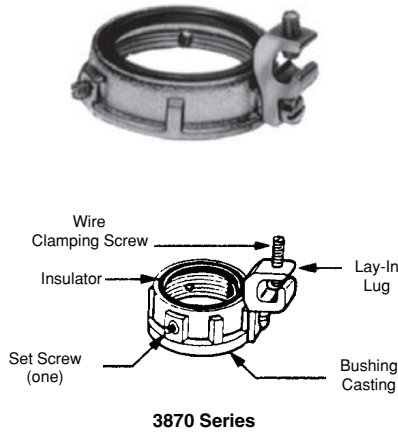
Trade Size	Metric Designator	Average Outside Diameter ¹		Average Wall Thickness ²		Approximate Weight Per 100 Ft. (30.5M)		Quantity In Master Bundle	
		in.	mm.	in.	mm.	lb.	kg.	ft.	m.
2-1/2	63	2.857	72.56	0.140	3.56	441	200.0	400	122.0
3	76	3.476	88.29	0.140	3.56	543	246.3	300	91.5
3-1/2	91	3.971	100.86	0.140	3.56	629	285.3	250	76.3
4	103	4.466	113.4	0.140	3.56	700	317.5	200	61.0

¹Outside diameter tolerances: +/- .010 in. (.25mm)

²Wall thickness tolerances: + .020 in. (.51mm) and -.000

NOTE: Length (w/coupling) = 10 ft. (3.05m) with a tolerance of +/- .25in. (6.35mm).

NOTE: Special orders are non-cancelable, non-returnable and non-refundable



Threaded Insulated Grounding Bushing

Application

- For quick installation of bonding jumper to multiple metal conduits (Rigid and IMC).
- Designed to bush conductors and prevent insulation damage.

Features

- Ease of installation, lay in lug design.
- Cast malleable iron body designed to lock insulator in place within body reducing common assembly problem resulting in dislodging of insulator.

- Insulator rated for 150°C/302°F application.

Standard Material/Finish:

Body	Electro zinc plated
Lay in lug	Aluminum/tin plated
Insulator	Thermoplastic
	150°C/302°F
	Application with 94V-0 flammability



Threaded Insulated Grounding Bushing

Cat. No.	Conduit Size	Bushing Dia.	Throat Dia.	Lug Length	Swing Radius	Bushing Height	Wire Range AWG CU/AL
3870-TB	½	1.125	.560	1.310	1.212	.657	14-4
3861	½	1.125	.560	1.675	1.402	.657	8-2/0
3871-TB	¾	1.420	.742	1.310	1.360	.660	14-4
3862	¾	1.420	.742	1.675	1.550	.660	8-2/0
3872	1	1.770	.944	1.310	1.535	.735	14-4
3882	1	1.770	.944	1.675	1.725	.735	8-2/0
3873	1¼	2.190	1.242	1.310	1.745	.735	14-4
3883	1¼	2.190	1.242	1.675	1.935	.735	8-2/0
3874	1½	2.468	1.449	1.310	1.884	.770	14-4
3884	1½	2.468	1.449	1.675	2.074	.770	8-2/0
3875	2	3.031	1.860	1.310	2.165	.770	14-4
3889	2	3.031	1.860	1.675	2.355	.770	8-2/0
3876	2½	3.516	2.222	1.310	2.408	.940	14-4
3886	2½	3.516	2.222	1.675	2.598	.940	8-2/0
3993	2½	3.516	2.222	2.230	2.928	.940	6-4/0
3877	3	4.234	2.761	1.310	2.767	.975	14-4
3887	3	4.234	2.761	1.675	2.957	.975	8-2/0
3994	3	4.234	2.761	2.230	3.287	.975	6-4/0
3878	3½	4.781	3.193	1.310	3.040	.975	14-4
3863	3½	4.781	3.193	1.675	3.230	.975	8-2/0
3995	3½	4.781	3.193	2.230	3.560	.975	6-4/0
3879	4	5.328	3.623	1.310	3.314	.980	14-4
3864	4	5.328	3.623	1.675	3.504	.980	8-2/0
3996	4	5.328	3.623	2.230	3.834	.980	6-4/0
3880	5	6.328	4.542	1.310	3.814	.985	14-4
3865	5	6.328	4.542	1.675	4.000	.985	8-2/0
3998	5	6.328	4.542	2.230	4.334	.985	6-4/0
3881	6	7.406	5.458	1.310	4.353	1.200	14-4
3866	6	7.406	5.458	1.675	4.543	1.200	8-2/0
3999	6	7.406	5.458	2.230	4.875	1.200	6-4/0

Temperature rating 150°C.
 Meets Coast Guard Regulation CG293
 Available with DURA-PLATE® Finish.
 For mechanically galvanized iron, add suffix-MG.

Electrical Metallic Tubing (EMT) and True Color™ EMT



A PART OF **atkore**
INDUSTRIAL

E-Z Pull® EMT

- Hot galvanized steel using patented inline Flo-Coat® process for long lasting exterior protection
- E-Z Pull interior coating provides a smooth raceway for fast, easier wire-pulling
- Excellent mechanical protection for conductors
- Ductility for faster and easier bending
- Optimal EMI shielding characteristics
- Listed to Underwriters Laboratories Safety Standard UL 797
- Manufactured in accordance with ANSI C80.3
- Available in sizes 1/2 (16) - 4 (103)

True Color™ EMT

- All the benefits of E-Z Pull EMT
- Instant identification of multiple circuits
- **Fire Alarm® Red EMT**
- Healthcare Green EMT
- Data Com Blue EMT
- Available in 8 colors
- Available in sizes 1/2 (16) - 4 (103)

True Color™ Applications

Black EMT

- Blends in dark colored areas

Fire Alarm® EMT **RED**

- Emergency circuits
- Fire alarm and Security systems

Orange EMT

- Construction/research areas
- Fiber optic systems
- Auto repair/maintenance

Yellow EMT

- High voltage wiring
- Caution areas
- Special equipment

Green EMT

- Hospital and healthcare areas
- Nurse call stations
- Critical circuits

Blue EMT

- Low voltage wiring
- Data com/video
- Network security

Purple EMT

- Specialty wiring systems
- Security systems

White EMT

- Blends in light colored areas

Silver EMT

- Standard Use
- Contemporary architecture

Quality Electrical Metallic Tubing



Identify Important Circuits Instantly!



Project Information

Company Name: _____
 Address: _____
 City: _____
 State & Zip: _____
 Phone: _____
 Project Name: _____
 City: _____
 State: _____

Electrical Metallic Tubing (EMT) and True Color™ EMT



A PART OF **atkore**
INTERNATIONAL

FEATURES & SPECIFICATIONS

Manufactured for Long Life

Allied Tube & Conduit® EMT is precision manufactured from high grade mild strip steel for exceptional durability and long-lasting life. Allied EMT is hot galvanized using a patented inline Flo-Coat® process. This process combines zinc, a conversion coating, and a clear organic polymer topcoat to form a triple layer of protection against corrosion and abrasion.

E-Z Pull® EMT combines strength with ductility, providing easy bending, cutting and joining while resisting flattening, kinking and splitting. Available in sizes 1/2 (16) - 4 (103).

Coatings

Allied's EMT (Electrical Metallic Tubing) has a special low friction ID coating called E-Z Pull that greatly improves the slip properties between conduit and wire. With E-Z Pull EMT, wire pulls through the EMT smoothly and easily, making installation easier and faster.

EMI Shielding

Allied EMT is very effective in reducing electromagnetic field levels for encased power distribution circuits, shielding computers and other sensitive electronic equipment from the effects of electromagnetic interference. For more information on EMT shielding, visit www.alliedeg.com to obtain the **GEMI (Grounding and Electro-Magnetic Interference)** software analysis program.

Electrical Metallic Tubing (EMT) and True Color™ EMT

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3



Codes & Standards Compliance

Allied EMT is listed to Underwriters Laboratories Safety Standard UL 797 and meets ANSI C80.3. These standards have been adopted as federal specifications in lieu of WWC 563. EMT is recognized as an equipment grounding conductor by NEC Section 250-118. Documentation for compliance with NEC Article 250 is also available in the **GEMI (Grounding and Electro-Magnetic Interference)** analysis software and related research studies found at the www.alliedeg.com website.

Installation of EMT shall be in accordance with the National Electrical Code and the UL listing information. Allied EMT is listed in category FJMX. Master bundles conform to NEMA Standard RN2.

Specification Data

To specify Allied EMT, include the following: Electrical Metallic Tubing shall be equal to that manufactured by Allied Tube & Conduit Corporation. EMT shall be hot galvanized steel O.D. with an organic corrosion resistant I.D. coating, and shall be listed to UL Safety Standard 797 and manufactured in accordance with ANSI C80.3.

Trade Size	Metric Designator	Outside Diameter ¹		Nominal Wall Thickness ²		Approximate Weight Per 100 Ft. (30.5M)		Red and Galvanized Master Bundle Quantity		True Color** Bundle Qty.	
		in	mm	in	mm	lb	kg	ft	m	ft	m
1/2	16	0.706	17.93	0.042	1.07	30	13.6	7000	2135	3500	1066.8
3/4	21	0.922	23.42	0.049	1.24	46	20.9	5000	1525	2500	762.0
1	27	1.163	29.54	0.057	1.45	67	30.4	3000	915	1500*	457.2
1-1/4	35	1.510	38.35	0.065	1.65	101	45.8	2000	610	2000	609.6
1-1/2	41	1.740	44.20	0.065	1.65	116	52.6	1500	457.5	1500	457.2
2	53	2.197	55.80	0.065	1.65	148	67.1	1200	366.0	1200	365.7
2-1/2	63	2.875	73.03	0.072	1.83	216	98.0	610	186.1	610	185.9
3	78	3.500	88.90	0.072	1.83	263	119.3	510	155.6	510	155.4
3-1/2	91	4.000	101.60	0.083	2.11	349	158.3	370	112.9	370	112.7
4	103	4.500	114.30	0.083	2.11	393	178.3	300	91.5	300	91.5

¹Outside diameter tolerances: +/- .005 in. (.13mm) for trade sizes 1/2 (16mm) through 2 (53mm);
+/- .010 in. (.25mm) for trade sizes 2-1/2 (63mm);
+/- .015 in. (.38mm) for trade size 3 (78mm);
+/- .020 in. (.51mm) for trade sizes 3-1/2 (91mm) and 4 (103mm).

*Blue trade size 1 master bundle size: 3000 ft / 915 m
** Other Color Trade Sizes 2 - 4 are available thru special order
NOTE: Length = 10 ft. (3.05m) with a tolerance of +/- .25 in. (6.35 mm)

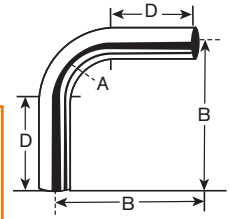
Electrical Metallic Tubing (EMT) Elbows

EMT 90° Elbows

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3



Trade Size	Metric Designator	Radius (A) ¹		Offset (B) ²		Straight (D) ¹		Approximate Weight Per 100 Pieces		Standard Package
		in	mm	in	mm	in	mm	lb	kg	
1/2	16	4	102	5 7/8	149	1 1/2	38	25	11.3	25
3/4	21	4 1/2	114	7	178	1 1/2	38	46	20.9	50
1	27	5 3/4	146	8 3/4	222	1 7/8	48	84	38.1	25
1 1/4	35	7 1/4	184	10 1/8	257	2	51	144	65.3	20
1 1/2	41	8 1/4	210	11 3/4	298	2	51	193	87.5	15
2	53	9 1/2	241	14	356	2	51	296	134.3	10
2 1/2	63	10 1/2	267	16 1/4	413	3	76	504	228.6	1
3	78	13	330	18 3/4	476	3 1/8	79	701	318.0	1
3 1/2	91	15	381	21 1/4	540	3 1/4	83	1047	474.9	1
4	103	16	406	23 3/8	594	3 3/8	86	1310	594.2	1



¹Minimum requirement as per UL Standard

²Dimensions and weights are approximate

Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.

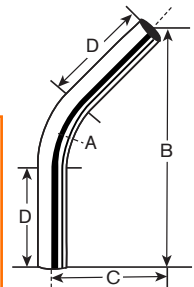
Also available in the following Degrees (60°, 45°, 30°, 22-1/2°, 15° & 11-1/4°)

EMT 45° Elbows

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3



Trade Size	Metric Designator	Radius (A) ¹		Offset (B) ²		Offset (C) ²		Straight (D) ¹		Approximate Weight Per 100 Pieces		Standard Package
		in	mm	in	mm	in	mm	in	mm	lb	kg	
1/2	16	4	102	6 1/8	156	2 1/2	64	1 1/2	38	18	8.2	25
3/4	21	4 1/2	114	7 3/8	187	3 1/8	79	1 1/2	38	33	15.0	50
1	27	5 3/4	146	8 3/4	222	3 5/8	92	1 7/8	48	56	25.4	25
1 1/4	35	7 1/4	184	10 1/8	257	4 1/8	105	2	51	97	44.0	20
1 1/2	41	8 1/4	210	13 1/8	333	5 3/8	137	2	51	145	65.8	15
2	53	9 1/2	241	13 1/8	333	5 1/2	140	2	51	185	83.9	10
2 1/2	63	10 1/2	267	17 1/2	445	7 1/4	184	3	76	360	163.3	1
3	78	13	330	17 1/2	445	7 1/4	184	3 1/8	79	438	198.7	1
3 1/2	91	15	381	26 1/8	664	10 7/8	276	3 1/4	83	873	396.0	1
4	103	16	406	26 1/4	667	10 7/8	276	3 3/8	86	983	445.9	1



¹Minimum requirement as per UL Standard

²Dimensions and weights are approximate

Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.

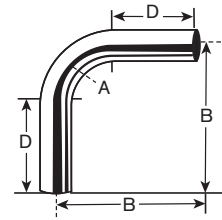
Also available in the following Degrees (90°, 60°, 30°, 22-1/2°, 15° & 11-1/4°)

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

Electrical Metallic Tubing (EMT) Elbows

EMT Large Radius 90° Elbows

Listed to Underwriters Laboratories Safety Standard UL 797
 Manufactured in accordance with ANSI C80.3



Trade Size	Metric Designator	Radius (A)		Offset (B) ²		Straight (D) ²		Approximate Weight Per 100 Pieces	
		in	mm	in	mm	in	mm	lb	kg
1	27	12	305	20 5/8	524	8 5/8	219	201	91.2
1	27	15	381	24 1/4	616	9 1/4	235	235	106.6
1	27	18	457	27 7/8	708	9 7/8	251	268	121.6
1	27	24	610	34 5/8	879	10 5/8	270	329	149.2
1	27	30	762	41	1041	11	279	385	174.6
1	27	36	914	46 3/4	1187	10 3/4	273	436	197.8
1	27	42	1067	54	1372	12	305	503	228.2
1	27	48	1219	60 1/4	1530	12 1/4	311	558	253.1
1 1/4	35	12	305	20 5/8	524	8 5/8	219	303	137.4
1 1/4	35	15	381	24 1/4	616	9 1/4	235	354	160.6
1 1/4	35	18	457	27 7/8	708	9 7/8	251	404	183.3
1 1/4	35	24	610	34 5/8	879	10 5/8	270	497	225.4
1 1/4	35	30	762	41	1041	11	279	581	263.5
1 1/4	35	36	914	46 3/4	1187	10 3/4	273	657	298.0
1 1/4	35	42	1067	54	1372	12	305	758	343.8
1 1/4	35	48	1219	60 1/4	1530	12 1/4	311	842	381.9
1 1/2	41	15	381	24 1/4	616	9 1/4	235	406	184.2
1 1/2	41	18	457	27 7/8	708	9 7/8	251	464	210.5
1 1/2	41	24	610	34 5/8	879	10 5/8	270	570	258.6
1 1/2	41	30	762	41	1041	11	279	667	302.6
1 1/2	41	36	914	46 3/4	1187	10 3/4	273	754	342.0
1 1/2	41	42	1067	54	1372	12	305	870	394.6
1 1/2	41	48	1219	60 1/4	1530	12 1/4	311	967	438.6
2	53	15	381	24 1/4	616	9 1/4	235	518	235.0
2	53	18	457	27 7/8	708	9 7/8	251	592	268.5
2	53	24	610	34 5/8	879	10 5/8	270	728	330.2
2	53	30	762	41	1041	11	279	851	386.0
2	53	36	914	46 3/4	1187	10 3/4	273	962	436.4
2	53	42	1067	54	1372	12	305	1110	503.5
2	53	48	1219	60 1/4	1530	12 1/4	311	1233	559.3
2 1/2	63	18	457	27 7/8	708	9 7/8	251	864	391.9
2 1/2	63	24	610	34 5/8	879	10 5/8	270	1062	481.7
2 1/2	63	30	762	41	1041	11	279	1242	563.4
2 1/2	63	36	914	46 3/4	1187	10 3/4	273	1404	636.9
2 1/2	63	42	1067	54	1372	12	305	1620	734.8
2 1/2	63	48	1219	60 1/4	1530	12 1/4	311	1800	816.5

²For information only, not a requirement as per UL Standard
 Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.
 Also available in the following Degrees (60°, 45°, 30°, 22-1/2°, 15° & 11-1/4°)

Chart continued on the next page

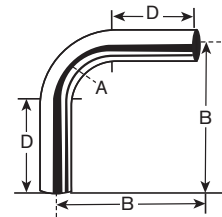
Electrical Metallic Tubing (EMT) Elbows

EMT Large Radius 90° Elbows (continued)

Listed to Underwriters Laboratories Safety Standard UL 797
 Manufactured in accordance with ANSI C80.3



Trade Size	Metric Designator	Radius (A)		Offset (B) ²		Straight (D) ²		Approximate Weight Per 100 Pieces	
		in	mm	in	mm	in	mm	lb	kg
3	78	15	381	24 1/4	616	9 1/4	235	921	417.8
3	78	18	457	27 7/8	708	9 7/8	251	1052	477.2
3	78	24	610	34 5/8	879	10 5/8	270	1293	586.5
3	78	30	762	41	1041	11	279	1512	685.8
3	78	36	914	46 3/4	1187	10 3/4	273	1710	775.7
3	78	42	1067	54	1372	12	305	1973	895.0
3	78	48	1219	60 1/4	1530	12 1/4	311	2192	994.3
3 1/2	91	18	457	27 7/8	708	9 7/8	251	1396	633.2
3 1/2	91	24	610	34 5/8	879	10 5/8	270	1716	778.4
3 1/2	91	30	762	41	1041	11	279	2007	910.4
3 1/2	91	36	914	46 3/4	1187	10 3/4	273	2269	1029.2
3 1/2	91	42	1067	54	1372	12	305	2618	1187.5
3 1/2	91	48	1219	60 1/4	1530	12 1/4	311	2908	1319.1
4	103	24	610	34 5/8	879	10 5/8	270	1932	876.4
4	103	30	762	41	1041	11	279	2260	1025.1
4	103	36	914	46 3/4	1187	10 3/4	273	2555	1158.9
4	103	42	1067	54	1372	12	305	2948	1337.2
4	103	48	1219	60 1/4	1530	12 1/4	311	3275	1485.5



²For information only, not a requirement as per UL Standard
 Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.
 Also available in the following Degrees (60°, 45°, 30°, 22-1/2°, 15° & 11-1/4°)

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

T&B Conduit Fittings

Electrical Metallic Tubing (EMT) Fittings

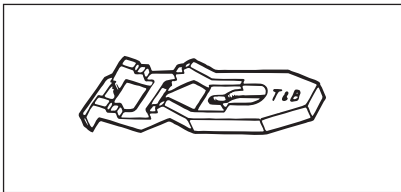
Suggested Specifications for Electrical Metallic Tubing (EMT) Fittings



**Series 5123 Insulated
EMT Fitting (Raintight)
(Compression Type)**



**Series 5120
EMT Coupling (Raintight)
(Compression Type)**



Series 1350 Pipe Spacers



**Series 106
Bonding Locknut**



**Series 4176
Pipe Straps**

- Ferrous Electrical Metallic Tubing (EMT) shall be of the hot dipped galvanized type conforming to applicable specifications WW-563/ANSI C80.3/U.L. 797/CSA C22.2 No. 83. EMT protected solely by enamel shall not be used.
- Where lengths of EMT are coupled together or connected to boxes or enclosures or where EMT is coupled to threaded rigid metal conduit or IMC, fittings approved for intended applications shall be used, and:
 - (1) Shall be of rugged steel/malleable iron construction electro-zinc plated inside/outside including threads. Fitting throat shall be bushed with a nylon insulator.
 - (2) Shall be of raintight type for installations exposed to weather or wet locations such as Thomas & Betts series 5123, 5120 and 530. Raintight type fittings may be substituted for concrete tight application.
- Where electrical metallic tubing and associated fittings are used as part of equipment grounding system:
 - (1) A bonding type locknut such as Thomas & Betts series 106 shall be installed where hub type fitting terminates into a threadless opening
 - (2) Compression ring type fittings such as Thomas & Betts series 5123 and 5120 shall be used for terminating and coupling.
- EMT shall be securely fastened in place at intervals as specified by the code using straps, hangers and other supporting assemblies as indicated on plans, and as manufactured by Thomas & Betts, series 4176 straps. In wet locations or where supporting surfaces are of absorbent materials vertical and horizontal runs of conduit shall be firmly supported such that there is at least 1/4" air space between conduit and supporting surface
- Spacers and supporting straps shall be of rugged malleable iron or steel construction, hot dipped galvanized, and conforming to requirements of Canadian Standards Association Standard C22.2 No. 18.3 as manufactured by Thomas & Betts, series 4176 straps and series 1350 spacers.

T&B Conduit Fittings

Electrical Metallic Tubing (EMT) Fittings



5123 Series*



5120 Series

*** 4230 Series—90° Fittings**

Specifications—Fittings for Electrical Metallic Tubing (EMT) Compression Type, Raintight



Application

- To connect and effectively bond electrical metallic tubing to a box or an enclosure.
- To provide a raintight connection between tubing and the fitting.
- To couple ends of tubing.

Features

- Rugged all steel construction.
- Rings designed to positively bond conduit to fitting; unique locknut design provides effective bond between fitting and box or enclosure; ground continuity is assured.
- Nylon insulator firmly secured in place—protects conductors, reduces wire pulling effort and prevents thread damage in handling.
- Locknuts are designed with extended reach to lock fitting on to a thin box or an enclosure.
- Locknuts tighten without deformation; will not vibrate loose.

Standard Material

All Steel except Insulator.
 Insulator Thermoplastic, U.L.
 Rated 105°C

Standard Finish

All Steel Parts Electro Zinc Plated
 & Chromate Coated
 Insulator As Molded

Range

- Conduit Size 1/2" thru 2"
- Hub Size 1/2" thru 2" NPS
 Hubs provided with straight pipe threads NPS.

Conformity

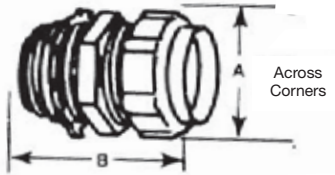
U.L. 514B
 CSA 22.2 No. 18.3
 NFPA 70-2008 (ANSI)
 NEMA FB-1
 Federal Specification W-F-408
 Federal Standard H-28 (Threads)

T&B Conduit Fittings

EMT Fittings

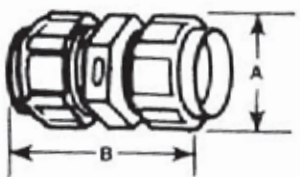


EMT Fittings—Nylon Insulated



Cat. No.	Size	Dimensions (in.)	
		A	B
5123	1/2"	1-3/64	1-21/32
5223	3/4"	1-21/64	1-27/32
5323	1"	1-11/16	1-7/8
5423	1-1/4"	2-1/16	2-11/32
5523	1-1/2"	2-5/16	2-23/32
5623	2"	2-25/32	2-13/16

U.L. Listed and CSA Certified raintight.

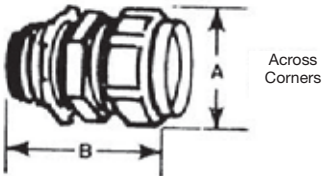


EMT Couplings



Cat. No.	Size	Dimensions (in.)	
		A	B
5120	1/2"	1-1/16	1-27/32
5220	3/4"	1-5/16	2-1/8
5320	1"	1-11/16	2-1/8
5420	1-1/4"	2-1/16	2-29/32
5520	1-1/2"	2-5/16	3-1/16
5620	2"	2-3/4	3-7/32

U.L. Listed and CSA Certified raintight.



EMT Fittings



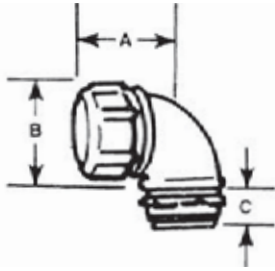
Cat. No.	Size	Dimensions (in.)	
		A	B
5121-TB	1/2"	1-1/16	1-9/16
5221	3/4"	1-5/16	1-21/32
5321	1"	1-11/16	1-3/4
5421	1-1/4"	2-1/16	1-11/32
5521-TB	1-1/2"	2-5/16	2-9/16
5621	2"	2-3/4	2-3/4

U.L. Listed and CSA Certified raintight.

T&B E.M.T. (thinwall) fittings comply with Federal Spec. WF408B.

T&B Conduit Fittings

EMT Fittings



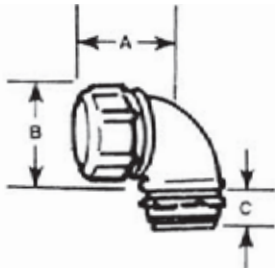
Ideal for cramped locations or tight corners where large radius conduit elbows will not fit or would appear unworkmanlike. Shoulders on body of 1/2" size are hex-shaped to provide positive holding for standard installation tools. Use insulated type for simple, and safe, installations. Malleable iron. CSA rated 105°C.

Short Elbows—Insulated



Cat. No.	Size	Dimension (in.)		
		A	B	C
4240	1/2"	1-7/8	1-1/8	11/16
4241-TB	1/2"	1-11/16	1-3/8	1/2
4242	1"	1-7/8	1-5/8	5/8
4243-TB	1-1/4"	2-3/4	2-5/16	11/16
4244	1-1/2"	3-1/16	2-5/8	11/16
4245	2"	3-3/8	3-7/32	3/4

U.L. Listed and CSA Certified raintight.



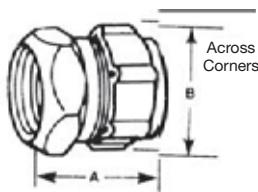
Ideal for cramped locations or tight corners where large radius conduit elbows will not fit or would appear unworkmanlike. Shoulders on body of 1/2" size are hex-shaped to provide positive holding for standard installation tools.

Short Elbows Malleable Iron



Cat. No.	Size	Dimension (in.)		
		A	B	C
4230	1/2"	1-7/16	1-9/32	7/16
4231	3/4"	1-11/16	1-19/32	1/2
4232	1"	1-7/8	1-27/32	5/8
4233	1-1/4"	2-3/4	2-15/32	11/16
4234	1-1/2"	3-1/16	2-3/4	11/16
4235	2"	3-3/8	3-5/16	11/16

U.L. Listed and CSA Certified raintight.



For connecting EMT to threaded rigid and intermediate metal conduit.

Combination Coupling—Steel



Cat. No.	Size	Dimension (in.)	
		A	B
530-TB	1/2"	1-3/8	1-1/16
531	3/4"	1-1/2	1-11/32
532	1"	1-19/32	1-21/32

U.L. Listed and CSA Certified raintight.

T&B Conduit Fittings

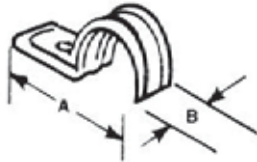
EMT Fittings



Pipe Straps—Steel



Oval Hole for Screw Size (C)



Elongated bolt hole makes alignment easy, even when holes in mounting surface are out of alignment. Snap on features hold strap in place.

Cat. No.	Size	Dimensions (in.)		
		A	B	C (Bolt Hole)
4159C	1/2"	1-27/32	3/4	1/4
4160C	3/4"	2-1/32	3/4	1/4
4161C	1"	2-11/32	3/4	1/4
4162*	1-1/4"	2-7/8	3/4	1/4
4163*	1-1/2"	3-11/16	1-1/4	11/32
4164*	2"	4-1/16	1-1/8	13/32

Not U.L. Listed

*Not CSA

Conform to CEC 12-1404



Oval Hole for Screw Size (C)



Designed to fit each size of conduit snugly. High reinforcing ribs on each side increase strength, reduce weight. Hot dipped galvanized finish.

Pipe Straps—Malleable Iron

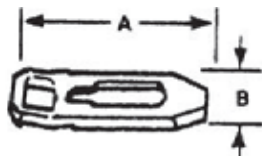


Cat. No.	Size	Dimensions (in.)		
		A	B	C (Bolt Hole)
4176	1/2"	2-5/32	2-1/32	1/4
4177	3/4"	2-9/16	1-1/16	1/4
4178	1"	3	3/4	1/4
4179	1-1/4"	3-3/4	1-3/16	5/16
4180	1-1/2"	4-3/16	1-5/16	3/8
4181	2"	5-3/16	1-1/8	7/16
1282*	2-1/2"	5-15/16	1-1/2	1/2
1283*	3	6-11/16	1-5/8	1/2
1284*	3-1/2	7-19/32	1-3/4	5/8
1285*	4"	8-5/16	1-7/8	5/8

Not U.L. Listed.

*Not CSA

Conforms to CEC 12-1404



Used with T&B conduit straps to permit space between conduit and mounting surface. Eliminates need for costly offset-bending conduit and possible corrosive moisture traps when conduit is mounted directly to a surface. Malleable iron. Hot-dipped galvanized finish, pre-mountable and stackable to eliminate offsetting.

Pipe Spacers



Cat. No.	Size	Dimensions (in.)	
		A	B
1350	1/2", 3/4", 1"	3"	7/8"
1351	1-1/4", 1-1/2", 2"	5"	1-3/16"
1352	2-1/2", 3"	9-9/16"	1-3/4"
1353	3-1/2", 4"	7-9/16"	2"
1354	4-1/2", 5", 6"	10-9/16"	2-9/16"

Conforms to CEC 12-012 (5).

Type RWS

Flexible Steel Conduit
UL Listed Flexible Metal Conduit (FMC)



Construction

- Constructed of continuously interlocked, zinc-coated steel strip.
- Flexible with high crush resistance.
- Smooth exterior and interior allow for easy pulling and wire fishing.



Angle-Lock Design 3/8" through 4"

Installation

- Uses standard flexible metal conduit fittings giving an IP40 rating.
- Continuous grounding contact.
- UL Listed Standard #1, File # E98045.
- Manufactured in size range from 3/8" through 4".
- Complies with Article 348, NEC.
- NEMA 1 Enclosure.
- Permitted to be used in exposed and concealed locations (Article 348.10); enclosed motor leads (Article 430.245(B); elevators, escalators, wheelchair lifts (Article 620.21). Not for wet locations.
- +450° F Maximum temperature.

NEC Articles

- Article 250.102, 250.118(5) and 250.134(B) Equipment Grounding.
- Article 300.22 (D) Information Technology Equipment
- Article 348 Flexible Metal Conduit. (FMC)
- Article 501.30 (B) Class I Div. 2.
- Article 620.21 Elevator Wiring Methods
- Article 645.5 (E) (2) Under Raised Floors

www.ul.com
www.nema.org

www.naed.org
www.anametelectrical.com

• UL LISTED  • RoHS WEEE COMPLIANT

Type RWS

Flexible steel conduit



Product Specifications

Ordering Information

Electrical Trade Size		Inside Diameter		Outside Diameter		Approx Inside Bend Radius	Approx Weight lbs.	Standard Coils		Standard Reels		Additional Packaging	
Inches	mm	Inches		Inches				PER	Length	NAED	Length	NAED	Length
		MIN.	MAX.	MIN.	MAX.	Inches	100 FT.	Feet	PIN	Feet	PIN	Feet	PIN
3/8	12	.375 – .393	.560 – .610	2	18	100	455503	1000	455507	250	455504		
1/2	16	.625 – .645	.860 – .920	3	28	100	455513	1000	455517	500	455516		
3/4	21	.812 – .835	1.045 – 1.105	4	33	100	455523	500	455526	1000	455527		
1	27	1.000 – 1.040	1.300 – 1.380	5	51	50	455532	300	455533				
1-1/4	35	1.250 – 1.300	1.550 – 1.630	6-1/4	63	50	455542	200	455543				
1-1/2	41	1.500 – 1.575	1.850 – 1.950	7-1/2	76	25	455551	150	455553				
2	53	2.000 – 2.080	2.350 – 2.450	10	100	25	455561	100	455563				
2-1/2	63	2.500 –	2.860 – 3.060	12-1/2	165	25	455571						
3	78	3.000 –	3.360 – 3.560	15	197	25	455581						
3-1/2	91	3.500 –	3.860 – 4.060	17-1/2	230	25	455601						
4	103	4.000 –	4.360 – 4.560	20	263	25	455591						

Note: 1. Additional put-ups available.

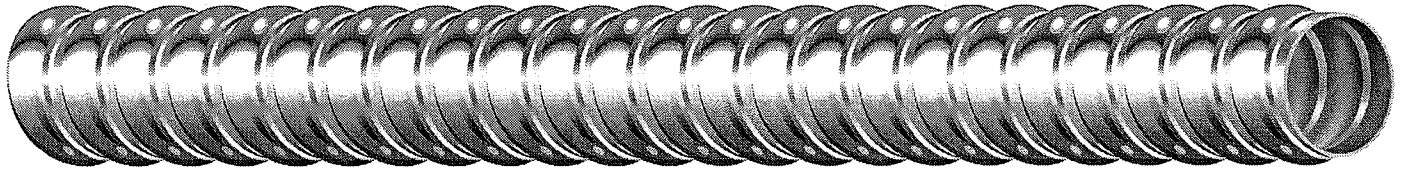
TYPICAL SPECIFICATION:

Conduit shall be Anaconda Type RWS. Conduit shall provide flexible raceway for wiring and shall be constructed of continuously interlocked hot dipped zinc galvanized steel. Conduit shall be UL listed in electrical trade sizes 3/8" thru 4".

Galflex® - Type RWS

(Reduced Wall Steel Flexible Metal Conduit)

Steel Flexible Metal Conduit. High Strength Steel Strip.
UL Recognized Component in 5/16". UL Listed in 3/8" through 3".
CSA Listed for Trade Sizes 5/16" and 3/8" Available Upon Request.



APPLICATIONS

Galflex® Type RWS (Reduced Wall Steel) Flexible Metal Conduit is suitable for the following installations:

- Environmental air-handling spaces per NEC® 300.22(C)
- Power and lighting branch circuit conductors and cables for connecting receptacles, luminaires, equipment, office partitions, etc.
- Metal raceway for wires and cables per NEC® (ANSI/NFPA-70) Article 348
- Motor feeder, branch, and control circuit conductors and cables
- Class 1, Class 2, Class 3 Remote-control, signaling, and power-limited circuit conductors and cables
- Fire alarm system conductors and cables of power-limited or non-power-limited fire alarm circuits
- Voice, data, communications and video cables including CATV and optical fiber cables
- Concealed or exposed installations per NEC® Article 348 and the applicable NEC® provisions
- Elevators, hoistways, and escalators per NEC® 620.21
- As a grounding conductor for lengths up to 6 feet (20A max) as per 2005 NEC® 250.118(5)
- Electric signs and outline lighting per NEC® 600.7, 600.31 (1000 volts or less), and 600.32 (>1000 volts)
- Hazardous location, Class 1, Div. 2, for flexible connectors only per 2005 NEC® 501.10(B)(2) & 501.30(B)
- UL 1, 2, & 3 Hour Through-Penetration Firestop Systems: C-AJ-1462, C-AJ-1463, C-AJ-1464, W-L-1308, and W-L-1309

STANDARDS & REFERENCES

- UL Listed per UL 1, Standard for Safety for Flexible Metal Conduit, ANSI/UL-1 for 3/8" through 3"
- CSA Listed per CSA 22.2 No. 56 per Canadian Electrical Code C22.1 Section 12-1000 for 5/16" and 3/8" trade sizes only
- Meets federal specification WW-C-566c
- NEC Type Designation - Article 348, Type FMC (flexible metal conduit)

CONSTRUCTION

Galflex® Type RWS is manufactured with a galvanized, corrosion resistant, high strength steel alloy. The metal strip is helically formed into a continuously interlocked flexible metal conduit that can withstand impact and crushing forces.

Galflex™ is a trademark of Southwire Company.



greenSpec™
RoHS Compliant

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Galflex - Type RWS

Trade Size (Inches)	Approximate Weight (lbs/100 ft)	Inner Diameter Min./Max. (inches)	Outer Diameter Min./Max. (inches)	Approx. Bend Radius* (Inches)	Standard Coil Length (feet)	Standard Reel Length (feet)
5/16*	16	0.312 / -	.0470 / 0.510	3.5	100	1000
3/8	18	0.375 / 0.393	.0560 / 0.610	4	100 / 250	1000
1/2	27	0.625 / 0.645	0.860 / 0.920	4	100	500 / 1000
3/4	34.5	0.812 / 0.835	1.045 / 1.105	5	100	500 / 1000
1	57	1.000 / 1.040	1.300 / 1.380	6	50	400
1-1/4	68	1.250 / 1.300	1.550 / 1.630	8	50	250
1-1/2	78	1.500 / 1.575	1.850 / 1.950	10	25	150
2	133	2.000 / 2.080	2.350 / 2.450	12	25	100
2-1/2	165	2.500 / -	2.860 / 3.060	15	25	100
3	197	3.000 / -	3.360 / 3.560	18	25	100
3-1/2**	231	3.500 / -	3.860 / 4.060	21	25	100
4**	264	4.000 / -	4.360 / 4.560	24	25	100

* Trade size 5/16" is provided as UL Recognized construction.
 ** Trade sizes 3-1/2" and 4" are non-UL.
 Note: Trade Sizes 3" and smaller are UL Listed.
 Minimum bend radius based on NEC Chapter 9 (other bends).

FEATURES

- Provides mechanical protection for conductors and cable
- For use with listed connectors intended for NEC Type FMC (Flexible Metal Conduit)
- Smooth interior for easy wire pulling
- High strength steel construction
- Hot-dipped, heavy zinc coating for rust/corrosion resistance
- Superior crush proof qualities
- Built in flexibility for simplified positioning

ADDITIONAL APPLICATIONS

- Listed wired fixtures per NEC 410.77(C)
- Raised floors for connection of information technology per NEC 645.5(D)(2) and 645.5(D)
- Places of assembly and theaters per NEC Articles 518 and 520
- Cranes and hoists per 2005 NEC 610.11(C)

ONLINE CERTIFICATIONS AND TOOLS

- UL Online Certifications Directory (www.ul.com)
- CSA Online Certifications Directory (www.csa.ca)
- UL Guide Information - Flexible Metal Conduit (DXUZ)
- CSA Product Information - Flexible Metal Conduit (1811-01)

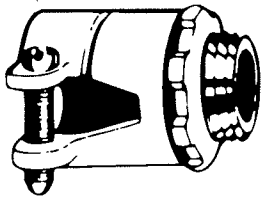


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Steel City®

Armored Cable/Flexible Metallic Conduit Fittings

Straight Connectors



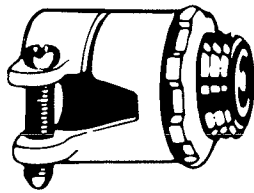
Straight Squeeze Type Connectors— Malleable Iron or Stamped Steel / Zinc Plated

Cat. No.	Conduit Size	Unit Qty.	Std. Ctn.
XC-400	3/8" (1/2" K.O.)	50	100
XC-401	1/2"	25	100
XC-402	3/4"	25	100
XC-403	1"	25	100
XC-404	1 1/4"	5	10
XC-405	1 1/2"	10	10
XC-406	2"	10	10
XC-407	2 1/2"	5	5
XC-408	3"	5	5

UL File No. E-17909 1/2"-3/4"

UL File No. E-1275 1"-3"

3/8"-3/4"-STEEL

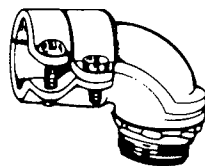


Straight Squeeze Type Connectors— Insulated Malleable Iron or Stamped Steel / Zinc Plated

Cat. No.	Conduit Size	Unit Qty.	Std. Ctn.
XC-901	1/2"	25	100
XC-902	3/4"	25	100
XC-903	1"	25	100
XC-904	1 1/4"	5	10
XC-905	1 1/2"	10	10
XC-906	2"	10	10
XC-907	2 1/2"	5	5
XC-908	3"	5	5

1/2"-3/4"-STEEL

Clamp Straight Set, 90°, and Duplex Connectors



90° Angle Squeeze Type Connectors—Steel or Malleable Iron / Zinc Plated

Cat. No.	Conduit Size	Unit Qty.	Std. Ctn.
XC-490	3/8" (1/2" K.O.)	50	100
XC-491	1/2"	25	100
XC-492	3/4"	25	50
XC-493	1"	25	25
XC-494	1 1/4"	10	10
XC-495	1 1/2"	10	10
XC-496	2"	5	5
XC-497	2 1/2"	1	1
XC-498	3"	1	1

For die cast armored cable/flexible metallic conduit fittings and combination fittings refer to the Steel City® Die Cast Conduit Fittings section.

UL File No. E-17909 3/8" & 1/2"

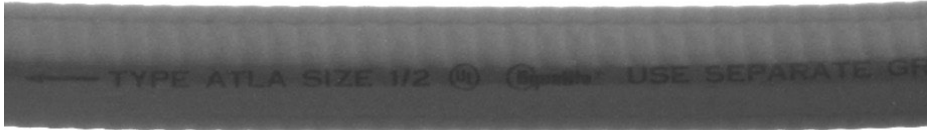
UL File No. E-1275 1"-3"

3/8"-3/4"-STEEL

Thomas & Betts

Steel Core

Type ATLA — All Temperature



Trade Size (in.)	Cat. No.	Carton Content* (m)	Cat. No.	Reel Content* (m)	Cat. No.	Reel Content* (m)	Inside Bend Radius		Weight kg/30m
							in.	(mm)	
3/8	ATLA038-30	30	ATLA038-150	150	ATLA038-300	300	2.0	(50.8)	13
1/2	ATLA050-30	30	ATLA050-150	150	ATLA050-300	300	3.0	(76.2)	15
3/4	ATLA075-30	30	ATLA075-150	150	ATLA075-300	300	4.2	(106.7)	24
1	ATLA100-30	30	ATLA100-120	120	-	-	5.5	(139.7)	37
1-1/4	ATLA125-15	15	ATLA125-60	60	-	-	7.0	(177.8)	46
1-1/2	ATLA150-15	15	ATLA150-45	45	-	-	4.5	(114.3)	47
2	ATLA200-15	15	ATLA200-30	30	-	-	6.0	(152.4)	66
2-1/2	ATLA250-8**	8	-	-	-	-	8.0	(203.2)	87
3	ATLA300-8**	8	-	-	-	-	10.0	(254.0)	114
3-1/2	ATLA350-8**	8	-	-	-	-	11.0	(279.4)	140
4	ATLA400-8**	8	-	-	-	-	12.0	(304.8)	154

See Chart on p. G28 for dimensions and tolerances

* See p. G27 for label and packaging detail

** CSA not applicable

Type ATLA

A liquidtight flexible steel conduit designed specifically for extreme hot or cold environments. The flexible inner core is identical to that found in Type LA. The specially formulated PVC jacket remains flexible at low temperatures and resists ageing at elevated temperatures. It is listed UL and certified CSA.

Construction

ATLA has a flexible inner core made from a spiral wound strip of heavy gauge, hot-dipped galvanized steel. The 3/8 through 1-1/4 inch trade sizes contain an integral bonding strip of copper. The 1-1/2 and larger sizes are designed with a fully interlocked strip.

The jacketing material is a rugged flame retardant flexible PVC resistant to weathering, UV, oils and many chemicals. Refer to the Conduit — Chemical Resistance Guide beginning on p. G30.

Applications

Designed to be used with high temperature machine tool wiring. Ideal for outdoor installations in cold climates. This conduit is intended for installation with Rule 12-1300 of Canadian Electrical Code (CEC) Part I 2002.

The use of a separate bonding conductor is mandatory in accordance with CEC Rule 12-1306 for Ordinary locations.

The use of Liquidtight Flexible Conduit with sign and Outline Lighting are in accordance with CEC Rule 34-400 (2).

- Listed and marked for direct burial and in poured concrete
- For containment of 600-volt and lower potential circuits

Working Temperatures

-55°C to 105°C Air / 60°C Wet / 70°C Oil

Listing / Certification

 Certified. Conforms to CSA 22.2 No. 56 for use per the CEC C22.1 Section 12-1300

 Listed. Conforms to UL Standard ANSI/UL-360 for Liquidtight Flexible Steel Conduit

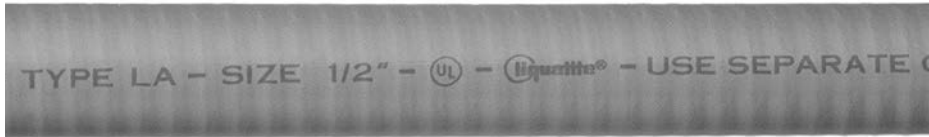
Conforms to the requirements of Section 16 & 17.7 of the ANSI/NFPA-79 Electrical Standard for Industrial Machinery.

Standard Colour

Machine tool grey

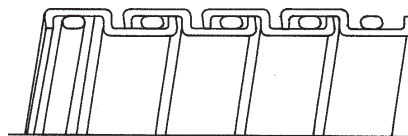
Steel Core

Type LA

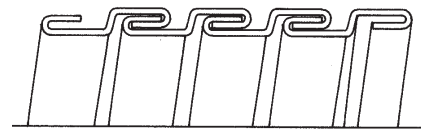


Trade Size (in.)	Cat. No.	Carton Content* (m)	Cat. No.	Reel Content* (m)	Cat. No.	Reel Content* (m)	Inside Bend Radius		Weight kg/30m
							in.	(mm)	
3/8	LA038-30	30	LA038-150	150	LA038-300	300	2.0	(50.8)	13
1/2	LA050-30	30	LA050-150	150	LA050-300	300	3.0	(76.2)	15
3/4	LA075-30	30	LA075-150	150	LA075-300	300	4.2	(106.7)	24
1	LA100-30	30	LA100-120	120	-	-	5.5	(139.7)	37
1-1/4	LA125-15	15	LA125-60	60	-	-	7.0	(177.8)	46
1-1/2	LA150-15	15	LA150-45	45	-	-	4.5	(114.3)	47
2	LA200-15	15	LA200-30	30	-	-	6.0	(152.4)	66
2-1/2	LA250-8	8	LA250-80	80	-	-	8.0	(203.2)	87
3	LA300-8	8	LA300-50	50	-	-	10.0	(254.0)	114
3-1/2	LA350-8	8	LA350-50	50	-	-	11.0	(279.4)	140
4	LA400-8	8	LA400-30	30	-	-	12.0	(304.8)	154

See Chart on p. G28 for dimensions and tolerances
 * See p. G27 for label and packaging detail



Squarelock with filler
3/8 in. - 1-1/4 in.



Interlock
1-1/2 in. - 4 in.

Type LA

A flexible liquidtight steel conduit which is both listed UL and certified CSA. It offers outstanding protection against wet, oily conditions and is permitted for use in exposed or concealed locations.

Construction

The flexible inner core is made from a spiral wound strip of heavy gauge, corrosion resistant, hot-dipped galvanized steel. The 3/8 through 1-1/4 inch trade sizes are square lock formed and include an integral bonding strip of copper that is enclosed within the convolutions throughout its entire length. The 1-1/2 through 4 inch trade sizes are designed with a fully interlocked strip.

The liquidtight jacketing material is of a high quality, rugged, flame retardant flexible PVC compound which resists oils, mild acids and exposure to sunlight. For further information, refer to the Conduit — Chemical Resistance chart beginning on p. G30.

Applications

This conduit is intended for installation with Rule 12-1300 of Canadian Electrical Code (CEC) Part I 2009.

The use of a separate bonding conductor is mandatory in accordance with CEC Rule 12-1306 for Ordinary locations.

The use of Liquidtight Flexible Conduit with sign and Outline Lighting are in accordance with CEC Rule 34-400 (2):

- Listed and marked for direct burial and in poured concrete
- For containment of 600-volt and lower potential circuits
- Sunlight resistant

Working Temperatures

-20°C to 60°C intermitting to 90°C

Listing / Certification

Certified. Conforms to CSA 22.2 No. 56 for use per CEC G22.1 Section 12-1300.

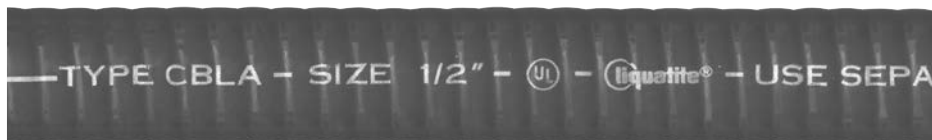
Listed. Conforms to UL Standard ANSI/UL-360 for Liquidtight Flexible Steel Conduit.

Standard Colours

Machine tool grey, and black. Other colours available upon request. Blue is commonly used for computer room installations. See TYPE CBLA on p. G8.

Steel Core

Type CBLA — Computer Blue



Trade Size (in.)	Cat. No.	Carton Content* (m)	Cat. No.	Reel Content* (m)	Cat. No.	Reel Content* (m)	Inside Bend Radius		Weight kg/30m
							in.	(mm)	
3/8	CBLA038-30	30	CBLA038-150	150	CBLA038-300	300	2.0	(50.8)	13
1/2	CBLA050-30	30	CBLA050-150	150	CBLA050-300	300	3.0	(76.2)	15
3/4	CBLA075-30	30	CBLA075-150	150	CBLA075-300	300	4.2	(106.7)	24
1	CBLA100-30	30	CBLA100-120	120	-	-	5.5	(139.7)	37
1-1/4	CBLA125-15	15	CBLA125-60	60	-	-	7.0	(177.8)	46
1-1/2	CBLA150-15	15	CBLA150-45	45	-	-	4.5	(114.3)	47
2	CBLA200-15	15	CBLA200-30	30	-	-	6.0	(152.4)	66
2-1/2	CBLA250-8	8	CBLA250-80	80	-	-	8.0	(203.2)	87
3	CBLA300-8	8	CBLA300-50	50	-	-	10.0	(254.0)	114
3-1/2	CBLA350-8	8	CBLA350-50	50	-	-	11.0	(279.4)	140
4	CBLA400-8	8	CBLA400-30	30	-	-	12.0	(304.8)	154

See Chart on p. G28 for dimensions and tolerances
 * See p. G27 for label and packaging detail

Type CBLA

Computer Blue LA is a liquidtight flexible steel conduit commonly used for computer room installations. The blue jacket colour easily identifies circuitry for computer power wiring.

Construction

CBLA has a flexible inner core made from a spiral wound strip of heavy gauge, hot-dipped galvanized steel. The 3/8 through 1-1/4 inch trade sizes contain an integral bonding strip of copper. The 1-1/2 and larger sizes are designed with a fully interlocked strip.

The jacketing material is a rugged flame retardant flexible blue PVC. For installations which do not allow the use of PVC, see TYPE ZHLA on p. G12.

Applications

Listed and marked for direct burial and in poured concrete.

Working Temperatures

-20°C to 60°C

Listing / Certification

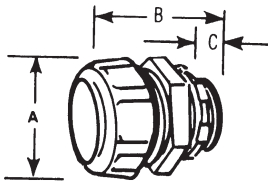


Certified. Conforms to CSA 22.2 No. 56 for use per CEC C22.1 Section 12-1300

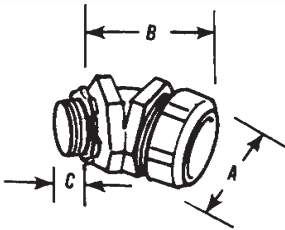


Listed. Conforms to UL Standard ANSI/UL-360 for Liquidtight Flexible Steel Conduit

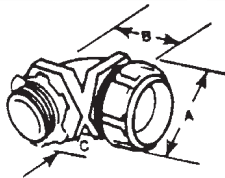
Liquidtight Flexible Metal Conduit Fittings



Steel malleable iron, or aluminum tapered hub threads. With safe-edge ground thru 4" cone and double bevel seating ring (through 2").



Malleable iron, tapered hub threads. With safe-edge ground cone and double bevel sealing ring (through 2").



52® and 53™ Series Liquidtight Straight Connectors*

CAT. NO.		CONDUIT SIZE	DIMENSIONS (IN.)		
INSULATED STEEL	NON-INSULATED STEEL		A	B	C
5229†	—	¼"	27/32	1 1/8	15/32
5330†	—	5/16"	63/64	1 1/8	15/32
5331***	5231†	3/8"	1 1/32	1 1/2	9/16
5332†	5232†	1/2"	1 1/8	1 1/16	9/16
5333†	5233†	3/4"	1 21/32	1 5/8	9/16
5334†	5234†	1"	1 7/8	2 1/16	3/4
5335†	5235†	1 1/4"	2 7/32	2 1/2	13/16
5336	5236	1 1/2"	2 23/32	2 11/16	13/16
5337	5237	2"	3 1/4	3 1/16	7/8
5338	5238	2 1/2"	3 3/4	4 1/8	1
5339	5239	3"	4 1/2	4 3/4	1
5340	5240	4"	5 1/2	4 3/2	1 1/8
5385†	5285	5"	8 3/4	7	1 1/8
5386†	—	6"	8 3/4	8 1/2	2

52® and 53™ Series Liquidtight 45° Angle Connectors*

CAT. NO.		CONDUIT SIZE	DIMENSIONS (IN.)		
INSULATED	NON-INSULATED		A	B	C
5341***	5241†	3/8"	1 1/32	1 1/16	9/16
5342†	5242†	1/2"	1 1/8	1 1/8	9/16
5343†	5243†	3/4"	1 21/32	2 1/8	9/16
5344†	5244†	1"	1 7/8	2 1/4	3/4
5345†	5245†	1 1/8"	2 7/32	2 3/4	13/16
5346	5246	1 1/2"	2 23/32	3 3/8	13/16
5347	5247	2"	3 1/4	3 3/8	7/8
5348	5248	2 1/2"	3 3/4	4 1/4	1
5349	5249	3"	4 1/2	4 3/4	1
5350	5250	4"	5 1/2	4 3/8	1 1/8



52® and 53™ Series Liquidtight 90° Angle Connectors

CAT. NO.		HUB SIZE	CONDUIT SIZE	DIMENSIONS (IN.)		
INSULATED	NON-INSULATED			A	B	C
5351	5251	1/2"	3/8"	1 1/32	1 1/8	9/16
5352	5252	1/2"	1/2"	1 3/8	1 1/16	9/16
5353	5253	3/4"	3/8"	1 21/32	1 3/4	9/16
5354	5254	1"	1"	1 7/8	2 1/16	3/4
5355	5255	1 1/4"	1 1/4"	2 7/32	2 3/4	13/16
5356	5256	1 1/2"	1 1/2"	2 23/32	2 15/16	13/16
5357	5257	2"	2"	3 1/4	3 1/16	7/8
5358	5258	2 1/2"	2 1/2"	3 3/4	8 1/8	1
5359	5259	3"	3"	4 1/2	10 1/4	1
5360	5260	4"	4"	5 1/2	12 3/8	1 1/8

* Suitable for hazardous locations use in Class I, Div. 2; Class II, Div. 1 and 2; Class III, Div. 1 and 2, where general purpose equipment is specifically permitted per NEC Section 500-2(a).

*** 3/8" Conduit Fitting has 1/2" hub.

† UL Listed as grounding means under NEC 351-7.

‡ Not UL Listed.

Note: UL Listed liquidtight; and CSA Certified watertight. Available with DURA-PLATE® Finish. UL File No. E-23018. CSA File No. 2884.

For Wiremesh Grips, refer to pages A-111 and A-141.

Blue is a trademark color of Thomas & Betts.

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Canada
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Fax: 450.347.1976

Technical Services
Tel: 888.862.3289

Thomas & Betts

www.tnb.com

Liquidtight Flexible Metal Conduit Fittings



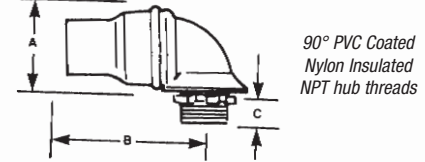
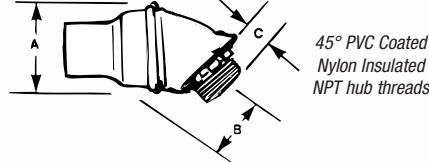
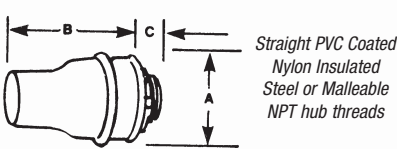
Corrosion-Resistant PVC Jacketed Liquidtight Connectors

CAT. NO.	CONDUIT SIZE	A	B	C	CAT. NO.	CONDUIT SIZE	A	B	C	CAT. NO.	CONDUIT SIZE	A	B	C
Straight PVC Coated					45° PVC Coated					90° PVC Coated				
3321†	3/8"	1 1/2"	2 3/8"	3/8"	3341†	3/8"	1 1/4"	1 1/8"	3/8"	3361†	3/8"	1 1/4"	2 3/8"	3/8"
3322†	1/2"	1 3/8"	2 1/2"	3/4"	3342†	1/2"	1 3/8"	1 1/8"	3/4"	3362†	1/2"	1 3/8"	2 1/2"	3/4"
3323†	3/4"	1 5/8"	2 7/8"	7/8"	3343†	3/4"	1 5/8"	1 1/8"	7/8"	3363†	3/4"	1 5/8"	2 7/8"	7/8"
3324†	1"	2 1/4"	3 1/4"	1"	3344†	1"	2 1/4"	1 3/8"	3/4"	3364†	1"	2 1/4"	3 1/2"	3/4"
3325†	1 1/8"	2 1/8"	4 1/4"	1 1/8"	3345†	1 1/8"	2 1/8"	2 1/8"	1 1/8"	3365†	1 1/8"	2 1/8"	4 1/2"	1 1/8"
3326	1 1/2"	3"	4 1 1/8"	1 1/2"	3346	1 1/2"	3"	2 1/8"	1 1/2"	3366	1 1/2"	3"	4 1 1/8"	1 1/2"
3327	2"	3 3/8"	5 5/8"	1 3/4"	3347	2"	3 3/8"	3 3/8"	1 3/4"	3367	2"	3 3/8"	5 1 1/8"	1 3/4"
3328	2 1/2"	4"	6 3/8"	1 3/4"	3348	2 1/2"	4"	3 1/2"	1 3/4"	3368	2 1/2"	4"	11 1/8"	1 3/4"
3329	3"	5 5/8"	6 1/2"	1 3/4"	3349	3"	5 5/8"	4 3/8"	1 3/4"	3369	3"	5 5/8"	12 1/2"	1 3/4"
3331	4"	6 3/4"	6 3/4"	1 3/4"	3352	4"	6 3/4"	5 3/4"	1 3/4"	3371	4"	6 3/4"	14 3/8"	1 3/4"

† UL Listed as grounding means per NEC, SECT. 351.7
Complies with JIC standards and Federal Specs A-A-50552,
A-A-50553
Suitable for hazardous locations use in Class I, Div. 2; Class II,

Div. 1 and 2; Class III, Div. 1 and 2, where general purpose
equipment is specifically permitted per NEC Section 500-2(a).
Meets Coast Guard CG293

UL File No. E 23018
CSA File No. 2884
UL Type 3, 3R, 3S, 4, 5, 12, 12K & 13 Locations



The strength of steel — with superior corrosion-resistance!

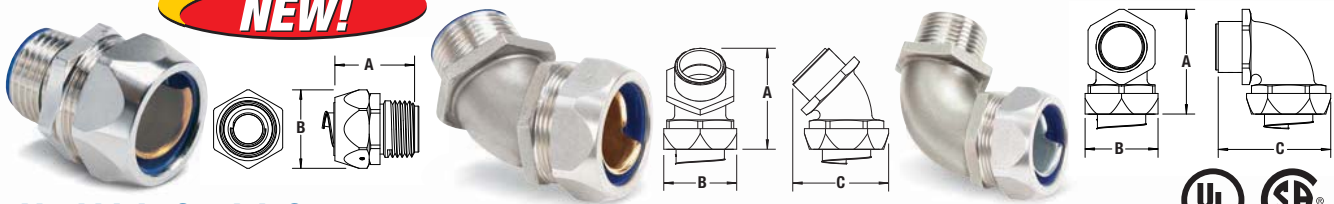
Stainless Steel Liquidtight Conduit Connectors

Until now, there's been no ideal conduit fitting solution for use in heavily corrosive environments. Traditional metallic fittings corrode and require frequent replacement. Non-metallic fittings offer less strength, lower UV-resistance and don't stand up well in extreme temperatures. T&B® Stainless Steel Liquidtight Conduit Connectors are constructed of 304 stainless steel to resist corrosion while offering high strength, high UV-resistance and high endurance. Choose among a full range of fittings in straight, 45°, and 90° angled configurations for 3/8" to 2" conduit sizes. Look for the distinctive blue insulator and sealing ring for assurance of T&B quality.

- Ideal for industrial MRO and OEM applications in food and beverage, pharmaceutical, petrochemical, wastewater, salt water and other corrosive environments
- Connects metallic-cored liquidtight conduit to a box or enclosure
- 304 stainless steel body and gland-nut resists corrosion far better than other metallic fittings
- Stronger, more UV-resistant than nonmetallic fittings
- Ground cones are available in 1 1/4", 1 1/2" and 2" sizes and are brass/nickel plated
- Available in straight, 45°, and 90° angled configurations to fit conduit from 3/8" to 2"
- UL® Listed Ratings: 3, 3R, 4, 4X
- 5262 Sealing Ring Gasket (sold separately) includes a stainless steel retaining ring to prevent elongation of the gasket and is made from Santoprene™ material, ensuring a superior seal



NEW!

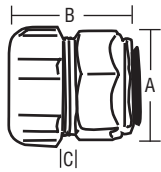


Liquidtight Conduit Connectors

CAT. NO.	SIZE	DIMENSIONS			STD. PKG. QTY.	CAT. NO.	SIZE	DIMENSIONS			STD. PKG. QTY.	CAT. NO.	SIZE	DIMENSIONS			STD. PKG. QTY.						
		A	B	C			A	B	C				A	B	C								
Straight					45° Angled					90° Angled					Sealing Gasket								
5331SST	3/8"	1.360"	1.02"	—	25	5341SST	3/8"	1.84"	1.02"	1.43"	25	5351SST	3/8"	1.95"	1.02"	1.84"	25	5261	3/8"	—	—	—	50
5332SST	1/2"	1.360"	1.18"	—	25	5342SST	1/2"	1.62"	1.18"	2.04"	25	5352SST	1/2"	2.12"	1.18"	2.07"	25	5262	1/2"	—	—	—	50
5333SST	3/4"	1.388"	1.37"	—	25	5343SST	3/4"	2.32"	1.37"	1.93"	10	5353SST	3/4"	2.47"	1.37"	2.44"	10	5263	3/4"	—	—	—	25
5334SST	1"	1.562"	1.77"	—	5	5344SST	1"	2.86"	1.77"	2.37"	5	5354SST	1"	2.98"	1.77"	2.90"	5	5264	1"	—	—	—	25
5335SST	1 1/8"	1.720"	2.12"	—	20	5345SST	1 1/8"	3.33"	2.12"	2.80"	5	5355SST	1 1/8"	3.53"	2.12"	3.36"	5	5265	1 1/8"	—	—	—	5
5336SST	1 1/2"	2.020"	2.48"	—	5	5346SST	1 1/2"	3.94"	2.48"	3.39"	2	5356SST	1 1/2"	4.16"	2.48"	3.88"	2	5266	1 1/2"	—	—	—	5
5337SST	2"	2.335"	3.04"	—	2	5347SST	2"	4.73"	3.04"	4.23"	1	5357SST	2"	8.60"	3.04"	4.69"	1	5267	2"	—	—	—	5

Blue is a trademark color of Thomas & Betts.

Liquidtight Flexible Metal Conduit Fittings



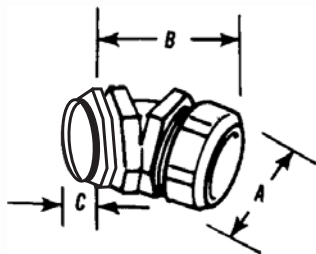
Steel or malleable iron with O-Ring Seal

Nylon Insulated CHASE® Connectors



CAT. NO.	CONDUIT SIZE	DIMENSIONS (IN.)		
		A	B	C
5361†	3/8"	1 1/2	1 1/8	1/8
5362†	1/2"	1 1/2	1 1/8	3/16
5363†	3/4"	1 11/16	1 1/8	1/4
5364†	1"	2 1/2	2 1/16	1/4
5365†	1 1/4"	2 3/8	2 3/8	5/16
5366†	1 1/2"	2 5/8	2 3/4	3/8
5367†	2"	3 3/8	3	3/8
5368†	2 1/2"	4 3/8	3 5/8	7/16
5369†	3"	5 1/8	4 1/2	1/2
5370†	4"	5 3/8	4 1/2	1/2

With SAFE-EDGE® ground cone and double bevel sealing ring (through 2").



Malleable iron

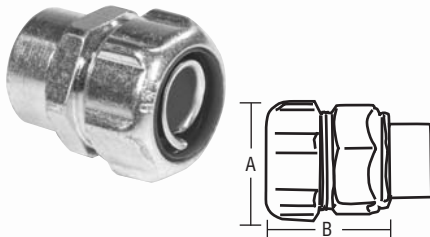
Nylon Insulated 90° Angle CHASE® Connectors

CAT. NO.	CONDUIT SIZE	DIMENSIONS (IN.)		
		A	B	C
5371†	3/8"	1 1/2	1 1/2	3/16
5372†	1/2"	1 5/8	1 5/8	3/16
5373†	3/4"	1 3/4	1 1/2	5/16
5374†	1"	1 7/8	2 1/4	1 1/2

With SAFE-EDGE® ground cone and double bevel sealing ring.

NOTE: UL Listed Liquidtight; & CSA certified watertight. Suitable for hazardous locations use in Class I, Div. 2; Class II, Div. 1 and 2; Class III, Div. 1 and 2, where general purpose equipment is specifically permitted per NEC Section 500-2(a).

†UL listed as grounding means under NEC 351-7.



Standard Liquidtight Female Hub Adapter



CAT. NO.	CONDUIT SIZE	DIMENSIONS (IN.)	
		A	B
5271†	3/8"	1 1/2	1 1/8
5272†	1/2"	1 1/2	1 1/8
5273†	3/4"	1 3/2	1 1/4
5274†	1"	1 1/2	2 1/8
5275†	1 1/4"	2 1/2	2 1/8

†UL Listed as grounding means under NEC 351-7.



Prevents severe conduit bends and pullout!

Wiremesh Grips for Liquidtight Fittings



CAT. NO.	CONDUIT SIZE	LIQUIDTIGHT CONNECTORS			90° CHASE	CHASE	ADAPTER
		STRAIGHT	45°	90°			
WVG-LT1	3/8"	5331	5341	5351	5361	5371	5271
WVG-LT2	1/2"	5332	5342	5352	5362	5372	5272
WVG-LT3	3/4"	5333	5343	5353	5363	5373	5273
WVG-LT4	1"	5334	5344	5354	5364	5374	5274
WVG-LT5	1 1/4"	5335	5345	5355	5365	—	5275
WVG-LT6	1 1/2"	5336	5346	5356	5366	—	5276
WVG-LT7	2"	5337	5347	5357	5367	—	5277
WVG-LT8	2 1/2"	5338	5348	5358	5368	—	5278
WVG-LT9	3"	5339	5349	5359	5369	—	5279
WVG-LT10	4"	5340	5350	5360	5370	—	5282

Order wiremesh grip separately; no need to duplicate inventory.

UL File No. E23018

CSA File No. 2884 & 4484

Aluminum Liquidtight Conduit

Specifications for LTA Conduit

- Construction: Utilizes the flexibility of a lightweight aluminum core, coupled with the advantage of a PVC jacket that is virtually unaffected by sunlight, acid and oil. WEEE and RoHS compliant
- Application: Used in situations where concerns of excessive weight and corrosion exist
- Standard Color: Machine tool gray
- Working Temperature: -20° C to +80° C
- Standard Materials/Finish: LTA Conduit
Conduit Core: Aluminum
Outer Jacket: PVC

LTA Aluminum Flexible Liquidtight Conduit

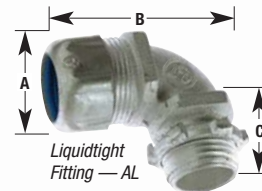
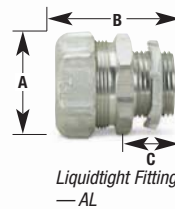
CAT. NO.	CONDUIT SIZE	LENGTH (FT.)	INSIDE BEND RADIUS (IN.)	WT. (LBS.)/ 100 FT.	WT. (LBS.)/ 50 FT.
LTA50-100	½"	100	2.5	15	—
LTA75-100	¾"	100	3.0	20	—
LTA100-100	1"	100	4.0	29	—
LTA125-50	1¼"	50	4.5	—	20
LTA150-50	1½"	50	5.5	—	28
LTA200-50	2"	50	7.0	—	36.5
LTA250-25	2½"	25	9.5	188	—
LTA300-25	3"	25	11.5	244	—
LTA400-25	4"	25	14	332	—

Add suffix -GR to the fitting catalog number to order the Revolver® Grounding version.



Standard Materials/Finish

Fittings Body, Gland, Locknut Aluminum
Sealing Ring. Thermoplastic
Zinc Plating with Clear Chromate Ground Cones



52° Series Liquidtight Fittings — AL



CAT. NO.	CONDUIT SIZE	DIMENSIONS		
		A	B	C

Straight

5231AL	¾"	1½"	1½"	¾"
5232AL	½"	1¾"	1¾"	¾"
5233AL	¾"	1 ²¹ / ₃₂ "	1¾"	¾"
5234AL	1"	1¾"	2 ¹ / ₁₆ "	¾"
5235AL	1¼"	2 ⁹ / ₃₂ "	2½"	1 ¹ / ₁₆ "
5236AL	1½"	2 ²² / ₃₂ "	2 ¹¹ / ₁₆ "	1 ³ / ₁₆ "
5237AL	2"	3¼"	3 ¹ / ₁₆ "	7 ⁸ / ₁₆ "
5238AL	2½"	3¾"	4 ¹ / ₈ "	1"
5239AL	3"	4 ¹ / ₂ "	4 ¹ / ₄ "	1"
5240AL	4"	5½"	4 ¹ / ₂ "	1 ¹ / ₈ "

90°

5251AL	¾"	1½"	1¾"	¾"
5252AL	½"	1¾"	1 ¹ / ₁₆ "	¾"
5253AL	¾"	1 ²¹ / ₃₂ "	1¾"	¾"
5254AL	1"	1¾"	2 ³ / ₁₆ "	¾"
5255AL	1¼"	2 ⁹ / ₃₂ "	2¾"	1 ¹ / ₁₆ "
5256AL	1½"	2 ²² / ₃₂ "	2 ¹¹ / ₁₆ "	1 ³ / ₁₆ "
5257AL	2"	3¼"	3 ¹ / ₁₆ "	7 ⁸ / ₁₆ "

Liquidtight Grounded Fittings — ALGR



CAT. NO.	CONDUIT SIZE	DIMENSIONS		
		A	B	C

Straight

5231ALGR	¾"	1½"	1½"	¾"
5232ALGR	½"	1¾"	1¾"	¾"
5233ALGR	¾"	1 ²¹ / ₃₂ "	1¾"	¾"
5234ALGR	1"	1¾"	2 ¹ / ₁₆ "	¾"

90°

5251ALGR	¾"	1½"	1¾"	¾"
5252ALGR	½"	1¾"	1 ¹ / ₁₆ "	¾"
5253ALGR	¾"	1 ²¹ / ₃₂ "	1¾"	¾"
5254ALGR	1"	1¾"	2 ³ / ₁₆ "	¾"

Ground Wire D 14-8 — 5231ALGR, 5232ALGR

Ground Wire D 14-8 — 5251ALGR, 5252ALGR

Ground Wire D 14-4 — 5233ALGR, 5234ALGR

Ground Wire D 14-4 — 5253ALGR, 5254ALGR

United States
Tel: 901.252.8000
800.816.7809
Fax: 901.252.1354

Canada
Tel: 450.347.5318
Fax: 450.347.1976

Technical Services
Tel: 888.862.3289

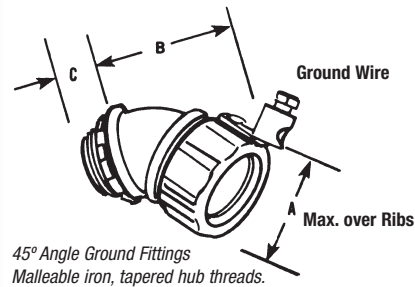
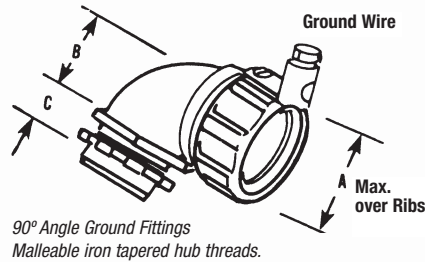
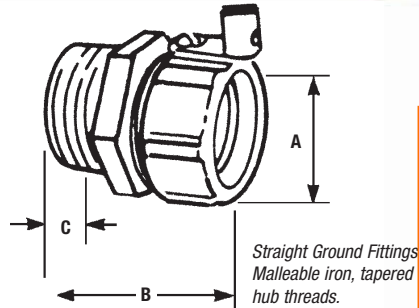
Thomas & Betts

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Liquidtight Flexible Metal Conduit Fittings



Malleable iron with tapered hub threads!
Grounding Fittings —
Straight*, 45° Angle
and 90° Angle



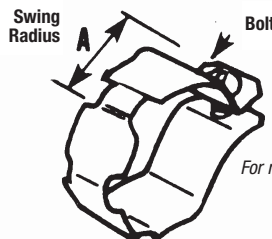
CAT. NO.		ALUMINUM NON-INSULATED	CONDUIT SIZE	DIMENSIONS (IN.)			GROUND WIRE D
STEEL INSULATED	STEEL NON-INSULATED			A	B	C	
Straight Grounding Fittings							
5331GR**	5231GR*	5231 ALGR*	3/8"	1 1/2"	1 1/2"	5/16"	14-8
5332GR*	5232GR*	5232ALGR*	1/2"	1"	1 1/8"	5/16"	14-8
5333GR*	5233GR*	5233ALGR*	3/4"	1 3/8"	1 1/8"	5/16"	14-4
5334GR*	5234GR*	5234ALGR*	1"	1"	2 1/8"	3/4"	14-4
5335GR	5235GR	—	1 1/4"	2 1/4"	2 1/2"	13/16"	8-1/0
5336GR	5236GR	—	1 1/2"	3/4"	2 1/8"	13/16"	4-2/0
5337GR	5237GR	—	2"	3 3/8"	3 3/8"	7/8"	4-2/0
5338GR	5238GR	—	2 1/2"	4 3/8"	4 3/8"	1"	2-4/0
5339GR	5239GR	—	3"	5 3/8"	4 3/4"	1"	2-4/0
5340GR	5240GR	—	4"	6"	4 1/2"	1 1/8"	2-4/0
5385GR	5285GR	—	5"	8 3/8"	7"	1 1/8"	2-4/0
5386GR	—	—	6"	8 1/2"	8 1/2"	2"	2-4/0

CAT. NO.		ALUMINUM NON-INSULATED	CONDUIT SIZE	DIMENSIONS (IN.)			GROUND WIRE D
STEEL INSULATED	STEEL NON-INSULATED			A	B	C	
90° Angle Grounding Fittings							
5351GR**	5251GR**	5251ALGR*	3/8"	1 1/2"	1 1/4"	5/16"	14-8
5352GR*	5252GR*	5252ALGR*	1/2"	1"	1 1/8"	5/16"	14-8
5353GR*	5253GR*	5253ALGR*	3/4"	1 3/8"	1 13/16"	5/16"	14-4
5354GR*	5254GR*	5254ALGR*	1"	1"	2 1/8"	3/4"	14-4
5355GR*	5255GR	—	1 1/4"	2 1/4"	2 1/2"	13/16"	8-1/0
5356GR	5256GR	—	1 1/2"	3/4"	2 1/8"	13/16"	4-2/0
5357GR	5257GR	—	2"	3 3/8"	3 3/8"	7/8"	4-2/0
5358GR	5258GR	—	2 1/2"	4 3/8"	4 3/8"	1"	2-4/0
5359GR	5259GR	—	3"	5 3/8"	4 3/4"	1"	2-4/0
5360GR	5260GR	—	4"	6"	12 3/8"	1 1/8"	2-4/0

CAT. NO.		ALUMINUM NON-INSULATED	CONDUIT SIZE	DIMENSIONS (IN.)			GROUND WIRE D
INSULATED	NON-INSULATED			A	B	C	
45° Angle Grounding Fittings							
5341GR**	5241GR**	5241GR**	3/8"	1 1/2"	1 1/8"	5/16"	14-8
5342GR*	5242GR*	5242GR*	1/2"	1"	1 1/8"	5/16"	14-8
5343GR*	5243GR*	5243GR*	3/4"	1 3/8"	2 1/8"	5/16"	14-4
5344GR*	5244GR*	5244GR*	1"	1"	2 1/4"	3/4"	14-4
5345GR	5245GR	5245GR	1 1/4"	2 1/4"	2 3/4"	13/16"	8-1/0
5346GR	5246GR	5246GR	1 1/2"	3/4"	3 3/8"	13/16"	4-2/0
5347GR	5247GR	5247GR	2"	3 3/8"	3 3/8"	7/8"	4-2/0
5348GR	5248GR	5248GR	2 1/2"	4 3/8"	4 3/8"	1"	2-4/0
5349GR	5249GR	5249GR	3"	5 3/8"	4 3/4"	1"	2-4/0
5350GR	5250GR	5250GR	4"	6"	4 3/8"	1 1/8"	2-4/0

** 3/8" conduit fittings have 1/2" trade size hub. With safe-edge ground cone (through 4") and double bevel sealing ring (through 2").
 UL Listed liquidtight; and CSA Certified watertight. Suitable for hazardous locations use in Class I, Div. 2; Class II, Div. 1 and 2; Class III, Div. 1 and 2, where general purpose equipment is specifically permitted per NEC Section 500-2(a). Available with DURA-PLATE® Finish. UL File No. E 3060 CSA File No. 638
 *NOTE: 3/8"-1" fittings include Revolver® grounding device. For sizes 1 1/4" and up, fittings are supplied with a copper mechanical lug.

For retrofit applications —
 includes strap, nut and bolt!
External Grounding Strap



For retrofit applications.
 Includes strap,
 nut and bolt.

CAT. NO.	CONDUIT SIZE	A	B BOLT SIZE
GR1W	3/8"	1"	10-24
GR2W	1/2"	1 1/8"	10-24
GR3W	3/4"	1 1/2"	1/4-20
GR4W	1"	1 3/4"	1/4-20
GR5W	1 1/4"	1 3/4"	5/16-18

UL File No. E-3060 CSA File No. 638

United States
 Tel: 901.252.8000
 800.816.7809
 Fax: 901.252.1354

Canada
 Tel: 450.347.5318
 Fax: 450.347.1976

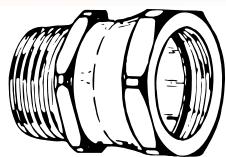
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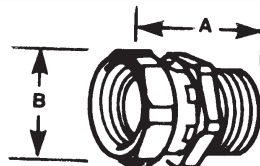
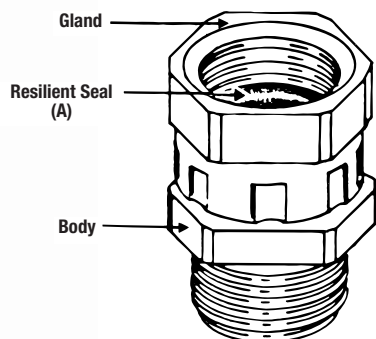
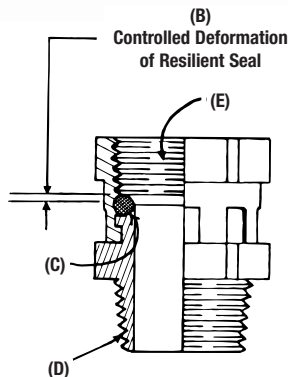
www.tnb.com

Liquidtight Flexible Metal Conduit Fittings

T&B Fittings



41 Series



Steel, zinc plated and chromated.
Ideal for angle fittings where swing clearance is not available.

Liquidtight Union for Threaded Hub

Application

- To couple threaded end of a fitting or a pipe to a tapped opening in a box or enclosure where rotation of fitting or pipe is limited or restricted

Features

- Design provides high quality bond between fitting or pipe to the union
- Provided with resilient seal (A)
- Resilient seal subjected to controlled deformation; positive seal and reusability are ensured (B)
- Unique design centralizes throat openings of threaded hub and union (C)
- Permits orientation of fitting in any predetermined direction for a safe, functional and neat assembly
- Provided with taper threaded hub for liquidtight assembly (D)
- Straight pipe threads on gland accept a straight or taper threaded hub on fitting or pipe to be coupled (E)
- Suitable for hazardous location use per NEC Article 501 Class I, Division 2, Article 502 Class II, Division 1 & 2 and Article III Division 1 & 2

Standard Material/Finish

Gland Steel/Electro Zinc Chromate Coated
Body Steel/Electro Zinc Chromate Coated
O-Ring Buna N/As Molded

Range

Hub (External Thread) 1/2" & 3/4" NPT
Gland (Internal Threads) 1/2" & 3/4" NPS

Listed/Certified by

UL (UL File No. E-23018)
CSA (LR-2884, LR-4484)

Conforms to

UL 514B
CSA C22.2 No. 18
NEMA FB1
NFPA 70
Federal Standard A-A-50553
Federal Standard A-A-50552
Federal Standard H-28 (Threads)

NOTE: For additional product information refer to Thomas & Betts publication 600.1



CAT. NO.	CONDUIT SIZE	A	B
41-TB	1/2"	1 3/64"	1"
42-TB	3/4"	1 1/16"	1 1/4"

UL File No. E-23018

CSA File No. 2884

Prime Conduit™ Rigid Nonmetallic Conduit (RNC)

Prime Conduit™ manufactures the most complete line of nonmetallic conduits in the electrical industry. Prime Conduit Schedule 40 and Schedule 80 conduits are designed for use aboveground and underground as described in the National Electrical Code. Specify only Prime Conduit conduits to insure raceway system quality.

Features

Ease of Installation Nonmetallic conduits are 1/4 to 1/5 the weight of metallic systems, can be installed in less than half the time, and are easily fabricated on the job.

Safety Nonmetallic conduits are nonconductive, assuring a safe system.

Impact Resistant Prime Conduit Schedule 40 and Schedule 80 nonmetallic conduits are resistant to sunlight and are listed for exposed or outdoor usage.

Corrosion Resistant Prime Conduit conduits are nonmetallic and will not rust or corrode.

Prime Conduit nonmetallic Schedule 40 and Schedule 80 conduits and elbows are manufactured to NEMA TC-2, Federal specification WC1094A and UL 651 specifications. The conduit carries respective UL or ETL Listings and UL or ETL labels.

Prime Conduit Schedule 40 PVC Rigid Nonmetallic Conduit (RNC). (Heavy Wall EPC)

Listed for underground applications encased in concrete or direct burial. Also for use in exposed or concealed applications aboveground.

- Sunlight resistant
- Rated for use with 90°C conductors
- Superior weathering characteristics
- Made in USA



RUS Accepted

Schedule 40 Heavy Wall

With Integral Bell*



Part No.		Trade Size	Std. Crate Qty.		Wt. Per 100'	Dimensions		
10'	20'		10'	20'		O.D.	I.D.	Wall
49005-010		1/2"	6000'		17	.840	.622	.109
49007-010	49007-020	3/4"	4400'	8800'	23	1.050	.824	.113
49008-010	49008-020	1"	3600'	7200'	34	1.315	1.049	.133
49009-010	49009-020	1 1/4"	3300'	6600'	46	1.660	1.380	.140
49010-010	49010-020	1 1/2"	2250'	4500'	55	1.900	1.610	.145
49011-010	49011-020	2"	1400'	2800'	73	2.375	2.067	.154
49012-010	49012-020	2 1/2"	930'	1860'	124	2.875	2.469	.203
49013-010	49013-020	3"	880'	1760'	163	3.500	3.068	.216
49014-010	49014-020	3 1/2"	630'	1260'	196	4.000	3.548	.226
49015-010	49015-020	4"	570'	1140'	232	4.500	4.026	.237
49016-010	49016-020	5"	380'	760'	315	5.563	5.047	.258
49017-010	49017-020	6"	260'	520'	409	6.625	6.065	.280

Rigid nonmetallic conduit is normally supplied in standard 10' lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10', with or without belled ends.

Use RNC Fittings with Schedule 40 and Schedule 80 Conduit.

- Notes:**
1. Special conduit sizes will be quoted on request.
 2. DON'T FORGET TO ORDER CEMENT.
 3. Prime conduit reserves the right to ship to the nearest unitized quantity.

Rigid Nonmetallic Conduit – Support in Aboveground Installations

Prime Conduit Schedule 80 PVC Rigid Nonmetallic Conduit (RNC) (Extra Heavy Wall EPC-80)



Listed for use in aboveground and belowground applications including areas subject to physical damage.

- Sunlight resistant • Rated for use with 90°C conductors • Superior weathering characteristics
- Identified for use in areas subject to physical damage in accordance to 352.12(C)

RUS Accepted

With Integral Bell*



Schedule 80 Extra Heavy Wall

Part No.		Trade Size	Std. Crate Qty.		Wt. Per 100'	Dimensions		
10'	20'		10'	20'		O.D.	I.D.	Wall
49405-010	49405-020	1/2"	6000'	12000'	21	.840	.546	.147
49407-010	49407-020	3/4"	4400'	8000'	30	1.050	.742	.154
49408-010	49408-020	1"	3600'	7200'	44	1.315	.957	.179
49409-010	49409-020	1 1/4"	3300'	6600'	60	1.660	1.278	.191
49410-010	49410-020	1 1/2"	2250'	3600'	72	1.900	1.500	.200
49411-010	49411-020	2"	1400'	2800'	101	2.375	1.939	.218
49412-010	49412-020	2 1/2"	930'	1880'	154	2.875	2.323	.276
49413-010	49413-020	3"	880'	1760'	210	3.500	2.900	.300
49415-010	49415-020	4"	570'	1140'	308	4.500	3.826	.337
49416-010	—	5"	380'	—	428	5.563	4.813	.375
49417-010	49417-020	6"	260'	520'	588	6.625	5.761	.432

Rigid nonmetallic conduit is normally supplied in standard 10' lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10', with or without belled ends.

Use RNC Fittings with Schedule 40 and Schedule 80 Conduit.

- Notes: 1. Special conduit sizes will be quoted on request.
2. DON'T FORGET TO ORDER CEMENT.
3. Prime Conduit reserves the right to ship to the nearest unitized quantity.

Support of Prime Conduit Rigid Nonmetallic Conduit in Aboveground Installations

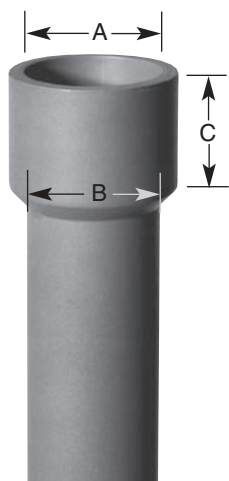
Table 352.30(B) NEC shows the support requirements for Schedule 40 and Schedule 80 rigid PVC nonmetallic conduit.

Plastic conduit should always be installed away from steam lines, etc. Support straps should allow for lineal movement caused by expansion and contraction.

Maximum ambient temperature is 122°F (50°C).

Table 352.30(B), NEC

Trade Size	Maximum Spacing Between Supports (feet)
1/2 - 1	3
1 1/4 - 2	5
2 1/2 - 3	6
3 1/2 - 5	7
6	8



Acceptable Dimensions in Inches of Integral Bell per UL 651

Trade Size	A		B		C Nominal Bell Depth (in.)
	At Entrance (in.) Maximum	Minimum	At Bottom (in.) Maximum	Minimum	
1/2	0.860	0.844	0.844	0.828	1.375
3/4	1.074	1.054	1.056	1.036	1.500
1	1.340	1.320	1.320	1.300	1.750
1 1/4	1.689	1.665	1.667	1.643	1.875
1 1/2	1.930	1.906	1.906	1.882	2.750
2	2.405	2.381	2.381	2.357	3.250
2 1/2	2.905	2.875	2.883	2.853	3.250
3	3.530	3.500	3.507	3.477	3.875
3 1/2	4.065	3.965	4.007	3.977	3.875
4	4.565	4.465	4.506	4.476	4.625
5	5.643	5.543	5.583	5.523	5.625
6	6.708	6.608	6.644	6.584	6.375

Heritage Plastics created the long bell for ease and efficiency. In compliance with the industry standards, Heritage Plastics PVC Electrical Conduit is manufactured from virgin PVC compounds complying with the UL651 standards as described in the standards specifications for rigid PVC compounds ASTM D 1784-81. Our PVC Electrical Conduits are subject to in-process quality control to assure compliance with appropriate manufacturing and performance standards.

- UL 651
- RUS Listed
- NEMA TC-2
- NEMA TC-3 (Accessories)
- UL Standard 514 B (Accessories)
- General Service Administration (GSA) WC 1094A
- National Electric Code – Article 347
- Sunlight and Weather resistant
- Reduced emissions of smoke & HCL
- Listed for 90° C conductors or cable and direct sunlight
- Rigid nonmetallic raceway for wires and cables in accordance with the NEC
- Superior weathering characteristics
- Installation on poles in accordance with the NEC

Schedule 80 Electrical Conduit

10' Part #	20' Part #	Nominal Size	Weight 100'	Pack Qty 10'	O.D.	I.D.	Wall
580510	580520	½"	20.5	6,000'	.840	.546	.147
580710	580720	¾"	27.8	4,400'	1.050	.742	.154
581010	581020	1"	40.9	3,600'	1.315	.957	.179
581310	581320	1 ¼"	56.7	3,300'	1.660	1.278	.191
581510	581520	1 ½"	68.6	2,250'	1.900	1.500	.200
582010	582020	2"	94.9	1,400'	2.375	1.939	.218
582510	582520	2 ½"	144.9	930'	2.875	2.323	.276
583010	583020	3"	193.8	880'	3.500	2.900	.300
583510	583520	3 ½"	234.5	630'	4.000	3.364	.318
584010	584020	4"	283.3	570'	4.500	3.826	.337
585010	585020	5"	393.8	380'	5.563	4.813	.375
586010	586020	6"	541.1	260'	6.625	5.761	.432



Heritage Plastics created the long bell for ease and efficiency. In compliance with the industry standards, Heritage Plastics PVC Electrical Conduit is manufactured from virgin PVC compounds complying with the UL651 standards as described in the standards specifications for rigid PVC compounds ASTM D 1784-81. Our PVC Electrical Conduits are subject to in-process quality control to assure compliance with appropriate manufacturing and performance standards.

- UL 651
- RUS Listed
- NEMA TC-2
- NEMA TC-3 (Accessories)
- UL Standard 514 B (Accessories)
- General Service Administration (GSA) WC 1094A
- National Electric Code - Article 352
- Sunlight and Weather resistant
- Reduced emissions of smoke & HCL
- Listed for 90° C conductors or cable and direct sunlight
- Rigid nonmetallic raceway for wires and cables in accordance with the NEC
- Superior weathering characteristics

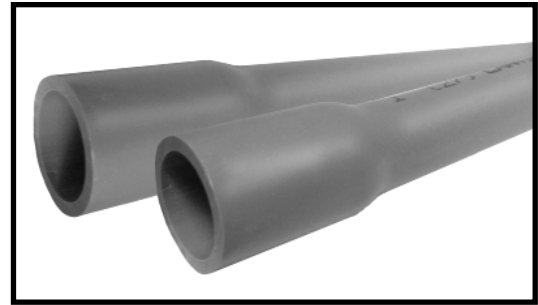
Schedule 40 Electrical Conduit

10' Part #	20' Part #	Nominal Size	Weight 100'	Pack Qty 10'	O.D.	I.D.	Wall
510510	510520	1/2"	16.4	6,000'	.840	.622	.109
510710	510720	3/4"	21.8	4,400'	1.050	.824	.113
511010	511020	1"	32.1	3,600'	1.315	1.049	.133
511310	511320	1 1/4"	43.4	3,300'	1.660	1.380	.140
511510	511520	1 1/2"	51.8	2,250'	1.900	1.610	.145
512010	512020	2"	69.5	1,400'	2.375	2.067	.154
512510	512520	2 1/2"	109.6	930'	2.875	2.469	.203
513010	513020	3"	143.5	880'	3.500	3.068	.216
513510	513520	3 1/2"	169.1	630'	4.000	3.548	.226
514010	514020	4"	204.3	570'	4.500	4.026	.237
515010	515020	5"	277.6	380'	5.563	5.047	.258
516010	516020	6"	360.0	260'	6.625	6.065	.280



Rigid Nonmetallic Schedule 80 Conduit

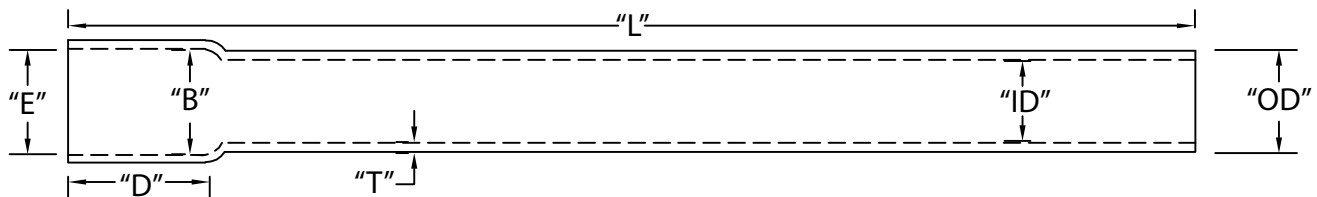
Meets specifications of UL 651 and NEMA TC2
 Rated for 90°C Cable
 Sunlight Resistant
 10' Lengths



Nonmetallic PVC Schedule 80 Conduit Belled End - 10' Lengths

Part No.	Size	Feet per Pack	T Min	OD	ID Min	E	B	D Nom	L Min
A53AE12	1/2	6,000	.147	.840	.502	.852	.836	1.500	120
A53AE12H	1/2	3,000	.147	.840	.502	.852	.836	1.500	120
A53AG12	3/4	4,400	.154	1.050	.698	1.064	1.046	1.750	120
A53AG12H	3/4	2,200	.154	1.050	.698	1.064	1.046	1.750	120
A53BA12	1	3,600	.179	1.315	.910	1.330	1.310	2.000	120
A53BA12H	1	1,800	.179	1.315	.910	1.330	1.310	2.000	120
A53BC12	1-1/4	3,300	.191	1.660	1.227	1.677	1.655	2.250	120
A53BC12H	1-1/4	1,650	.191	1.660	1.227	1.677	1.655	2.250	120
A53BE12	1-1/2	2,250	.200	1.900	1.446	1.918	1.894	2.500	120
A53BE12H	1-1/2	900	.200	1.900	1.446	1.918	1.894	2.500	120
A53CA12	2	1,400	.218	2.375	1.881	2.393	2.369	3.000	120
A53CE12	2-1/2	930	.276	2.875	2.250	2.890	2.868	3.250	120
A53DA12	3	880	.300	3.500	2.820	3.515	3.492	3.750	120
A53EA12	4	570	.337	4.500	3.737	4.515	4.491	4.500	120
A53FA12	5	380	.375	5.563	4.713	5.593	5.553	5.500	120
A53GA12	6	260	.432	6.625	5.646	6.658	6.614	6.125	120

Dimensions are nominal



Note: 20' length available on request
 Schedule 80 conduit complies with federal and military specifications by conforming to UL 651

Expansion and Contraction

Temperature Considerations for Rigid Nonmetallic Conduit Compensation for Linear Expansion

Like all construction materials, PVC will expand or contract with variations in temperatures. The coefficient of linear expansion in PVC conduit is 3.38×10^{-5} in./in./°F as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion coupling is needed whenever the change in length due to temperature variation will exceed 1/2 in.

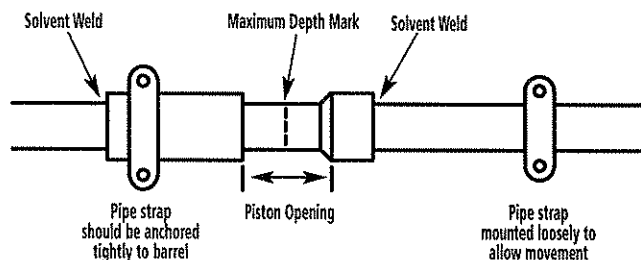
Add 30°F to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

An expansion coupling consists of two sections of conduit, one telescoping inside another. When installing expansion couplings, alignment of piston and barrel is important. Be sure to mount expansion joint level for best performance.

For a vertical run, the expansion coupling must be installed close to the top of the run with the barrel jointing down, in order that rain water does not run into the opening. The lower end of the conduit run must be secured at the bottom so that any length change due to temperature variation will result in an upward movement.

Expansion Characteristics of PVC Rigid Nonmetallic Conduit Coefficient of Thermal Expansion = 3.38×10^{-5} in./in./°F

Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit
5	0.2	55	2.2	105	4.2	155	6.3
10	0.4	60	2.4	110	4.5	160	6.5
15	0.6	65	2.6	115	4.7	165	6.7
20	0.8	70	2.8	120	4.9	170	6.9
25	1.0	75	3.0	125	5.1	175	7.1
30	1.2	80	3.2	130	5.3	180	7.3
35	1.4	85	3.4	135	5.5	185	7.5
40	1.6	90	3.6	140	5.7	190	7.7
45	1.8	95	3.8	145	5.9	195	7.9
50	2.0	100	4.1	150	6.1	200	8.1



Determine the Piston Opening

The expansion joint must be installed to allow both expansion and contraction of the conduit run. The correct piston opening for any installation condition should use the following formula:

$$O = \left[\frac{T_{\max} - T_{\text{installed}}}{\Delta T} \right] E$$

Where:

- O = Piston opening (in.)
- T max = Maximum anticipated temperature of conduit (°F)
- T inst. = Temperature of conduit at time of installation (°F)
- Δ T = Total change in temperature of conduit (°F)
- E = Expansion allowance built into each expansion coupling (in.)

Example

380 ft. of conduit is to be installed on the outside of a building exposed to the sun in a single straight run. It is expected that the conduit will vary in temperature from 0°F in the winter to 140°F in the summer (this includes the 30°F for radiant heating from the sun.) The installation is to be made at a conduit temperature of 90°F. From the table, a 140°F temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is $5.7 \times 3.8 = 21.67$ " which should be rounded to 22". The number of expansion couplings will be $22 \div 4 = 5.5$ which should be rounded to 6. The coupling should be placed at 62 ft. intervals ($380 \div 6$), the proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{140 - 90}{140} \right] 4.0 = 1.4 \text{ in.}$$

Insert the piston into the barrel to the maximum depth. Place a mark on the piston at the end of the barrel. To properly set the piston, pull the piston out of the barrel to correspond to the 2.1 in. calculated above. See drawing at lower left.

Summary

1. Anticipate expansion and contraction of PVC conduit in aboveground, exposed installation.
2. Use an expansion coupling when length change due to temperature variation will exceed 1/2".
3. PVC conduit expands 4.1" for each 100 feet of run and a 100°F temperature change.
4. Align expansion coupling with the conduit run to prevent binding.
5. Follow the instructions to set the piston opening.
6. Rigidly fix the outer barrel of the expansion coupling so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.

Corrosion Resistance of Carlon Schedule 40 and Schedule 80 PVC Conduit and Fittings

Carlon Schedule 40 and Schedule 80 are generally acceptable for use in environments containing the chemicals below. These environmental resistance ratings are based upon tests where the specimens were placed in complete submergence in the reagent listed. Schedule 40 and Schedule 80 can be used in many process areas where

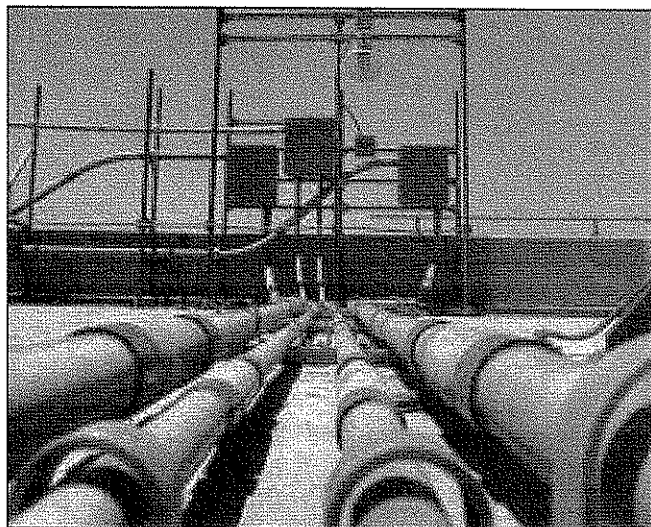
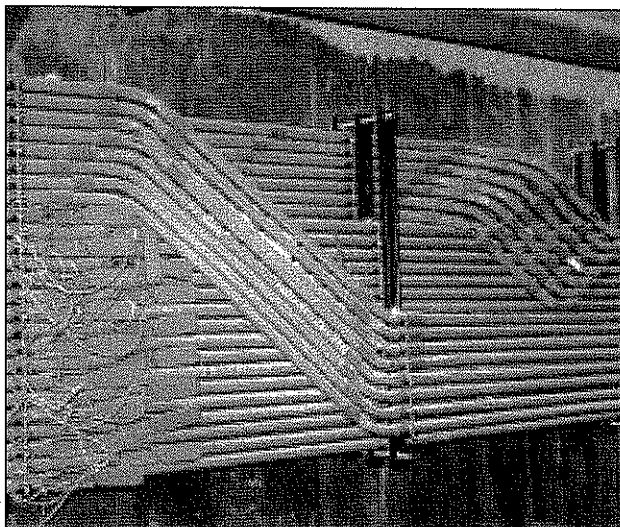
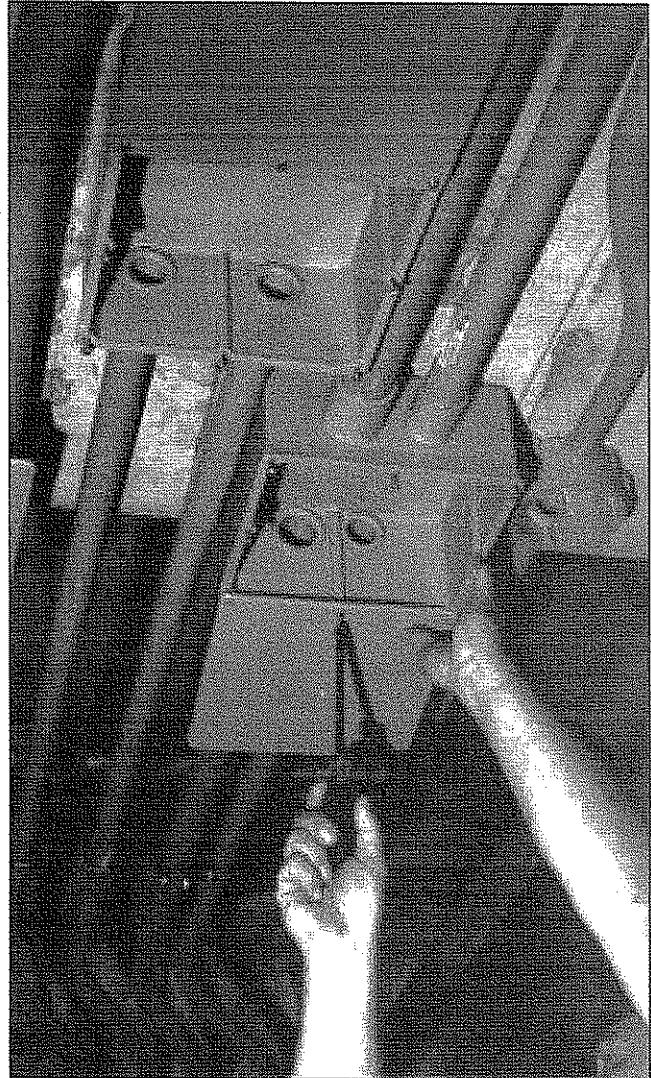
chemicals not on this list are manufactured or used because worker safety requirements dictate that any air presence or splashing be at a very low level.

If there are any questions for specific suitability in a given environment, prototype samples should be tested under actual conditions.

Acetic Acid 0-20%	Butyl Alcohol	Fluorine Gas – Wet	Mercurous Nitrate	Sodium Arsenite
Acetic Acid 20-30%	Butyl Phenol	Fluorine Gas – Dry	Mercury	Sodium Benzoate
Acetic Acid 30-60%	Butylene	Fluoroboric Acid	Methyl Sulfate	Sodium Bicarbonate
Acetic Acid 80%	Butyric Acid	Fluorosilicic Acid	Methylene Chloride	Sodium Bisulfate
Acetic Acid – Glacial	Calcium Bisulfite	Formaldehyde	Mineral Oils	Sodium Bisulfite
Acetic Acid Vapors	Calcium Carbonate	Formic Acid	Naphthalene	Sodium Bromide
Acetylene	Calcium Chlorate	Fructose	Nickel Chloride	Sodium Chlorate
Adipic Acid	Calcium Chloride	Gallic Acid	Nickel Nitrate	Sodium Chloride
Alum	Calcium Hydroxide	Gas – Coke Oven	Nitric Acid, Anhydrous	Sodium Cyanide
Aluminum Chloride	Calcium Hypochlorite	Gas – Natural (Dry)	Nitric Acid 20%	Sodium Dichromate
Aluminum Fluoride	Calcium Nitrate	Gas – Natural (Wet)	Nitric Acid 40%	Sodium Ferricyanide
Aluminum Hydroxide	Calcium Sulfate	Gasoline – Sour	Nitric Acid 60%	Sodium Ferrocyanide
Aluminum Oxochloride	Carbonic Acid	Gasoline – Refined	Nitrobenzene	Sodium Fluoride
Aluminum Nitrate	Carbon Dioxide Gas – Wet	Glucose	Nitrous Oxide	Sodium Hydroxide
Aluminum Sulfate	Carbon Dioxide – Aqueous	Glycerine (Glycerol)	Oils and Fats	Sodium Hypochlorite
Ammonia-Dry Gas	Solution	Glycol	Oils – Petroleum – (See Type)	Sodium Nitrate
Ammonium Bifluoride	Carbon Monoxide	Glycolic Acid	Oleic Acid	Sodium Nitrite
Ammonium Carbonate	Caustic Potash	Green Liquor (Paper Industry)	Oxalic Acid	Sodium Sulfate
Ammonium Chloride	Caustic Soda	Heptane	Palmitic Acid 10%	Sodium Sulfide
Ammonium Hydroxide 28%	Chloracetic Acid	Hexanol, Tertiary	Perchloric Acid 10%	Sodium Sulfite
Ammonium Metaphosphate	Chloral Hydrate	Hydrobromic Acid 20%	Phenylhydrazine Hydrochloride	Sodium Thiosulfate (Hypo)
Ammonium Nitrate	Chlorine Gas (Dry)	Hydrochloric Acid 0% - 25%	Phosgene, Gas	Stannic Chloride
Ammonium Persulfate	Chlorine Gas (Moist)	Hydrochloric Acid 25% - 40%	Phosphoric Acid – 0-25%	Stannous Chloride
Ammonium Phosphate – Neutral	Chlorine Water	Hydrocyanic Acid or	Phosphoric Acid – 25-50%	Stearic Acid
Ammonium Sulfate	Chlorosulfonic Acid	Hydrogen Cyanide	Phosphoric Acid – 50-85%	Sulfur
Ammonium Sulfide	Chrome Alum	Hydrofluoric Acid 10%	Photographic Chemicals	Sulfur Dioxide – Gas Dry
Ammonium Thiocyanate	Chromic Acid 10%	Hydrofluorosilicic Acid	Plating Solutions	Sulfur Trioxide
Amyl Alcohol	Chromic Acid 30%	Hydrogen Phosphide	Potassium Bicarbonate	Sulfuric Acid – 0-10%
Anthraquinone	Chromic Acid 40%	Hydrogen Sulfide – Dry	Potassium Bichromate	Sulfuric Acid – 10-75%
Anthraquinonesulfonic Acid	Chromic Acid 50%	Hydrogen Sulfide –	Potassium Borate	Sulfuric Acid – 75-90%
Antimony Trichloride	Citric Acid	Aqueous Solution	Potassium Bromide	Sulfurous Acid
Aqua Regia	Copper Chloride	Hydroquinone	Potassium Carbonate	Tannic Acid
Arsenic Acid 80%	Copper Cyanide	Hydroxylamine Sulfate	Potassium Chloride	Tanning Liquors
Arylsulfonic Acid	Copper Fluoride	Iodine	Potassium Chromate	Tartaric Acid
Barium Carbonate	Copper Nitrate	Kerosene	Potassium Cyanide	Titanium Tetrachloride
Barium Chloride	Copper Sulfate	Lactic Acid 28%	Potassium Dichromate	Triethanolamine
Barium Hydroxide	Cottonseed Oil	Lauric Acid	Potassium Ferricyanide	Trimethyl Propane
Barium Sulfate	Cresylic Acid 50%	Lauryl Chloride	Potassium Ferrocyanide	Trisodium Phosphate
Barium Sulfide	Crude Oil – Sour	Lauryl Sulfate	Potassium Fluoride	Turpentine
Beet – Sugar Liquor	Crude Oil – Sweet	Lead Acetate	Potassium Hydroxide	Urea
Benzine Sulfonic Acid 10%	Demineralized Water	Lime Sulfur	Potassium Nitrate	Vinegar
Benzoic Acid	Dextrin	Linoleic Acid	Potassium Perborate	Whiskey
Bismuth Carbonate	Dextrose	Linseed Oil	Potassium Perchlorate	White Liquor (Paper Industry)
Black Liquor (Paper Industry)	Diglycolic Acid	Lubricating Oils	Potassium Permanganate 10%	Wines
Bleach – 12.5% Active Cl ₂	Disodium Phosphate	Magnesium Carbonate	Potassium Persulfate	Zinc Chloride
Borax	Ethyl Alcohol	Magnesium Chloride	Potassium Sulfate	Zinc Chromate
Boric Acid	Ethylene Glycol	Magnesium Hydroxide	Propane	Zinc Cyanide
Brine	Fatty Acids	Magnesium Nitrate	Propyl Alcohol	Zinc Nitrate
Breeder Pellets – Dane, fish	Ferric Chloride	Magnesium Sulfate	Silicic Acid	Zinc Sulfate
Bromic Acid	Ferric Nitrate	Maleic Acid	Silver Cyanide	
Bromine – Water	Ferric Sulfate	Malic Acid	Silver Nitrate	
Butane	Ferrous Chloride	Mercuric Chloride	Silver Plating Solutions	
Butadiene	Ferrous Sulfate	Mercuric Cyanide	Sodium Acetate	

Suggested Format for Specifying Carlon Nonmetallic Conduit, Conduit Fittings and Junction Boxes

- A.** The Carlon rigid nonmetallic conduit system shall be installed as indicated on the drawings and as specified herein.
- B.** All wiring shall be installed in Carlon rigid nonmetallic conduit. All conduit shall be secured by means of proper fittings. All fittings shall be Carlon.
- C.** Carlon outlet boxes, fittings and junction boxes shall be used for all outlets, pull boxes and junction points. (Lighting fixtures shall not be supported or hung from PVC junction boxes but be supported in position by other means.)
- D.** Exposed conduits shall be mounted securely by suitable hangers or straps with the maximum spacing of points of supports not greater than indicated by Section 352.30 of the NEC.
- E.** Except where embedded in concrete or direct buried, Carlon conduit shall be supported to permit adequate lineal movement to allow for expansion and contraction of conduit due to temperature change.
- F.** For aboveground installations where temperature change in excess of 14°C (25°F) is anticipated, expansion joints shall be installed. See Table 352.44(A) NEC for expansion characteristics.
- G.** Proper care shall be taken when field bending is employed to maintain the internal diameter and wall thickness of the conduit.



Rigid Nonmetallic Conduit – Couplings

Expansion Fittings

(For Use with Schedule 40 & 80 Conduit)

E945 series expansion fittings are designed to compensate for length changes due to temperature variations in exposed conduit runs.

- EXCLUSIVE Molded in Mid-point indicator on the piston.
- EXCLUSIVE 2" Expansion Fitting with an 8" travel distance.
- Two-piece molded design with lubricated seals for easier movement for the life of the product.
- Ridges on the fitting for easier installation (Sizes 2" through 6" only).
- Male terminal Adapter End design (1/2" – 2" NPT Threads, and 2 1/2" – 6" NPSC Threads).
- Two O-Rings to prevent leakage.
- Can be installed vertically or horizontally.



Coupling End Part No.	Male Terminal Adapter End Part No.	Size	Std. Ctn. Qty.	Travel Length (in.)
E945D	E945DX	1/2	20	4"
E945E	E945EX	3/4	15	4"
E945F	E945FX	1	10	4"
E945G	E945GX	1 1/4	5	4"
E945H	E945HX	1 1/2	5	4"
E945J	E945JX	2	15	8"
E945K	E945KX	2 1/2	10	8"
E945L	E945LX	3	10	8"
E945M	E945MX	3 1/2	5	8"
E945N	E945NX	4	5	8"
E945P	E945PX	5	1	8"
E945R	E945RX	6	1	8"



Couplings Standard Couplings

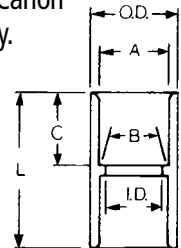


Except where noted by ▶

All socket fittings should be attached Using Carlon solvent cement. Using Carlon fittings with Carlon nonmetallic conduit insures system integrity.



Socket type for joining nonmetallic conduit.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	I.D.	O.D.	C Typical	L
E940D	1/2	150	.852	.836	.728	17/64	11/16	1 1/2
E940E	3/4	100	1.064	1.046	.840	15/16	3/4	1 5/8
E940F	1	50	1.330	1.310	1.210	15/8	15/16	2
E940G	1 1/4	30	1.677	1.655	1.535	163/64	1	2 1/8
E940H	1 1/2	25	1.918	1.894	1.755	215/64	1 1/8	2 3/8
E940J	2	30	2.393	2.369	2.190	247/64	1 3/16	2 1/2
E940K	2 1/2	20	2.890	2.868	2.688	35/16	133/64	3 3/16
E940K-CAR	2 1/2	4	2.890	2.868	2.688	35/16	133/64	3 3/16
E940L	3	25	3.515	3.492	3.375	331/32	1 3/4	3 13/32
E940L-CAR	3	5	3.515	3.492	3.375	331/32	1 3/4	3 13/32
E940M	3 1/2	20	4.015	3.992	3.780	49/16	1 3/4	3 5/8
E940N	4	15	4.515	4.491	4.265	53/32	125/32	3 3/4
E940N-CAR	4	5	4.515	4.491	4.265	53/32	125/32	3 3/4
E940P	5	8	5.593	5.553	5.097	6 1/4	15/16	4 1/16
E940R	6	5	6.658	6.614	6.115	7 1/2	23/16	4 5/8

Special Long Line Couplings



Long Line Couplings

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E941H	1 1/2	40	9
E941J	2	25	8
E941K	2 1/2	15	8
E941L	3	15	14
E941N	4	10	15
E941PF	5	4	12
▶ E941RF	6	5	21

Short Expansion Couplings

(Expands to a maximum of 2")



Part No.	Size	Std. Ctn. Qty.
E955D	1/2	40
E955E	3/4	40
E955F	1	25
E955G	1 1/4	15
E955H	1 1/2	10
E955J	2	6



Fabricated Expansion Couplings



Part No.	Size	Std. Ctn. Qty.	Travel Length (in.)
E945KXL	2 1/2	10	12



Except where noted by ▶

Couplings

Special Long Line Couplings – Sleeve Couplings



Sleeve Coupling (For Repair Work)
No Internal Stop

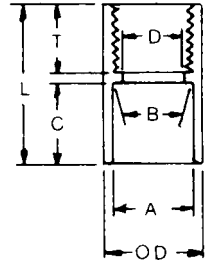
Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E948H	1½	25	6
▶ E948J	2	25	5
▶ E948K	2½	25	16
▶ E948L	3	25	13
▶ E948N	4	10	8
▶ E948P	5	14	33
▶ E948R	6	6	16
▶ E948JR	2" (6" long)	15	8
▶ E948JS	2" (Sch. 40 Split Duct)	25	6
▶ E948L12	3" (12" long)	1	1
▶ E948L6	3" (6" long)	15	15
▶ E948LS	3" (Sch. 40 Split Duct)	25	17
▶ E948N12	4" (12" long)	10	28
▶ E948N7	4" (7" long)	15	25
▶ E948NS	4" (Sch. 40 Split Duct)	10	15
▶ E948PS	5" (Sch. 40 Split Duct)	1	2
▶ E948R10	6" (10" long)	6	25
▶ E948R12	6" (12" long)	6	25
▶ E948RS	6" (Sch. 40 Split Duct)	1	2

Adapters

Female Adapters



For adapting nonmetallic conduits to threaded fittings, metallic systems. Female threads on one end, socket end on other.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C	T Typical	L
E942D	1/2	150	.852	.836	.620	17/64	11/16	3/4	19/16
E942E	3/4	100	1.064	1.046	.822	15/16	13/16	3/4	15/8
E942F	1	50	1.330	1.310	1.046	15/8	15/16	7/8	115/16
E942G	1¼	30	1.677	1.655	1.377	163/64	1	7/8	2
E942H	1½	25	1.918	1.894	1.607	25/32	11/8	7/8	27/32
E942J	2	30	2.393	2.369	2.064	247/64	13/16	1	25/16
E942K	2½	20	2.890	2.868	2.450	311/32	15/8	11/8	215/16
E942K-CAR	2½	4	2.890	2.868	2.450	311/32	15/8	11/8	215/16
E942L	3	25	3.515	3.492	3.000	331/32	13/4	11/8	31/16
E942L-CAR	3	3	3.515	3.492	3.000	331/32	13/4	11/8	31/16
E942M	3½	20	4.015	3.992	3.500	41/2	17/8	11/8	31/4
E942N	4	15	4.515	4.491	4.000	51/64	2	11/8	313/64
E942N-CAR	4	7	4.515	4.491	4.000	51/64	2	11/8	313/64
E942NX9*	4	15	(Call for information)						
E942P	5	8	5.593	5.553	5.047	61/4	115/16	11/16	33/16
E942R	6	6	6.658	6.614	6.055	71/4	21/8	11/16	33/8
E942RX*	6	6	(Call for information)						

* Long Line Adapter

Special Schedule 40 Swedge Couplings

*Consult factory for additional sizes

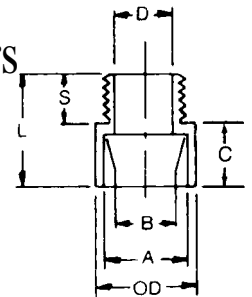


Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E442K	2½	20	13
▶ E442R	6	6	27
▶ E442T	8	2	17

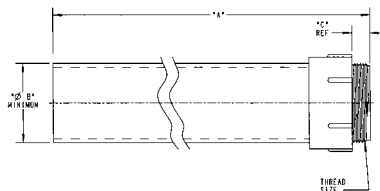
Male Terminal Adapters



For adapting nonmetallic conduits to boxes, threaded fittings, metallic systems. Male threads on one end, socket end on other.



Risers Schedule 40



Part No.	Size	A (Length)	B (Min.)	C	Thread Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E954HX	1½	80.00	1.567	.950	1½" NPT	1	3.8
E954J	2	60.00	2.024	.825	2" NPT	1	3.7
E954JX	2	80.00	2.024	.825	2" NPT	1	5.0
E954K	2½	60.00	2.418	.812	2½" NPSC	1	6.0
E954KX	2½	80.00	2.418	.812	2½" NPSC	1	8.4
E954L	3	60.00	3.012	.798	3" NPSC	1	8.7
E954LX	3	80.00	3.012	.798	3" NPSC	1	11.0

Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C	S Typical	L
E943D	1/2	150	.852	.836	.597	11/8	5/8	9/16	15/16
E943E	3/4	125	1.064	1.046	.800	111/32	3/4	9/16	13/8
E943F	1	50	1.330	1.310	1.018	15/8	1	11/16	125/32
E943G	1¼	50	1.677	1.655	1.332	21/32	1	3/4	115/16
E943H	1½	25	1.918	1.894	1.566	25/32	13/16	3/4	21/16
E943J	2	50	2.393	2.369	2.000	221/32	13/16	3/4	21/8
E943K	2½	25	2.890	2.868	2.376	35/16	13/4	7/8	27/8
E943K-CAR	2½	5	2.890	2.868	2.376	35/16	13/4	7/8	27/8
E943L	3	45	3.515	3.492	2.954	4	115/16	7/8	31/16
E943L-CAR	3	5	3.515	3.492	2.954	4	115/16	7/8	31/16
E943M	3½	30	4.015	3.992	3.440	41/2	27/16	17/8	37/16
E943N	4	20	4.515	4.491	3.940	53/32	23/8	7/8	31/2
E943N-CAR	4	20	4.515	4.491	3.940	53/32	23/8	7/8	31/2
E943P	5	5	5.593	5.553	4.815	61/4	21/3	1	315/16
E943R	6	10	6.658	6.614	5.860	71/2	23/8	1	33/8



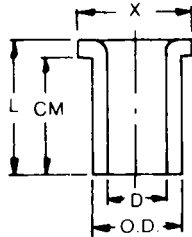
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Adapters

Box Adapters for Enclosures



Adapts nonmetallic conduit to all electrical enclosures by inserting adapter through knockout and cementing into Carlon couplings.



Part No.	Size	Std. Ctn. Qty.	Min D	OD Typical	Max X	CM Typical	L Typical
E996D	1/2	100	.662	.840	17/64	23/32	27/32
E996E	3/4	100	.824	1.050	1 21/64	25/32	29/32
E996F	1	100	1.049	1.315	15/8	61/64	13/32
E996G	1 1/4	50	1.380	1.660	1 31/32	1 1/16	1 1/4
E996H	1 1/2	50	1.610	1.900	2 13/64	1 3/16	1 3/8
E996J	2	25	2.067	2.375	2 29/32	1 1/4	1 7/16
E996K-CAR	2 1/2	10	2.469	2.875	3 7/16	1 7/8	1 15/16
E996L	3	20	3.068	3.500	4 7/8	2	2 1/16
E996L-CAR	3	5	3.068	3.500	4 7/8	2	2 1/16
E996N	4	10	4.026	4.500	5 1/8	2 1/2	2 1/4

Threaded Adapters



Part No.	Size	Std. Ctn. Qty.
E9842D ¹	1/2	25
E9842E ²	3/4	25

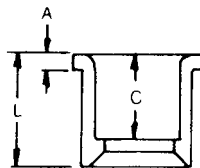
¹ Fits 3/4" sockets ² Fits 1" sockets

Reducers

Reducer Bushings



For connecting different sizes of conduit. Bell x Spigot.



Part No.	Size	Std. Ctn. Qty.	L Typical	A Typical	C Typical
E950ED	3/4" x 1/2"	100	15/32	13/64	11/32
E950FD-CAR	1" x 1/2"	25	1 11/32	3/16	57/64
E950FE	1" x 3/4"	100	1 11/32	3/16	11/64
E950GE-CAR	1 1/4" x 3/4"	10	1 15/32	3/16	11/64
E950GF	1 1/4" x 1"	50	1 15/32	3/16	19/64
E950HF-CAR	1 1/2" x 1"	10	1 19/32	3/16	19/64
E950HG-CAR	1 1/2" x 1 1/4"	10	1 19/32	3/16	117/64
E950JG-CAR	2" x 1 1/4"	10	1 3/4	7/32	117/64
E950JH-CAR	2" x 1 1/2"	10	1 3/4	7/32	125/64
E950KJ-CAR	2 1/2" x 2"	10	2 5/32	3/8	127/64
E950LJ-CAR	3" x 2"	10	2 1/8	1/4	17/8
▶ E950LK	3" x 2 1/2"	25	1 15/16	1/4	1 11/16
E950NL	4" x 3"	25	2 3/4	5/16	1 15/16

Reducers

Fabricated Reducers



Fabricated Reducers (Male x Male)

Part No.	Size	Std. Ctn. Qty.	Std. Wt. (lbs.)
▶ E952KJ	2 1/2" x 2"	48	28
▶ E952LJ	3" x 2"	36	21
▶ E952LK	3" x 2 1/2"	36	31
▶ E952NL	4" x 3"	15	23
▶ E952NM	4" x 3 1/2"	15	25
▶ E952PN	5" x 4"	12	26
▶ E952RP	6" x 5"	10	31

Plugs

Reducer Plugs



Part No.	Size	Std. Ctn. Qty.	Std. Wt. (lbs.)
▶ E971C	3/4" x 1 1/2"	100	2
▶ E971D	1" x 3/4"	100	3

Plugs (Polyethylene)



Part No.	Size	Std. Ctn. Qty.	Std. Wt. (lbs.)
▶ P258H	1 1/2"	50	2
▶ P258K	2 1/2"	25	1.5

Plugs with Pull Tabs (Polyethylene)



Part No.	Size	Std. Ctn. Qty.	Std. Wt. (lbs.)
▶ P258JT	2	60	3
▶ P258LT	3	30	3
▶ P258NT	4	48	8
▶ P258PT	5	30	6
▶ P258RT	6	30	9



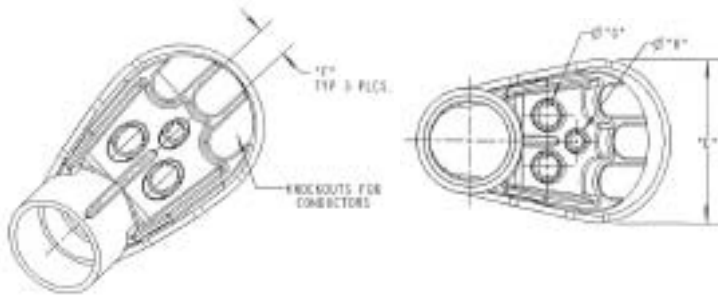
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Caps

Service Entrance Caps

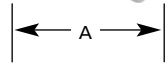


Part No.	Size	Std. Ctn. Qty.	Dimensions (in.)		
			F	G	H
E998D	1/2	5	.45	.45	–
E998E	3/4	20	.45	.45	–
E998E-CAR	3/4	5	.45	.45	–
E998F	1	15	.59	.58	–
E998F-CAR	1	5	.59	.58	–
E998G-CAR	1 1/4	5	.74	.71	.50
E998H-CAR	1 1/2	5	.74	.71	.50
E998J-CAR	2	5	.83	.78	.56
E998K-UPC	2 1/2	2	1.70	1.31	1.00
E998L	3	2	1.70	1.31	1.00
E998N	4	2	2.25	1.88	1.31



Offsets

Meter Offset



Part No.	Size	Std. Ctn. Qty.	Offset	A
▶ E995G	1 1/4	15	0.758	4.230
E995G-CTN	1 1/4	6	0.758	4.230
▶ E995J	2	8	0.684	4.270

Offset



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. (lbs.)
▶ E994DR-CAR	1/2	25	3
▶ E994ER-CAR	3/4	15	2
▶ E994F	1	50	12

End Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. (lbs.)
▶ E958D	1/2	100	3
▶ E958E	3/4	100	4
▶ E958F	1	75	5
▶ E958G	1 1/4	40	4
▶ E958H	1 1/2	30	4
▶ E958J	2	25	5
▶ E958K	2 1/2	10	4
▶ E958L	3	10	5
▶ E958N	4	5	17
▶ E958P	5	5	11
▶ E958R	6	5	13

End Bells

End Bells



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. (lbs.)
▶ E997F	1	50	1
▶ E997F-CAR	1	15	1
▶ E997G	1 1/4	35	1
▶ E997G-CAR	1 1/4	15	1
▶ E997H	1 1/2	30	1
▶ E997H-CAR	1 1/2	10	1
▶ E997J	2	40	1
▶ E997J-CAR	2	10	1
▶ E997K	2 1/2	30	2
▶ E997K-CAR	2 1/2	10	2
▶ E997L	3	50	2
▶ E997L-CAR	3	10	2
▶ E997M	3 1/2	40	10
▶ E997N	4	30	11
▶ E997P	5	15	10
▶ E997R	6	10	7.4
▶ E997T	8	3	14.55

PVC Riser Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. (lbs.)
▶ E935J	2	25	9
▶ E935L	3	25	18
▶ E935N	4	25	18
▶ E935P	5	25	35
▶ E935R	6	10	13

Fabricated End Bells

Schedule 40



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. (lbs.)
E949J5	2" x 5"	50	10
E949J6	2" x 6"	25	12
E949JN	2" x 4"	25	7
E949JX	2" x 8"	12	7
E949LR	3" x 6"	20	21
E949N5	4" x 5"	20	2
E949NR	4" x 6"	15	21
E949R5	6" x 5"	12	27
E949RX	6" x 8"	6	17



Except where noted by ▶

Washers

Flat Sealing Washer

Where a waterproof termination is required into any enclosure (metallic or nonmetallic), install the neoprene washer over the threads of a terminal adapter before inserting into the enclosure. Use a standard locknut or threaded bushing to secure the assembly.



Part No.	Size	Std. Ctn. Qty.
▶ E943DW	1/2	125
▶ E943EW	3/4	125
▶ E943FW	1	100
▶ E943GW	1 1/4	50
▶ E943HW	1 1/2	50
▶ E943JW	2	25

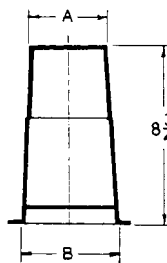
Sleeves

HOLFORM™ Concrete Sleeves

HOLFORM nonmetallic concrete sleeve forms are the easy way to form holes in concrete. They install in seconds with nails, screws or staples and are easily removed. Concrete will not adhere to them. HOLFORMS are adjustable to any slab thickness.



Part No.	Min. O.D. A	B	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E92CSH	1 1/2	1 3/4	20	3
▶ E92CSJ	2	2 13/32	25	6
▶ E92CSL	3	3 13/32	25	8
▶ E92CSN	4	4 13/32	18	8
▶ E92CSP	5	5 13/32	15	8
▶ E92CSR	6	6 13/32	12	8



Lock Nuts



PVC Lock Nut



Part No.	Size	Std. Ctn. Qty.
▶ LT9LD	1/2	1200
▶ LT9LE	3/4	700
▶ LT9LF	1	600

Conduit Bodies

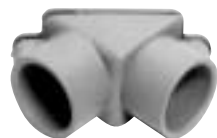
Type X with Cover

Four knock-out type socket openings, 90° spacing. Available with 1/2" or 3/4" socket outlets. Includes cover and gasket.

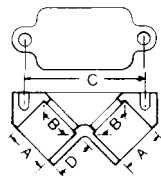


Pull Elbows

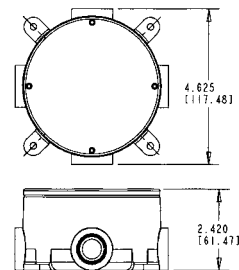
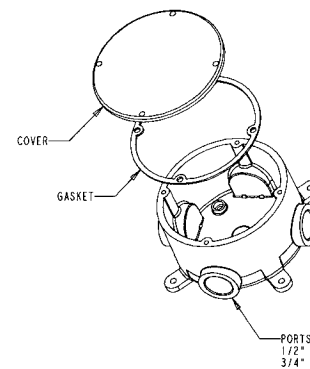
Access Pull Elbows



Gasket included.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	C Typical	D Typical
E990D	1/2	75	.852	.836	2.187	.718
E990DR-CAR	1/2	25	.852	.836	2.187	.718
E990E	3/4	50	1.064	1.046	2.531	.781
E990ER-CAR	3/4	20	1.064	1.046	2.531	.781



Part No.	Size	Vol. Cu. In.	Std. Ctn. Qty.
E970CD	1/2	15.16	15
E970CE	3/4	15.16	15

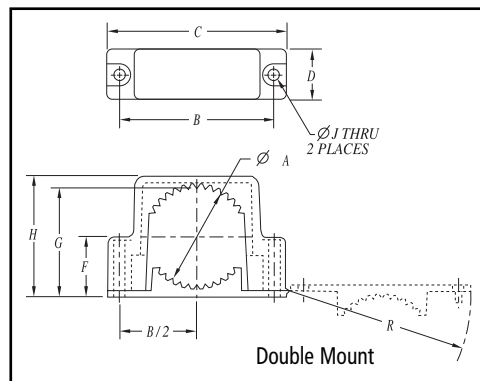
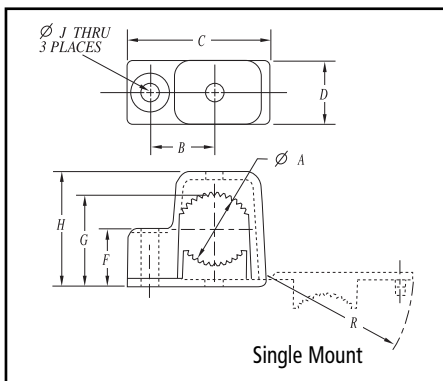
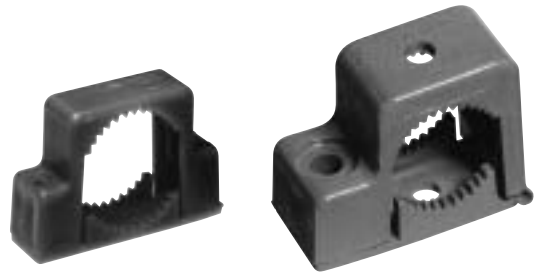
Supplied with 4 stainless steel cover screws. Diameter 4 1/8", Thickness 1/4".
*Not designed for use with wiring devices or light fixtures.

Snap Strap® Conduit Support Straps

Carlson's Snap Strap® offers a unique support strap designed especially for the installation of PVC conduit. Also usable for installations of rigid steel. This high strength, nonmetallic clamp allows conduit to expand and contract freely, eliminating the bowing commonly seen from the expansion and contraction of conduit caused by varying temperature changes. Finished installations have a neat, attractive appearance on exposed applications.

To be used in accordance with conduit spacing requirements per the NEC, Section 352.30. This part is not supplied with screws.

- UV inhibited for use in direct sunlight



Single Mount

Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	F	G	H	J	R
E978DC-CAR	1/2" (16)	40	1	0.80 (20.3)	.75 (1.90)	1.63 (41.4)	0.75 (19.1)	.59 (14.9)	.99 (25.1)	1.36 (34.5)	.21 (5.33)	1.67 (42.4)
E978EC-CAR	3/4" (21)	40	3	1.00 (25.4)	.88 (22.4)	1.92 (48.7)	0.75 (19.1)	.70 (17.8)	1.20 (30.4)	1.57 (39.9)	.21 (5.33)	1.96 (49.8)
E978FC-CAR	1" (27)	30	4	1.20 (30.5)	1.02 (25.9)	2.17 (55.1)	0.75 (19.1)	.83 (21.1)	1.43 (36.3)	1.84 (46.7)	.21 (5.33)	2.22 (56.3)

Double Mount

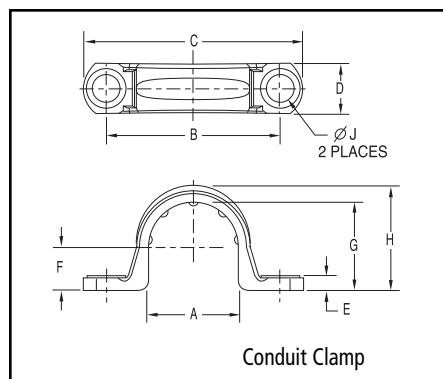
Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	F	G	H	J	R
E978GC-CAR	1 1/4" (35)	15	4	1.66 (42.16)	2.75 (69.9)	3.23 (82.0)	1.00 (25.4)	.95 (24.1)	1.78 (45.2)	2.15 (54.61)	.218 (5.54)	3.28 (83.3)
E978HC-CAR	1 1/2" (41)	15	5	1.92 (48.77)	3.05 (77.5)	3.53 (89.7)	1.00 (25.4)	1.08 (27.4)	2.04 (51.8)	2.40 (60.96)	.218 (5.54)	3.58 (90.9)
E978JC-CAR	2" (53)	10	5	2.34 (59.44)	3.50 (88.9)	4.00 (101.6)	1.00 (25.4)	1.31 (33.3)	2.48 (63.0)	2.86 (72.64)	.218 (5.54)	4.06 (103.1)

Nonmetallic Clamps

Nonmetallic clamps offer the same chemical resistance as Carlon nonmetallic conduits for a complete, corrosion resistant system.

To be used in accordance with conduit spacing requirements per the NEC, Section 352.30.

- UV inhibited for use in direct sunlight



Conduit Clamps

Part No.	Size: inches (mm)	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)	A	B	C	D	E	F	G	H	J
E977DC	1/2" (16)	100	1.2	0.892 (22.6)	1.71 (43.4)	2.16 (54.8)	0.50 (12.7)	.14 (3.5)	.42 (10.6)	.866 (21.9)	1.04 (26.4)	.260 (6.6)
E977EC	3/4" (21)	100	1.4	1.102 (27.9)	1.97 (50.0)	2.40 (60.9)	0.50 (12.7)	.14 (3.5)	.525 (13.3)	1.076 (27.3)	1.255 (31.8)	.260 (6.6)
E977FC	1" (27)	100	2	1.39 (35.3)	2.25 (57.1)	2.81 (71.3)	0.594 (15.0)	.14 (3.5)	.658 (16.7)	1.342 (34.0)	1.574 (39.9)	.260 (6.6)
E977GC	1 1/4" (35)	50	5	1.714 (43.5)	2.68 (68.0)	3.28 (83.3)	.64 (16.2)	.15 (3.8)	.83 (21.0)	1.687 (42.8)	1.89 (48.0)	.320 (8.1)
E977HC	1 1/2" (41)	50	6	1.92 (48.7)	2.82 (71.6)	3.44 (87.3)	.70 (17.7)	.15 (3.8)	.97 (24.6)	1.93 (49.0)	2.12 (53.8)	.312 (7.9)
E977JC	2" (53)	25	4.5	2.54 (64.5)	3.54 (89.9)	4.18 (106.1)	.76 (19.3)	.16 (4.0)	1.05 (26.6)	2.29 (58.1)	2.49 (63.2)	.315 (8.0)
E977KC-CAR	2 1/2" (63)	25	1.4	2.86 (72.6)	4.50 (114.3)	5.46 (138.7)	1.00 (25.4)	.20 (5.08)	1.43 (36.3)	2.86 (72.6)	3.12 (79.2)	.36 (9.14)
E977LC-CAR	3" (78)	20	1.4	3.47 (88.2)	5.00 (127.0)	6.00 (152.4)	1.00 (25.4)	.20 (5.08)	1.74 (44.3)	3.48 (88.4)	3.70 (94.0)	.36 (9.14)
E977NC-CAR	4" (103)	15	12.2	4.366 (110.9)	6.15 (156.2)	7.20 (182.9)	1.00 (25.4)	.20 (5.08)	2.32 (58.8)	4.50 (114.3)	4.70 (119.4)	.36 (9.14)

*Note: Some clamp applications require 2 screws, 2 nuts and 2 washers.

Expansion and Contraction

Temperature Considerations for Rigid Nonmetallic Conduit Compensation for Linear Expansion

Like all construction materials, PVC will expand or contract with variations in temperatures. The coefficient of linear expansion in PVC conduit is 3.38×10^{-5} in./in./°F as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion coupling is needed whenever the change in length due to temperature variation will exceed 1/2 in.

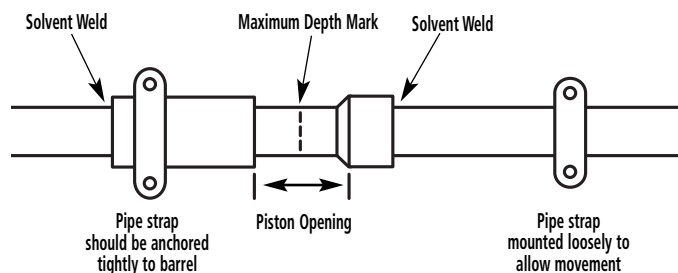
Add 30°F to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

An expansion coupling consists of two sections of conduit, one telescoping inside another. When installing expansion couplings, alignment of piston and barrel is important. Be sure to mount expansion joint level for best performance.

For a vertical run, the expansion coupling must be installed close to the top of the run with the barrel jointing down, in order that rain water does not run into the opening. The lower end of the conduit run must be secured at the bottom so that any length change due to temperature variation will result in an upward movement.

Expansion Characteristics of PVC Rigid Nonmetallic Conduit Coefficient of Thermal Expansion = 3.38×10^{-5} in./in./°F

Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit
5	0.2	55	2.2	105	4.2	155	6.3
10	0.4	60	2.4	110	4.5	160	6.5
15	0.6	65	2.6	115	4.7	165	6.7
20	0.8	70	2.8	120	4.9	170	6.9
25	1.0	75	3.0	125	5.1	175	7.1
30	1.2	80	3.2	130	5.3	180	7.3
35	1.4	85	3.4	135	5.5	185	7.5
40	1.6	90	3.6	140	5.7	190	7.7
45	1.8	95	3.8	145	5.9	195	7.9
50	2.0	100	4.1	150	6.1	200	8.1



Determine the Piston Opening

The expansion joint must be installed to allow both expansion and contraction of the conduit run. The correct piston opening for any installation condition should use the following formula:

$$O = \left[\frac{T_{\max} - T_{\text{installed}}}{\Delta T} \right] E$$

Where:

- O = Piston opening (in.)
- T max = Maximum anticipated temperature of conduit (°F)
- T inst. = Temperature of conduit at time of installation (°F)
- Δ T = Total change in temperature of conduit (°F)
- E = Expansion allowance built into each expansion coupling (in.)

Example

380 ft. of conduit is to be installed on the outside of a building exposed to the sun in a single straight run. It is expected that the conduit will vary in temperature from 0°F in the winter to 140°F in the summer (this includes the 30°F for radiant heating from the sun.) The installation is to be made at a conduit temperature of 90°F. From the table, a 140°F temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is $5.7 \times 3.8 = 21.67$ " which should be rounded to 22". The number of expansion couplings will be $22 \times$ coupling range (4" for Carlon trade sizes 1/2" through 1-1/2", and 8" for sizes 2" through 6"). If the E945D coupling is used, the number will be $22 \times 4 = 5.50$ which should be rounded to 6. The coupling should be placed at 62 ft. intervals (380 x 6). the proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{140 - 90}{140} \right] 4.0 = 1.4 \text{ in.}$$

Insert the piston into the barrel to the maximum depth. Place a mark on the piston at the end of the barrel. To properly set the piston, pull the piston out of the barrel to correspond to the 2.1 in. calculated above. See drawing at lower left.

Summary

1. Anticipate expansion and contraction of PVC conduit in aboveground, exposed installation.
2. Use an expansion coupling when length change due to temperature variation will exceed 1/2".
3. PVC conduit expands 4.1" for each 100 feet of run and a 100°F temperature change.
4. Align expansion coupling with the conduit run to prevent binding.
5. Follow the instructions to set the piston opening.
6. Rigidly fix the outer barrel of the expansion coupling so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.

Corrosion Resistance of Carlon Schedule 40 and Schedule 80 PVC Conduit and Fittings

Carlon Schedule 40 and Schedule 80 are generally acceptable for use in environments containing the chemicals below. These environmental resistance ratings are based upon tests where the specimens were placed in complete submergence in the reagent listed. Schedule 40 and Schedule 80 can be used in many process areas where

chemicals not on this list are manufactured or used because worker safety requirements dictate that any air presence or splashing be at a very low level.

If there are any questions for specific suitability in a given environment, prototype samples should be tested under actual conditions.

Acetic Acid 0-20%	Butyl Alcohol	Fluorine Gas – Wet	Mercurous Nitrate	Sodium Arsenite
Acetic Acid 20-30%	Butyl Phenol	Fluorine Gas – Dry	Mercury	Sodium Benzoate
Acetic Acid 30-60%	Butylene	Fluoroboric Acid	Methyl Sulfate	Sodium Bicarbonate
Acetic Acid 80%	Butyric Acid	Fluorosilicic Acid	Methylene Chloride	Sodium Bisulfate
Acetic Acid – Glacial	Calcium Bisulfite	Formaldehyde	Mineral Oils	Sodium Bisulfite
Acetic Acid Vapors	Calcium Carbonate	Formic Acid	Naphthalene	Sodium Bromide
Acetylene	Calcium Chlorate	Fructose	Nickel Chloride	Sodium Chlorate
Adipic Acid	Calcium Chloride	Gallic Acid	Nickel Nitrate	Sodium Chloride
Alum	Calcium Hydroxide	Gas – Coke Oven	Nitric Acid, Anhydrous	Sodium Cyanide
Aluminum Chloride	Calcium Hypochlorite	Gas – Natural (Dry)	Nitric Acid 20%	Sodium Dichromate
Aluminum Fluoride	Calcium Nitrate	Gas – Natural (Wet)	Nitric Acid 40%	Sodium Ferricyanide
Aluminum Hydroxide	Calcium Sulfate	Gasoline – Sour	Nitric Acid 60%	Sodium Ferrocyanide
Aluminum Oxychloride	Carbonic Acid	Gasoline – Refined	Nitrobenzene	Sodium Fluoride
Aluminum Nitrate	Carbon Dioxide Gas – Wet	Glucose	Nitrous Oxide	Sodium Hydroxide
Aluminum Sulfate	Carbon Dioxide – Aqueous Solution	Glycerine (Glycerol)	Oils and Fats	Sodium Hypochlorite
Ammonia-Dry Gas	Carbon Monoxide	Glycol	Oils – Petroleum – (See Type)	Sodium Nitrate
Ammonium Bifluoride	Caustic Potash	Glycolic Acid	Oleic Acid	Sodium Nitrite
Ammonium Carbonate	Caustic Soda	Green Liquor (Paper Industry)	Oxalic Acid	Sodium Sulfate
Ammonium Chloride	Chloracetic Acid	Heptane	Palmitic Acid 10%	Sodium Sulfide
Ammonium Hydroxide 28%	Chloral Hydrate	Hexanol, Tertiary	Perchloric Acid 10%	Sodium Sulfite
Ammonium Metaphosphate	Chlorine Gas (Dry)	Hydrobromic Acid 20%	Phenylhydrazine Hydrochloride	Sodium Thiosulfate (Hypo)
Ammonium Nitrate	Chlorine Gas (Moist)	Hydrochloric Acid 0% - 25%	Phosgene, Gas	Stannic Chloride
Ammonium Persulfate	Chlorine Water	Hydrochloric Acid 25% - 40%	Phosphoric Acid – 0-25%	Stannous Chloride
Ammonium Phosphate – Neutral	Chlorosulfonic Acid	Hydrocyanic Acid or Hydrogen Cyanide	Phosphoric Acid – 25-50%	Stearic Acid
Ammonium Sulfate	Chrome Alum	Hydrofluoric Acid 10%	Phosphoric Acid – 50-85%	Sulfur
Ammonium Sulfide	Chromic Acid 10%	Hydrofluorosilicic Acid	Photographic Chemicals	Sulfur Dioxide – Gas Dry
Ammonium Thiocyanate	Chromic Acid 30%	Hydrogen Phosphide	Plating Solutions	Sulfur Trioxide
Amyl Alcohol	Chromic Acid 40%	Hydrogen Sulfide – Dry	Potassium Bicarbonate	Sulfuric Acid – 0-10%
Anthraquinone	Chromic Acid 50%	Hydrogen Sulfide – Aqueous Solution	Potassium Bichromate	Sulfuric Acid – 10-75%
Anthraquinonesulfonic Acid	Citric Acid	Hydroquinone	Potassium Borate	Sulfuric Acid – 75-90%
Antimony Trichloride	Copper Chloride	Hydroxylamine Sulfate	Potassium Bromide	Sulfurous Acid
Aqua Regia	Copper Cyanide	Iodine	Potassium Carbonate	Tannic Acid
Arsenic Acid 80%	Copper Fluoride	Kerosene	Potassium Chloride	Tanning Liquors
Arylsulfonic Acid	Copper Nitrate	Lactic Acid 28%	Potassium Chromate	Tartaric Acid
Barium Carbonate	Copper Sulfate	Lauric Acid	Potassium Cyanide	Titanium Tetrachloride
Barium Chloride	Cottonseed Oil	Lauryl Chloride	Potassium Dichromate	Triethanolamine
Barium Hydroxide	Cresylic Acid 50%	Lauryl Sulfate	Potassium Ferricyanide	Trimethyl Propane
Barium Sulfate	Crude Oil – Sour	Lead Acetate	Potassium Ferrocyanide	Trisodium Phosphate
Barium Sulfide	Crude Oil – Sweet	Lime Sulfur	Potassium Fluoride	Turpentine
Beet – Sugar Liquor	DeminerIALIZED Water	Linoleic Acid	Potassium Hydroxide	Urea
Benzene Sulfonic Acid 10%	Dextrin	Linseed Oil	Potassium Nitrate	Vinegar
Benzoic Acid	Dextrose	Lubricating Oils	Potassium Perborate	Whiskey
Bismuth Carbonate	Diglycolic Acid	Magnesium Carbonate	Potassium Perchlorate	White Liquor (Paper Industry)
Black Liquor (Paper Industry)	Disodium Phosphate	Magnesium Chloride	Potassium Permanganate 10%	Wines
Bleach – 12.5% Active CL ₂	Ethyl Alcohol	Magnesium Hydroxide	Potassium Persulfate	Zinc Chloride
Borax	Ethylene Glycol	Magnesium Nitrate	Potassium Sulfate	Zinc Chromate
Boric Acid	Fatty Acids	Magnesium Sulfate	Propane	Zinc Cyanide
Brine	Ferric Chloride	Maleic Acid	Propyl Alcohol	Zinc Nitrate
Breeder Pellets – Dane. Fish	Ferric Nitrate	Malic Acid	Silicic Acid	Zinc Sulfate
Bromic Acid	Ferric Sulfate	Mercuric Chloride	Silver Cyanide	
Bromine – Water	Ferrous Chloride	Mercuric Cyanide	Silver Nitrate	
Butane	Ferrous Sulfate		Silver Plating Solutions	
Butadiene			Sodium Acetate	

Suggested Format for Specifying Carlon Nonmetallic Conduit, Conduit Fittings and Junction Boxes

- A.** The Carlon rigid nonmetallic conduit system shall be installed as indicated on the drawings and as specified herein.
- B.** All wiring shall be installed in Carlon rigid nonmetallic conduit. All conduit shall be secured by means of proper fittings. All fittings shall be Carlon.
- C.** Carlon outlet boxes, fittings and junction boxes shall be used for all outlets, pull boxes and junction points. (Lighting fixtures shall not be supported or hung from PVC junction boxes but be supported in position by other means.)
- D.** Exposed conduits shall be mounted securely by suitable hangers or straps with the maximum spacing of points of supports not greater than indicated by Section 352.30 of the NEC.
- E.** Except where embedded in concrete or direct buried, Carlon conduit shall be supported to permit adequate lineal movement to allow for expansion and contraction of conduit due to temperature change.
- F.** For aboveground installations where temperature change in excess of 14°C (25°F) is anticipated, expansion joints shall be installed. See Table 352.44(A) NEC for expansion characteristics.
- G.** Proper care shall be taken when field bending is employed to maintain the internal diameter and wall thickness of the conduit.





52141-1/2



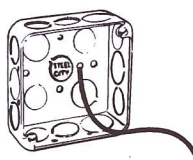
52151-1/2



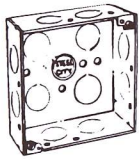
52151-3/4



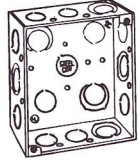
52151-1/2 & 3/4



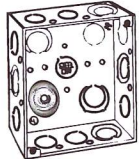
52151-1/2 & 3/4



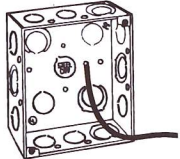
52151-3/4-W



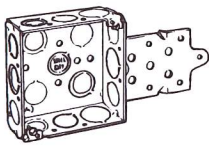
52151-1/2 & 3/4-EW



52151-1/2 & 3/4-EWGB

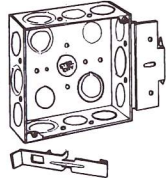


52151-1/2 & 3/4-EWP



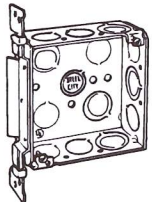
52151-B-1/2 & 3/4

"B" Bracket mounted flush



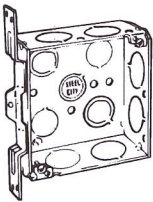
52151-MS-1/2 & 3/4

For use on 1 5/8", 2 1/2", 3 3/8", 4", 6" metal studs



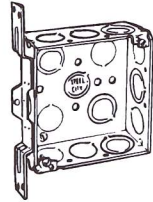
52151-V-1/2 & 3/4

"SV" Bracket mounted flush



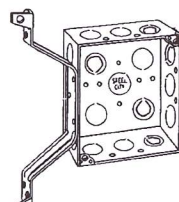
52151-CV-3/4

"CV" Bracket mounted flush



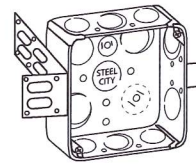
52151-CV-1/2 & 3/4

"CV" Bracket mounted flush



52151-DV-1/2

"DV" Bracket provides offset



52151-EF-SSX

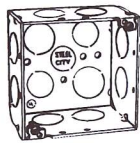
4" Square Boxes

Cat. No.	Brkts.	Knockouts			Std. Ctn.
		Ea. Side Conduit	Ea. End Conduit	Bottom Cable	
1 1/4" deep—with conduit KOs—18.0 cubic inch capacity					
52141-1/2	—	2-1/2"	3-1/2"	5-1/2"	50
1 1/2" deep—with conduit KOs—21.0 cubic inch capacity drawn					
52151-1/2	—	3-1/2"	3-1/2"	5-1/2"	50
52151-3/4	—	2-3/4"	2-3/4"	3-1/2"	50
52151-1/2 & 3/4	—	2-1/2" 1-3/4"	2-1/2" 1-3/4"	3-1/2" 2-3/4"	50
52151-1/2 & 3/4P	—	2-1/2" 1-3/4"	2-1/2" 1-3/4"	3-1/2" 2-3/4"	50
52151-3/4-W	—	2-3/4"	2-3/4"	3-1/2" 2-3/4"	50
52151-B-1/2 & 3/4*	B	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-3/4" & 3/4E	3-1/2" 2-1/2" & 3/4E	25
52151-1/2 & 3/4-EW*	H	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-1/2" & 3/4E	3-1/2" 2-1/2" & 3/4E	50
52151-1/2 & 3/4-EWGB (Ground Bump)	H	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-1/2" & 3/4E	2-1/2" 2-1/2" & 3/4E	50
52151-1/2 & 3/4-EWGBP (Ground Bump with 10 1/2" Ground Wire)	H	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-1/2" & 3/4E	2-1/2" 2-1/2" & 3/4E	50
52151-1/2 & 3/4-EWP*	H	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-1/2" & 3/4E	3-1/2" 2-1/2" & 3/4E	50
52151-MS-1/2 & 3/4*	MS	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-3/4" & 3/4E	3-1/2" 2-1/2" & 3/4E	25
52151-V-1/2 & 3/4*	SV	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-3/4" & 3/4E	3-1/2" 2-1/2" & 3/4E	25
52151-CV-3/4	CV	2-3/4" 1-1/2" & 3/4E	2-3/4" 1-3/4" & 3/4E	3-1/2" 2-1/2" & 3/4E	25
52151-CV-1/2 & 3/4*	CV	2-1/2" 1-1/2" & 3/4E	2-1/2" 1-3/4" & 3/4E	3-1/2" 2-1/2" & 3/4E	25
52151-DV-1/2*	DV	2-1/2" & 3/4E	3-1/2" & 3/4E	3-1/2" & 3/4E	25
52151-EF-SSX	SSX	1-1/2" 1-1/2" & 3/4E	2-1/2" 1-1/2" & 3/4E	2-1/2" 2-1/2" & 3/4E	25

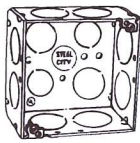
* Per U.L. 514-A, suitable for use without a bonding jumper in circuits above or below 250 volts.

* All Bracketed Boxes come complete with eccentric knockouts.

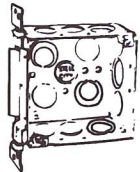
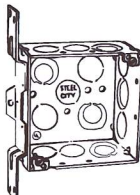
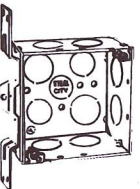
• Pigtail wire is #12 AWG insulated, 10 1/2" long.



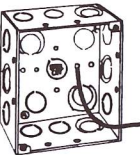
52171-3/4



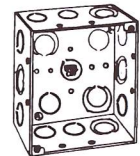
52171-1

52171-V-1/2 & 3/4**
"SV" bracket
mounted flush52171-CV-1/2 & 3/4**
"CV" bracket
mounted flush

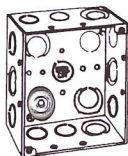
52171-CV-3/4



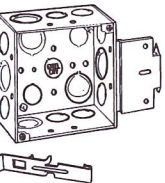
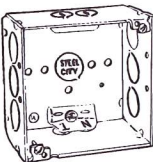
52171-CV-1/2 & 3/4-EP



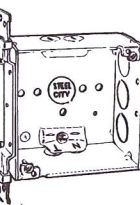
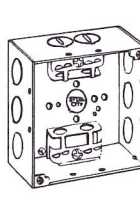
52171-1/2 & 3/4-E



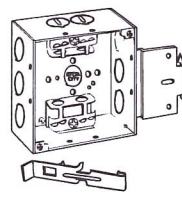
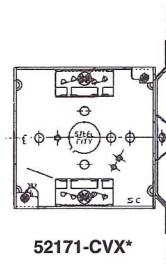
52171-1/2 & 3/4-EGB

52171-MS-1/2 & 3/4**
"MS" bracket for
1 1/2", 2 1/2", 3 3/8",
4", 6" metal studs

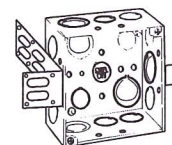
52171-N**

52171-VN**
"SV" bracket
mounted flush

52171-X**

52171-MSX**
"MS" bracket for
1 1/2", 2 1/2", 3 3/8",
4", 6" metal studs

52171-CVX*



52171-EW-SSX

4" Square Boxes – Continued

Cat. No.	Clamps	Brkts.	Knockouts			Std. Ctn.
			Ea. Side Conduit	Ea. End Cable	Bottom Conduit	
2 1/8" deep—with conduit KOs—30.3 cubic inch capacity						
52171-3/4	—	—	2-3/4"	2-3/4"	3-1/2" 2-3/4"	50
52171-1	—	—	2-1"	2-1"	3-1/2" 2-3/4"	50
52171-V-1/2 & 3/4*	—	SV	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	3-1/2" 2-1/2" & 3/4"E	25
52171-CV-1/2 & 3/4*	—	CV	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	3-1/2" 2-1/2" & 3/4"E	25
NEW 52171-CV-3/4	—	—	2-3/4"	2-3/4"	3-1/2" 2-3/4"	25
NEW 52171-CV-1/2 & 3/4EP*	—	CV	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	3-1/2" 2-1/2" & 3/4"E	25
52171-1/2 & 3/4-E	—	—	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	3-1/2" 2-1/2" & 3/4"E	50
NEW 52171-1/2 & 3/4-EGB (Ground Bump)	—	CV	2-1/2"	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	25
NEW 52171-1/2 & 3/4-EGBP (Ground Bump with 10 1/2" Ground Wire)	—	—	2-1/2"	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	50
52171-MS-1/2 & 3/4*	—	MS	2-1/2" 1-1/2" & 3/4"E	2-1/2" 1-1/2" & 3/4"E	3-1/2" 2-1/2" & 3/4"E	25
2 1/8" deep—with nonmetallic sheathed cable clamps—30.3 cubic inch capacity						
52171-N	C-5	—	2-1/2"	2 1-1/2" & 3/4"E	1-1/2"	25
52171-VN*	C-5	SV	2-1/2"	2 1-1/2" & 3/4"E	1-1/2"	25
2 1/8" deep—for armored cable and metal clad cable clamps—30.3 cubic inch capacity						
52171-X*	C-3	—	2-1/2" 1-1/2" & 3/4"E	2	1-1/2"	25
52171-MSX*	C-3	MS	2-1/2" 1-1/2" & 3/4"E	2	1-1/2"	25
NEW 52171-CVX*	C-3	CV-2	1/2-3/4"	—	—	25
52171-EW-SSX	C-3	SSX	—	—	—	25

* Per U.L. 514-A, suitable for use without a bonding jumper in circuits above or below 250 volts.

* All Bracketed Boxes come complete with eccentric knockouts.

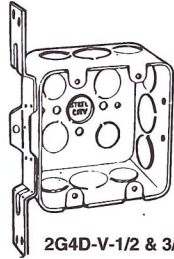
• Pigtail wire is #12 AWG insulated, 10 1/2" long.



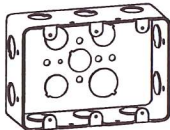
X1-1/2-1/2 & 3/4



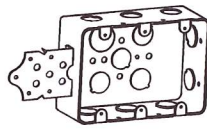
2G4D-1/2 & 3/4



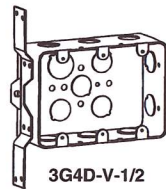
2G4D-V-1/2 & 3/4
- "CV" bracket recessed 1/8"



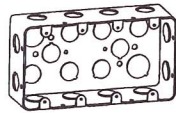
3G4D-1/2



3G4D-B-1/2



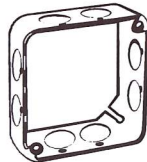
3G4D-V-1/2



4G4D-1/2



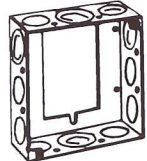
53151-1/2



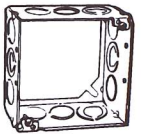
53151-3/4



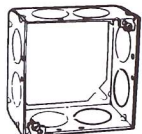
53151-1/2 & 3/4



53151-1/2 & 3/4-UB**



53171-1/2 & 3/4**



53171-1

4" Square Thru-Wall Box

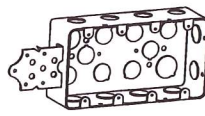
Cat. No.	Knockouts		Std. Ctn.
	Ea. Side Conduit	Ea. End Conduit	
1½" deep—with conduit KOs—21.0 cubic inch capacity			
X1-1/2 & 3/4	2-½", 1-¾"	2-½", 1-¾"	25

4" Square Two-Device Boxes

Cat. No.	Brkts.	Knockouts			Std. Ctn.
		Ea. Side Conduit	Ea. End Conduit	Bottom Conduit	
2½" deep—with conduit KOs—30.3 cubic inch capacity					
2G4D-1/2 & 3/4	-	2-½", 1-¾"	2-½", 1-¾"	3-½", 2-¾"	25
2G4DV-1/2 & 3/4	CV	2-½", 1-¾"	2-½", 1-¾"	3-½", 2-¾"	25

3 and 4 Gang Drawn-Style Device Boxes

Cat. No.	Brkts.	Ea. Side Conduit	Ea. End Conduit	Std. Ctn.
2½" deep—3 gang – cubic inch, 4 gang – cubic inch				
3G4D-1/2	-	3-½"	2-½"	20
3G4D-B-1/2	B	3-½"	2-½"	20
3G4D-V-1/2	CV	3-½"	2-½"	20
4G4D-1/2	-	4-½"	2-½"	20
4G4D-B-1/2	B	4-½"	2-½"	20
4G4D-V-1/2	CV	4-½"	2-½"	20



4G4D-B-1/2



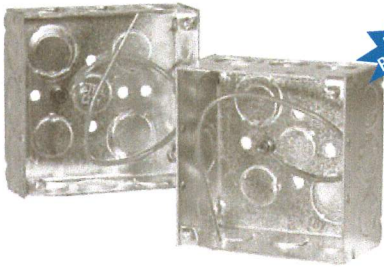
4G4D-V-1/2

4" Square Extension Rings

Cat. No.	Knockouts		Std. Ctn.
	Ea. Side Conduit	Ea. End Conduit	
1½" deep—with conduit KOs—21.0 cubic inch capacity			
53151-1/2	3-½"	3-½"	50
53151-3/4	2-¾"	2-¾"	25
53151-1/2 & 3/4	2-½" 1-¾"	2-½" 1-¾"	50
53151-1/2 & 3/4-UB*	2-½" 1-½" & ¾"E	2-½"	50
2½" deep—with conduit KOs—30.3 cubic inch capacity			
53171-1/2 & 3/4*	2-½" 1-½" & ¾"E	2-½" 1-¾"	25
53171-1	2-1"	2-1"	25

* Per U.L. 514-A, suitable for use without a bonding jumper in circuits above or below 250 volts.

** ECC, KO's on sides.



52151-1/2 & 3/4-EWP

- Popular 4" Square Boxes and Switch Boxes.
- Pre-Installed 10½" Insulated Pigtails.

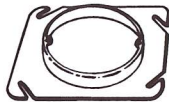


Boxes with Pre-Installed Pigtails

Cat. No.	Box Type Included	Pigtail Type Included	Std. Ctn.
52151-1/2 & 3/4-EWP	521511234EW	10½"	50
52151-1/2 & 3/4-P	521511234	10½"	50
52151-1/2 & 3/4-EP	521711234E	10½"	50
52151-XP	52151X	10½"	50
52151-CVNP	52151CVN	10½"	25
LXWOWP	LXWOW-25	10½"	25
LXVP	LXV-25	10½"	25
CXWOWP	CXWOW	10½"	25
CXWVP	CXWV	10½"	25
CXP	CX	10½"	25



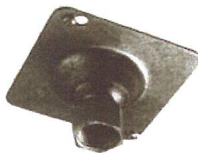
52-C-1



52-C-3



52-C-6



SH 1/2 & 3/4

4" Square Covers

Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
52-C-1	—	Flat, blank	—	100
52-C-3-25	5/8"	Center blanked with tapped ears on 2¾" centers	4.3	25
52-C-3-1/2-25	½"	Center blanked with tapped ears on 2¾" centers	3.5	25
52-C-3-3/4	¾"	Center blanked with tapped ears on 2 ²³ / ₃₂ " centers	4.3	25
52-C-3-1	1"	Center blanked with tapped ears on 2 ²³ / ₃₂ " centers	5.8	25
52-C-3-1-1/4	1½"	Center blanked with tapped ears on 2 ²³ / ₃₂ " centers	7.3	25
52-C-6	—	Flat, with ½" KO	—	100

Swivel Hangers

Cat. No.	Bar Lgth. (in.)	Description	Slot (in.)	Std. Ctn.
SH 1/2 & 3/4	—	Swivel Hanger for 4" Square Boxes	—	25

UL Listed for 50 lb. Fixture Support.



52-C-0



52-C-10



52-C-14



52-C-36

4" Square Device Covers

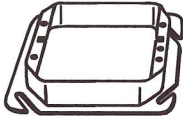
Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
For single device				
52-C-0	—	Flat	—	25
52-C-62	¼"	Keyed for plaster	1.5	25
52-C-10	¼"	Offset, keyed for plaster	1.0	25
52-C-13	½"		3.0	50
52-C-14	¾"		5.0	50
52-C-14-5/8	5/8"		4.0	50
52-C-15	1"		7.0	25
52-C-16	1¼"		8.3	25
52-C-36	¼"	For dry wall construction	1.0	25



52-C-00



52-C-17

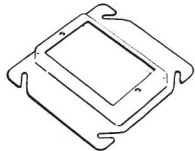


52-C-21

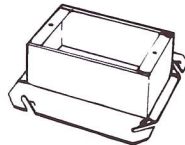
4" Square Device Covers

Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
For two devices				
52-C-00	—	Flat	—	25
52-C-20-25	1/4"		2.3	25
52-C-17-25	1/2"		6.3	25
52-C-18	3/4"		9.0	25
52-C-18-5/8-25	5/8"	For dry wall construction	7.3	25
52-C-19	1"		12.0	25
52-C-21	1 1/8"		15.0	25
52-C-37	1 1/8"		2.3	25

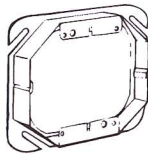
For Swivel Covers see Accessories Section on pages A16 and A26.



52-C-49-1/2



52-C-50-1-1/2

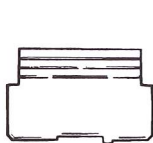


52-C-52-1/2

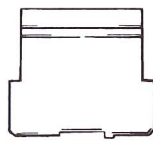
4" Square Cut Tile Wall Covers

Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
For single device—steel				
52-C-49-1/2*	1/2"	—	3.5	50
52-C-49-3/4*	3/4"	—	5.3	50
52-C-49-1*	1"	—	7.0	10
52-C-49-1-1/4	1 1/4"	—	9.3	10
52-C-50-1-1/2-25	1 1/2"		11.0	25
52-C-51-2-25	2"		14.8	25
For two devices—steel				
52-C-52-1/2	1/2"	Square corners facilitate tile installation	6.0	10
52-C-52-3/4	3/4"		9.0	10
52-C-52-1	1"		12.5	10
52-C-52-1-1/4	1 1/4"		15.5	10
52-C-53-1-1/2	1 1/2"		19.0	10
52-C-54-2	2"		25.5	10

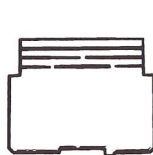
*Drawn style.



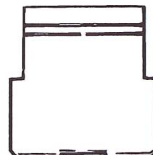
52-PS-1



52-PS-2



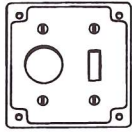
52-PD-1



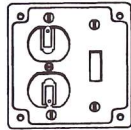
52-PD-2

4" Square Box Partitions

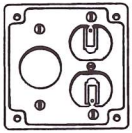
Cat. No.	Description	Std. Ctn.
For 1 1/2" deep box with square cut tile wall two-device covers		
52-PS-1	For 1/2", 3/4" and 1" raised covers	25
52-PS-2	For 1 1/4", 1 1/2" and 2" raised covers	25
For 2 1/8" deep box with square cut tile wall two-device covers		
52-PD-1	For 1/2", 3/4" and 1" raised covers	25
52-PD-2	For 1 1/4", 1 1/2" and 2" raised covers	25



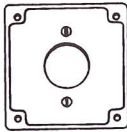
RS-1



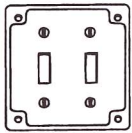
RS-2



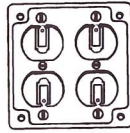
RS-3



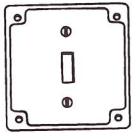
RS-4



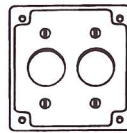
RS-5



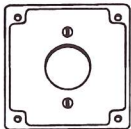
RS-8



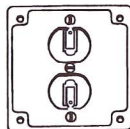
RS-9



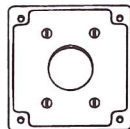
RS-10



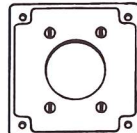
RS-11



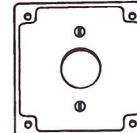
RS-12



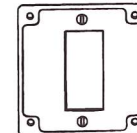
RS-13



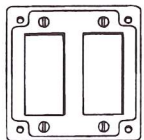
RS-14



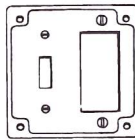
RS-15



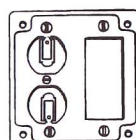
RS-16-CC



RS-17-CC



RS-18-CC



RS-19-CC

4" Square Surface Covers

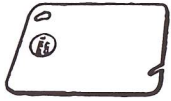
Cat. No.	Dia. Hole (in.)	Description	Std. Ctn.
½" deep—5.0 cubic inch capacity			
RS-1	1 ³ / ₂	For one toggle switch and one single flush receptacle	50
RS-2*	—	For one toggle switch and one duplex flush receptacle	50
RS-3*	1 ³ / ₂	For one single and one duplex flush receptacle	50
RS-4	1 ⁹ / ₂	For one 4-wire twist-lock single receptacle	50
RS-5	—	For two toggle switches	50
RS-8*	—	For two duplex, flush receptacles	50
RS-9	—	For one toggle switch	50
RS-10	1 ³ / ₂	For two single, flush receptacles	50
RS-11	1 ³ / ₂	For one single, flush receptacle	50
RS-12*	—	For one duplex, flush receptacle	50
RS-13	2 ⁵ / ₂	For one 30 or 50 amp. dryer or range receptacle	50

Cat. No.	Die Hole (in.)	For Recept. No.	Amps	Wire	Std. Ctn.
1½" deep—5.0 cubic inch capacity					
RS-14	2 ¹⁵ / ₂	7112	30	3	50
		7301	60	4	
		7512	50	3	
		9430	30	4	
		9430	50	4	
		9650	60	4	
RS-15	1 ³ / ₄ "	For #3330—30A 250 V twist-lock receptacle			50
RS-16-CC		For one ground fault receptacle			25
RS-17-CC		For two ground fault receptacles			25
RS-18-CC		For one ground fault receptacle and one toggle switch			25
RS-19-CC*		For one ground fault receptacle and one duplex receptacle			25

Remove portion of G.F.I. receptacle ear to mount receptacle to cover.

Screws captivated.

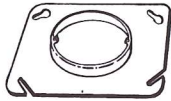
* Now manufactured to meet new code C4 and to conform to the 1996 N.E.C. change.



72-C-1



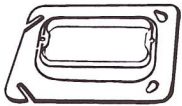
72-C-6



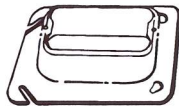
72-C-3

4¹¹/₁₆" Square Covers

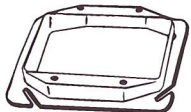
Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
72-C-1	—	Flat blank	—	50
72-C-6	—	Flat with 1/2" KO	—	25
72-C-3	5/8"	Center blanked with tapped ears on 2 ³ / ₃₂ " centers	3.5	10
72-C-3-1/2	1/2"		3.0	25
72-C-3-3/4	3/4"		4.3	10
72-C-3-1	1"		5.8	25



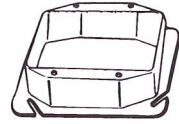
72-C-13



72-C-15



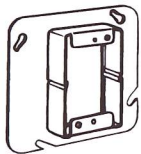
72-C-17



72-C-21

4¹¹/₁₆" Square Device Covers

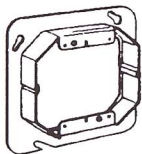
Cat. No.	Raised	Cu. In. Cap.	Std. Ctn.
For single device			
72-C-62	1/4"	1.0	25
72-C-13	1/2"	3.0	25
72-C-14	3/4"	5.0	25
72-C-14-5/8	5/8"	4.0	25
72-C-15	1"	7.0	10
72-C-16	1 1/4"	8.3	10
For two devices			
72-C-17	1/2"	6.3	25
72-C-18	3/4"	9.0	25
72-C-18-5/8	5/8"	7.5	25
72-C-19	1"	12.0	25
72-C-21	1 1/4"	15.0	25



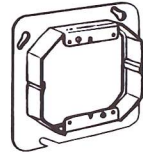
72-C-49-3/4



72-C-50-1-1/2



72-C-52-3/4



72-C-53-1-1/2

4¹¹/₁₆" Square Cut Tile Wall Covers

Cat. No.	Raised	Description	Cu. In. Cap.	Std. Ctn.
For single device—steel				
72-C-49-1/2	1/2"	—	3.5	10
72-C-49-3/4	3/4"	—	5.3	10
72-C-49-1	1"	—	7.0	10
72-C-49-1-1/4	1 1/4"	—	7.0	10
72-C-50-1-1/2	1 1/2"	—	9.0	10
72-C-51-2	2"	—	14.5	20
For two devices—steel				
72-C-52-1/2	1/2"	Square corners facilitate tile installation	6.0	10
72-C-52-3/4	3/4"		9.0	10
72-C-52-1	1"		12.5	25
72-C-52-1-1/4	1 1/4"		15.5	25
72-C-53-1-1/2	1 1/2"		19.0	10
72-C-54-2	2"		25.5	10

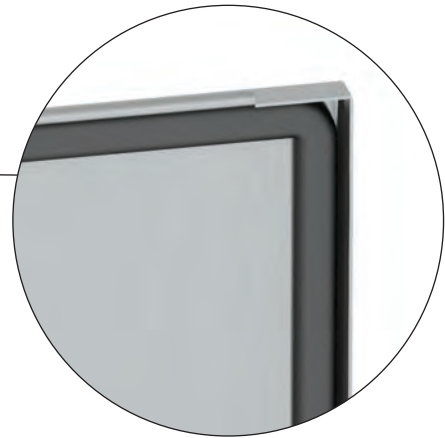
Type 4X Panel Enclosures



JIC Enclosures Type 4X Lift-Off Cover	194-195
JIC Enclosures Type 4X Lift-Off Cover, Aluminum	196-197
JIC Enclosures Type 4X JIC Continuous Hinge Cover	198-199
JIC Enclosures Type 4X JIC Continuous Hinge Cover Aluminum	200-201
JIC Enclosures Type 4X JIC Continuous Hinge Cover Quarter-Turn Latches	202-203
Wall-Mount Enclosures Type 4X Single-Door	204-205
Wall-Mount Enclosures Type 4X Single-Door, Aluminum	206-207
Wall-Mount Enclosures Type 4X Premier™ Quarter-Turn Latches	208-211
Premier™ Series Accessories	212-217
Wall-Mount Enclosures Type 4X Single-Door 3-Point Locking	218-219
Wall-Mount Enclosures Type 4X Double-Door 3-Point Locking	220-221
Ground-Mount Enclosures Type 4X Double-Door Floor Standing	222-223
Ground-Mount Enclosures Type 4X Double-Door Floor-Standing Quarter-Turn Latches	224-225
Ground-Mount Enclosures Type 4X Double-Door Floor-Standing 3-Point Locking	226-227
Ground-Mount Enclosures Type 4X Single-Door Free-Standing	228-229
Ground-Mount Enclosures Type 4X Single-Door Free-Standing Quarter-Turn Latches	230-231
Ground-Mount Enclosures Type 4X Single-Door Free-Standing 3-Point Locking	232-233
Ground-Mount Enclosures Type 4X Single-Door Dual Access Free-Standing 3-Point Locking	234-235
Ground-Mount Enclosures Type 4X Double-Door Free-Standing 3-Point Locking	236-237
Ground-Mount Enclosures Type 4X Double-Door Dual Access Free-Standing 3-Point Locking	238-239
Ground-Mount Enclosures Type 4X Multi-Door Free-Standing 3-Point Locking	239a-239d
Ground-Mount Enclosures Type 4X Double-Door EnviroShield™ Free-Standing 3-Point Locking	240-241
Free-Standing Enclosure Accessories	242-253

Type 4X Panel Enclosures

JIC Enclosures Type 4X Lift-Off Cover Data Sheet



Seamless, poured in-place gasket

Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4X, Type 4, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4X, Type 4, Type 12 and Type 13
- Conforms to NEMA standard for Type 4X, Type 4, Type 12 and Type 13

Finish

- Cover and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- JIC terminal strap kit
- JIC terminal strip kit
- Terminal blocks
- See Accessories section

Construction

- Enclosure and cover are fabricated from (16) gauge, Type 304 or Type 316L stainless steel
- All continuous welded seams are finished smooth
- Cover is secured to the body with easy-to-operate stainless steel screw clamps mounted on all four sides
- Cover has a seamless poured in-place gasket
- #10-32 weld nuts are provided for mounting optional panel on 6" x 4" and larger enclosures
- Ground stud provided on cover
- External mounting feet are provided for secure wall mounting

Discount Schedule: C2

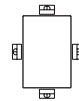
**Subclass: DD0 (Type 304)
D10 (Type 316L)**

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

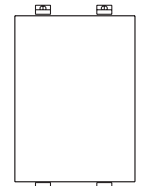
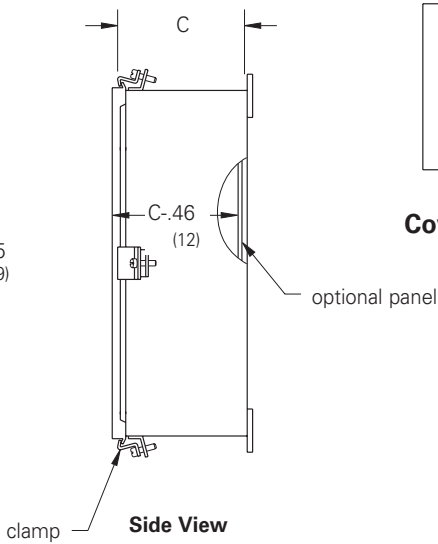
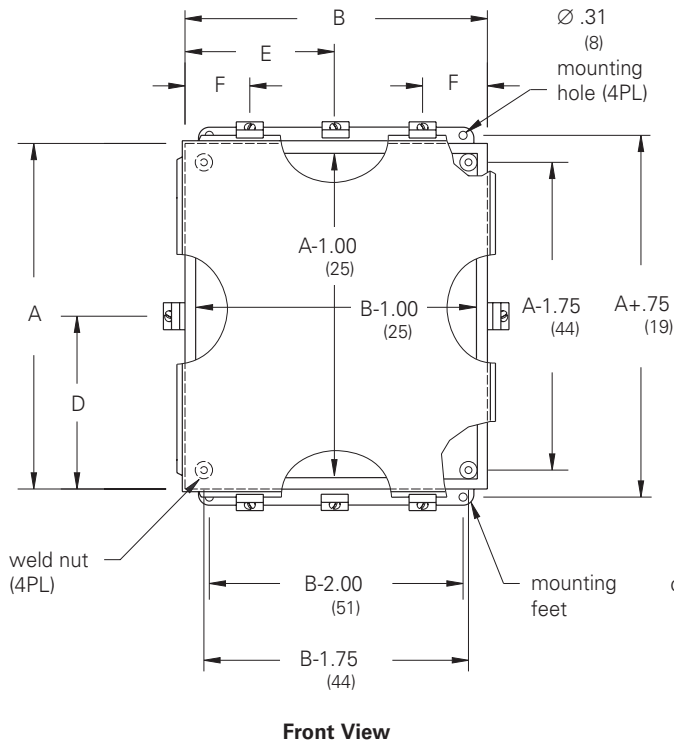
Type 4X Panel Enclosures

JIC Enclosures Type 4X Lift-Off Cover Illustration Sheet and Catalog Number

Enclosure Catalog Number Stainless Steel		Enclosure Size Height x Width x Depth A x B x C		D	E	F	Panel Catalog Number		Panel Size Height x Width		
Type 304	Type 316L	in.	mm	in.	mm	in.	mm	Steel	Conductive	in.	mm
443-4XSLC	443-4XSS6LC	4.00 x 4.00 x 3.00	102 x 102 x 76	2.00	51	2.00	51	—	—	—	—
643-4XSLC	643-4XSS6LC	6.00 x 4.00 x 3.00	152 x 102 x 76	3.00	76	2.00	51	AW64P	AW64GP	4.87 x 2.87	124 x 73
664-4XSLC	664-4XSS6LC	6.00 x 6.00 x 4.00	152 x 152 x 102	3.00	76	3.00	76	AW66P	AW66GP	4.87 x 4.87	124 x 124
864-4XSLC	864-4XSS6LC	8.00 x 6.00 x 4.00	203 x 152 x 102	—	—	—	—	AW86P	AW86GP	6.87 x 4.87	174 x 124
884-4XSLC	884-4XSS6LC	8.00 x 8.00 x 4.00	203 x 203 x 102	—	—	—	—	AW88P	AW88GP	6.87 x 6.87	174 x 174
1084-4XSLC	1084-4XSS6LC	10.00 x 8.00 x 4.00	254 x 203 x 102	—	—	—	—	AW108P	AW108GP	8.87 x 6.87	225 x 174
12105-4XSLC	12105-4XSS6LC	12.00 x 10.00 x 5.00	305 x 254 x 127	—	—	—	—	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
14126-4XSLC	14126-4XSS6LC	14.00 x 12.00 x 6.00	356 x 305 x 152	—	—	—	—	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
16146-4XSLC	16146-4XSS6LC	16.00 x 14.00 x 6.00	406 x 356 x 152	—	—	—	—	AW1614P	AW1614GP	14.87 x 12.87	378 x 327



443-4XSLC
643-4XSLC
664-4XSLC



864-4XSLC
884-4XSLC
1084-4XSLC
12105-4XSLC
14126-4XSLC
16146-4XSLC

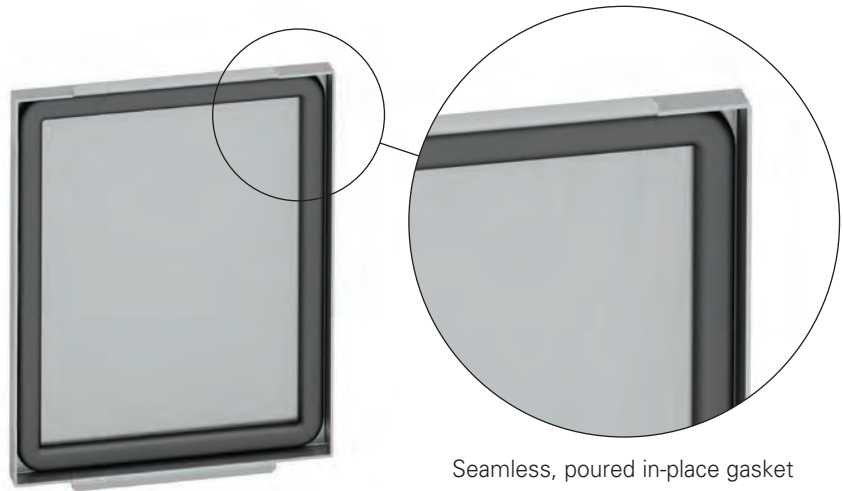
Cover Clamp Layout

optional panel

Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

JIC Enclosures Type 4X Lift-Off Cover, Aluminum Data Sheet



Seamless, poured in-place gasket

Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4, Type 4X, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4, Type 4X, Type 12 and Type 13
- Conforms to NEMA standard for Type 4, Type 4X, Type 12 and Type 13

Finish

- Cover and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- JIC terminal strap kit
- JIC terminal strip kit
- Terminal blocks
- See Accessories section

Construction

- Enclosure and cover are fabricated from (14) gauge, Type 5052-H32 aluminum
- All continuous welded seams are finished smooth
- Cover is secured to the body with easy-to-operate stainless steel screw clamps mounted on all four sides
- Each door has a print pocket and padlock hasp with sealing hole provision
- Cover has a seamless poured in-place gasket
- #10-32 weld nuts are provided for mounting optional panel on 6" x 4" and larger enclosures
- External mounting feet are provided for secure wall mounting

Discount Schedule: C2

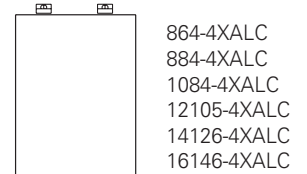
Subclass: DDA

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Type 4X Panel Enclosures

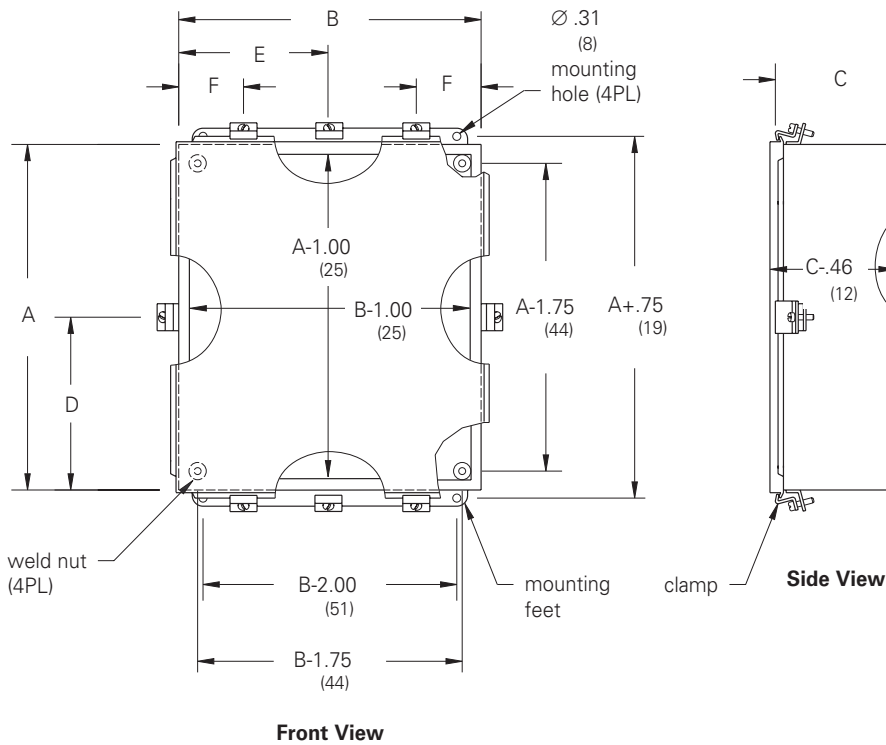
JIC Enclosures Type 4X Lift-Off Cover, Aluminum Illustration Sheet and Catalog Number

Enclosure Catalog Number	Enclosure Size Height x Width x Depth A x B x C		D in. mm	E in. mm	F in. mm	Panel Catalog Number		Panel Size Height x Width in. mm	
	in.	mm				Steel	Conductive	in.	mm
443-4XALC	4.00 x 4.00 x 3.00	102 x 102 x 76	2.00 51	2.00 51	— —	—	—	—	—
643-4XALC	6.00 x 4.00 x 3.00	152 x 102 x 76	3.00 76	2.00 51	— —	AW64P	AW64GP	4.87 x 2.87	124 x 73
664-4XALC	6.00 x 6.00 x 4.00	152 x 152 x 102	3.00 76	3.00 76	— —	AW66P	AW66GP	4.87 x 4.87	124 x 124
864-4XALC	8.00 x 6.00 x 4.00	203 x 152 x 102	— —	— —	2.00 51	AW86P	AW86GP	6.87 x 4.87	174 x 124
884-4XALC	8.00 x 8.00 x 4.00	203 x 203 x 102	— —	— —	2.00 51	AW88P	AW88GP	6.87 x 6.87	174 x 174
1084-4XALC	10.00 x 8.00 x 4.00	254 x 203 x 102	— —	— —	2.00 51	AW108P	AW108GP	8.87 x 6.87	225 x 174
12105-4XALC	12.00 x 10.00 x 5.00	305 x 254 x 127	— —	— —	3.00 76	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
14126-4XALC	14.00 x 12.00 x 6.00	356 x 305 x 152	— —	— —	3.00 76	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
16146-4XALC	16.00 x 14.00 x 6.00	406 x 356 x 152	— —	— —	3.00 76	AW1614P	AW1614GP	14.87 x 12.87	378 x 327



Cover Clamp Layout

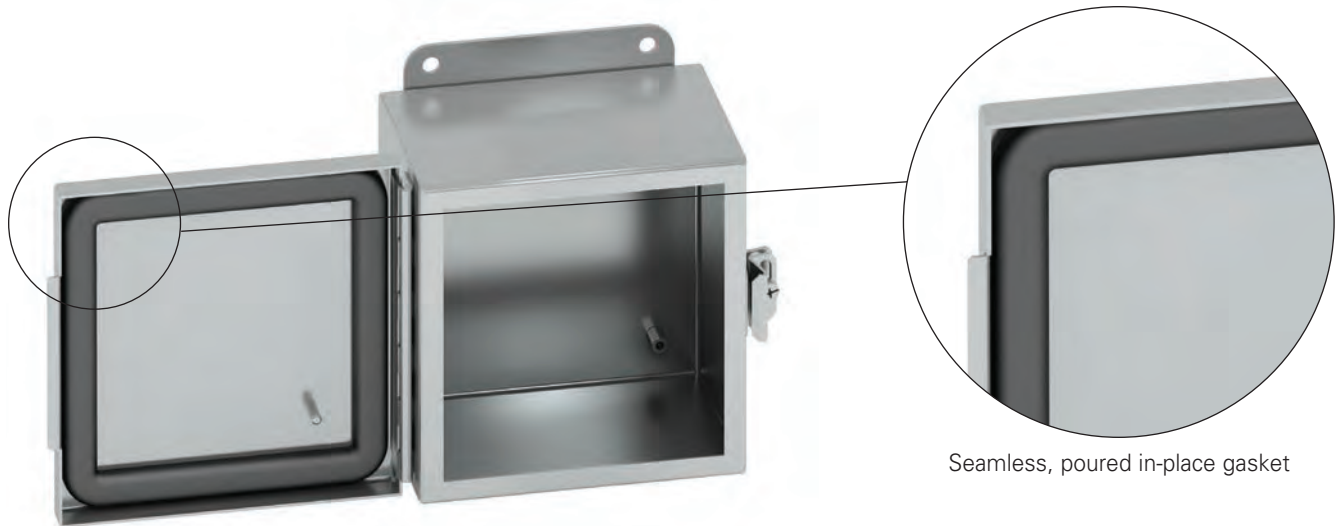
optional panel



Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

JIC Enclosures Type 4X Continuous Hinge Cover Data Sheet



Seamless, poured in-place gasket

Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4, Type 4X, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4, Type 4X, Type 12 and Type 13
- Conforms to NEMA standard for Type 4, Type 4X, Type 12 and Type 13

Finish

- Cover and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- JIC terminal strap kit
- JIC terminal strip kit
- Terminal blocks
- See Accessories section

Construction

- Enclosure and cover are fabricated from (16) gauge, Type 304 or Type 316L stainless steel
- All continuous welded seams are finished smooth
- Cover is secured to the body with a stainless steel continuous hinge and pin on one side and easy-to-operate stainless steel screw clamps mounted to the opposite side
- Cover has a seamless poured in-place gasket
- Ground stud provided on cover
- #10-32 weld nuts are provided for mounting optional panel
- External mounting feet are provided for secure wall mounting

Discount Schedule: C2

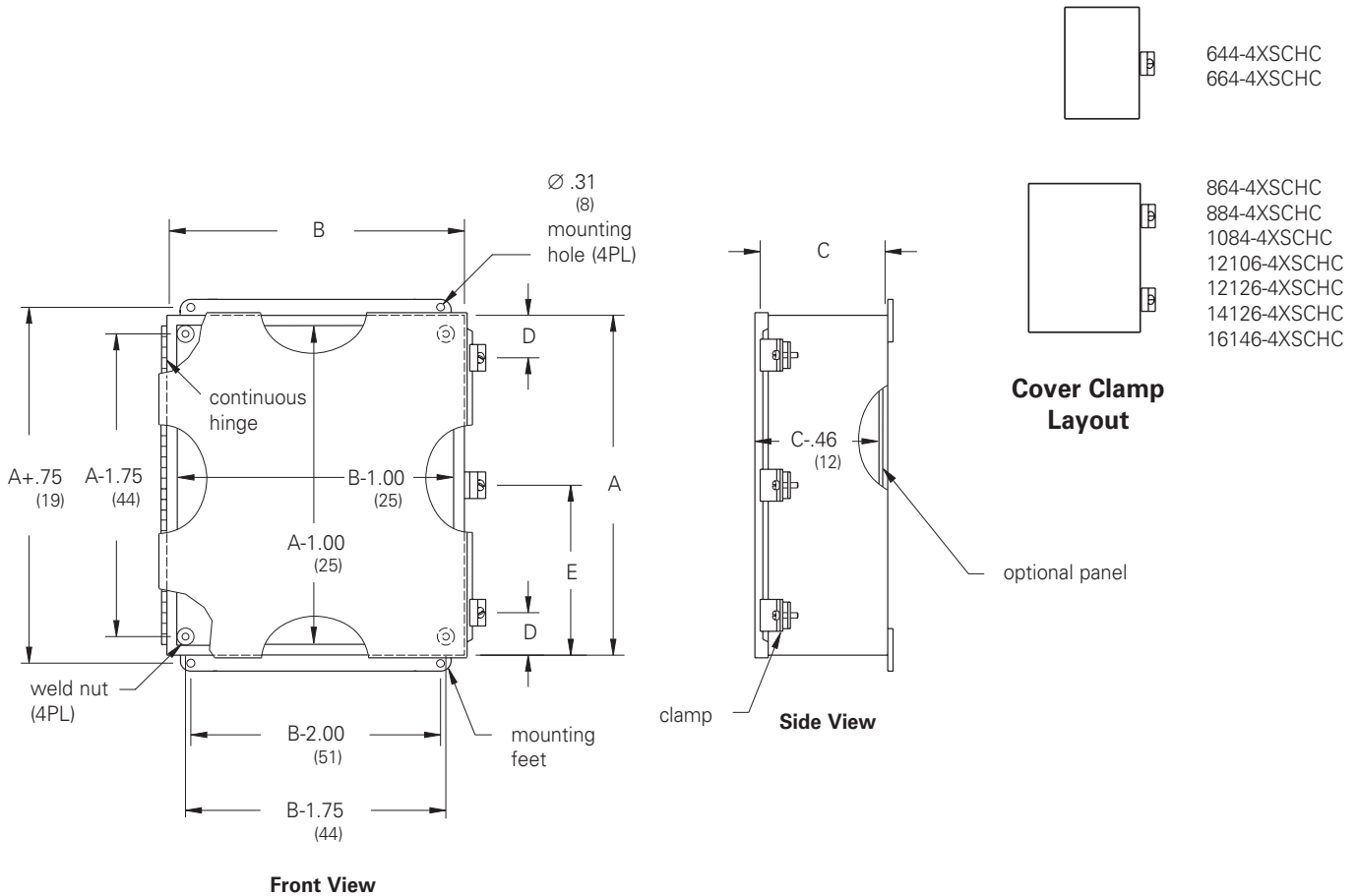
**Subclass: DD0 (Type 304)
D10 (Type 316L)**

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Type 4X Panel Enclosures

JIC Enclosures Type 4X Continuous Hinge Cover Illustration Sheet and Catalog Number

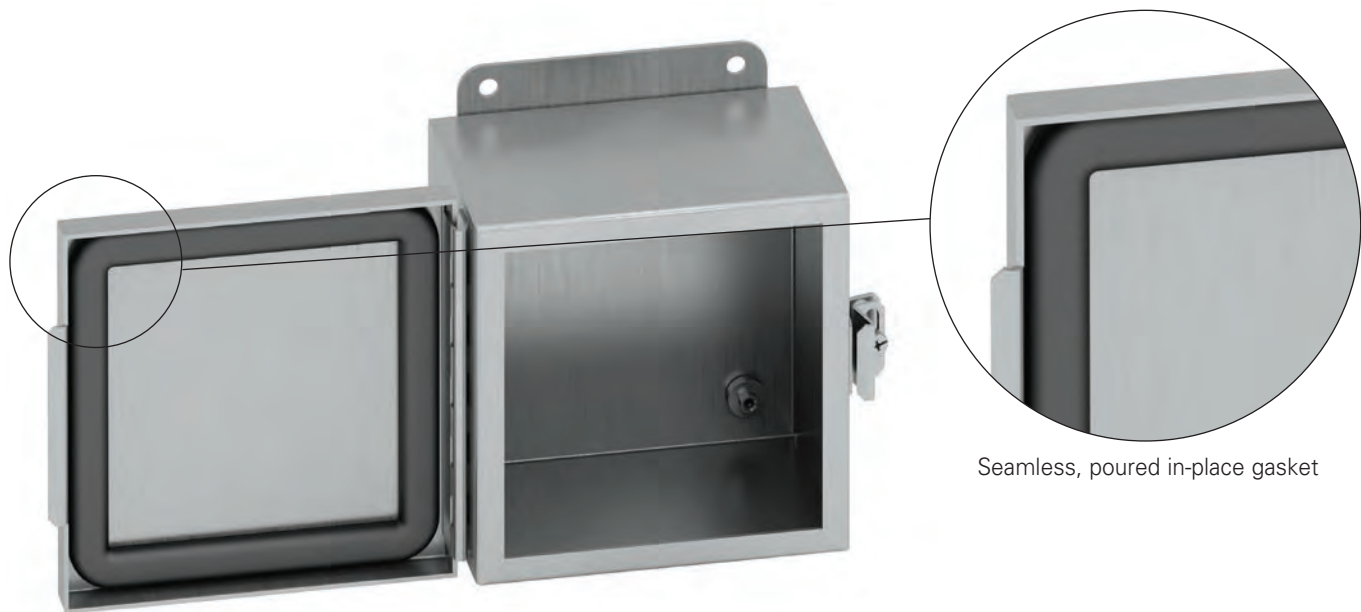
Enclosure Catalog Number Stainless Steel		Enclosure Size Height x Width x Depth A x B x C		D		E		Panel Catalog Number		Panel Size Height x Width	
Type 304	Type 316L	in.	mm	in.	mm	in.	mm	Steel	Conductive	in.	mm
644-4XSCHC	644-4XSS6CHC	6.00 x 4.00 x 4.00	152 x 102 x 102	—	—	3.00	76	AW64P	AW64GP	4.87 x 2.87	124 x 73
664-4XSCHC	664-4XSS6CHC	6.00 x 6.00 x 4.00	152 x 152 x 102	—	—	3.00	76	AW66P	AW66GP	4.87 x 4.87	124 x 124
864-4XSCHC	864-4XSS6CHC	8.00 x 6.00 x 4.00	203 x 152 x 102	2.00	51	—	—	AW86P	AW86GP	6.87 x 4.87	174 x 124
884-4XSCHC	884-4XSS6CHC	8.00 x 8.00 x 4.00	203 x 203 x 102	2.00	51	—	—	AW88P	AW88GP	6.87 x 6.87	174 x 174
1084-4XSCHC	1084-4XSS6CHC	10.00 x 8.00 x 4.00	254 x 203 x 102	2.00	51	—	—	AW108P	AW108GP	8.87 x 6.87	225 x 174
12106-4XSCHC	12106-4XSS6CHC	12.00 x 10.00 x 6.00	305 x 254 x 152	3.00	76	—	—	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
12126-4XSCHC	12126-4XSS6CHC	12.00 x 12.00 x 6.00	305 x 305 x 152	3.00	76	—	—	AW1212P	AW1212GP	10.87 x 10.87	276 x 276
14126-4XSCHC	14126-4XSS6CHC	14.00 x 12.00 x 6.00	356 x 305 x 152	3.00	76	—	—	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
16146-4XSCHC	16146-4XSS6CHC	16.00 x 14.00 x 6.00	406 x 356 x 152	3.00	76	—	—	AW1614P	AW1614GP	14.87 x 12.87	376 x 327



Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

JIC Enclosures Type 4X Continuous Hinge Cover, Aluminum Data Sheet



Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4, Type 4X, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4, Type 4X, Type 12 and Type 13
- Conforms to NEMA standard for Type 4, Type 4X, Type 12 and Type 13

Finish

- Cover and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- JIC terminal strap kit
- JIC terminal strip kit
- Terminal blocks
- See Accessories section

Construction

- Enclosure and cover are fabricated from (14) gauge, Type 5052-H32 aluminum
- All continuous welded seams are finished smooth
- Cover is secured to the body with an aluminum continuous hinge and pin on one side and easy-to-operate stainless steel screw clamps mounted to the opposite side
- Cover has a seamless poured in-place gasket
- #10-32 weld nuts are provided for mounting optional panel
- External mounting feet are provided for secure wall mounting

Discount Schedule: C2

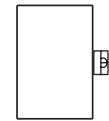
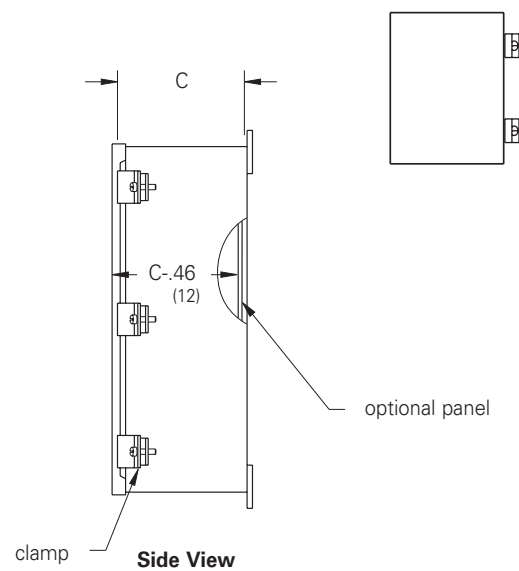
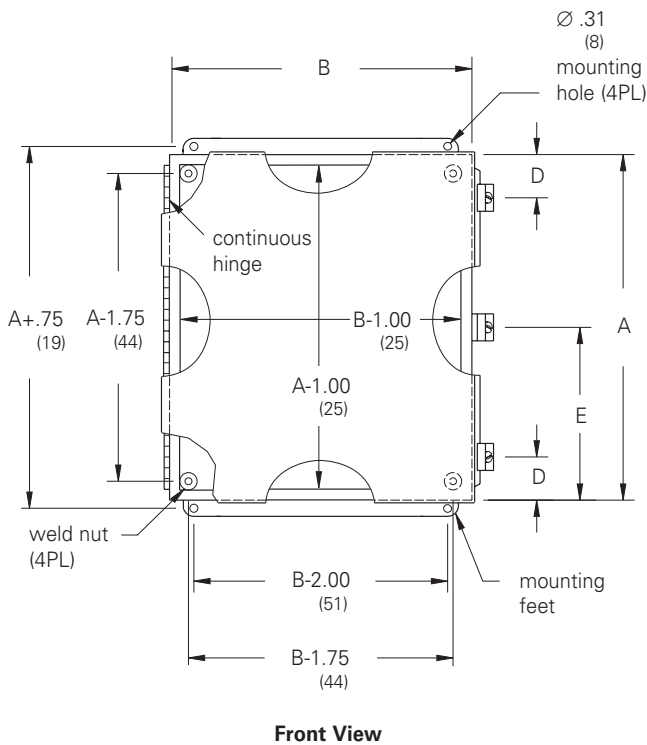
Subclass: DDA

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

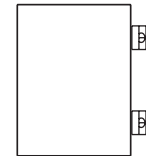
Type 4X Panel Enclosures

JIC Enclosures Type 4X Continuous Hinge Cover, Aluminum Illustration Sheet and Catalog Number

Enclosure Catalog Number	Enclosure Size Height x Width x Depth A x B x C		D		E		Panel Catalog Number		Panel Size Height x Width	
	in.	mm	in.	mm	in.	mm	Steel	Conductive	in.	mm
644-4XACHC	6.00 x 4.00 x 4.00	152 x 102 x 102	—	—	3.00	76	AW64P	AW64GP	4.87 x 2.87	124 x 73
664-4XACHC	6.00 x 6.00 x 4.00	152 x 152 x 102	—	—	3.00	76	AW66P	AW66GP	4.87 x 4.87	124 x 124
864-4XACHC	8.00 x 6.00 x 4.00	203 x 152 x 102	2.00	51	—	—	AW86P	AW86GP	6.87 x 4.87	174 x 124
1084-4XACHC	10.00 x 8.00 x 4.00	254 x 203 x 102	2.00	51	—	—	AW108P	AW108GP	8.87 x 6.87	225 x 174
12106-4XACHC	12.00 x 10.00 x 6.00	305 x 254 x 152	3.00	76	—	—	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
12126-4XACHC	12.00 x 12.00 x 6.00	305 x 305 x 152	3.00	76	—	—	AW1212P	AW1212GP	10.87 x 10.87	276 x 276
14126-4XACHC	14.00 x 12.00 x 6.00	356 x 305 x 152	3.00	76	—	—	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
16146-4XACHC	16.00 x 14.00 x 6.00	406 x 356 x 152	3.00	76	—	—	AW1614P	AW1614GP	14.87 x 12.87	378 x 327



644-4XACHC
664-4XACHC



864-4XACHC
1084-4XACHC
12106-4XACHC
12126-4XACHC
14126-4XACHC
16146-4XACHC

Type 4X Panel Enclosures

Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

JIC Enclosures

Type 4X Continuous Hinge Cover with Quarter-Turn Latches

Data Sheet



Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A Listed, Type 3R, Type 4, Type 4X, Type 12
- CSA C22.2 No.94 certified, Type 3R, Type 4, Type 4X, Type 12
- Conforms to NEMA Standards for Type 3, Type 3R, Type 4, Type 4X, Type 12

Finish

- Cover and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- Swing-out panel kits
- JIC terminal kits
- Window kits
- Locks and latches

Construction

- Enclosure and cover are fabricated from (16) gauge stainless steel
- All continuous welded seams are finished smooth
- Stainless steel continuous hinge and pin
- Slotted quarter-turn flush latch(es)
- Cover has a seamless poured in-place gasket
- Ground stud provided on cover
- #10-32 weld nuts are provided for mounting optional panel
- External mounting feet

Discount Schedule: C2

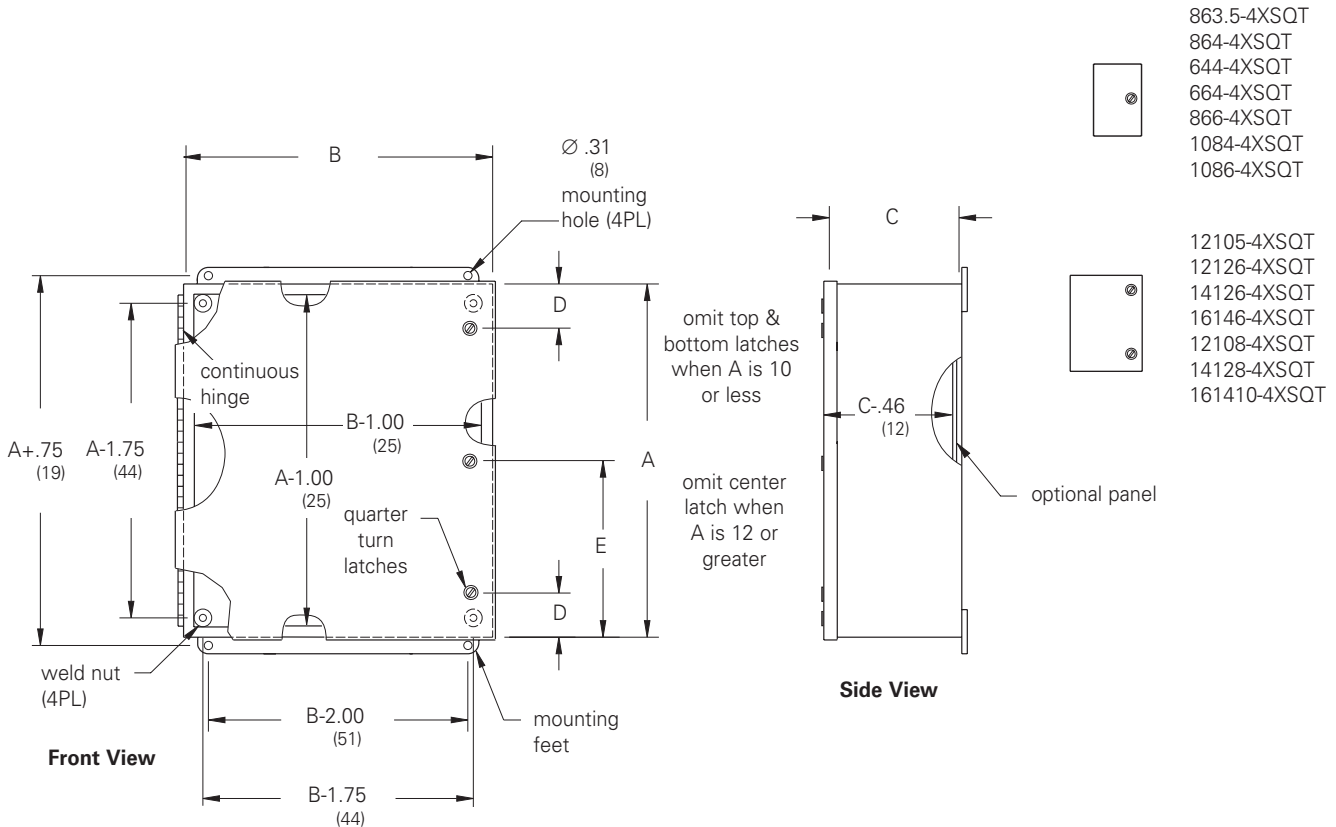
Subclass: DDO

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Type 4X Panel Enclosures

JIC Enclosures Type 4X Continuous Hinge Cover with Quarter-Turn Latches Illustration Sheet and Catalog Number

Enclosure Catalog Number	Enclosure Size Height x Width x Depth A x B x C		D		E		Panel Catalog Number		Panel Size Height x Width	
	in.	mm	in.	mm	in.	mm	Steel	Conductive	in.	mm
644-4XSQT	6.00 x 4.00 x 4.00	152 x 102 x 102	—	—	3.00	76	AW64P	AW64GP	4.87 x 2.87	124 x 73
664-4XSQT	6.00 x 6.00 x 4.00	152 x 152 x 102	—	—	3.00	76	AW66P	AW66GP	4.87 x 4.87	124 x 124
863.5-4XSQT	8.00 x 6.00 x 3.50	203 x 152 x 89	—	—	4.00	101	AW86P	AW86GP	6.87 x 4.87	174 x 124
864-4XSQT	8.00 x 6.00 x 4.00	203 x 152 x 102	—	—	4.00	101	AW86P	AW86GP	6.87 x 4.87	174 x 124
1084-4XSQT	10.00 x 8.00 x 4.00	254 x 203 x 102	—	—	5.00	127	AW108P	AW108GP	8.87 x 6.87	225 x 174
12105-4XSQT	12.00 x 10.00 x 5.00	305 x 254 x zzz	3.00	76	—	—	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
866-4XSQT	8.00 x 6.00 x 6.00	203 x 152 x 152	—	—	4.00	101	AW86P	AW86GP	6.87 x 4.87	174 x 124
1086-4XSQT	10.00 x 8.00 x 6.00	254 x 203 x 152	—	—	5.00	127	AW108P	AW108GP	8.87 x 6.87	225 x 174
12126-4XSQT	12.00 x 12.00 x 6.00	305 x 305 x 152	3.00	76	—	—	AW1212P	AW1212GP	10.87 x 10.87	276 x 276
14126-4XSQT	14.00 x 12.00 x 6.00	355 x 305 x 152	3.00	76	—	—	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
16146-4XSQT	16.00 x 14.00 x 6.00	406 x 355 x 152	3.00	76	—	—	AW1614P	AW1614GP	14.87 x 12.87	377 x 327
12108-4XSQT	12.00 x 10.00 x 8.00	305 x 254 x 203	3.00	76	—	—	AW1210P	AW1210GP	10.87 x 8.87	276 x 225
14128-4XSQT	14.00 x 12.00 x 8.00	355 x 305 x 203	3.00	76	—	—	AW1412P	AW1412GP	12.87 x 10.87	327 x 276
161410-4XSQT	16.00 x 14.00 x 10.00	406 x 355 x 254	3.00	76	—	—	AW1614P	AW1614GP	14.87 x 12.87	377 x 327



Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

Wall-Mount Enclosures Type 4X Single-Door Data and Illustration Sheet



Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4, Type 4X, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4, Type 4X, Type 12 and Type 13
- Conforms to NEMA standard for Type 4, Type 4X, Type 12 and Type 13

Construction

- Enclosure and door are fabricated from (14) gauge, Type 304 or Type 316L stainless steel
- All continuous welded seams are finished smooth
- Doors are secured to the body with a heavy-duty, stainless steel continuous hinge and pin on one side and easy to release stainless steel door clamps mounted to the other three sides
- Each door has a padlock hasp with sealing hole provision
- Print pocket provided
- Door has a seamless poured in-place gasket
- Ground stud provided on door and body
- Formed lip around enclosure opening diverts liquids and contaminants
- .375-16 collar studs are provided for mounting optional panel
- External mounting feet are provided for secure wall mounting

Finish

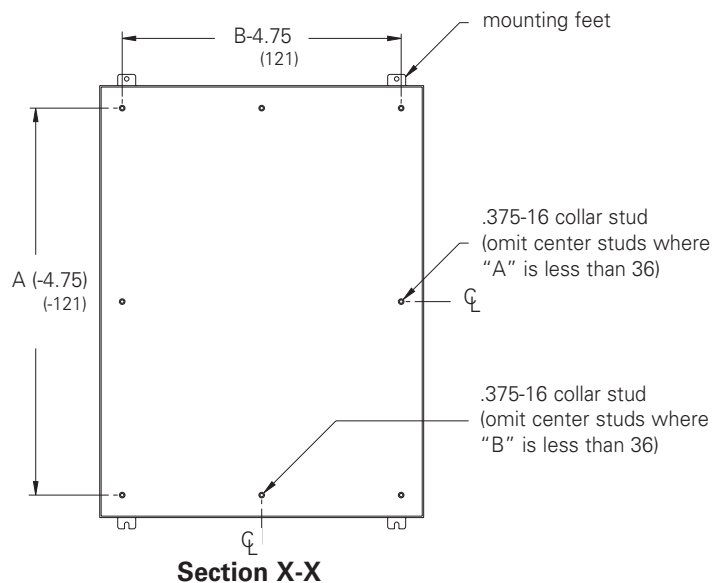
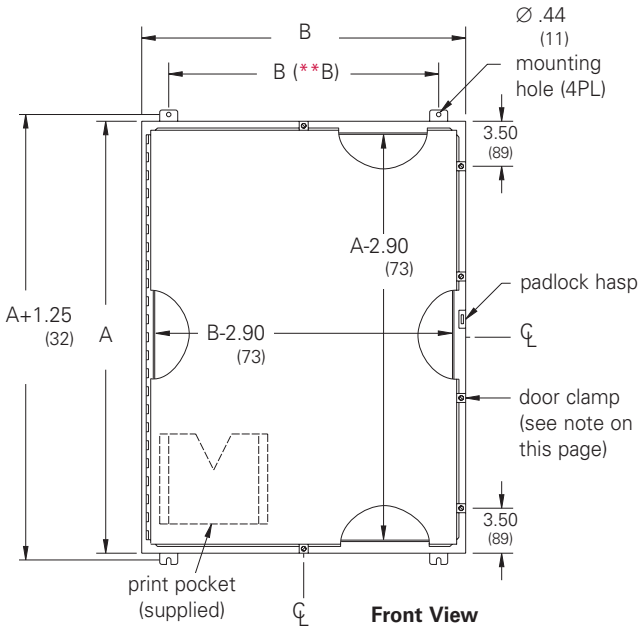
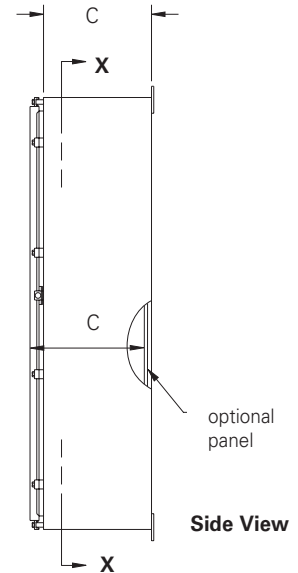
- Door and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- NEMA terminal strap kit
- Terminal blocks
- Floor stand kit
- See Accessories section

Discount Schedule: C2

Subclass: **DG0 (Type 304)**
D00 (Type 316L)



Notes: Dimensions: **B = (-2.50) if 12 inches wide; (-6.00) if wider than 12 inches.

We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Type 4X Panel Enclosures

Wall-Mount Enclosures Type 4X Single-Door Catalog Number

Enclosure Catalog Number Stainless Steel		Enclosure Size Height x Width x Depth A x B x C		Panel Catalog Number		Panel Size Height x Width	
Type 304	Type 316L	in.	mm	Steel	Conductive	in.	mm
16126-4XS	16126-4XSS6	16.00 x 12.00 x 6.00	406 x 305 x 152	AW1612P	AW1612GP	13.00 x 9.00	330 x 229
16166-4XS	16166-4XSS6	16.00 x 16.00 x 6.00	406 x 406 x 152	AW1616P	AW1616GP	13.00 x 13.00	330 x 330
16206-4XS	16206-4XSS6	16.00 x 20.00 x 6.00	406 x 508 x 152	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
20166-4XS	20166-4XSS6	20.00 x 16.00 x 6.00	208 x 406 x 152	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
20206-4XS	20206-4XSS6	20.00 x 20.00 x 6.00	508 x 508 x 152	AW2020P	AW2020GP	17.00 x 17.00	432 x 432
24126-4XS	24126-4XSS6	24.00 x 12.00 x 6.00	610 x 305 x 152	AW2412P	—	21.00 x 9.00	533 x 229
24166-4XS	24166-4XSS6	24.00 x 16.00 x 6.00	610 x 406 x 152	AW2416P	AW2416GP	21.00 x 13.00	533 x 330
24206-4XS	24206-4XSS6	24.00 x 20.00 x 6.00	610 x 508 x 152	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
24246-4XS	24246-4XSS6	24.00 x 24.00 x 6.00	610 x 610 x 152	AW2424P	AW2424GP	20.87 x 20.87	530 x 530
30246-4XS	30246-4XSS6	30.00 x 24.00 x 6.00	762 x 610 x 152	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
36246-4XS	36246-4XSS6	36.00 x 24.00 x 6.00	914 x 610 x 152	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
16128-4XS	16128-4XSS6	16.00 x 12.00 x 8.00	406 x 305 x 203	AW1612P	AW1612GP	13.00 x 9.00	330 x 229
20168-4XS	20168-4XSS6	20.00 x 16.00 x 8.00	508 x 406 x 203	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
20208-4XS	20208-4XSS6	20.00 x 20.00 x 8.00	508 x 508 x 203	AW2020P	AW2020GP	17.00 x 17.00	432 x 432
20248-4XS	20248-4XSS6	20.00 x 24.00 x 8.00	508 x 610x203	AW2420P	AW2420GP	32.87 x 26.87	835 x 682
24168-4XS	24168-4XSS6	24.00 x 16.00 x 8.00	610 x 406 x 203	AW2416P	AW2416GP	21.00 x 13.00	533 x 330
24208-4XS	24208-4XSS6	24.00 x 20.00 x 8.00	610 x 508 x 203	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
24248-4XS	24248-4XSS6	24.00 x 24.00 x 8.00	610 x 610 x 203	AW2424P	AW2424GP	20.87 x 20.87	530 x 530
24308-4XS	24308-4XSS6	24.00 x 30.00 x 8.00	610 x 762 x 203	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
30208-4XS	30208-4XSS6	30.00 x 20.00 x 8.00	762 x 508 x 203	AW3020P	AW3020GP	26.87 x 16.87	682 x 428
30248-4XS	30248-4XSS6	30.00 x 24.00 x 8.00	762 x 610 x 203	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
30308-4XS	30308-4XSS6	30.00 x 30.00 x 8.00	762 x 762 x 203	AW3030P	AW3030GP	26.87 x 26.87	682 x 682
36248-4XS	36248-4XSS6	36.00 x 24.00 x 8.00	914 x 610 x 203	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
36308-4XS	36308-4XSS6	36.00 x 30.00 x 8.00	914 x 762 x 203	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
42308-4XS	42308-4XSS6	42.00 x 30.00 x 8.00	1067 x 762 x 203	AW4230P	AW4230GP	38.87 x 26.87	987 x 682
42368-4XS	42368-4XSS6	42.00 x 36.00 x 8.00	1067 x 914 x 203	AW4236P	AW4236GP	38.87 x 32.87	987 x 835
48368-4XS	48368-4XSS6	48.00 x 36.00 x 8.00	1219 x 914 x 203	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835
201610-4XS	201610-4XSS6	20.00 x 16.00 x 10.00	508 x 406 x 254	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
242010-4XS	242010-4XSS6	24.00 x 20.00 x 10.00	610 x 508 x 254	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
302410-4XS	302410-4XSS6	30.00 x 24.00 x 10.00	762 x 610 x 254	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
362410-4XS	362410-4XSS6	36.00 x 24.00 x 10.00	914 x 610 x 254	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
363010-4XS	363010-4XSS6	36.00 x 30.00 x 10.00	914 x 762 x 254	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
423010-4XS	423010-4XSS6	42.00 x 30.00 x 10.00	1067 x 762 x 254	AW4230P	AW4230GP	38.87 x 26.87	987 x 682
483010-4XS	483010-4XSS6	48.00 x 30.00 x 10.00	1219 x 762 x 254	AW4830P	AW4830GP	44.87 x 26.87	1140 x 682
483610-4XS	483610-4XSS6	48.00 x 36.00 x 10.00	1219 x 914 x 254	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835
603610-4XS	603610-4XSS6	60.00 x 36.00 x 10.00	1524 x 914 x 254	AW6036P	AW6036GP	56.87 x 32.87	1444 x 835
242412-4XS	242412-4XSS6	24.00 x 24.00 x 12.00	610 x 610 x 305	AW2424P	AW2424GP	20.87 x 20.87	530 x 530
302412-4XS	302412-4XSS6	30.00 x 24.00 x 12.00	762 x 610 x 305	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
363012-4XS	363012-4XSS6	36.00 x 30.00 x 12.00	914 x 762 x 305	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
363612-4XS	363612-4XSS6	36.00 x 36.00 x 12.00	914 x 914 x 305	AW3636P	—	32.87 x 32.87	835 x 835
483612-4XS	483612-4XSS6	48.00 x 36.00 x 12.00	1219 x 914 x 305	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835
603612-4XS	603612-4XSS6	60.00 x 36.00 x 12.00	1524 x 914 x 305	AW6036P	AW6036GP	56.87 x 32.87	1444 x 835
302416-4XS	302416-4XSS6	30.00 x 24.00 x 16.00	762 x 610 x 406	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
363016-4XS	363016-4XSS6	36.00 x 30.00 x 16.00	914 x 762 x 406	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
483616-4XS	483616-4XSS6	48.00 x 36.00 x 16.00	1219 x 914 x 406	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835
603616-4XS	603616-4XSS6	60.00 x 36.00 x 16.00	1524 x 914 x 406	AW6036P	AW6036GP	56.87 x 32.87	1444 x 835

Notes: Clamps are mounted along three sides of the enclosure door. Spacing between clamps along side opposite the hinge does not exceed 15 inches. Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Panel Enclosures

Wall-Mount Enclosures Type 4X Single-Door, Aluminum Data Sheet and Catalog Number



Application

- Houses electrical controls and instruments
- Intended for indoor or outdoor use where a corrosive environment exists
- Protects against corrosion, windblown dust and rain, splashing water and hose directed water

Standards

- UL 508A listed, Type 4, Type 4X, Type 12 and Type 13
- CSA C22.2 No.94 certified, Type 4, Type 4X, Type 12 and Type 13
- Conforms to NEMA standard for Type 4, Type 4X, Type 12 and Type 13

Finish

- Door and sides of body have a smooth #4 brushed finish

Accessories

- Panels
- NEMA terminal strap kit
- Terminal blocks
- Floor stand kit
- See Accessories section

Construction

- Enclosure and door are fabricated from (14) gauge, Type 5052-H32 aluminum
- All continuous welded seams are finished smooth
- Doors are secured to the body with a heavy-duty, aluminum continuous hinge and pin on one side and easy to operate stainless steel door clamps mounted to the other three sides
- Each door has a padlock hasp with sealing hole provision
- Print pocket provided
- Door has a seamless poured in-place gasket
- Formed lip around enclosure opening diverts liquids and contaminants
- .375-16 collar studs are provided for mounting optional panel
- External mounting feet are provided for secure wall mounting

Discount Schedule: C2

Subclass: DGA

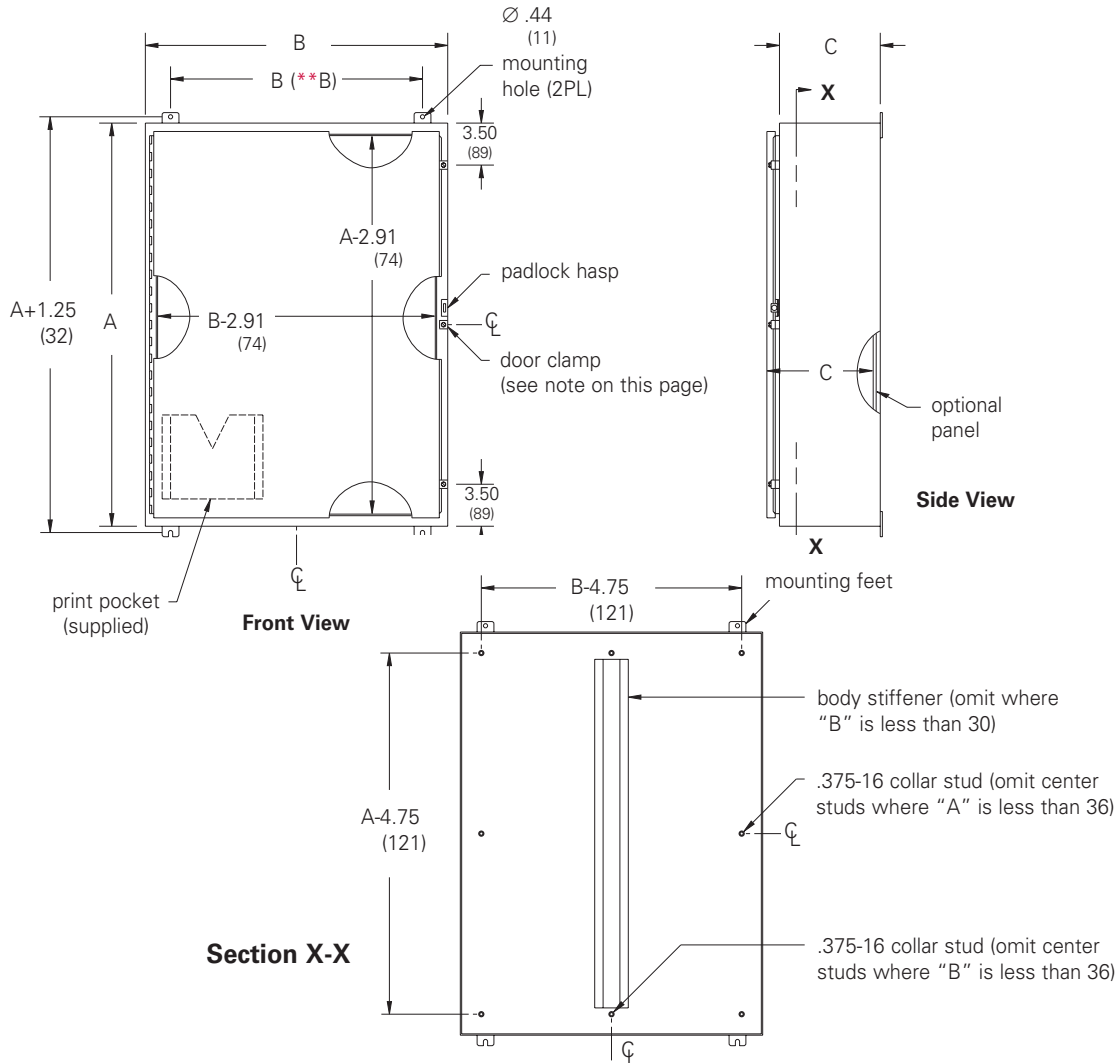
Enclosure Catalog Number	Enclosure Size Height x Width x Depth A x B x C		Panel Catalog Number		Panel Size Height x Width	
	in.	mm	Steel	Conductive	in.	mm
16126-4XA	16.00 x 12.00 x 6.00	406 x 305 x 152	AW1612P	AW1612GP	13.00 x 9.00	330 x 229
16166-4XA	16.00 x 16.00 x 6.00	406 x 406 x 152	AW1616P	AW1616GP	13.00 x 13.00	330 x 330
20166-4XA	20.00 x 16.00 x 6.00	508 x 406 x 152	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
20206-4XA	20.00 x 20.00 x 6.00	508 x 508 x 152	AW2020P	AW2020GP	17.00 x 17.00	432 x 432
24206-4XA	24.00 x 20.00 x 6.00	610 x 508 x 152	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
16128-4XA	16.00 x 12.00 x 8.00	406 x 305 x 203	AW1612P	AW1612GP	13.00 x 9.00	330 x 229
20168-4XA	20.00 x 16.00 x 8.00	508 x 406 x 203	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
24168-4XA	24.00 x 16.00 x 8.00	610 x 406 x 203	AW2416P	AW2416GP	21.00 x 13.00	533 x 330
24208-4XA	24.00 x 20.00 x 8.00	610 x 508 x 203	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
24248-4XA	24.00 x 24.00 x 8.00	610 x 610 x 203	AW2424P	AW2424GP	20.87 x 20.87	530 x 530
24308-4XA	24.00 x 30.00 x 8.00	610 x 762 x 203	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
30208-4XA	30.00 x 20.00 x 8.00	762 x 508 x 203	AW3020P	AW3020GP	26.87 x 16.87	682 x 428
30248-4XA	30.00 x 24.00 x 8.00	762 x 610 x 203	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
30308-4XA	30.00 x 30.00 x 8.00	762 x 762 x 203	AW3030P	AW3030GP	26.87 x 26.87	682 x 682
36248-4XA	36.00 x 24.00 x 8.00	914 x 610 x 203	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
36308-4XA	36.00 x 30.00 x 8.00	914 x 762 x 203	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
42368-4XA	42.00 x 36.00 x 8.00	1067 x 914 x 203	AW4236P	AW4236GP	38.87 x 32.87	987 x 835
48368-4XA	48.00 x 36.00 x 8.00	1219 x 914 x 203	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835

Notes: We can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Type 4X Panel Enclosures

Wall-Mount Enclosures Type 4X Single-Door, Aluminum Illustration Sheet and Catalog Number

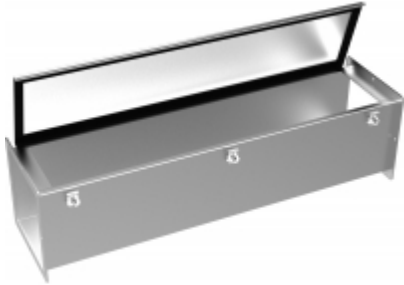
Enclosure Catalog Number	Enclosure Size Height x Width x Depth A x B x C		Panel Catalog Number		Panel Size Height x Width	
	in.	mm	Steel	Conductive	in.	mm
201610-4XA	20.00 x 16.00 x 10.00	508 x 406 x 254	AW2016P	AW2016GP	17.00 x 13.00	432 x 330
242010-4XA	24.00 x 20.00 x 10.00	610 x 508 x 254	AW2420P	AW2420GP	20.87 x 16.87	530 x 428
362410-4XA	36.00 x 24.00 x 10.00	914 x 610 x 254	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
363010-4XA	36.00 x 30.00 x 10.00	914 x 762 x 254	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
423010-4XA	42.00 x 30.00 x 10.00	1067 x 762 x 254	AW4230P	AW4230GP	38.87 x 26.87	987 x 682
242412-4XA	24.00 x 24.00 x 12.00	610 x 610 x 305	AW2424P	AW2424GP	20.87 x 20.87	530 x 530
302412-4XA	30.00 x 24.00 x 12.00	762 x 610 x 305	AW3024P	AW3024GP	26.87 x 20.87	682 x 530
363012-4XA	36.00 x 30.00 x 12.00	914 x 762 x 305	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
483612-4XA	48.00 x 36.00 x 12.00	1219 x 914 x 305	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835
603612-4XA	60.00 x 36.00 x 12.00	1524 x 914 x 305	AW6036P	AW6036GP	56.87 x 32.87	1444 x 835
362416-4XA	36.00 x 24.00 x 16.00	914 x 610 x 406	AW3624P	AW3624GP	32.87 x 20.87	835 x 530
363016-4XA	36.00 x 30.00 x 16.00	914 x 762 x 406	AW3630P	AW3630GP	32.87 x 26.87	835 x 682
483616-4XA	48.00 x 36.00 x 16.00	1219 x 914 x 406	AW4836P	AW4836GP	44.87 x 32.87	1140 x 835



Notes: Dimensions: **B = (-2.50) if 12 inches wide; (-6.00) if wider than 12 inches. Clamps are mounted along three sides of the enclosure door. Spacing between clamps along side opposite the hinge does not exceed 15 inches. Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.

Type 4X Pull Through Wireway 1487SS Series

Wireway & Accessories



Application

- Designed to enclose and protect electrical wiring from dirt, dust, oil and water.
- Ideal for connecting machines to control panels or power sources.

Standards

- UL 870 Type 1, 12, 4, 4X (unless marked¹)
- CSA Type 1, 12, 4, 4X (unless marked¹)
- Complies with
 - NEMA Type 1, 12, 4, 4X (unless marked¹)
 - IEC 60529, IP66

Construction

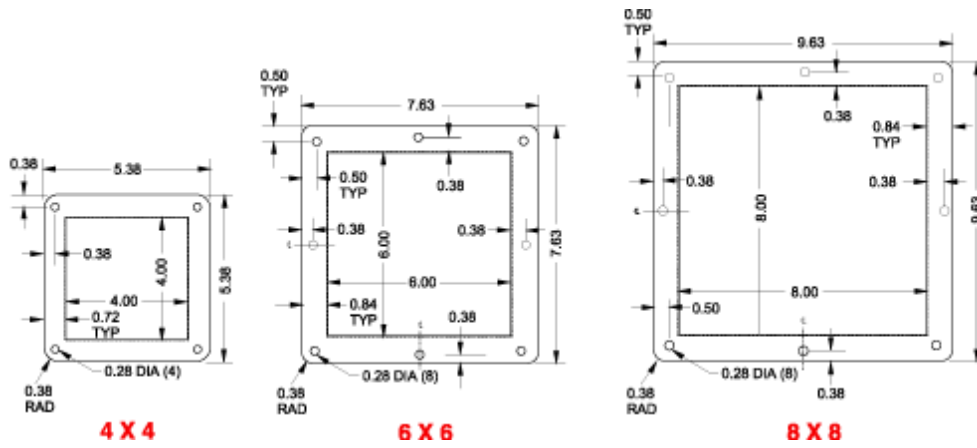
- Bodies and covers are formed from 14 gauge 304 stainless steel with 10 gauge flanges.
- Continuous flange around wireway ends, requires cables to be pulled through.
- Smooth continuously welded seams.
- Interior surfaces are smooth to prevent wire damage during installation.
- Butt hinged covers are secured with easily operated screw clamps.
- Oil resistant gaskets are permanently secured.
- Solid oil resistant gaskets are used between flanges when sections and fittings are bolted together.
- One gasket kit, complete with hardware is provided with each straight section or fitting.

Finish

- Sections and fittings are natural stainless steel with a smooth brushed finish.

Accessories

- Typical Straight Section
- Swivel Nipple
- Adjustable Fitting
- 45 Degree Elbow
- Box Connector
- Bracket Hanger
- Reducers (Center Hole)
- Nipple
- Flexible Fitting
- 90 Degree Elbow
- Tee Fitting
- Drop Hanger
- Cover Plate
- Reducers (Edge Hole)



Description	4 x 4 Part No.	6 x 6 Part No.	8 x 8 Part No.
12" Section	1487C12SS	1487D12SS	1487E12SS
24" Section	1487C24SS	1487D24SS	1487E24SS
36" Section	1487C36SS	1487D36SS	1487E36SS
48" Section	1487C48SS	1487D48SS	1487E48SS
60" Section	1487C60SS	1487D60SS	1487E60SS
120" Section	1487C120SS	1487D120SS	1487E120SS
6" Nipple	1487CM6SS	1487DM6SS	1487EM6SS
Standard Swivel Nipple	1487CV2SS	1487DV2SS	1487EV2SS
Flexible Fitting	1487CFFSS ¹	1487DFFSS ¹	1487EFFSS ¹
Adjustable Fitting	1487CXSS ¹	1487DXSS ¹	1487EXSS ¹
90° Elbow	1487C9PSS	1487D9PSS	1487E9PSS
45° Elbow	1487C4PSS	1487D4PSS	1487E4PSS
Tee Fitting	1487CTSS	1487DTSS	1487ETSS
Center Hole Reducers			
Reducer - 6 x 6 to 4 x 4	-	1487DRCSS ²	-
Reducer - 8 x 8 to 4 x 4	-	-	1487ERCSS ²
Reducer - 8 x 8 to 6 x 6	-	-	1487ERCSS ²
Edge Hole Reducers			
Reducer 6 x 6 to 4 x 4	-	1487DRESS ²	-
Reducer 8 x 8 to 4 x 4	-	-	1487ERECSS ²
Reducer 8 x 8 to 6 x 6	-	-	1487EREDSS ²
Box Connector	1487CKSS ¹	1487DKSS ¹	1487EKSS ¹
Drop Hanger	1487CL1SS ¹	1487DL1SS ¹	1487EL1SS ¹
Bracket Hanger	1487CL2SS ¹	1487DL2SS ¹	1487EL2SS ¹
Cover Plate	1487CHSS ²	1487DHSS ²	1487EHSS ²
Gasket & Screws	1487CSSS ¹	1487DSSS ¹	1487ESSS ¹

¹ Does not meet CSA or UL requirements

² Maintains ratings on CSA and UL approved wireway

Data subject to change without notice

Condulet FS and FD single-gang device boxes – cast iron or aluminum

With and without mounting lugs for threaded rigid and IMC conduit

Applications:

Cast device boxes are installed to:

- Accommodate wiring devices
- Act as pull boxes for conductors in a conduit system
- Provide openings to make splices and taps in conductors
- Provide access to conductors for maintenance and future system changes
- Connect conduit sections
- FSY boxes for mounting surface devices on floor or bench (used with single-gang covers)

Features:

- Internal green ground screw standard on boxes
- Suitable for use in wet locations when used with gasketed covers
- Mounting lugs standard on most boxes
- Tapered threaded hubs (NPT) with integral bushing
- Available for surface mounting (with mounting lugs) or flush mounting (without mounting lugs) as listed
- Available as shallow (FS) or deep (FD) configuration; use FD if device to be enclosed exceeds 1 5/8" in depth
- Ample wiring room provided in either FS or FD configuration
- Wide selection of surface or flush covers available in three materials (sheet steel, Feraloy, aluminum)
- Covers for flush mounting extend to conceal the rough plaster line
- Available in single-gang and multi-gang configurations with hubs, and as blank bodies for drilled and tapped openings

Certifications and compliances:

- UL standard: UL514A
- ANSI standard: C33.84
- Fed. Spec.: W-C-5860
- CSA standard: C22.2 No. 18

Standard materials:

- Feraloy iron alloy or copper-free aluminum

Standard finishes:

- Feraloy – electrogalvanized and aluminum acrylic paint
- Aluminum – natural

Options:

Description	Suffix
• Corro-free epoxy powder coat, external.....	S752
• Corro-free epoxy powder coat, internal and external.....	S753
• Hot dip galvanized	HDG

Size ranges:

- Hubs – 1/2" to 1"

Ordering information:

FS/FD[ⓐ]



Hub size	Cat. #	Cat. #
1/2"	FS1[ⓐ]	FD1[ⓐ]
3/4"	FS2[ⓐ]	FD2[ⓐ]
1"	FS3[ⓐ]	FD3[ⓐ]

FSL/FDL



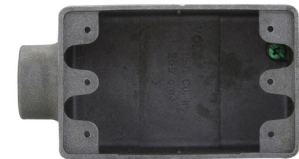
Hub size	Cat. #	Cat. #
1/2"	FSL1	FDL1
3/4"	FSL2	FDL2

FSR/FDR



Hub size	Cat. #	Cat. #
1/2"	FSR1	FDR1
3/4"	FSR2	FDR2

Die cast aluminum[ⓐ]



Hub size	Cat. #	Cat. #
1/2"	FS1 SA	FSC1 SA
3/4"	FS2 SA	FSC2 SA

FSC/FDC[ⓐ]



Hub size	Cat. #	Cat. #
1/2"	FSC1[ⓐ]	FDC1[ⓐ]
3/4"	FSC2[ⓐ]	FDC2[ⓐ]
1"	FSC3[ⓐ]	FDC3[ⓐ]

[ⓐ] Available in sand cast copper-free aluminum. To order, add suffix 'SCA' to end of catalog number.

[ⓑ] Available in copper-free aluminum. To order, add suffix 'SA' to end of catalog number.

[ⓒ] Compatible with select hinged and open front control station covers in Section 4C.

[ⓓ] Mounting lugs and ground screw are not offered with standard die cast aluminum box. For sand cast aluminum box with mounting lugs and ground screw, change 'SA' in catalog number to 'SCA.' For example: FS1 SCA.

Condulet FS and FD single-gang device boxes – cast iron or aluminum

With and without mounting lugs for threaded rigid and IMC conduit

Ordering information (continued):

FSA/FDA[ⓐ]



Hub size	Cat. #	Cat. #
1/2"	FSA1	FDA1
3/4"	FSA2	FDA2

FSSA[ⓐ]



Hub size	Cat. #
3/4"	FSSA2

FSLA/FDLA[ⓐ]



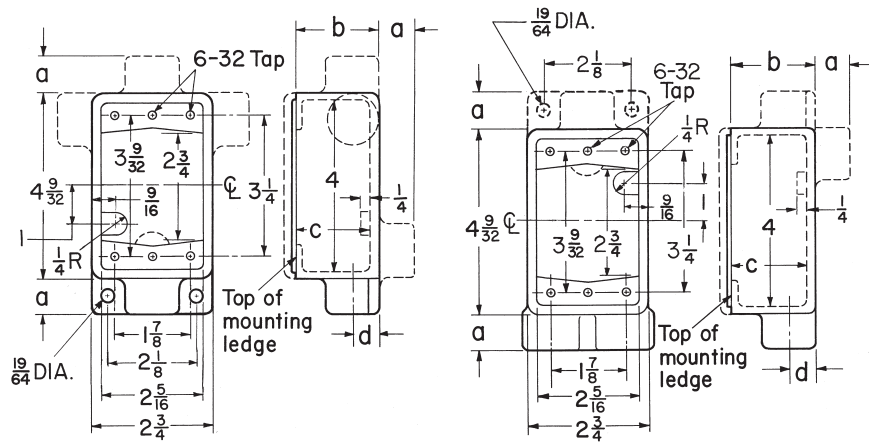
Hub size	Cat. #	Cat. #
1/2"	FSLA1	FDLA1
3/4"	FSLA2	FDLA2

FSS/FDD[ⓐ]



Hub size	Cat. #	Cat. #
1/2"	FSS1 [ⓐ]	FDD1
3/4"	FSS2 [ⓐ]	FDD2 [ⓐ]
1"	FSS3	FDD3

Dimensions (in inches):



FSCC/FDCC



Hub size	Cat. #	Cat. #
1/2"	FSCC1	FDCC1
3/4"	FSCC2	FDCC2

FSCA[ⓐ]



Hub size	Cat. #
1/2"	FSCA1
3/4"	FSCA2

Series	Hub size	a	b	c	d
FS	1/2"	7/8	1 1/8	1 11/16	5/8
	3/4"	7/8	1 1/8	1 11/16	3/4
	1"	1	1 1/8	1 11/16	7/8
FD	1/2"	7/8	2 11/16	2 1/2	5/8
	3/4"	7/8	2 11/16	2 1/2	3/4
	1"	1	2 11/16	2 1/2	7/8

[ⓐ] Mounting lugs not available.

[ⓑ] Back entry hub is threaded.

[ⓒ] Available in copper-free aluminum. To order, add suffix 'SA' to end of catalog number.

Condulet FS and FD single-gang device boxes – cast iron or aluminum

With and without mounting lugs for threaded rigid and IMC conduit

Ordering information (continued):

FSCT/FDCT



Hub size	Cat. #	Cat. #
1/2"	FSCT1	FDCT1
3/4"	FSCT2 ^H	FDCT2 ^H
1"	FSCT3	FDCT3

FSY^⓪



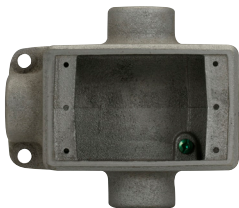
Description	Hub size	Cat. #
Single face	1"	FSY311
Double face	1"	FSY312

FDXC^{⓪⓪}



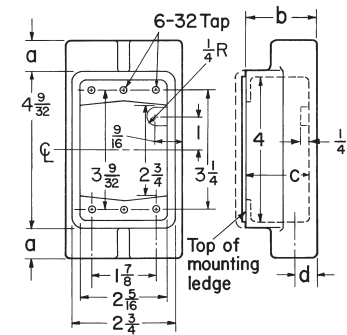
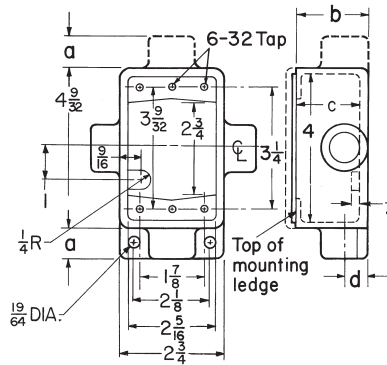
Hub size	Cat. #
3/4"	FDXC219

FST/FDT



Hub size	Cat. #	Cat. #
1/2"	FST1	FDT1
3/4"	FST2 ^H	FDT2
1"	FST3	FDT3

Dimensions (in inches):

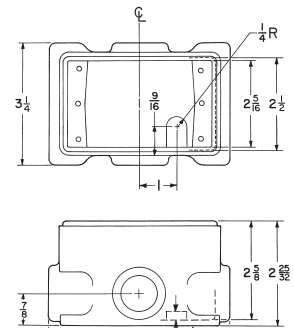
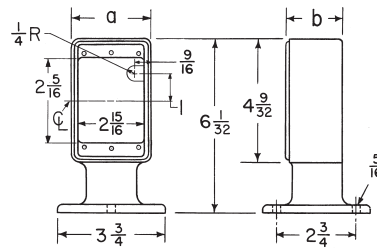


FSX/FDX



Hub size	Cat. #	Cat. #
1/2"	FSX1	FDX1
3/4"	FSX2	FDX2
1"	FSX3	FDX3

FSCT, FSX, FST, FSDC



FSCD^⓪



Hub size	Cat. #
1/2"	FSCD1
3/4"	FSCD2

FSY

FDXC

FSCT, FSX, FST, FSDC

Series	Hub size	a	b	c	d
FS	1/2"	7/8	1 1/8	1 11/16	5/8
	3/4"	7/8	1 1/8	1 11/16	3/4
	1"	1	1 1/8	1 11/16	7/8

FSY

Description	Hub size	a	b
Single-gang, single face	1"	2 3/4	1 15/16
Single-gang, double face	1"	2 3/4	3 3/8

- ^H Available in copper-free aluminum. To order, add suffix 'SA' to end of catalog number.
- ^⓪ Not available with mounting lugs.
- ^{⓪⓪} Six hubs – all 3/4" pipe tap.

Condulet FS single-gang device boxes – cast iron or aluminum

With and without mounting lugs

Ordering information (continued):

FS double face[Ⓚ]



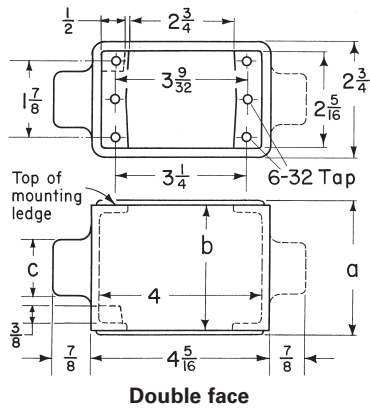
Hub size	Cat. #
1/2"	FS152
3/4"	FS252

FSC double face[Ⓚ]



Hub size	Cat. #
1/2"	FSC152
3/4"	FSC252

Dimensions (in inches):



Series	Hub size	a	b	c
FS	1/2"	3 ⁵ / ₁₆	3 ¹ / ₂	1 ¹ / ₄
	3/4"	3 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹ / ₂

[Ⓚ]Mounting lugs not available.

Condulet FS and FD multi-gang device boxes – cast iron or aluminum

With and without mounting lugs for threaded rigid and IMC conduit

Ordering information:

FS two-gang tandem[Ⓐ]



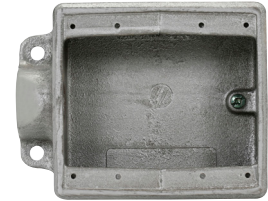
Hub size	Cat. #
1/2"	FS17
3/4"	FS27

FSC two-gang tandem[Ⓐ]



Hub size	Cat. #
1/2"	FSC17
3/4"	FSC27

FSE two-gang



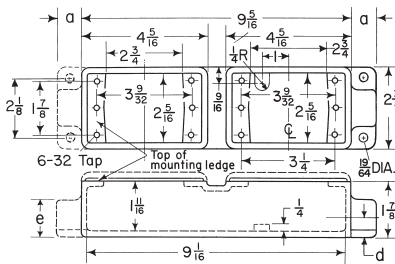
Hub size	Cat. #
3/4"	FSE22

FS/FD two-gang

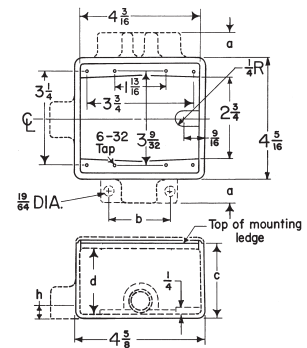


Hub size	Cat. #	Cat. #
1/2"	FS12 [Ⓑ]	FD12
3/4"	FS22 [Ⓑ]	FD22 [Ⓑ]
1"	FS32	FD32

Dimensions (in inches):



Two-gang tandem



Two-gang

FSC/FDC two-gang



Hub size	Cat. #	Cat. #
1/2"	FSC12	FDC12
3/4"	FSC222	FDC222 [Ⓑ]
1"	FSC32	FDC32

Two-gang tandem

Series	Hub size	a	d	e
FS	1/2"	7/8	5/8	1 1/4
	3/4"	7/8	3/4	1 1/2

Two-gang

Series	Hub size	a	b	c	d	h
FS	1/2"	7/8	2 1/4	1 7/8	1 11/16	5/8
	3/4"	7/8	2 1/4	1 7/8	1 11/16	3/4
	1"	1	2 1/2	1 7/8	1 11/16	7/8
FD	1/2"	7/8	2 1/4	2 11/16	2 1/2	5/8
	3/4"	7/8	2 1/4	2 11/16	2 1/2	3/4
1"	1	2 1/2	2 11/16	2 1/2	7/8	

[Ⓐ] Use single-gang covers only.

[Ⓑ] Available in copper-free aluminum. To order, add suffix 'SA' to end of catalog number.

Condulet FS and FD multi-gang device boxes – cast iron or aluminum

With and without mounting lugs for threaded rigid and IMC conduit

Ordering information (continued):

FSS/FDS two-gang



Hub size	Cat. #	Cat. #
$\frac{3}{4}$ "	FSS222	FDS222

FSD two-gang



Hub size	Cat. #
$\frac{3}{4}$ "	FSD212 [Ⓞ]

FS/FD three-gang



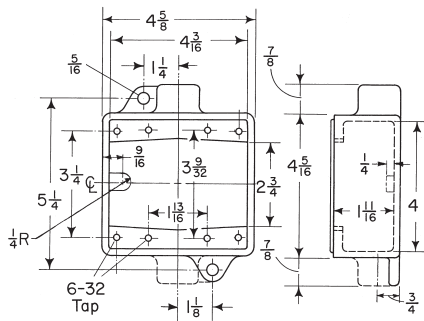
Hub size	Cat. #	Cat. #
$\frac{3}{4}$ "	FS23	FD23
1"	FS33	

FSS three-gang

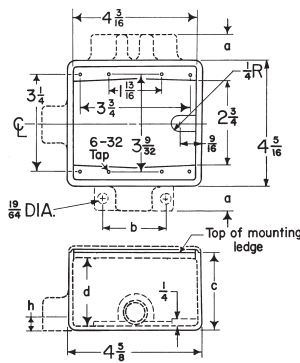


Hub size	Cat. #
$\frac{3}{4}$ "	FSS23

Dimensions (in inches):



Two-gang with mounting lugs



Three-gang

Three-gang

Series	Hub size	a	c	d
FS	$\frac{3}{4}$ "	$\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{11}{16}$
	1"	1	$1\frac{7}{8}$	$1\frac{11}{16}$
FD	$\frac{3}{4}$ "	$\frac{7}{8}$	$2\frac{11}{16}$	$2\frac{1}{2}$

[Ⓞ]Hubs on two hub side are $\frac{1}{2}$ ".

Condulet FS and FD blank device boxes – cast iron

Blank bodies with mounting lugs for drilling and tapping
Single-gang, multi-gang, tandem

Applications:

Blank cast device boxes are used:

- Where several wiring devices are to be grouped together
- To assemble special combinations of wiring devices
- Where special arrangements of conduit hubs or entrances are required

Features:

- Available in shallow (FS) or deep (FD) configurations
- FS/FD bodies have thick walls for drilling and tapping conduit entrances
- Internal green ground screw standard on boxes
- Available in single-, two-, three-, four- and five-gang, and two-gang tandem bodies
- Cast mounting lugs at diagonally opposite corners

Certifications and compliances:

- UL standard: UL514A
- CSA standard: C22.2 No. 18

Standard material:

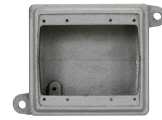
- Feraloy iron alloy

Standard finish:

- Feraloy – electrogalvanized and aluminum acrylic paint



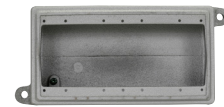
FS019, FD019 – single-gang



FS062, FD062 – two-gang



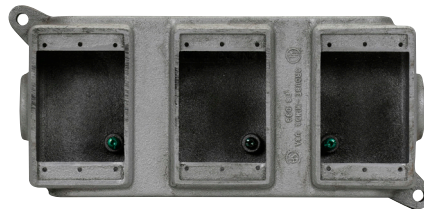
FS063, FD063 – three-gang



FS094, FD094 – four-gang



FS029, FD029 – two-gang



FS039, FD039 – three-gang



FS097, FD097 – two-gang tandem



FD04 – four-gang



FD05 – five-gang

Ordering information:

Description	Cat. # Shallow	Cat. # Deep
Single-gang	FS019	FD019
Two-gang	FS029	FD029
Three-gang	FS039	FD039 ^A
Four-gang		FD04
Five-gang		FD05
Two-gang (takes one two-gang cover)	FS062	FD062
Three-gang (takes one three-gang cover)	FS063	FD063
Four-gang (takes one four-gang cover)	FS094	FD094
Two-gang tandem	FS097	FD097

^A Available in copper-free aluminum. To order, add suffix 'SA' to end of catalog number.

Condulet FS and FD blank device boxes – cast iron

Blank bodies for drilling and tapping
Single-gang, multi-gang, tandem

Ordering information:

To order one of the blank bodies with drilled and tapped holes listed on previous page, proceed as follows:

Step 1

Select the required box.

Step 2

Select the arrangement that meets the requirements from Table 1.

Step 3

Determine the maximum size and spacing of conduit openings from Table 2.

Step 4

Substitute the appropriate symbol from Table 4 for each conduit entrance, using "0" (zero) for those locations on arrangement where an entrance is not required.

Example:

Step 1 – box required FS062

Step 2 – arrangement 1

Step 3 – conduit entrances – 1/2" at 'a'; none at 'b'; 1" at 'c' and 'd'; none at 'e' and 'f.'

Step 4 – symbols are substituted and written in alphabetical order starting with location 'a.' For this example: A0CC00.

Complete catalog number is made up of three parts:

Part 1 – box number;

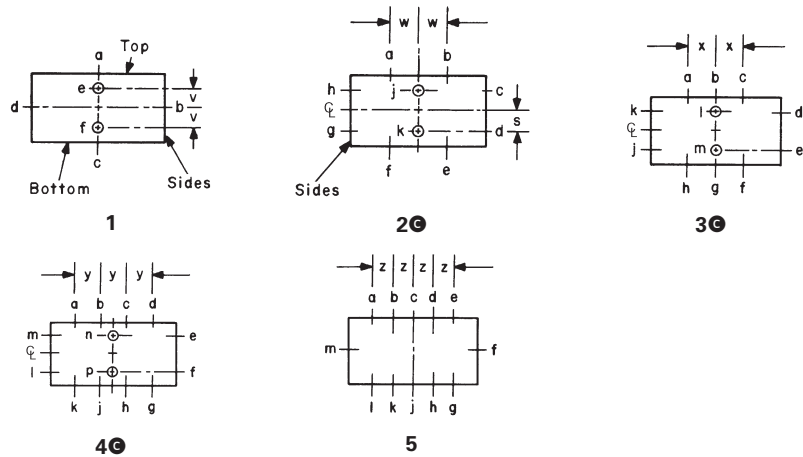
Part 2 – arrangement number;

Part 3 – symbols for conduit entrances.

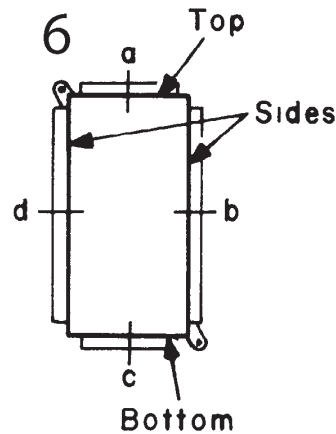
For this example: FS062-1-A0CC00.

Table 1 – Drilling and tapping arrangements: ⑥

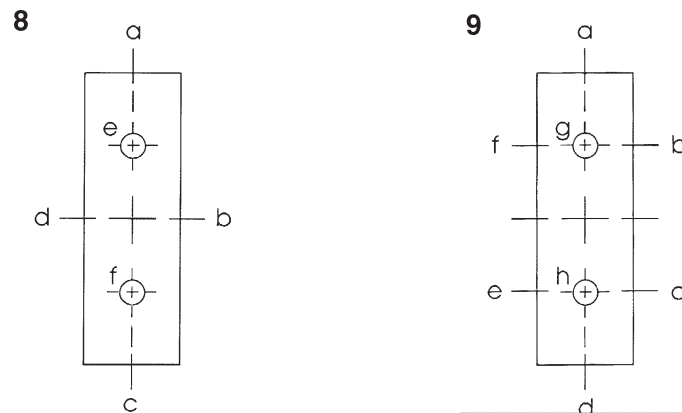
Two-, three-, four- and five-gang



Single-gang only (FS or FD019)



Two-gang tandem (FS or FD097)



⑥ Drilling and tapping arrangements other than those in Table 1 are available. Consult Eaton's Crouse-Hinds Division.

⑦ If only one conduit entry is specified or permitted (see Table 2) on a side wall, that conduit entry will be centered on the wall.

Condulet FS and FD

cast device boxes

Blank bodies for drilling and tapping
Single-gang, multi-gang, tandem

Table 2 – Maximum number, size and spacing of conduit openings:

Cat. #	Maximum conduit opening size													
	Top and bottom					Sides		Back	Spacings					
	1	2	3	4	5	1	2	2	s	v	w	x	y	z
FS019	1					1								
FD019	1 1/2					1 1/2								
FS029	1	1	1	3/4		1					1/8	1/8	1 5/16	
FD029	1 1/2	1 1/2	1	3/4		1 1/2					1/8	1/8	1 5/16	
FS039	1	1	1	1	1	1					3/4	3/4	2 1/2	1 1/8
FD039	1 1/2	1 1/2	1 1/2	1 1/2	1	1 1/2					3/4	3/4	2 1/2	1 1/8
FD04	1 1/2	1 1/2	1 1/2	1 1/2		1 1/2	1	1		1 3/16	1/8	3/4	3/4	
FD05	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1	1		1 3/16	3/4	3/4	3 3/4	3 3/4
FS062	1	1	3/4			1	1	1		1 1/4	29/32	1 5/8		
FD062	1 1/2	1 1/4	3/4			1 1/2	1	1 1/4	1	1	1	1 3/8		
FS063	1	1	1	3/4		1	1	1		1 1/4	1 13/16	1 13/16	1 5/8	
FD063	1 1/2	1 1/4	1	3/4		1 1/2	1	1 1/4	1	1	1 13/16	2	1 1/8	
FS094	1	1	1	1	3/4	1	1	1		1 1/4	1 13/16	1 13/16	1 13/16	1 5/8
FD094	1 1/2	1 1/2	1 1/2	1	3/4	1 1/2	1	1		1 1/8	1 1/2	2 5/8	1 13/16	1 5/8
FS097	1	1 1/2				1	1	1 1/2		1 5/16	3/4			
FD097	1 1/2	1 1/2				1 1/2	1 1/2	1 1/2		1 5/16	3/4			

Table 3 – Distance from mounting surface to center line of conduit opening ('u'):

Cat. #	u
FS019	29/32
FD019	1 3/8
FS029	29/32
FD029	1 3/8
FS039	31/32
FD039	1 3/8
FD04	1 9/16
FD05	1 9/16
FS062	1 5/32
FD062	1 5/8
FS063	1 5/32
FD063	1 5/8
FS094	1 5/32
FD094	1 9/16
FS097	1 5/32
FD097	1 9/16

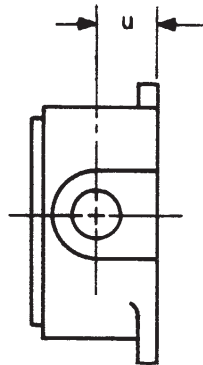


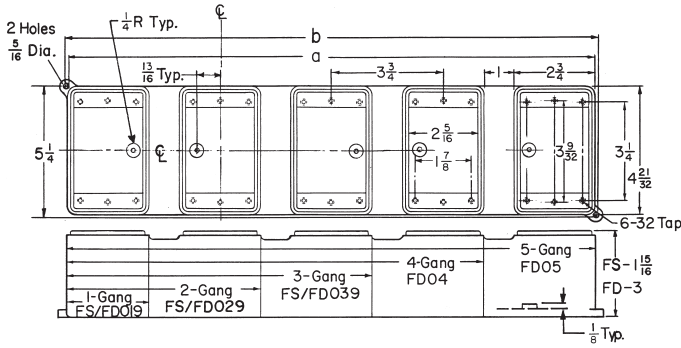
Table 4 – Symbols for openings:

Hub size	Symbol
1/2"	A
3/4"	B
1"	C
1 1/4"	E
1 1/2"	F
None	0

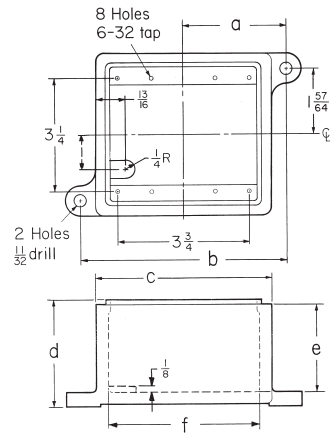
Condulet FS and FD cast device boxes

Blank bodies for drilling and tapping
Single-gang, multi-gang, tandem

Dimensions (in inches):

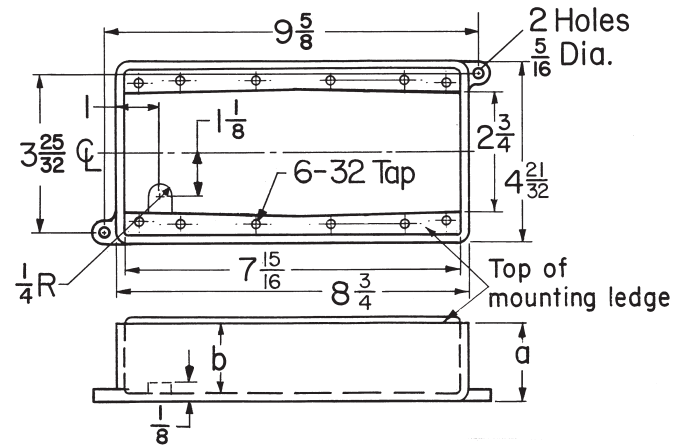


Cat. #	a	b
FS/FD019	3/4	3/4
FS/FD029	7	7
FS/FD039	10 3/4	10 3/4
FD04	14 7/8	15
FD05	18 7/8	18 3/4



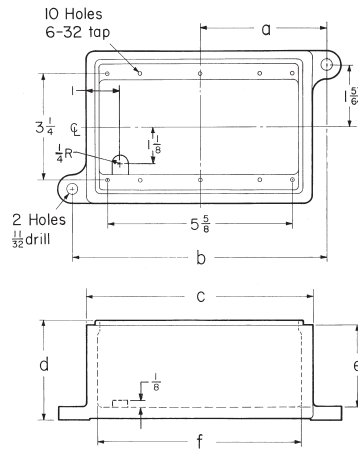
FS/FD062

Cat. #	a	b	c	d	e	f
FS062	2 7/8	5 3/4	5	2 7/16	1 1/2	4 7/8
FD062	2 15/16	5 7/8	5 1/16	3 1/16	2 1/2	4 5/16



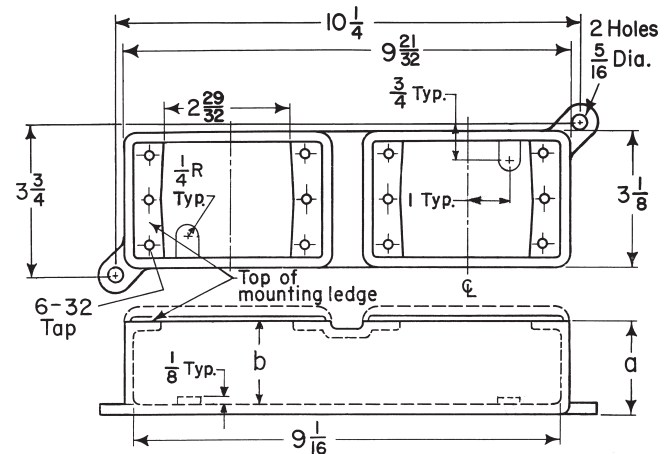
FS/FD094

Cat. #	a	b
FS094	2 7/16	1 45/64
FD094	3	2 1/2



FS/FD063

Cat. #	a	b	c	d	e	f
FS063	3 13/16	7 7/8	6 7/8	2 7/16	1 1/2	6 1/4
FD063	3 7/8	7 1/4	7 1/16	3 1/32	2 1/2	6 7/16



FS/FD097

Cat. #	a	b
FS097	2 7/32	1 1/2
FD097	2 7/32	2 7/16

Hinged-Cover Type 1 Boxes and Enclosures and Accessories

Medium, Type 1



Industry Standards

UL 50, 50E Listed; Type 1; File No. E27567
cUL Listed per CSA C22.2 No 40; Type 1; File No. E27567

NEMA/EEMAC Type 1
CSA, File 42184: Type 1
IEC 60529, IP30

Application

These enclosures have a size range of 16 x 12 x 6-in. to 36 x 30 x 12-in. and meet basic functionality requirements for applications that do not require oil- or dust-tight enclosures.

Features

- Doors have butt hinges
- Collar studs provided for mounting optional panel
- Slotted flush latches; optional latches available
- Mounting holes on back of enclosure

Specifications

- 14 or 12 gauge steel

Finish

ANSI 61 gray polyester powder paint finish inside and out over pretreated surfaces. Optional solid panels are white and optional perforated panels are gray.

Accessories

See also Accessories.

T-Handle Latch and Keyed Cylinder Lock Kits
Electric Heater
Electrical Interlocks
Grounding Device
Panels for Medium Type 1 Enclosures
Rack Mounting Angles - U Style (Type RA)
T-Handle Latch and Keyed Cylinder Lock Kits
Touch-Up Paint
Steel and Stainless Steel Window Kits

Bulletin: A1M

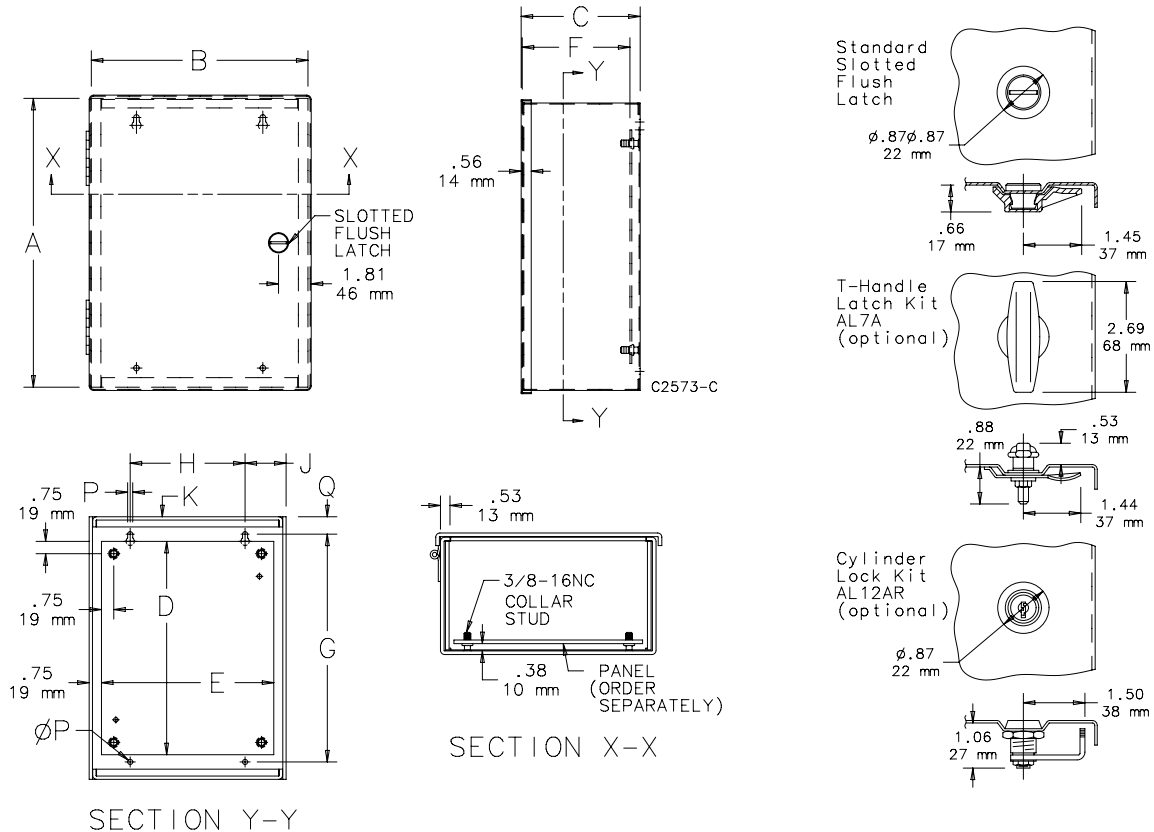
Standard Product

Catalog Number	AxBxC in./mm	Panel	Perforated Panel	Panel Size	Panel Gauge	G in./mm	H in./mm	J in./mm	Q in./mm	P in./mm	F in./mm	K in./mm
				D x E in./mm								
A16N12ALP	16.00 x 12.00 x 6.62	A16N12MP	A16N12MPP	13.00 x 10.50	14	13.88	7.00	2.50	1.06	0.31	6.00	1.50
	406 x 305 x 168			330 x 267								
A16N16ALP	16.00 x 16.00 x 6.62	A16N16MP	A16N16MPP	13.00 x 14.50	14	13.88	11.00	2.50	1.06	0.31	6.00	1.50
	406 x 406 x 168			330 x 368								
A16N20ALP	16.00 x 20.00 x 6.62	A16N20MP	A16N20MPP	13.00 x 18.50	14	13.88	15.00	2.50	1.06	0.31	6.00	1.50
	406 x 508 x 168			330 x 470								
A20N16ALP	20.00 x 16.00 x 6.62	A20N16MP	A20N16MPP	17.00 x 14.50	14	17.88	11.00	2.50	1.06	0.31	6.00	1.50
	508 x 406 x 168			432 x 368								
A20N20ALP	20.00 x 20.00 x 6.62	A20N20MP	A20N20MPP	17.00 x 18.50	14	17.88	15.00	2.50	1.06	0.31	6.00	1.50
	508 x 508 x 168			432 x 470								
A24N16ALP	24.00 x 16.00 x 6.62	A24N16MP	A24N16MPP	21.00 x 14.50	14	21.88	11.00	2.50	1.06	0.31	6.00	1.50
	610 x 406 x 168			533 x 368								
A24N20ALP	24.00 x 20.00 x 6.62	A24N20MP	A24N20MPP	21.00 x 18.50	14	21.88	15.00	2.50	1.06	0.31	6.00	1.50
	610 x 508 x 168			533 x 470								
A24N24ALP	24.00 x 24.00 x 6.62	A24N24MP	A24N24MPP ^a	21.00 x 22.50	12	21.88	19.00	2.50	1.06	0.31	6.00	1.50
	610 x 610 x 168			533 x 572								
A30N24ALP	30.00 x 24.00 x 6.62	A30N24MP	A30N24MPP ^a	26.00 x 22.50	12	27.50	16.75	3.62	1.25	0.44	6.00	2.00
	762 x 610 x 168			660 x 572								
A36N24ALP	36.00 x 24.00 x 6.62	A36N24MP	A36N24MPP ^a	32.00 x 22.50	12	33.50	16.75	3.62	1.25	0.44	6.00	2.00
	914 x 610 x 168			813 x 572								
A36N30ALP	36.00 x 30.00 x 6.62	A36N30MP	A36N30MPP ^a	32.00 x 28.50	12	33.50	22.75	3.62	1.25	0.44	6.00	2.00
	914 x 762 x 168			813 x 724								
A16N12BLP	16.00 x 12.00 x 8.62	A16N12MP	A16N12MPP	13.00 x 10.50	14	13.88	7.00	2.50	1.06	0.31	8.00	1.50
	406 x 305 x 219			330 x 267								
A20N12BLP	20.00 x 12.00 x 8.62	A20N12MP	A20N12MPP	17.00 x 10.50	14	17.88	7.00	2.50	1.06	0.31	8.00	1.50
	508 x 305 x 219			432 x 267								
A20N16BLP	20.00 x 16.00 x 8.62	A20N16MP	A20N16MPP	17.00 x 14.50	14	17.88	11.00	2.50	1.06	0.31	8.00	1.50
	508 x 406 x 219			432 x 368								
A20N20BLP	20.00 x 20.00 x 8.62	A20N20MP	A20N20MPP	17.00 x 18.50	14	17.88	15.00	2.50	1.06	0.31	8.00	1.50
	508 x 508 x 219			432 x 470								
A24N20BLP	24.00 x 20.00 x 8.62	A24N20MP	A24N20MPP	21.00 x 18.50	14	21.88	15.00	2.50	1.06	0.31	8.00	1.50
	610 x 508 x 219			533 x 470								
A24N24BLP	24.00 x 24.00 x 8.62	A24N24MP	A24N24MPP ^a	21.00 x 22.50	12	21.88	19.00	2.50	1.06	0.31	8.00	1.50
	610 x 610 x 219			533 x 572								

Hinged-Cover Type 1 Boxes and Enclosures and Accessories

Catalog Number	Ax B x C in./mm	Panel	Perforated Panel	Panel Size		Panel Gauge	G in./mm	H in./mm	J in./mm	Q in./mm	P in./mm	F in./mm	K in./mm
				D x E in./mm									
A30N20BLP	30.00 x 20.00 x 8.62	A30N20MP	A30N20MPP ^a	26.00 x 18.50		12	27.50	15.00	2.50	1.25	0.44	8.00	2.00
	762 x 508 x 219			660 x 470	699								
A30N24BLP	30.00 x 24.00 x 8.62	A30N24MP	A30N24MPP ^a	26.00 x 22.50		12	27.50	16.75	3.62	1.25	0.44	8.00	2.00
	762 x 610 x 219			660 x 572	699								
A30N30BLP	30.00 x 30.00 x 8.62	A30N30MP	A30N30MPP ^a	26.00 x 28.50		12	27.50	22.75	3.62	1.25	0.44	8.00	2.00
	762 x 762 x 219			660 x 724	699								
A36N24BLP	36.00 x 24.00 x 8.62	A36N24MP	A36N24MPP ^a	32.00 x 22.50		12	33.50	16.75	3.62	1.25	0.44	8.00	2.00
	914 x 610 x 219			813 x 572	851								
A36N30BLP	36.00 x 30.00 x 8.62	A36N30MP	A36N30MPP ^a	32.00 x 28.50		12	33.50	22.75	3.62	1.25	0.44	8.00	2.00
	914 x 762 x 219			813 x 724	851								
A18N18CLP	18.00 x 18.00 x 10.62	A18N18MP	A18N18MPP	15.00 x 16.50		14	15.88	13.00	2.50	1.06	0.31	10.00	1.50
	441 x 441 x 270			381 x 419	403								
A24N20CLP	24.00 x 20.00 x 10.62	A24N20MP	A24N20MPP	21.00 x 18.50		14	21.88	15.00	2.50	1.06	0.31	10.00	1.50
	610 x 508 x 270			533 x 470	556								
A30N24CLP	30.00 x 24.00 x 10.62	A30N24MP	A30N24MPP ^a	21.00 x 22.50		12	27.50	16.75	3.62	1.25	0.44	10.00	2.00
	762 x 610 x 270			533 x 572	699								
A24N24DLP	24.00 x 24.00 x 12.62	A24N24MP	A24N24MPP ^a	21.00 x 22.50		12	21.88	19.00	2.50	1.06	0.31	12.00	1.50
	610 x 610 x 321			533 x 572	556								
A30N24DLP	30.00 x 24.00 x 12.62	A30N24MP	A30N24MPP ^a	26.00 x 22.50		12	27.50	16.75	3.62	1.25	0.44	12.00	2.00
	762 x 610 x 321			660 x 724	699								
A36N30DLP	36.00 x 30.00 x 12.62	A36N30MP	A36N30MPP ^a	32.00 x 28.50		12	33.50	22.75	3.62	1.25	0.44	12.00	2.00
	914 x 762 x 321			813 x 724	851								

Purchase panels separately.
^a Flanged on all four sides



**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

26 05 53

Identification for
Electrical Systems

Critical
Secondary Water
Supply

Electrical Submittal

Section 26 05 53
Identification for Electrical
Systems

BRADY B-720 IDENTOLINE® UNDERGROUND WARNING TAPE

TDS No. B-720
Effective Date: 02/15/2001

Description:

Brady B-720 is a printed plastic tape that has no adhesive.

Details:



Use:

Brady B-720 is used to identify the location and direction of buried utility lines and pipes. It is installed below ground level, directly over the line it protects.

Substrate Type:

Polyethylene

Standard Material Colors:

Yellow, orange, blue, red, and green

Standard Legend Color:

Black

Thickness (ASTM D 1593):

0.0035 in. (0.89 mm)

Tensile Strength (ASTM D 638):

7 lb/in. (123 N/100mm)

Elongation (ASTM D 638):

300%

Abrasion Resistance (Method 5306 of U.S. Federal Test Method Std. No. 191A):

CS-10 wheels, 250 g wts.

Legend withstood up to 1100 cycles

Simulated Underground Burial Test:

(A solution at pH 7.1 prepared by adding 50% sulfuric acid to a 10% (wt.) solution of Na₂S·9H₂O in water.)

No discoloration of film or bleed of legend.

Chemical Resistance:

REAGENT	7 DAY IMMERSION	DIP TEST	RUB TEST
30% Sulfuric Acid	F	F	F
10% Sulfuric Acid	F	F	NE
30% HCl	NE	NE	F
10% HCl	NE	NE	NE
50% NaOH	NE	NE	NE
10% NaOH	NE	NE	NE
Methyl Ethyl Ketone	F	NE	F
Acetone	F	NE	F

1,1,1-Trichloroethane	F	NE	F
Methanol	F	F	F
IPA (Isopropanol)	F	NE	F
ASTM #3 Oil	NE	NE	F
SAE 20 Oil	NE	NE	F
Alconox®	F	F	NE
Toluene	F	NE	F
Mineral Spirits	F	NE	F
Glacial Acetic Acid	F	F	F
5% Acetic Acid	NE	NE	NE
Diesel Fuel	NE	NE	F
Heptane	F	NE	F
Cellosolve Acetate	F	NE	F
Conc. Ammonia	NE	NE	NE
10% Ammonia	NE	NE	NE
Turpentine	F	F	F
Kerosene	F	NE	F
Water	NE	NE	NE
Gasoline	F	F	F

NE = No Effect

NT = Not Tested

F = Failed (affected Sample)

7 Day Immersion: Immersed in reagent for 7 days.

Dip Test: Five 10 minute dips in reagent with 30 minute recovery.

Rub Test: Rubbed sample for 1minute with swab soaked in reagent.

Shelf Life:

Indefinite when stored at 70°F (21°C) and 40% to 50% R.H.

Trademarks:

Alconox® is a registered trademark of Alconox Co.

Signmark® is a registered trademark of Brady Worldwide, Inc.

Identoline® is a registered trademark of Brady Worldwide, Inc.

ASTM: American Society for Testing and Materials (U.S.A.)

SAE: Society of Automotive Engineers (U.S.A.)

All S.I. Units (metric) are mathematically derived from the U.S. Conventional Units.

Note: All values shown are averages and should not be used for specification purposes.

Test data and test results contained in this document are for general information only and shall not be relied upon by Brady customers for designs and specifications, or be relied on as meeting specified performance criteria. Customers desiring to develop specifications or performance criteria for specific product applications should contact Brady for further information.

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Brady products are sold with the understanding that the buyers will test them in actual use and determine for themselves their adaptability to their intended uses. Brady warrants to the buyers that its products are free from defects in material and workmanship, but limits its obligation under this warranty to replacement of the product shown to Brady's satisfaction to have been defective at the time Brady sold it. This warranty does not extend to any persons obtaining the product from the buyers. This warranty is in lieu of any other warranty, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on Brady's part. Under no circumstances will Brady be liable for any loss, damage, expense, or consequential damages of any kind arising in connection with the use, or inability to use, Brady's products.

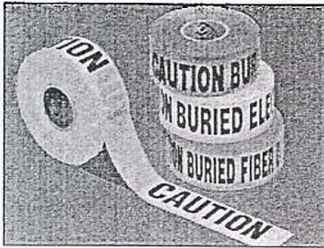
Brady North America | 6555 W. Good Hope Rd | Milwaukee, WI 53223 | USA | Tel: 414-358-6600 | Fax: 800-292-2289

Safety Identification Products



Hazard Tape

Underground Tape



Two Styles:

Detectable (with standard metal detector);

Standard polyethylene.

Part Number	Legend	Color (Legend/Background)	Roll Height (In.)	Roll Length (Ft.)	Std. Pkg. Qty.
2.00"					
HTDU2B-W	CAUTION CAUTION CAUTION WATER LINE BURIED BELOW	Black/Blue	2.00	1000.00	1
HTDU2O-FO	CAUTION CAUTION CAUTION FIBER OPTIC CABLE BURIED BELOW	Black/Orange	2.00	1000.00	1
HTDU2O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW	Black/Orange	2.00	1000.00	1
HTDU2R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	Black/Red	2.00	1000.00	1
3.00"					
HTDU3O-FO	CAUTION CAUTION CAUTION FIBER OPTIC CABLE BURIED BELOW	Black/Orange	3.00	1000.00	1
HTDU3O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW	Black/Orange	3.00	1000.00	1
HTDU3R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	Black/Red	3.00	1000.00	1
HTU3O-FO	CAUTION CAUTION CAUTION BURIED FIBER OPTIC CABLE	Black/Orange	3.00	1000.00	1
HTU3O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW	Black/Orange	3.00	1000.00	1
HTU3R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	Black/Red	3.00	1000.00	1
6.00"					
HTDU6O-FO	CAUTION CAUTION CAUTION FIBER OPTIC CABLE BURIED BELOW	Black/Orange	6.00	1000.00	1
HTDU6O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW	Black/Orange	6.00	1000.00	1
HTU6O-TV	CAUTION CAUTION CAUTION CABLE TV LINE BURIED BELOW	Black/Orange	6.00	1000.00	1
HTDU6R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	Black/Red	6.00	1000.00	1
HTU6O-FO	CAUTION CAUTION CAUTION BURIED FIBER OPTIC CABLE	Black/Orange	6.00	1000.00	1
HTU6O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW	Black/Orange	6.00	1000.00	1
HTU6R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	Black/Red	6.00	1000.00	1
HTU6Y-G	CAUTION CAUTION CAUTION GAS LINE BURIED BELOW	Black/Yellow	6.00	1000.00	1



Other colors available. Order by number of rolls required.

PAN: Panduit Corp.

45



3M

Vinyl Tapes for Floor and Hazard Marking

MRO
Essentials

*Adhere on contact, resist wear and spills,
and remove cleanly when you're ready*

When you want easy product solutions for marking, identifying, and color-coding, depend on 3M™ vinyl tapes for application simplicity and durability.

- 3M pressure sensitive rubber adhesive sticks on contact to just about any surface for fast application with no dripping, drying, or clean-up.
- Durable vinyl backing resists abrasion, scuffing, moisture, weathering, acids, and alkaline chemicals for long service life.

- Bright colors are locked into the vinyl for permanent high visibility. Select from nine colors or transparent to let underlying color show through.

- Flexible construction stretches and conforms to curved surfaces and around corners for a tight fit.
- When you're ready, 3M Vinyl Tapes peel up easily and leave no adhesive behind.

Application Ideas

- Marking lanes and corridors in factories, warehouses, and hospitals

- Marking hazardous or no-go areas
- Highlighting safety equipment locations protruding equipment, or low hanging objects
- Delineating playing areas and out-of-bounds in sports facilities
- Color-coding instruments, storage systems, and piping
- Decorative marking

3M™ Vinyl Tapes

Product/Color	UPC # 021200-	Size	Tape Structure (Backing/Adhesive)	Backing Thickness mils (mm)	Total Thickness mils (mm) (N/100 mm)	Adhesion to Steel oz./in. (N/100 mm)	Tensile Strength lbs./in. (N/100 mm)	Elongation at Break %	Temperature Range °F (°C)	Packaging
ASTM Test Method:				D-3652	D-3652	D-3330	D-3759	D-3759		
Premium performance Vinyl Tape										
471/Black	04306-2	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/Blue	04308-6	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/Green	04313-0	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/Orange	04312-3	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/Red	04305-5	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/Trans.	04314-7	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/White	04311-6	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
471/White	06466-1	3 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	12 per case
471/Yellow	04310-9	2 in. x 36 yds.	Vinyl/Rubber	4.1 (0.10)	5.2 (0.13)	23 (25)	16 (280)	130	40 to 170 °F (4 to 77°C)	24 per case
3M™ Safety Stripe Tapes										
5700/Black & White Stripes	04367-3	2 in. x 36 yds.	Vinyl/Rubber	4.2 (0.11)	5.5 (0.14)	19 (21)	15 (260)	170	40 to 170 °F	24 per case
5700/Black & White Stripes	03954-6	3 in. x 36 yds.	Vinyl/Rubber	4.2 (0.11)	5.5 (0.14)	19 (21)	15 (260)	170	40 to 170 °F	12 per case
5702/Black & Yellow Stripes	03951-5	3 in. x 36 yds.	Vinyl/Rubber	4.2 (0.11)	5.4 (0.14)	19 (21)	15 (260)	170	40 to 170 °F	12 per case
5702/Black & Yellow Stripes	04585-1	2 in. x 36 yds.	Vinyl/Rubber	4.2 (0.11)	5.4 (0.14)	19 (21)	15 (260)	170	40 to 170 °F	24 per case

NOTE: The technical information and data provided above is a general guide only and should be considered representative or typical only and should not be used for specification purposes.

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3M

Industrial Business

Customer Response Center
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St. Paul, MN 55144-1000













Minimum 10% Post-Consumable Fiber

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3M Electrical Tape Chart

Vinyl Electrical Tapes	Product Description/Applications	Tape Thickness	Temp Range	Roll Size
 <p>Scotch® Super 33+™ Professional Grade Vinyl Electrical Tape*</p>	Insulates splices up to 600V. Repairs cable jacketing. Resists UV rays, abrasion, corrosion, alkalis and acids. Flame retardant. UL Listed and CSA Certified.	7 mil	105°C 221°F	3/4" x 66' (19 mm x 20,1 m) 3/4" x 44' (19 mm x 13,4 m) 3/4" x 20' (19 mm x 6,0 m) 3/4" x 36 yd (19 mm x 32,9 m) 1" x 36 yd (25,4 mm x 32,9 m) 1-1/2" x 36 yd (38 mm x 32,9 m)
 <p>Scotch® Heavy Duty Grade Vinyl Electrical Tape Super 88*</p>	Thick, heavy duty vinyl protects cable and provides faster build-up. Insulates splices up to 600V. Repairs cable jacketing. Resists UV rays, abrasion, corrosion, alkalis and acids. Flame retardant. UL Listed and CSA Certified.	8.5 mil	105°C 221°F	3/4" x 66' (19 mm x 20,1 m) 3/4" x 44' (19 mm x 13,4 m) 3/4" x 36 yd (19 mm x 32,9 m) 1" x 36 yd (25,4 mm x 32,9 m) 1-1/2" x 36 yd (38 mm x 32,9 m) 1-1/2" x 44' (38 mm x 13,4 m) 2" x 36 yd (51 mm x 32,9 m)
 <p>Scotch® Professional Grade Color Coding Vinyl Electrical Tape 35+*</p>	9 fade-resistant colors identify and mark phases/cables. Insulate splices up to 600V. Repair cable jacketing. Resists UV rays, abrasion, corrosion, alkalis and acids. Flame retardant. UL Listed and CSA Certified.	7 mil	105°C 221°F	3/4" x 60' (19 mm x 18,2 m) 1/2" x 20' (12 mm x 6,1 m) 3/4" x 66' (19 mm x 20,1 m) 1/2" x 20' (12 mm x 6,1 m)
 <p>Scotch® Extra Heavy Duty Grade Vinyl Electrical Tape 22*</p>	Extra-thick, heavy duty vinyl protects cable and provides faster build-up. Insulates splices up to 600V. Repairs cable jacketing. Resists UV rays, abrasion, corrosion, alkalis and acids. Flame retardant. UL Listed and CSA Certified.	10 mil	80°C 176°F	1/2" x 36 yd (13 mm x 32,9 m) 3/4" x 36 yd (19 mm x 32,9 m) 1" x 36 yd (25,4 mm x 32,9 m) 1-1/2" x 36 yd (38 mm x 32,9 m) 2" x 36 yd (51 mm x 32,9 m)
 <p>3M™ Highland™ Medium Grade Vinyl Electrical Tape*</p>	Bundles cable and pull wire. Insulate splices up to 600V. Flame retardant. UL Listed and CSA Certified.	7 mil	90°C 194°F	3/4" x 60' (19 mm x 20,1 m) 3/4" x 66' (19 mm x 20,1 m)
 <p>3M™ Temflex™ Economy Grade Vinyl Electrical Tape 1700</p>	Bundle cable, wire pull and repair cable jacketing. Flame retardant. UL Listed and CSA certified.	7 mil	80°C 176°F	3/4" x 60' (19 mm x 18,2 m) 3/4" x 36 yd (19 mm x 32,9 m) 3/4" x 66' (19 mm x 20,1 m) 1" x 66' (25,5 mm x 20,1 m)
 <p>3M™ Temflex™ Mining Grade Vinyl Electrical Tape 1700P</p>	Insulate and repair mining cable jacketing. Flame retardant. Printed for use in MSHA-approved splicing kits.	7 mil	80°C 176°F	3/4" x 66' (19 mm x 20,1 m) 1-1/2" x 44' (38 mm x 13,4 m) 1-1/2" x 66' (38 mm x 20,1 m) 3/4" x 66' (19 mm x 20,1 m) 1-1/2" x 44' (38 mm x 13,4 m) 1-1/2" x 66' (38 mm x 20,1 m)

Insulating and Sealing Tapes	Product Description/Applications	Tape Thickness	Temp Range	Roll Size
 <p>Scotch® Professional Grade Linerless Rubber Splicing Tape 130C*</p>	Insulate and splice solid dielectric cables through 69kV. Linerless, high-voltage insulating, thermally conductive, self-bonding rubber.	30 mil	continuous: 90°C / 194°F short-term: 130°C / 266°F	1" x 30' (25 mm x 9,1 m) 3/4" x 30' (19 mm x 9,1 m) 1-1/2" x 30' (38 mm x 9,1 m) 2" x 30' (50 mm x 9,1 m) 1" x 10' (25 mm x 3,05 m) 1" x 15' (25 mm x 4,6 m)
 <p>Scotch® Professional Grade Lined Rubber Splicing Tape 23</p>	Insulate and splice solid dielectric cables through 69kV. Lined, insulating, thermally conductive, self-bonding rubber.	30 mil	continuous: 90°C /194°F short term: 130°C / 266°F	3/4" x 30' (19 mm x 9,1 m) 1" x 20' (19 mm x 25 m) 1" x 30' (25 mm x 9,1 m) 1-1/2" x 30' (38 mm x 9,1 m) 2" x 30' (50 mm x 9,1 m)
 <p>Scotch® Medium Grade Linerless Rubber Splicing Compound 2242*</p>	Splice and insulate cables and connections. General purpose, linerless rubber insulating tape.	30 mil	continuous: 90°C / 194°F short-term: 130°C / 266°F	3/4" x 15' (19 mm x 4,57 m) 1-1/2" x 15' (38 mm x 4,57 m) 2" x 15' (51 mm x 4,6 m)



(Not all tapes are US tapes)

Many 3M Electrical Products including electrical tapes, are ROHS Compliant. To check the compliance status of a 3M Electrical Product, go to www.3m.com/electrical



Products

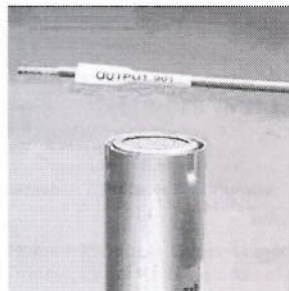
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[Printers](#) > [Cougar LS9 Hand-Held Thermal Printer, Label Parts and Accessories](#) > **P1™ Continuous Heat Shrink Label Cassettes**

H000X034F1C



- Labels offer crisp, clear legends with superior legibility
- Meets UL Standard 224 for flammability
- Shrink ratio 3:1
- Each cassette contains a continuous roll of flattened polyolefin that can be cut-to-length and partially cut
- For use in *PanTher™* LS8 and *Cougar™* LS9 Hand-Held Thermal Transfer Printers

Related Products

[PanTher™ LS8E Han...](#)

• Part Number	H000X034F1C
• RoHS Compliancy Status	Compliant
• Part Description	White, 3/16" diameter heat shrinkable polyolefin, 18-12 AWG.
• Length (ft.)	8.0
• Length (m)	2.44
• Width (In.)	.34
• Width (mm)	8.64
• Max. Wire O.D. (In.)	.19
• Max. Wire O.D. (mm)	4.83
• Min. Cable O.D. (In.)	.06
• Min. Cable O.D. (mm)	1.52
• Pricing Description	P1 Cassette, Continuous Heatshrink Tubing, Polyolefin, 8' W x .34" H, White
• Min. Order UOM	PC
• Min. Order Qty.	1
• BOM Qty. (# of Pkgs.)	<input type="text" value="0"/>
• Add to Favorite Product List	

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LS8E



visibility

- [Part Number](#)
- [RoHS Compliancy Status](#)
- [Part Description](#)
- [Pricing Description](#)
- [Min. Order UOM](#)
- [Min. Order Qty.](#)
- [BOM Qty. \(# of Pkgs.\)](#)
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- Cut-to-length functionality eliminates label waste and label trimming labor
- Partial cut feature available to provide tear-apart strips of labels
- Label cassette contains integrated memory device for automatic formatting, recall of last legend used and number of labels remaining in cassette
- USB interface for importing data, system upgrades and printing from a wireless laptop or desktop computer
- Fast loading label cassette includes both label material and ribbon to make changing labels easy
- Prints self-laminating labels, heat shrink tubing, die-cut component labels and continuous tape
- Large graphic display with backlight for improved

LS8E
Under review
Includes LS8E printer, one cassette of S100X150VAC self-laminating labels, six AA alkaline batteries and quick reference card.
LS8E, Printer
PC
1
<input type="text" value="0"/>

Related Products

- [P1™ Self-Laminati ..](#)
- [P1™ Continuous He ..](#)
- [P1™ Continuous Ta ..](#)
- [P1™ Network Compo ..](#)
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3M Electrical Tapes
Product Selection Guide



**Insulate & Protect
with Quality Tapes**

3M

Rowmark®

Great people. Great plastic.

Ultra-Mattes

Front Engravable

Physical Properties	Typical Values	ASTM Method
<u>IZOD Impact Strength</u>		
Notched at 73°F (22.78°C)	1.10 ft lbs/in	D-256
<u>Tensile Strength</u>		
To break	5,500 psi	D-638
Elongation before break	50%	D-638
<u>Flexural Strength</u>		
Load to stretch outer surface 5%	10,300 psi	D-790
<u>Specific Gravity</u>	1.15	D-792
<u>Rockwell Hardness</u>	M45	D-785
<u>Deflection Temperature</u>		
Temperature at which material deflects .010" (.254mm) at 264 psi	175°F (79.44°C)	D-648
<u>Coefficient of Thermal Expansion</u>		
Inch/inch/°F	5.6 x 10 ⁻⁵	D-696
<u>Vicat Softening Point</u>		
Temperature for needle to penetrate 1mm (90°F/hr, 2.2 lbs)	208°F (97.78°C)	D-1525
Temperature for needle to penetrate 1mm (90°F/hr, 11.0 lbs)	187°F (86.11°C)	D-1525

ULTRA-MATTES (FRONT) engraving material softens at about 200°F (93.33°C) sufficiently so that it can be bent as needed. It can be sawed, drilled and bonded, but not sheared. For best appearance, sawed edges should be buffed on material 1/8" (3.0mm) and thicker.

The base and cap materials were tested for flammability by Underwriters Laboratories. The base and cap materials are rated 94 HB on the UL 94 test.

Under the ASTM Standard G-155, Ultra-Mattes (front) engraving material was tested with a Xenon Arc Light Apparatus under specific, reproducible conditions. Testing resulted in no noticeable change in color after 300 hours of exposure to the Xenon Arc. Exposure to the Xenon Arc for 300 hours is supposedly the equivalent of approximately 3 years of exposure in a normal, mild climate, such as the Midwestern States of the United States.

This is not intended as a statement of warranty, rather a statement of general comparison.

NOTE: The above information is given in good faith, but no warranty, express or implied, is given.

Ultra-Mattes

Front Engravable

Specifications	
Material:	Laminated Impact Acrylic
Finish:	Matte non-glare
Sheet Size:	24" x 48¾" (610 x 1238mm)
Thickness 1-Ply:	NONE
Thickness 2-Ply:	1/16" (1.6mm) Use 322 as first three digits in item code
	1/8" (3.2mm) Use 342 as first three digits in item code
Thickness 3-Ply:	1/16" (1.6mm) Use 323 as first three digits in item code
	1/8" (3.2mm) Use 343 as first three digits in item code
Usage:	Interior signage Exterior signage ADA compliant Personal Identification
Engraving Method:	Rotating Carbide
Cutting Depth:	.012" (.30mm)
Capabilities	
Scores	■ Bonds
Saws ■	Permits Fine Engraving
Drills ■	■ UV Stable
Shears	Back-Filling
Laser Vector Cuts	Back-Lighting
Bevels ■	■ Braille-Engravable
Heat Bendable ■	Embosses
Screen Prints ■	Ink Prints
Hot Stamps ■	Thermal Prints

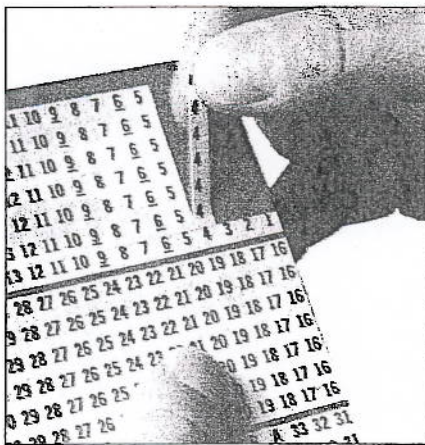
E-Z-Code®

Wire Marker Books



Pocket pack wire marker books are easy to carry, easy to use. The material is an all purpose vinyl coated cloth tape exclusively designed to resist abrasion, oil, water and dirt. From Thomas & Betts you get the one-piece wire marker and terminal marker. A slight die-cut allows you to easily remove the terminal marker if you need it or leave it in place for a longer marker.

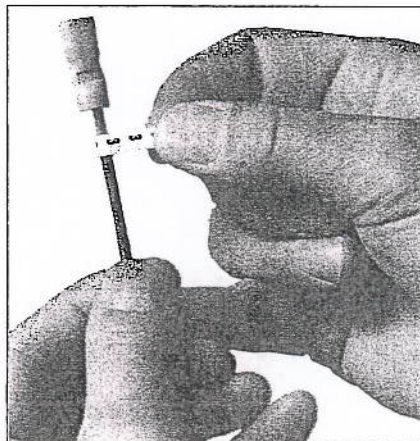
- Size 3" x 5" (76 mm x 146 mm).
- Quantity of pages: 10.
- Material: vinyl cloth.
- Cover keeps markers clean.
- Books are 3" x 5 1/2" pocket size.
- 10 pages per book.



Vinyl Cloth, Standard Books

Cat. No.	Number of Markers and Legends
WM-0 thru 9	40 Markers each: 0 thru 9; 10 Markers each: T1, T2, T3, L1, L2, L3, WM-0 thru -9
WM-0-9M	46 Markers each page; full page of 1, full page of 2, etc.
WM-0-45	10 Markers each: 0 thru 45
WM-46-90	10 Markers each 46 thru 90
WM-A-Z	10 Markers each: A thru Z, +, -, and 0 thru 15
WM-123	150 Markers each: 1, 2, 3
WM-ABC	150 Markers each: A, B, C
WM-A-33	10 Markers each: 1 thru 33, A, B, C, +, -, T1, T2, T3, L1, L2, L3
WM-A-90	6 Markers each: 0 thru 15; 4 Markers each: 16 thru 90; 2 Markers each: A thru Z
WM-0 thru WM-9	460 Markers each of any number 0 thru 9
WM-A, -B, -C, -D, -E, -F, -G, -L, -N, -P, -R, -S, -T, or X	460 Markers each of any letter; -A, -B, -C, -D, -E, -F, -G, -L, -N, -P, -R, -S, -T or X
WM-GRD	120 Markers 7/8" x 2 1/2" or 240 Markers 7/8" x 1 1/4" with "GRD" legend
WMLC-1	24 Legends, 2 legends each per page, 480 markers per book for house wiring and circuit breakers; 3/8" x 1 1/2" (16mm x 10mm)
WM-T3	10 Pages T ₁ , T ₂ , T ₃ ; 140 Markers ea.; total 420
WM-L3	10 Pages L ₁ , L ₂ , L ₃ ; 140 markers ea.; total 420
WM-9T	3 Pages 1, 2, 3; 42 markers ea.; 3 Pages A, B, C; 42 markers ea.; 2 Pages T ₁ , T ₂ , T ₃ ; 28 markers ea.; 2 Pages L ₁ , L ₂ , L ₃ ; 28 markers ea.; total 140
WM-1-30	10 Pages 1-30; 14 markers ea.; total 140
WM-12	A-Z 8 1/2 Pages, 14 markers ea.; Blank Write Ons 1 Page, 22 markers ea.; Plus & Minus 1/2 Page, 7 markers ea.; total 393
WM-13	Plus & Minus, AC, DC, 1 Page ea., 46 markers ea.; Pos. Neg. Gnd. 1 Page ea., 28 markers ea.; Spare, Neut. 1 Page ea., 22 markers ea.; Blank Write Ons 1 Page ea., 22 markers ea.; total 256
WM-0-90	5 Pages ea. 0-45; 5 markers ea.; 5 Pages ea. 46-90; 5 markers ea.; total 455

Minimum order quantity is 10.



E-Z-Code®

Thomas & Betts

Signs



Material Chart

Material	Print Method	Temperature Range	Features
Polyester (PPS)	Pre-Printed	-40°F to 275°F (-40°C to 135°C)	Indoor/outdoor rated; laminated label material protects legend from abrasion and chemicals; resistant to UV light chemical atmosphere and abrasion; excellent life and adhesion properties
Rigid Polyethylene (PRS)		175°F to 250°F (79°C to 121°C)	Indoor/outdoor rated; high quality, rugged material resistant to abrasion; use where adhesives will not work
Vinyl (PVS)		-40°F to 200°F (-40°C to 93°C)	Indoor rated; overlaminated, economical general purpose material; excellent adhesion properties when applied to a clean, dry surface

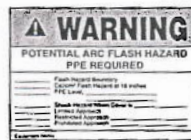
Size Reference Chart

Part Number	Width		Height		Signs per Card
	In.	mm	In.	mm	
0109	9.00	228.60	1.50	38.10	1
0204	4.50	114.30	2.25	57.15	2
0209	9.00	228.60	2.25	57.15	1
0305	5.00	127.00	3.50	88.90	1
0503	3.00	76.20	5.00	127.00	2
0507	7.00	177.80	5.00	127.00	1
0509	9.00	228.60	5.00	127.00	1
0710	10.00	254.00	7.00	177.80	1
1014	14.00	355.60	10.00	254.00	1

*Denotes the part number's prefix and suffix.



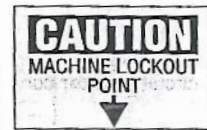
PPS0204W2100
PPS0305W2100
PPS0507W2100



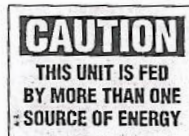
PVS0305W2101^
PVS0507W2101^



PVS0204C171



PVS0204C179



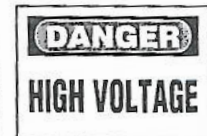
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PVS0505C174



PVS0710C173



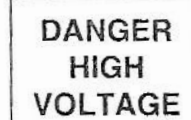
PVS0710C180



PRS0710D72
PVS0109D72
PVS0204D72
PVS0710D72



PVS0204D100



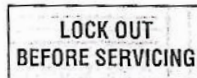
PRS1014B364
PVS0509B364
PVS0710B364



PVS0204W172



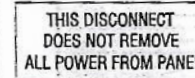
PVS0209D445



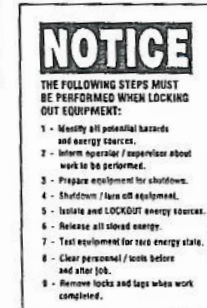
PVS0204C176



PVS0204C177



PVS0204C178



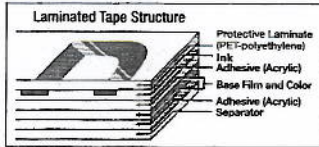
PVS0503N458

^Can be clearly identified with PANDUIT permanent marking pens, page G19.

There's a TZ tape for every application!

STANDARD LAMINATED TAPES

Our standard laminated tapes offer a wide variety of colors, styles and sizes for your everyday home, home-office and general business office needs. These laminated labels feature our standard adhesive, which is designed for flat items like office paper, file folders, binders, and most flat, non-textured metal, plastic and glass surfaces. They resist water, grease or grime – the laminated surface wipes clean – and fading and abrasion. Can also be used in hot and cold environments, as well as outdoors.



There's a variety of colors, styles and sizes – from 1/4" to 1-1/2" – to choose from, depending on your P-touch electronic labeler.

TZ STANDARD LAMINATED TAPES						
26.2' long, unless otherwise noted	1/4"	1/2"	1"			
BLACK ON WHITE	TZ211	TZ221	TZ231	TZ241	TZ251	TZ261
BLACK ON CLEAR	TZ111	TZ121	TZ131	TZ141	TZ151	TZ161
BLACK ON CLEAR MATTE				TZM41		
BLACK ON RED		TZ421		TZ441	TZ451	
BLACK ON YELLOW			TZ631	TZ641	TZ651	TZ661
BLACK ON GREEN				TZ741		
BLACK ON BLUE				TZ541		
BLACK ON FL. ORANGE				TZB41*	TZB51*	
WHITE ON BLACK	TZ315	TZ325	TZ335	TZ345	TZ355	
WHITE ON CLEAR			TZ135	TZ145		
WHITE ON YELLOW				TZ545		
RED ON WHITE			TZ232	TZ242	TZ252	
BLUE ON WHITE				TZ243		
GOLD ON BLACK			TZ334	TZ344	TZ354	

* 16.4" long

SPECIALTY TAPES

Produce labels with stronger adhesive strength than our standard laminated labels.

P-touch® Extra Strength Adhesive Tapes are a remarkable breakthrough in labeling your most challenging surfaces. Their extraordinary adhesive properties — up to twice as strong as our standard laminated labels — make them ideal for the toughest labeling tasks you face.

Extra Strength Adhesive Tape – Laminated

For Tough Applications

Perfect for labeling:

- Harsh environments
- Textured surfaces
- Painted surfaces
- A variety of plastics



26.2' long

1/4" 1/2" 1"

BLACK ON WHITE	TZS211	TZS221	TZS231	TZS241	TZS251	TZS261
BLACK ON CLEAR	TZS111	TZS121	TZS131	TZS141	TZS151	TZS161
BLACK ON YELLOW	TZS611	TZS621	TZS631	TZS641	TZS651	TZS661
WHITE ON CLEAR			TZS135	TZS145	TZS155	
BLACK ON MATTE SILVER				TZS941	TZS951	TZS961

Special Adhesive For Bending, Wrapping & Flagging

- Cable & wire
- Pipes and other round surfaces
- Vials, beakers & test tubes
- Electrical fittings and connectors*



* Not suitable as an electrical insulator

26.2' long

1/4" 1/2" 1"

BLACK ON WHITE	TZFX231	TZFX241	TZFX251	TZFX261
----------------	---------	---------	---------	---------

Acid-Free Adhesive* Tape - Laminated

For Photo-Safe* Applications

Perfect for labeling: • Photos • Scrapbooks



26.2' long

1/4" 1/2" 1"

BLACK ON CLEAR	TZAF131
BLACK ON WHITE	TZAF231

* Claims that adhesive is "acid-free" and/or "photo-safe" are based upon: 1. Satisfactory test results obtained from Photographic Activity Tests per ISO 14523 and non-acidic pH Tests per TAPPI 509 (Data from independent tests performed at the Image Permanence Institute at Rochester Institute of Technology.); 2. Certifications from material manufacturers.

Security Pattern Appears If Removed

Perfect for labeling:

- Computers / electronic devices
- Furniture & other company property
- Equipment after calibration
- Items sealed for security

26.2' long

1/4" 1/2" 1"

BLACK ON WHITE TZSE4

Fabric Iron-On Tape – Non-laminated

For Use On Various Fabrics; Withstands Multiple Launderings

Perfect for labeling:

- Cotton, cotton-polyester blends and linen
- Uniforms and commercial garments
- Bedding and table linens
- Camp, school and other clothing

9.6' long

1/4" 1/2" 1"

NAVY BLUE ON WHITE TZFA3

Super Narrow Tape – Non-laminated

Perfect for labeling:

- CD case spines
- Other narrow spaces

26.2' long

9/64"

BLACK ON WHITE TZN201

Print Head Cleaning Cassette

Maintains And Restores Print Quality

Benefits:

- Self contained / Dry process
- Good for approximately 100 cleanings

1/4" 1/2" 1"

DRY TAPE TZCL4 TZCL6

Some P-touch tapes have been tested and are UL-969 certified (PGJ12). For part numbers and more detailed information please do a general search for UL file number MH21016 on the UL Web site (www.ul.com/database).



General Purpose Contractor Ties

- -40°F (-40°C) to 185°F (85°C) Operating Temp.
- cULus Listing in accordance with Table
- CE Declaration
- Plenum Rated AH-2
- Black UV Weather resistant is suitable for outdoor use
- Halogen Free Polyamide 6.6

Miniature Cable Ties 18 lbs (80N)

Part number	Length (In.) (mm)	Max. Bundle Dia. (In.) (mm)	Width (In.) (mm)	Pkg. Qty.	Color	AH-2 Plenum Rated	UV Resistant	cULus Listed 62275 Type 2,21	CE Declaration
S4-18-C	3.94 (100)	0.87 (22)	0.10 (2.5)	100	Natural	✓	No	✓	✓
S4-18-M	3.94 (100)	0.87 (22)	0.10 (2.5)	1000	Natural	✓	No	✓	✓
S4-18-C0	3.94 (100)	0.87 (22)	0.10 (2.5)	100	Black	✓	✓	✓	✓
S4-18-M0	3.94 (100)	0.87 (22)	0.10 (2.5)	1000	Black	✓	✓	✓	✓
S6-18-C	6.30 (160)	1.57 (40)	0.10 (2.5)	100	Natural	✓	No	✓	✓
S6-18-M	6.30 (160)	1.57 (40)	0.10 (2.5)	1000	Natural	✓	No	✓	✓
S6-18-C0	6.30 (160)	1.57 (40)	0.10 (2.5)	100	Black	✓	✓	✓	✓
S6-18-M0	6.30 (160)	1.57 (40)	0.10 (2.5)	1000	Black	✓	✓	✓	✓
S8-18-C	7.87 (200)	2.09 (53)	0.10 (2.5)	100	Natural	✓	No	✓	✓
S8-18-M	7.87 (200)	2.09 (53)	0.10 (2.5)	1000	Natural	✓	No	✓	✓
S8-18-C0	7.87 (200)	2.09 (53)	0.10 (2.5)	100	Black	✓	✓	✓	✓
S8-18-M0	7.87 (200)	2.09 (53)	0.10 (2.5)	1000	Black	✓	✓	✓	✓

Intermediate Cable Ties 40 lbs (178 N)

S6-40-C	5.51 (140)	1.30 (33)	0.14 (3.6)	100	Natural	✓	No	✓	✓
S6-40-M	5.51 (140)	1.30 (33)	0.14 (3.6)	1000	Natural	✓	No	✓	✓
S6-40-C0	5.51 (140)	1.30 (33)	0.14 (3.6)	100	Black	✓	✓	✓	✓
S6-40-M0	5.51 (140)	1.30 (33)	0.14 (3.6)	1000	Black	✓	✓	✓	✓
S8-40-C	7.87 (200)	2.09 (53)	0.14 (3.6)	100	Natural	✓	No	✓	✓
S8-40-M	7.87 (200)	2.09 (53)	0.14 (3.6)	1000	Natural	✓	No	✓	✓
S8-40-C0	7.87 (200)	2.09 (53)	0.14 (3.6)	100	Black	✓	✓	✓	✓
S8-40-M0	7.87 (200)	2.09 (53)	0.14 (3.6)	1000	Black	✓	✓	✓	✓
S12-40-C	11.81 (300)	2.99 (76)	0.14 (3.6)	100	Natural	✓	No	✓	✓
S12-40-M	11.81 (300)	2.99 (76)	0.14 (3.6)	1000	Natural	✓	No	✓	✓
S12-40-C0	11.81 (300)	2.99 (76)	0.14 (3.6)	100	Black	✓	✓	✓	✓
S12-40-M0	11.81 (300)	2.99 (76)	0.14 (3.6)	1000	Black	✓	✓	✓	✓
S15-40-C	14.57 (370)	4.02 (102)	0.14 (3.6)	100	Natural	✓	No	✓	✓
S15-40-C0	14.57 (370)	4.02 (102)	0.14 (3.6)	100	Black	✓	No	✓	✓

Standard Cable Ties 50 lbs (222 N)

S5-50-C	4.72 (120)	0.94 (24)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S5-50-M	4.72 (120)	0.94 (24)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S5-50-C0	4.72 (120)	0.94 (24)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S5-50-M0	4.72 (120)	0.94 (24)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S6-50-C	6.30 (160)	1.50 (38)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S6-50-M	6.30 (160)	1.50 (38)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S6-50-C0	6.30 (160)	1.50 (38)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S6-50-M0	6.30 (160)	1.50 (38)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S7-50-C	7.40 (188)	1.81 (46)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S7-50-M	7.40 (188)	1.81 (46)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S7-50-C0	7.40 (188)	1.81 (46)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S7-50-M0	7.40 (188)	1.81 (46)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S7-50-C2	7.40 (188)	1.81 (46)	0.19 (4.8)	100	Red	✓	No	✓	✓
S8-50-C	8.46 (215)	2.09 (53)	0.19 (4.8)	100	Natural	✓	✓	✓	✓
S8-50-M	8.46 (215)	2.09 (53)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S8-50-C0	8.46 (215)	2.09 (53)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S8-50-M0	8.46 (215)	2.09 (53)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S10-50-C	9.84 (250)	2.36 (60)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S10-50-C0	9.84 (250)	2.36 (60)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S12-50-C	11.81 (300)	2.99 (76)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S12-50-M	11.81 (300)	2.99 (76)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S12-50-C0	11.81 (300)	2.99 (76)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S12-50-M0	11.81 (300)	2.99 (76)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S12-50-C2	11.81 (300)	2.99 (76)	0.19 (4.8)	100	Red	✓	No	✓	✓
S15-50-C	14.57 (370)	4.02 (102)	0.19 (4.8)	100	Natural	✓	No	✓	✓

continued on next page

Standard Cable Ties 50 lbs (222 N) (continued)

Part number	Length (In.) (mm)	Max. Bundle Dia. (In.) (mm)	Width (In.) (mm)	Pkg. Qty.	Color	AH-2 Plenum Rated	UV Resistant	cULus Listed 62275 Type 2,21	CE Declaration
S15-50-M	14.57 (370)	4.02 (102)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S15-50-C0	14.57 (370)	4.02 (102)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S15-50-M0	14.57 (370)	4.02 (102)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S15-50-C2	14.57 (370)	4.02 (102)	0.19 (4.8)	100	Red	✓	No	✓	✓
S17-50-C	16.90 (430)	4.33 (110)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S17-50-M	16.90 (430)	4.33 (110)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S17-50-C0	16.90 (430)	4.33 (110)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S17-50-M0	16.90 (430)	4.33 (110)	0.19 (4.8)	1000	Black	✓	✓	✓	✓
S21-50-C	20.87 (530)	5.51 (140)	0.19 (4.8)	100	Natural	✓	No	✓	✓
S21-50-M	20.87 (530)	5.51 (140)	0.19 (4.8)	1000	Natural	✓	No	✓	✓
S21-50-C0	20.87 (530)	5.51 (140)	0.19 (4.8)	100	Black	✓	✓	✓	✓
S21-50-M0	20.87 (530)	5.51 (140)	0.19 (4.8)	1000	Black	✓	✓	✓	✓

Light Heavy Cable Ties 120 lbs (534 N)

S14-120-L	14.49 (368)	4.02 (102)	0.30 (7.6)	50	Natural	✓	No	✓	✓
S14-120-TL	14.49 (368)	4.02 (102)	0.30 (7.6)	250	Natural	✓	No	✓	✓
S14-120-L0	14.49 (368)	4.02 (102)	0.30 (7.6)	50	Black	✓	✓	✓	✓
S14-120-TL0	14.49 (368)	4.02 (102)	0.30 (7.6)	250	Black	✓	✓	✓	✓
S18-120-L	17.71 (450)	5.12 (130)	0.30 (7.6)	50	Natural	✓	No	✓	✓
S18-120-L0	17.71 (450)	5.12 (130)	0.30 (7.6)	50	Black	✓	✓	✓	✓
S21-120-L	20.98 (533)	5.51 (140)	0.30 (7.6)	50	Natural	✓	No	✓	✓
S21-120-C	20.98 (533)	5.51 (140)	0.30 (7.6)	100	Natural	✓	No	✓	✓
S21-120-L0	20.98 (533)	5.51 (140)	0.30 (7.6)	50	Black	✓	✓	✓	✓
S21-120-C0	20.98 (533)	5.51 (140)	0.30 (7.6)	100	Black	✓	✓	✓	✓
S24-120-Q	23.62 (600)	6.89 (175)	0.30 (7.6)	25	Natural	✓	No	✓	✓
S24-120-L	23.62 (600)	6.89 (175)	0.30 (7.6)	50	Natural	✓	No	✓	✓
S24-120-Q0	23.62 (600)	6.89 (175)	0.30 (7.6)	25	Black	✓	✓	✓	✓
S24-120-L0	23.62 (600)	6.89 (175)	0.30 (7.6)	50	Black	✓	✓	✓	✓
S30-120-X	29.53 (750)	8.58 (218)	0.30 (7.6)	10	Natural	✓	No	✓	✓
S30-120-L	29.53 (750)	8.58 (218)	0.30 (7.6)	50	Natural	✓	No	✓	✓
S30-120-X0	29.53 (750)	8.58 (218)	0.30 (7.6)	10	Black	✓	✓	✓	✓
S30-120-L0	29.53 (750)	8.58 (218)	0.30 (7.6)	50	Black	✓	✓	✓	✓

Heavy Cable Ties 175 lbs (778 N)

S18-175-L	17.71 (450)	5.20 (132)	0.35 (9.0)	50	Natural	✓	No	✓	✓
S18-175-L0	17.71 (450)	5.20 (132)	0.35 (9.0)	50	Black	✓	✓	✓	✓
S21-175-L	20.86 (530)	5.51 (140)	0.35 (9.0)	50	Natural	✓	No	✓	✓
S21-175-C	20.86 (530)	5.51 (140)	0.35 (9.0)	100	Natural	✓	No	✓	✓
S21-175-L0	20.86 (530)	5.51 (140)	0.35 (9.0)	50	Black	✓	✓	✓	✓
S21-175-C0	20.86 (530)	5.51 (140)	0.35 (9.0)	100	Black	✓	✓	✓	✓
S24-175-L	24.02 (610)	7.36 (187)	0.35 (9.0)	50	Natural	✓	No	✓	✓
S24-175-L0	24.02 (610)	7.36 (187)	0.35 (9.0)	50	Black	✓	✓	✓	✓
S31-175-L	30.55 (776)	8.98 (228)	0.35 (9.0)	50	Natural	✓	No	✓	✓
S31-175-L0	30.55 (776)	8.98 (228)	0.35 (9.0)	50	Black	✓	✓	✓	✓
S32-175-L	32.12 (816)	9.41 (239)	0.35 (9.0)	50	Natural	✓	No	✓ (also UL181)	✓
S32-175-L0	32.12 (816)	9.41 (239)	0.35 (9.0)	50	Black	✓	✓	✓ (also UL181)	✓
S36-175-L	35.91 (912)	10.35 (263)	0.35 (9.0)	50	Natural	✓	No	✓ (also UL181)	✓
S36-175-L0	35.91 (912)	10.35 (263)	0.35 (9.0)	50	Black	✓	✓	✓ (also UL181)	✓
S40-175-X	40.16 (1020)	11.61 (295)	0.35 (9.0)	10	Natural	✓	No	✓ (also UL181)	✓
S40-175-L	40.16 (1020)	11.61 (295)	0.35 (9.0)	50	Natural	✓	No	✓ (also UL181)	✓
S40-175-X0	40.16 (1020)	11.61 (295)	0.35 (9.0)	10	Black	✓	✓	✓ (also UL181)	✓
S40-175-L0	40.16 (1020)	11.61 (295)	0.35 (9.0)	50	Black	✓	✓	✓ (also UL181)	✓
S48-175-L	48.03 (1220)	14.37 (365)	0.35 (9.0)	50	Natural	✓	No	✓ (also UL181)	✓
S48-175-L0	48.03 (1220)	14.37 (365)	0.35 (9.0)	50	Black	✓	✓	✓ (also UL181)	✓
S48-175-L8	48.03 (1220)	14.37 (365)	0.35 (9.0)	50	Gray	✓	No	✓ (also UL181)	✓

Cable Ties, Releasable, 50 lbs (222 N)

SR8-50-C	7.87 (200)	1.97 (50)	0.19 (4.8)	100	Natural	✓	No	✓	✓
SR8-50-C0	7.87 (200)	1.97 (50)	0.19 (4.8)	100	Black	✓	✓	✓	✓

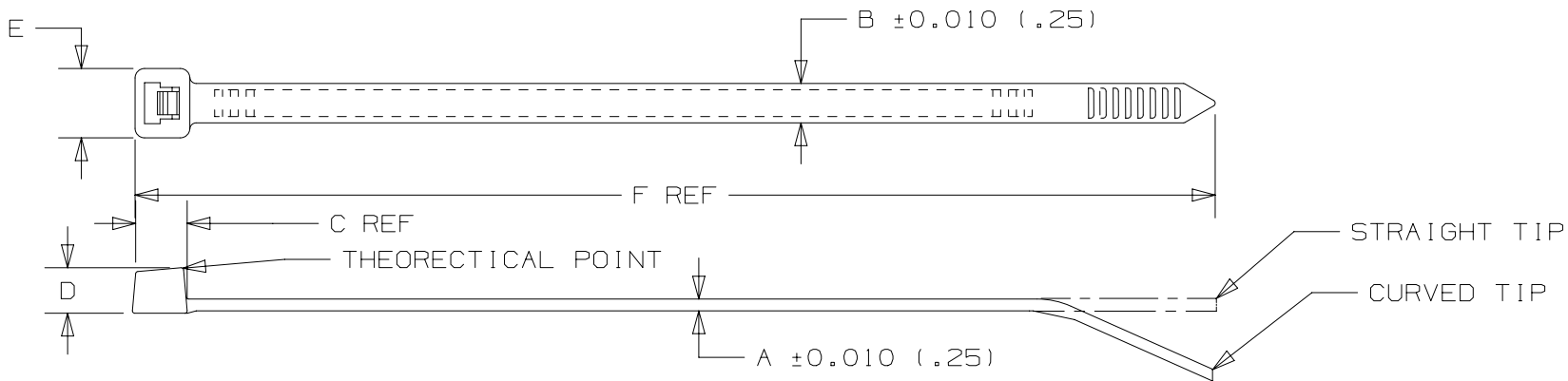
Cable Ties, Clamp Style, 50 lbs (222 N) - Clamp Mount takes #10 / M5 Screw

SC8-50-S10-C	7.87 (200)	1.85 (47)	0.19 (4.8)	100	Natural	No	No	No*	✓
SC8-50-S10-C0	7.87 (200)	1.85 (47)	0.19 (4.8)	100	Black	No	✓	No*	✓

Cable Ties, Clamp Style, 120 lbs (534 N) - Clamp Mount takes 1/4" / M6 Screw

SC15-120-S25-L	14.96 (380)	3.86 (98)	0.30 (7.6)	50	Natural	✓	No	✓	✓
SC15-120-S25-L0	14.96 (380)	3.86 (98)	0.30 (7.6)	50	Black	✓	✓	✓	✓

*SC8-50-S10 are cULus Recognized 62275, Type 1, 11



PANDUIT PART NO	BUNDLE DIAM		A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	LOOP TENSILE lbs (N)	CROSS SECTION	WEIGHT lbs (g)/100 pcs	TIP STYLES
	MIN in (mm)	MAX in (mm)										
S14-120	.28 (7.0)	4.02 (102)	.063 (1.6)	.30 (7.6)	.417 (10.6)	.295 (7.5)	.492 (12.5)	14.49 (368)	120 (534)	LIGHT HEAVY DUTY	1.034 (469.47)	STRAIGHT
S18-120	.28 (7.0)	5.2 (132)	.071 (1.8)	.30 (7.6)	.44 (11.2)	.303 (7.7)	.496 (12.6)	17.71 (450)	120 (534)	LIGHT HEAVY DUTY	1.402 (635.8)	STRAIGHT
S21-120	.28 (7.0)	5.51 (140)	.071 (1.8)	.30 (7.6)	.44 (11.2)	.303 (7.7)	.492 (12.5)	20.98 (533)	120 (534)	LIGHT HEAVY DUTY	1.668 (756.8)	STRAIGHT
S24-120	.28 (7.0)	6.69 (170)	.063 (1.6)	.30 (7.6)	.425 (10.8)	.295 (7.5)	.492 (12.5)	23.62 (600)	120 (534)	LIGHT HEAVY DUTY	1.686 (764.4)	STRAIGHT
S30-120	.28 (7.0)	8.58 (218)	.063 (1.6)	.30 (7.6)	.429 (10.9)	.295 (7.5)	.492 (12.5)	29.53 (750)	120 (534)	LIGHT HEAVY DUTY	2.130 (968)	STRAIGHT

NOTE:
SEE WWW.PANDUIT.COM FOR PART NUMBER SUFFIX DESIGNATION FOR PACKAGE SIZE, PART MATERIAL,
PART COLOR AND ANY THIRD PARTY RECOGNITION OR COMPLIANCE.

REV	DATE	BY	CHK	APR	DESCRIPTION	ECN	TITLE	ITEM REVISION NAME	DATASET FILE NAME	MATERIAL:	DRAWING NUMBER:
00	3/8/17	ACC	JSWA	JADE	DRAWING RELEASED	012502	STRONGHOLD LIGHT HEAVY TIES	00092FBL/00	00092FBL_DC/00	NYLON 6.6	00092FBL_DC
							CUSTOMER DRAWING				
							UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: IN [mm]				
							.x ± .1 [2.54] .xxx ± .020 [.51]				
							.xx ± .02 [.51] ANGLES ± 5°				
							THIRD ANGLE PROJECTION				
REV	DATE	BY	CHK	APR	DESCRIPTION	ECN	DRAWN BY	DATE	CHK	SCALE	SIZE
							ACC	2-22-17	JSWA	N/A	A
							SHT 1 OF 1				

D10100DA/20

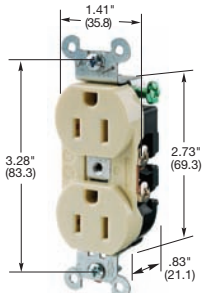
Wrangell High School
and Middle School Fire
Alarm Replacement

Electrical Submittals

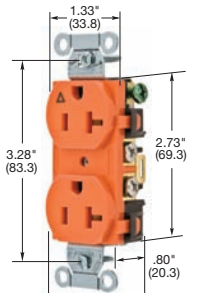
26 27 26

Wiring Devices

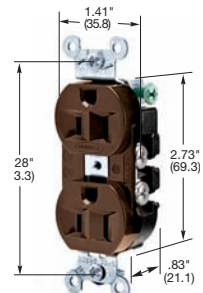
Straight Blade Devices
15 and 20 Ampere, 125 Volts
 2 Pole, 3 Wire Grounding
Hubbell-Pro™ Series Receptacles



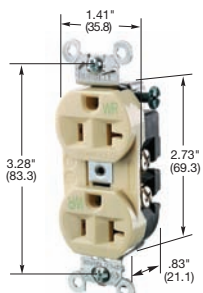
5252AI



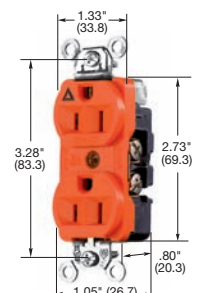
IG5352



5262B



5362IWR



CR5252IG



15A 125V
NEMA 5-15R
 UL CSA
 0.5 HP



20A 125V
NEMA 5-20R
 UL CSA
 1 HP

Receptacles

Hubbell-Pro™ Heavy Duty, Specification Grade, Duplex, Back and Side Wired

Description	Color	Catalog Number		
Smooth nylon face.	Almond	5252AAL	5352AAL	
	Black	5252ABLK	5352ABLK	
	Brown	5252AB	5352AB	
	Gray	5252AG	5352AG	
	Ivory	5252AI	5352AI	
	Light Almond	5252ALA	5352ALA	
	Office White	5252AOW	5352AOW	
	Red	5252AR	5352AR	
	White	5252AW	5352AW	
	Isolated ground ⁽¹⁾ , smooth face.	Almond	IG5252AL	IG5352AL
Gray		IG5252GY	IG5352GY	
Ivory		IG5252I	IG5352I	
Light Almond		IG5252LA	IG5352LA	
Orange		IG5252	IG5352	
White		IG5252W	IG5352W	
Finder groove nylon face.	Almond	5262AL	5362AL	
	Black	5262BLK	5362BLK	
	Blue	-	5362BL	
	Brown	5262B	5362B	
	Gray	5262G	5362G	
	Ivory	5262I	5362I	
	Light Almond	5262LA	5362LA	
	Office White	5262OW	5362OW	
	Red	5262R	5362R	
	White	5262W	5362W	
	Weather-Resistant, finder groove nylon face.	Black	5262BKWR	5362BKWR
		Brown	5262WR	5362WR
Gray		5262GYWR	5362GYWR	
Ivory		5262IWR	5362IWR	
White		5262WWR	5362WWR	
Isolated ground ⁽¹⁾ , finder groove face.	Black	CR5252IGBK	CR5352IGBK	
	Blue	-	CR5352IGBL	
	Gray	CR5252IGGY	CR5352IGGY	
	Ivory	CR5252IGI	CR5352IGI	
	Orange	CR5252IG	CR5352IG	
	Office White	CR5252IGOW	CR5352IGOW	
	White	CR5252IGW	CR5352IGW	



*Note: (1) See Section J for complete line of isolated ground devices.
 See page A-46 for accessories.
 See page A-55 for technical information.
 Horsepower ratings listed above are AC only.
 See Section K for wallplates.*



Twist-Lock® Devices 15A, 125V, 2 Pole, 3 Wire Grounding Receptacle

HUBBELL

Features

- Reinforced thermoplastic construction
- Single piece, all brass contacts
- Single point break-off tabs
- Mounting strap tabs lock the body and base together



15A 125V
NEMA L5-15R
UL/CSA



Ordering Information

Description	Device Color	UPC	Catalog Number
Duplex, flush, ivory RTP face	Ivory	783585002323	HBL4700I

Listings

Listed to UL 498
Fed. Spec. W-C-596
Certified to CSA C22.2 No.42

Specifications

Face	RTP
Base	RTP
Contacts	Brass
Clamp	Brass
Ground Contact	Brass
Terminal Screws	Brass

Performance

Electrical

Current Interrupting Certified for current interrupting at full rated current
Dielectric Voltage Withstands 2,000V minimum

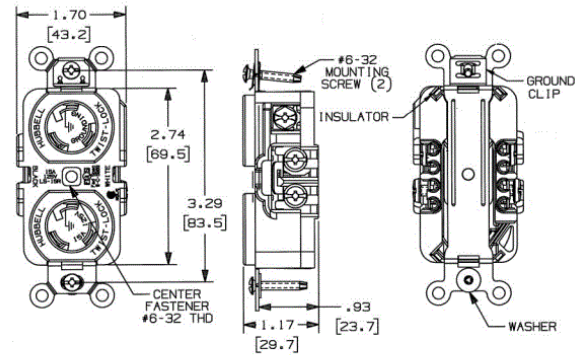
Mechanical

Terminal Accommodation #18 AWG - #10 AWG solid or stranded copper wire only.

Terminal Identification Terminals identified in accordance with UL 498

Environmental

Flammability HB or better per UL94/CSA 22.2 No.0.17
Operating Temperatures Maximum Continuous 75°C; Minimum -40°C (w/o impact)



Accessories

Plug HBL4720C
Wallplate or Weatherproof Cover Duplex Opening

Resources

Customer Use Drawing
eCatalog

Dimensions in Inches (mm)

Hubbell Wiring Device-Kellems • Hubbell Incorporated (Delaware) • 40 Waterview Drive • Shelton, CT 06484

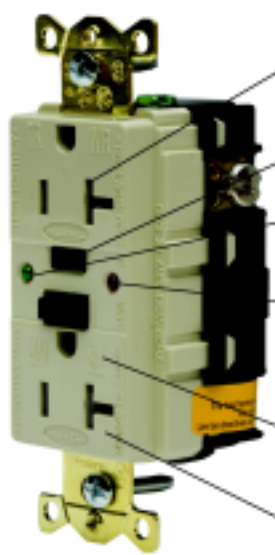
Phone (800) 288-6000 • Fax (800) 255-1031 • Specifications subject to change without notice.



Ground Fault Products Extra Heavy Duty and Hospital Grade Tamper-Resistant GFCI Receptacles

15 and 20 Ampere, 125 Volts AC
2 Pole, 3 Wire Grounding

  Meets July 28, 2006
UL Standard 943
Class A GFCI



- 10ka Short Circuit Current Rating**
- Limits improper access to energized contacts.
 - Patented tamper-resistant protection.
 - Continually tests and monitors for people protection automatically.
 - Patented self test diagnostics.
 - Power indication.
 - Steady "ON" GREEN LED provides indication of power.
 - Ground fault indicator.
 - Steady "ON" RED LED provides visual indication of a ground fault condition. Flashing red indicates device has lost capability to provide protection.
 - No power at face if reverse wired.
 - Open circuit condition eliminates false assumption of protection at face.
 - Durable face with V-0 flammability rating.
 - Polyester face cover.



GFR5362SGI



GFR8300SGI



GFR5362ITR



GFR8300ITR



AUTOGUARD™ Self Test GFCI Receptacles Tamper-Resistant, Weather Resistant



Description	Rating	Color	Catalog Numbers	
Flush, polyester face, back and side wired, multiple drive screws.	15 and 20A 125V AC	Black	GFR5262SGBK	GFR5362SGBK
		Brown	GFR5262SG	GFR5362SG
		Gray	GFR5262SGGY	GFR5362SGGY
		Ivory	GFR5262SGI	GFR5362SGI
		Red	GFR5262SGR	GFR5362SGR
		White	GFR5262SGW	GFR5362SGW
Hospital Grade Flush, polyester face, back and side wired, multiple drive screws.	15 and 20A 125V AC	Black	GFR8200SGBK	GFR8300SGBK
		Brown	GFR8200SG	GFR8300SG
		Gray	GFR8200SGGY	GFR8300SGGY
		Ivory	GFR8200SGI	GFR8300SGI
		Red	GFR8200SGR	GFR8300SGR
		White	GFR8200SGW	GFR8300SGW

Circuit Guard® GFCI Receptacles Tamper-Resistant, Weather Resistant



Description	Rating	Color	Catalog Numbers	
Flush, polyester face, back and side wired, multiple drive screws.	15 and 20A 125V AC	Black	GFR5262BKTR	GFR5362BKTR
		Brown	GFR5262TR	GFR5362TR
		Gray	GFR5262GYTR	GFR5362GYTR
		Ivory	GFR5262ITR	GFR5362ITR
		Red	GFR5262RTR	GFR5362RTR
		White	GFR5262WTR	GFR5362WTR
Hospital Grade Flush, polyester face, back and side wired, multiple drive screws.	15 and 20A 125V AC	Black	GFR8200BKTR	GFR8300BKTR
		Brown	GFR8200TR	GFR8300TR
		Gray	GFR8200GYTR	GFR8300GYTR
		Ivory	GFR8200ITR	GFR8300ITR
		Red	GFR8200RTR	GFR8300RTR
		White	GFR8200WTR	GFR8300WTR

Notes: GFCI type receptacles should not be used in critical care patient areas or for electrical life support equipment applications because of the possibility of power interruption. All GFCI receptacles listed above are furnished with both a matching color nylon wallplate, and a SS26 302/304 super stainless steel wallplate. 20 amp feedthrough capability.
* Refer to Technical Section X, page X-8 for TR and WR descriptions.



UPC Code: 07847724045

1221-LHI

Brand Features

Leviton's Industrial Grade AC toggle switches for extra heavy-duty applications represent top-of-the-line quality and peak performance. Leviton uses the finest materials available and the highest production standards to produce industrial switches of unmatched versatility and reliability.

Item Description

20 Amp, 120 Volt, Toggle Lighted Handle - Illuminated OFF Single-Pole AC Quiet Switch, Industrial Grade, Self Grounding, Back & Side Wired, - Ivory

Technical Information

AC Horsepower Ratings

HP Rating: 1HP-120V

Max. Amperage: 16 Amp

Electrical Specifications

Amperage: 20 Amp

Voltage: 120 Volt AC

Grounding: Self-Grounding

Dielectric Voltage: Withstands 1500V for 1 minute

Overload UL20 Test: 100 cycles of OL at 4.8 times rated current

Temperature Rise: Maximum 30 degrees C rise

Endurance: 50,000 cycles minimum

Environmental Specifications

Flammability: Rated V-2 per UL94

Operating Temperature: -40°C to 65°C

Material Specifications

Strap Material: Steel

Base Material: Thermoplastic

Toggle: Polycarbonate

Cover Material: Thermoplastic

Contact Material: Silver Alloy

Terminal Screws: Brass 8-32

Grounding Screw: Brass 8-32

Ground Clips: Brass

Color: Ivory

Mechanical Specifications

Terminal ID: Brass-Hot Black-Hot White-Neutral Green-Gnd

Terminal Accom.: 14-#10 AWG back wired; #14-#12 AWG side wired

Product ID: Ratings are permanently marked on device

Torque Range: 12-14 inch pounds

Termination: Back or Side Wire

Product Features

Color: Ivory

Grounding: Self-Grounding

Actuator Material: Polycarbonate

Body Material: Thermoplastic

Strap Material: Steel

Grade: Extra Heavy-Duty Industrial Specification Grade

Feature 2: Illuminated - Load OFF

Function: Single-Pole

Device Type: Toggle Switch

Standards and Certifications

NEMA: WD-1 & WD-6

ANSI: C-73

UL Fed Spec WS896E: File #E7458

UL Standard: UL 20

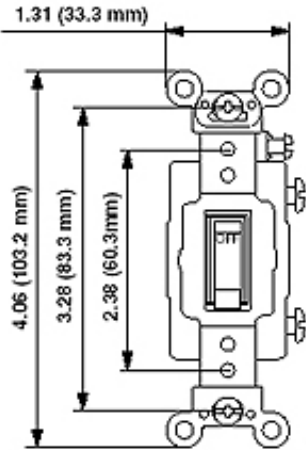
CSA C22.2 No. 111: File #152105

NOM: 057

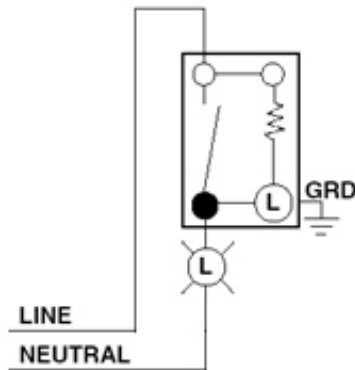
RoHS: Compliant

Warranty: 10 Year Limited

Dimensional Diagram



Wiring Diagram Single-Pole Lighted



SPECIFICATION SUBMITTAL

JOB NAME: <input type="text"/>	CATALOG NUMBERS: <input type="text"/>
JOB NUMBER: <input type="text"/>	<input type="text"/>

Leviton Manufacturing Co., Inc.

201 North Service Road, Melville, NY 11747

Teléfono: +1-800-323-8920 · FAX: +1-800-832-9538 · Tech Line (8:30AM-7:30PM E.S.T. Monday-Friday): +1-800-824-3005

Leviton Manufacturing of Canada, Ltd.

165 Hymus Boulevard, Pointe Claire, Quebec H9R 1E9 · Telephone: +1-800-469-7890 ·

FAX: +1-800-824-3005 · www.leviton.com/canada

Leviton S. de R.L. de C.V.

Lago Tana 43, Mexico DF, Mexico CP 11290 · Tel.: (+52)55-5082-1040 · FAX: (+52)5386-1797 · www.leviton.com.mx

Visit our Website at: www.leviton.com

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Leviton has a global presence.

If you would like to know where your local Leviton office is located please go to:
www.leviton.com/international/contacts/





Stainless Steel Wallplates

Available in Two Grades:
302/304 Stainless Steel
430 Stainless Steel

Protective Film Helps to
Prevent Scratches and
Damage



FEATURES

- Protective film helps to prevent scratches and damage during installation
- #6-32 slotted head mounting screws
- Brushed finish

SPECIFICATIONS

- | | |
|---------------------|---|
| ■ 302/304 S/S | Non-magnetic
18.0% Chromium
8.0% Nickel |
| ■ 430 S/S | Magnetic
17.0% Chromium
less than 0.5% Nickel |
| ■ Nominal thickness | 0.04 inch (0.9) |
| ■ Mounting screws | 302/304 stainless steel, slotted head |

LISTINGS

- Meets UL Standard 514D
- Meets CSA Standard C22.2 No. 42.1

Hubbell's stainless steel wallplate offering provides solutions for a variety of industrial and commercial applications; with environments subjected to heavy abuse.

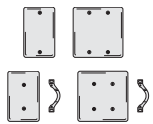
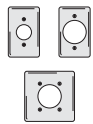
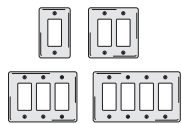
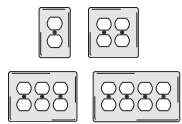
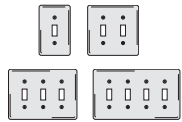
The 302/304 type stainless steel wallplates are ideal for highly corrosive environments; such as food processing, hospitals, static free requirements, and more.

The 430 type stainless steel wallplates are aesthetically identical to the 302/304 type stainless steel wallplates; and are best suited for environments where corrosion resistance is less critical.

APPLICATIONS

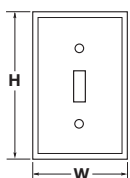
- Industrial and commercial applications with exposure to high abuse
- 302/304 Stainless Steel
 - ◆ Indoor/outdoor use
 - ◆ High exposure to corrosion
 - ◆ Static free requirement
- 430 Stainless Steel
 - ◆ Indoor use
 - ◆ Low to moderate exposure to corrosion

Stainless Steel Wall Plates



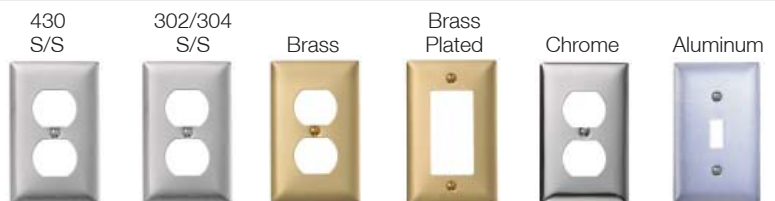
	NEW!	Additional Metal Wallplates				
	430 S/S	302/304 S/S	Brass	Brass Plated	Chrome	Aluminum
Toggle Wallplates						
1-Gang; 1-toggle opening	SS1L	SS1	SB1	SBP1	SCH1	SA1
2-Gang; 2-toggle openings	SS2L	SS2	SB2	SBP2	SCH2	SA2
3-Gang; 3-toggle openings	SS3L	SS3	—	—	—	—
4-Gang; 4-toggle openings	SS4L	SS4	—	—	—	—
Duplex Wallplates						
1-Gang; 1-duplex opening	SS8L	SS8	SB8	SBP8	SCH8	SA8
2-Gang; 2-duplex openings	SS82L	SS82	SB82	SBP82	SCH82	SA82
3-Gang; 3-duplex openings	—	SS83	—	—	—	—
4-Gang; 4-duplex openings	—	SS84	—	—	—	—
Decorator Wallplates						
1-Gang; 1-decorator opening	SS26L	SS26	SB26	SBP26	SCH26	—
2-Gang; 2-decorator openings	SS262L	SS262	SB262	SBP262	SCH262	—
3-Gang; 3-decorator openings	—	SS263	—	SBP263	—	—
4-Gang; 4-decorator openings	—	SS264	—	—	—	—
Single Receptacle Wallplates						
1-Gang; 1-1.36" to 1.39" (34.5 to 35.3) dia. opening	SS7L	SS7	SB7	SBP7	SCH7	SA7
1-Gang; 1-2.15" (54.6) dia. opening	SS723L	SS723	—	—	SCH723	SA723
2-Gang; 1-single 2.15" (54.6) dia. opening	SS703L	SS703	—	—	—	—
Blank Wallplates						
1-Gang, box mount	SS13L	SS13	SB13	SBP13	SCH13	SA13A
2-Gang, box mount	SS23L	SS23	—	—	SCH23	SA23
1-Gang, strap mount	SS14L	SS14	SB14	—	—	—
2-Gang, strap mount	SS24L	SS24	—	—	—	—
Combination Wallplates						
2-Gang; 1-toggle and 1-duplex opening	SS18L	SS18	SB18	SBP18	SCH18	—
2-Gang; 1-toggle and 1-decorator opening	SS126L	SS126	SB126	SBP126	—	—
Telephone & Coaxial Wallplates						
1-Gang; 1-telephone .41" (10.3) dia. hole; box mount	SS11L	SS11	—	SBP11	—	—

DIMENSIONS



Gang	Standard Metal	
	Height	Width
1	4.50" (114.3)	2.87" (72.9)
2	4.50" (114.3)	4.60" (116.8)
3	4.50" (114.3)	6.41" (162.8)
4	4.50" (114.3)	8.22" (208.8)

METAL WALLPLATE OFFERING



Metal weatherproof covers

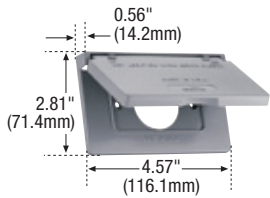
Product description

Metal 1- & 2-Gang self-closing covers
1-Gang blank wallplates

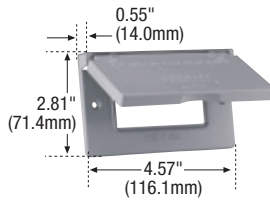
Metal weatherproof covers - wet locations

Features

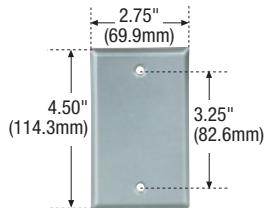
- Meets 2014 NEC® 406.9 (A) and 406.9 (B)(2)
- Gasket provided seals both device openings and edges
- Electrostatically painted with a baked, weather-resistant powder coat finish for exceptional durability



S992





S1966



S1987

1-Gang self-closing lids

Description	Mounting	Color suffix	Catalog no.	 
Single receptacle	Horizontal	GY	□ S992	• •
Duplex receptacle	Vertical	GY	□ S994	• •
Duplex receptacle, 2 self-closing lids	Horizontal	BLK, GY	□ S989__	• •
GFCI/decorator receptacle	Vertical	GY	□ S966-SP	• •
	Horizontal	GY	□ S1966-SP	• •
20A and 30A receptacles 1.625" (41.27mm) dia. opening	Vertical	GY	□ S993-SP	• •

1-Gang blank wallplate

Description	Mounting	Color	Catalog no.	
Blank wallplate	Horizontal or vertical	GY	□ S1987	•

Color ordering information:

For ordering devices, include Catalog no. followed by the Color suffix: BLK (Black), GY (Gray).



Compliances, specifications and availability are subject to change without notice.

 Indicates NAFTA compliant - Page Q-32

 RoHS compliant - Page Q-32

SYSTEM DATA SHEET

CX6300 | CAT 6 PREMIUM+ UTP SYSTEM

Our best Cat 6 system features the Atlas-X1™ connector and offers superior performance for mission-critical applications

- Exceeds ANSI/TIA-568-C.2 Cat 6 and ISO/IEC 11801 Class E requirements for channel, link, and component performance to support IEEE 1000BASE-T networks
- Ideal for military applications and projects funded by the American Recovery and Reinvestment Act (ARRA)^
- Limited lifetime warranty available when projects are installed by Leviton or Berk-Tek certified contractors
- Error-free performance up to 1 Gigabit Ethernet with full duplex transmission
- Provides additional performance margin to reliably support Gigabit Ethernet in high-noise environments
- Third-party verified by Intertek Testing Services (ETL)
- Provides bandwidth required for multimedia, broadband, and video applications
- Guaranteed cable balance improves overall performance and reduces emissions which results in reduced transmission errors
- Enables Ethernet channel lengths beyond 100 meters

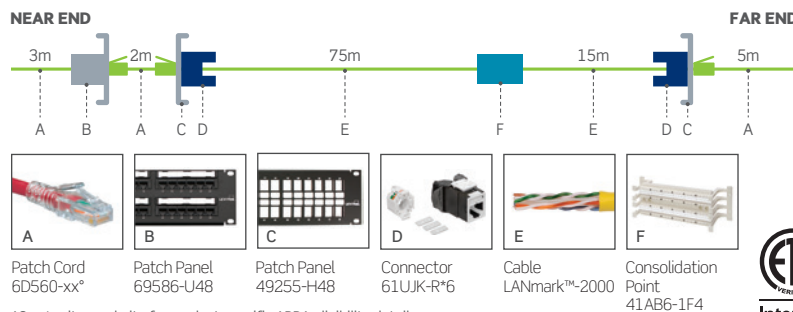
GUARANTEED* SYSTEM PERFORMANCE

CX6300 CAT 6 PREMIUM+ UTP SYSTEM CHANNEL MARGIN GUARANTEES*							
Insertion Loss	NEXT	PSNEXT	ACR-F (ELFEXT)	PSACR-F (PSELFEXT)	Return Loss	ACR-N	PSACR-N
5%	8 dB	8 dB	9 dB	10 dB	5 dB	9 dB	10 dB

*Values represent guaranteed margins to ANSI/TIA-568-C.2 standard at 20°C ambient temperature. All parameters comply with ANSI/TIA-568-C.2 Cat 6 and ISO/IEC 11801 Class E requirements across the entire frequency range. All values represent worst-case margins for 9- to 100-meter channel configurations. System performance margin guarantees are representative of the specific components and topologies as listed on the CX6300 solution data sheet and third-party test report. Contact your Berk-Tek Leviton Technologies technical representative for more information on alternative components and channel configurations. Details at berkteklevitontechnologies.com.

Guaranteed System Performance applies exclusively when the system is installed and tested by Leviton Network Solutions Certified Contractors, or Berk-Tek Certified OASIS Integrators. Guaranteed margin values apply at the time of installation.

SYSTEM TOPOLOGY



RECOMMENDED FOR

1000BASE-T network applications
and mission-critical systems

Network applications in data center,
financial, health care, government,
transportation, and education environments

PoE standards: IEEE 802.3af, 802.3at,
Cisco UPoE, and Power over HDBase™ (PoH)
up to 100 watts

Supports emerging PoE standards such as
the draft IEEE 802.3bt, including 100 watts

Networks with high bandwidth
utilization requirements

Extending network reach beyond 100 meters

Any IP-based system utilizing UTP cabling

AV systems for high-end conference
rooms and classrooms

Federal, state, and municipal
projects funded by ARRA^

6

CAT 6 PREMIUM+



LEVITON CONNECTORS

ATLAS-X1™ CAT 6 COMPONENT-RATED QUICKPORT® CONNECTORS

- Tested and approved for use in air-handling spaces (plenum rating) in accordance with UL Standard 2043
- Independently tested and guaranteed to exceed all component, permanent link, and channel margins
- Patented Retention Force Technology (RFT) protects against tine damage and maintains contact force between plug and connector, preventing arcing from intermittent disconnects in PoE applications
- PoE optimized tine geometry prevents arcing damage where plug and connector make contact, extending the life of the connector and ensuring maximum performance (see specification sheets for full PoE capabilities)
- Solid metal body dissipates 53% more heat than plastic, minimizing damage from excess heat in PoE applications
- Available with internal shutter to protect from dust and debris
- Unique tool-free design requires no specialized termination or re-termination tool
- Short connector design supports a wider range of applications (e.g. shallow boxes, enclosures, bend radius, etc.)
- Includes interchangeable color-coded icons for identification (VOICE, DATA, AV, blank), also offered separately in 13 colors
- Proudly manufactured in the U.S.

LEVITON PATCH CORDS

ATLAS-X1 CAT 6 SLIMLINE PATCH CORDS

- Verified by ETL for TIA Category 6 component requirements
- 24-gauge stranded for maximum flexibility
- Nominal outer diameter of .25" to reduce cable pathways in racks and cabinets
- SlimLine boot supports high-density patching and extraction with extended-reach latch release
- Made-to-order custom lengths are quickly available for top-of-rack, end-of-row, or general network patching
- Country of Origin is U.S., manufactured using Berk-Tek cable



BERK-TEK CABLE

LANMARK™ - 2000 PREMIUM CAT 6 CABLE

- Performance margin allows reliable support for Gigabit Ethernet, even in high-noise environments
- Full duplex operation capable over four cable pairs enables multimedia, broadband video, analog video, and other future applications
- ETL LANmark Verified beyond ANSI/TIA-568-C.2 Category 6 performance
- Independently verified headroom of 10dB beyond standard on NEXT, PSNEXT, ACR, and PSACT ensures exceptional performance
- Improved ACR means stronger signal reaches the receiver for cleaner video and data transmission
- Outer diameter 0.220" (5.69mm), CMP
- Characterized to 600 MHz, 350 MHz greater than the standard
- UL/ETL Listed
- 23-gauge
- Proudly manufactured in the U.S.



LEVITON PATCH PANELS

CAT 6 110-STYLE AND QUICKPORT PATCH PANELS

- Exceed requirements for Category 6 described in ANSI/TIA-568-C.2 and Class E requirements described in ISO/IEC 11801
- Independently tested and verified by Intertek (ETL) to meet all TIA component, permanent link, and channel requirements
- 110-Style available in flat and angled
- QuickPort available in flat, angled, recessed, and Zero-U configurations
- Gas-tight insulation displacement contacts provide excellent conductor retention and resistance to surface-contact oxidation for life of the system
- Include color codes for T568A/B wiring schemes

PART NUMBERS - Common part numbers shown. Many additional colors, lengths, and other options available online.

LEVITON CONNECTORS	STANDARD	SHUTTERED	ADDITIONAL ICONS
Atlas-X1 Cat 6 Component-Rated QuickPort Connector	61UJK-R*6	61UJK-S*6	ICONS-IC*
LEVITON PATCH PANELS	1RU 24-PORT	1RU 48-PORT	2RU 48-PORT
Cat 6 Flat 110-Style Patch Panel	69586-U24		69586-U48
Cat 6 Angled 110-Style Patch Panel	69587-U24		69587-U48
Flat QuickPort Patch Panel+	49255-H24	49255-Q48	49255-H48
Angled QuickPort Patch Panel +	49256-H24	49256-D48	49256-H48
LEVITON 110-STYLE WALL-MOUNT WIRING BLOCK KIT			96-PAIR
Cat 6 110-Style Wiring Block, Wall Mount with Legs and C-4 Clips*			41AB6-1F4
LEVITON PATCH CORDS			
Atlas-X1 Cat 6 SlimLine UTP Patch Cord			6D560-xx°
BERK-TEK CABLE	PLENUM REEL	PLENUM REEL-IN-A-BOX	RISER REEL
LANmark-2000 Premium Cat 6 Cable, Blue	10163222	10163780	10167476
LANmark-2000 Premium Cat 6 Cable, White	10167311	10167312	10167480
LANmark-2000 Premium Cat 6 Cable, Grey	10167464	10167307	10167478
			RISER REEL-IN-A-BOX
			10167477
			10167481
			10167479

* = Color: White (W), Lt. Almond (T), Ivory (I), Yellow (Y), Orange (O), Crimson (C), Dark Red (R), Purple (P), Blue (L), Green (V), Grey (G), Black (E), Brown (B)
 + = Sold empty, load with 61UJK connectors ° = For consolidation point. Legs are non-removable and not sold separately
 xx = Length in feet ° = Color: White (W), Yellow (Y), Blue (L), Black (E), Red (R), Green (G), Grey (S), Orange (O), Violet (V)

QuickPort® Field-Configurable Connector Housings Multi-Port Wallplates

APPLICATION

Field-configurable wallplates accept QuickPort® snap-in modules to support multimedia applications with 1, 2, 3, 4 or 6 ports. Use where a one-piece, single-gang, economical flush-mount housing is desired.

STANDARDS COMPLIANCE

Meets or exceeds all applicable standards: UL Listed; CSA certified; complies with TIA/EIA-568-B; and meets FCC Part 68.

PHYSICAL SPECIFICATIONS

Capacity: Available in 1-, 2-, 3-, 4- or 6-port versions.
Materials: High-impact, fire-retardant plastic rated UL 94V-0.
Dimensions: 4.5"H x 2.75"W x .925"D (in-wall depth 0.925 w/ connectors installed)

DESIGN CONSIDERATIONS

- Fits single-gang backboxes, or four-square boxes with appropriate user-provided reducer.
- Put blanks (PN# 41084-B*B) in unused ports for future expansion.
- Specify port identification method (colored modules, designation labels, and custom silkscreening available). To ID ports, use different colored connectors for each application (full selection of TIA/EIA-606 compatible colors—13 available), or Leviton's pre-printed Port Designation Labels. (PN# 41080-LXB)

UNIQUE FEATURES

- Color-matched wallplate screws
- Five color choices
- Fits within minimum rectangular NEMA openings
- Compatible with all individual QuickPort® modules
- Individual-port configurability allows specification flexibility
- Narrow module width allows high port density in a small area

WARRANTY INFORMATION

- One-year limited product warranty and 15-year performance guarantee are standard.
- Product and performance warranties are extended to a Lifetime as part of Leviton's Certified Cabling System.

See ELECTRONIC FILES for CAD files (.DXF, .DWG, MS-DOS.EPS) on disk



See ELECTRONIC FILES for CAD files (.DXF, .DWG, MS-DOS.EPS) on disk.

TYPICAL SPECIFICATION

The wallplate housing shall be a one-piece, single-gang flush mount style that fits standard NEMA openings, or four-square boxes with reducer. It should provide 1, 2, 3, 4 or 6 ports. Must be able to accept all Leviton QuickPort® modules. It must be made of high-impact, fire-retardant plastic rated UL 94V-0, and be UL Listed, CSA certified and compliant with FCC Part 68 and TIA/EIA-568-B specifications. Colors, port counts and configurations to be specified per schedule on plan. Wallplate screws must match wallplate color. The manufacturer shall provide a one-year limited product warranty and 15 year product performance guarantee. The manufacturer shall provide a lifetime warranty against defects in material and workmanship, and an application guarantee when installed as part of a certified system.



For Applications Engineering Support – Call 1-425-485-4288; in USA call 1-800-722-2082
Spec sheets and updates are also available at www.levitonvoicedata.com.

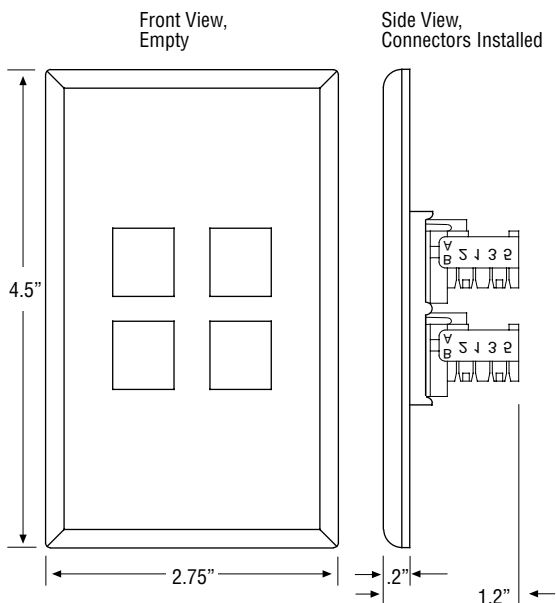
QuickPort® Field-Configurable Connector Housings

Part Number
41080-xxP

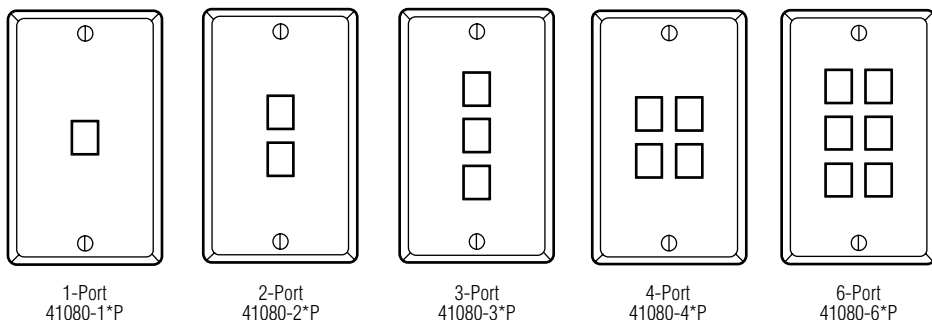
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DIMENSIONAL LINE ART

See ELECTRONIC FILES for CAD images
(.DXF, .DWG, MS-DOS.EPS)



Note: QuickPort® snap-in modules (connectors and bulkhead connectors and couplings) are sold separately.
Please refer to the QuickPort module spec sheets for ordering information.



Part Number

QuickPort® Wallplates	Part No.
1-Port wallplate	41080-1*P
2-Port wallplate	41080-2*P
3-Port wallplate	41080-3*P
4-Port wallplate	41080-4*P
6-Port wallplate	41080-6*P

* = color: Ivory (I), White (W), Grey (G), Black (E), Almond (A)
Special order color: Brown (B)

For Applications Engineering Support – Call 1-425-485-4288; in USA call 1-800-722-2082.
Spec sheets and updates are also available at www.levitonvoicedata.com.



2222 – 222nd St. SE • Bothell, WA 98021 USA • Tel: 1-800-722-2082 / 1-425-485-4288 • Fax: 1-425-483-5270 • Int'l Fax: 1-425-485-9170 • GSA# GS-35F-4785G

Single-Gang QuickPort® Wallplates

Ivory

41080-xxP

APPLICATION

Single-Gang QuickPort Wallplates accept QuickPort connectors to support multimedia applications with 1, 2, 3, 4, or 6 ports. Use where a one-piece, single-gang, economical flush-mount housing is desired. Available in six colors (white, light almond, ivory, grey, brown, and black) with color-matched screws.



SPECIFICATION

The wallplate housing shall be a one-piece, single-gang flush-mount style that fits standard NEMA openings, or four-square boxes with reducer. It should provide 1, 2, 3, 4, or 6 ports. Must be able to accept all Leviton QuickPort connectors. It must be made of high-impact, fire-retardant plastic rated UL 94V-0, and be cULus Listed, and compliant with ANSI/TIA-568-C.0 specifications. The wallplate shall accommodate low-voltage box eliminators for a flush mount.

FEATURES

- Color-matched wallplate screws
- Fits within minimum rectangular NEMA openings and accommodates low-voltage box eliminators for a flush mount
- Compatible with all individual QuickPort connectors
- Individual port configurability allows specification flexibility
- Narrow module width allows high port density in a small area

DESIGN CONSIDERATIONS

- Fits single-gang back boxes, or four-square boxes with appropriate user-provided reducer
- Put blanks in unused ports for future expansion
- Specify port identification method (colored modules, designation labels, and custom silk-screening available/to identify ports, use different colored connectors for each application or Leviton pre-printed Port Designation Labels (41080-LEB)

STANDARDS COMPLIANCE

- cULus Listed (UL 1863 & CAN/CSA-C22.2 No. 182.4)
- ANSI/TIA-568-C.0

PHYSICAL SPECIFICATIONS

- Dimensions: See page two
- Materials: High-impact, durable, fire-retardant plastic rated UL 94V-0
- Capacity: Available in 1-, 2-, 3-, 4-, and 6-port versions
- Mounting: Color-matched screws

COUNTRY OF ORIGIN

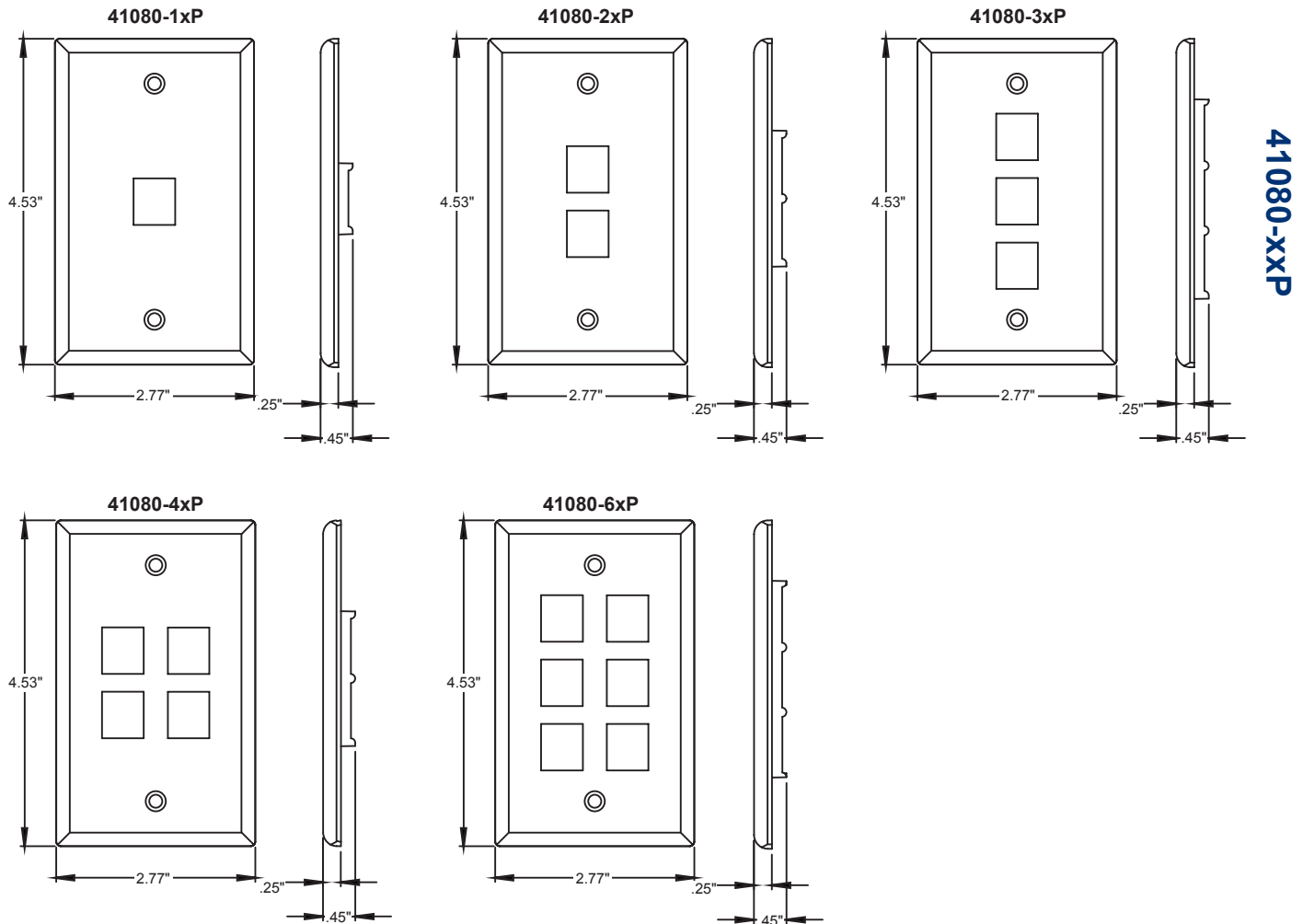
USA

WARRANTY INFORMATION

For a copy of Leviton product warranties, visit www.leviton.com/warranty.

ELECTRONIC FILES

For CAD files, typical specs, or technical drawings (.DXF, .DWG), visit www.leviton.com.



PART NUMBERS

Description	WHITE	LT. ALMOND	IVORY	GREY	BROWN	BLACK
Single-Gang QuickPort® Wallplate, 1 Port	41080-1WP	41080-1TP	41080-1IP	41080-1GP	41080-1BP	41080-1EP
Single-Gang QuickPort Wallplate, 2 Ports	41080-2WP	41080-2TP	41080-2IP	41080-2GP	41080-2BP	41080-2EP
Single-Gang QuickPort Wallplate, 3 Ports	41080-3WP	41080-3TP	41080-3IP	41080-3GP	41080-3BP	41080-3EP
Single-Gang QuickPort Wallplate, 4 Ports	41080-4WP	41080-4TP	41080-4IP	41080-4GP	41080-4BP	41080-4EP
Single-Gang QuickPort Wallplate, 6 Ports	41080-6WP	41080-6TP	41080-6IP	41080-6GP	41080-6BP	41080-6EP



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**Wrangell High School
and Middle School Fire
Alarm Replacement**

Electrical Submittals

28 46 00

Fire Detection and
Alarm



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Wrangell Schools
High & Middle School
Fire Alarm System

Product Submittal

Project Engineer: *Maria Gerrone, NICET Level IV #126987*

State of Alaska Fire Permit: *#190088*

Johnson Controls Project #463: *650295090*

FIRE ALARM SYSTEM EQUIPMENT

MODEL #	DESCRIPTION
4100-9701	ES PS Master Controller - English
4100-9600	BASIC TRANSPONDER
4100-9611	BASIC REMOTE ANNUNCIATOR PANEL
4098-9792	TRUEALARM SENSOR BASE
4098-9714	TRUEALARM PHOTO SMOKE SENSOR
4098-9733	TRUEALARM HEAT SENSOR
4098-9770	TRUEALARM SENSOR BASE WITH CO MODULE
4098-9019	ADDRESSABLE BEAM SMOKE DETECTOR AND CONTROLLER
5000-031	ADDITIONAL DETECTOR HEAD AND PRISM
1210-000	SURFACE MOUNT WALL BRACKET
4099-9006	IDNET DOUBLE ACTION PULL STATION
4098-9755	TRUEALARM DUCT SMOKE SENSOR W/O RELAY OUTPUT
4098-9856	SAMPLING TUBE 49", PLASTIC
4090-9001	IDNET SUPERVISED IAM
YJ1283	BRACKET/COVER IAM 2-GANG RED
4090-9002	IDNET RELAY IAM
4090-9802	COVER, ADDRESSABLE MODULE, SURFACE
2088-9008	10A RELAY SPDT W/ ENCLOSURE, MR-101/C
49VO-APPLW	ADDRESSABLE STROBE ,WALL MOUNT, APPLIANCE ONLY, CLEAR LENS
49VOC-WWFIRE	APPLIANCE COVER, WHITE, FIRE LETTERING
49MP-AVVOWW	MOUNTING PLATE, WHITE
49VO-APPLC	ADDRESSABLE STROBE, CEILING MOUNT, APPLIANCE ONLY, CLEAR LENS
49VOC-CWF	STROBE WHITE CEILING COVER "FIRE"
49AV-APPLW-O	WP ADDRESSABLE APPLIANCE ONLY WALL MOUNT AV
49AVC-WRFIRE-O	APPLIANCE COVER, RED, FIRE LETTERING
49WPBB-AVVOWR	WEATHERPROOF BACKBOX AV/VO
49HF-APPLW	ADDRESSABLE HIGH FIDELITY SPEAKER, WALL MOUNT, APPLIANCE ONLY
49SOC-WRFIRE	SPEAKER ONLY COVER WALL, RED, FIRE
49MP-SOWR	SPEAKER ONLY RED MOUNTING PLATE
49HF-APPLC	ADDRESSABLE HIGH FIDELITY SPEAKER, CEILING MOUNT, APPLIANCE ONLY
49SOC-CWFIRE	APPLIANCE COVER, WHITE, FIRE LETTERING
49HFV-APPLW	ADDRESSABLE MULTI-CANDELA HIGH FIDELITY SPEAKER/STROBE, WALL MOUNT, APPLIANCE ONLY, CLEAR LENS
49SVC-WWFIRE	SV COVER WALL-MOUNT WHITE FIRE
49MP-SVWWW	SPEAKER/STROBE MOUNTING PLATE WHITE
49SV-APPLW-O	ADDRESSABLE MULTI-CANDELA WEATHERPROOF SPEAKER/STROBE ,WALL MOUNT, APPLIANCE ONLY, CLEAR LENS
49SVC-WRFIRE-O	APPLIANCE COVER, RED, FIRE LETTERING
49MP-SVWR	SPEAKER/STROBE MOUNTING PLATE RED
49WPBB-SVWR	Surface or WP back box in red
49HFV-APPLC	ADDRESSABLE MULTI-CANDELA HIGH FIDELITY SPEAKER/STROBE, CEILING MOUNT, APPLIANCE ONLY, CLEAR LENS
49SVC-CWFIRE	SV COVER CELING WHITE FIRE
49SVH-APPLC-O	ADDRESSABLE MULTI, HIGH-CANDELA WEATHERPROOF SPEAKER/STROBE, CEILING MOUNT, APPLIANCE ONLY, CLEAR LENS
49SVC-CRFIRE-O	APPLIANCE COVER, RED, FIRE LETTERING
49WPBB-SVCR	Surface or WP back box in red
2098-9806	REMOTE TEST STATION W/ LED AND KEY SWITCH
4081-9004	END OF LINE RESISTOR, 6.8K 1/2W
E120V-GT	120V HYBRID SURGE PROTECTION DEVICE
DTK-2MHL P24BWB	OVERVOLTAGE SUPPPRESSOR 5 AMP CAPACITY ASSEMBLY FOR IDNAC/CONV. NAC-RUI-25V AUDIO
DTK-2MHL P755BWB	OVERVOLTAGE SUPPPRESSOR ASSEMBLY FOR 70V AUDIO
2081-9279	BATTERY 110AH
2081-9296	BATTERY 50AH



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Features



Figure 1: 4100ES Cabinets are available with one, two, or three bays (two bay cabinet with ES Touch Screen Display shown)

Master Controller (top) bay:

- Models available with Color ES Touch Screen Display (shown in Figure 1), Monochrome 2 line x 40 Character Display, or Monochrome InfoAlarm Display
- 32-Bit Master Controller with color-coded operator interface including raised switches for high-confidence feedback
- Dual configuration program CPU, convenient service port access, and capacity for up to 3000 addressable points
- CPU assembly includes 2 GB dedicated compact flash memory for on-site system programming and information storage
- ES Power Supply (ES-PS) and charger with onboard alarm relay, programmable auxiliary power output and provisions for one 4 in. x 10 in. or two 4 in. x 5 in. compatible option cards such as IDNet2 addressable device interface, Conventional NAC or Addressable IDNAC SLC modules; refer to 579-1288 installation instructions for additional details
- Upgrade kits are available for existing control panels

Network compatibility:

Compatible with Simplex ES Net or 4120 Fire Alarm Networks

Standard addressable interfaces include:

- 250 point addressable IDNet 2 SLC channel with electrically isolated dual short circuit isolating loops that supports TrueAlarm analog sensors and IDNet communications monitoring and control devices
- Remote annunciator module support through RUI+ (remote unit interface) communications port

Optional modules include:

- Building Network Interface Module (BNIC) for Ethernet connectivity options, refer to data sheet *S4100-0061*
- Electrically isolated output IDNet 2 (two loop) and IDNet 2+2 (four loop) modules with short circuit isolation output loops allowing use with either shielded or unshielded, twisted or untwisted single pair wiring
- Fire Alarm Network Interfaces, DACTs, city connections, and up to five RS-232 ports for printers and terminals
- Compatible with Connected Services Gateway to support central station communication and enable SafelINC Cloud Services, refer to datasheet *S2080-0091*
- MAPNET II addressable device modules and MAPNET II quad isolator modules
- IDNAC signalling line circuits (SLCs) for addressable appliance control
- Alarm relays, auxiliary relays, additional power supplies, IDC modules, NAC expansion modules
- Service modems, VESDA Air Aspiration Systems interface, ASHRAE BACnet Interface, TCP/IP Bridges
- LED/switch modules and panel mount printers
- Emergency communications systems (ECS) equipment; 8 channel digital audio or 2 channel analog audio
- 8-point zone/relay module, each point is selectable as an IDC input or relay output. Class A IDCs require two points (one out and one return). Relays rated for 2 A @ 30 VDC (resistive) and configurable as either normally open or normally closed.
- Compatible with Simplex remotely located 4009 IDNet NAC Extenders, up to ten for each IDNet SLC

Listings information*

- UL 864, Fire Detection and Control (UOJZ), Smoke Control Service (UUKL), Releasing Device Service (SYZV), Emergency Communication and Relocation Equipment (UOQY)
- UL 1076, Proprietary Alarm Units - Burglar (APOU)
- UL 2017, Process Management Equipment (QVAX), Emergency Alarm System Control Units (FSZI)
- UL 1730, Smoke Detector Monitor (UULH)
- UL 2572, Mass Notification Systems (PGWM)
- CAN/ULC-S527 Control Units for Fire Alarm Systems (UOJZ7), Releasing Device Service (SYZV7)
- CAN/ULC-S559 Central Station Fire Alarm System Units (DAYR7)
- ULC/ORD-C1076 Proprietary Burglar Alarm Units and Systems (APOU7)
- ULC/ORD-C100 Smoke Control System Equipment (UUKL7)

Software Feature Summary

CPU provides dual configuration programs

- Two programs allow for optimal system protection and commissioning efficiency with one active program and one reserve
- Downtime is reduced because the system stays running during download

PC based programmer features

- Convenient front panel accessed Ethernet port for quick and easy download of site-specific programming
- Modifications can be uploaded as well as downloaded for greater service flexibility

* See module information sections for product that is UL or ULC listed and additional listing information. This product has been listed by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7165-0026:251(4100ES) for allowable values and/or conditions concerning material presented in this document. Accepted for use – City of New York Department of Buildings – MEA35-93E. At the time of publication only UL and ULC listings are applicable to ES Net network products. Additional listings may be applicable; contact your local Simplex product supplier for the latest status

- Firmware enhancements are made through software downloads to the on-board flash memory

Operator interface features

- TrueAlarm individual analog sensing with front panel information and selection access
- "Dirty" TrueAlarm sensor maintenance alerts, service and status reports including "almost dirty"
- TrueAlarm magnet test indication appears as distinct "test abnormal" message on display when in test mode
- TrueAlarm sensor peak value performance report
- **Install Mode** allows grouping of multiple troubles for uninstalled modules and devices into a single trouble condition, typical with future phased expansion; with future equipment and devices grouped into a single trouble, operators can more clearly identify events from the commissioned and occupied areas
- Module level ground fault searching assists installation and service by locating and isolating modules with grounded wiring
- **Recurring Trouble Filtering** allows the panel to recognize, process, and log recurring intermittent troubles, such as external wiring ground faults, but only sends a single outbound system trouble to avoid nuisance communications
- **WALKTEST** silent or audible system test performs an automatic self-resetting test cycle

Introduction

4100ES Series Fire Detection and Control Panels provide extensive installation, operator, and service features with point and module capacities suitable for a wide range of system applications. An on-board Ethernet port provides fast external system communications to expedite installation and service activity. Dedicated compact flash memory archiving provides secure on-site system information storage of electronic job configuration files.

Modular design

A wide variety of functional modules are available to meet specific system requirements. Selections allow panels to be configured for either Stand-Alone or Networked fire control operation. InfoAlarm Command Center options provide convenient expanded display content, detailed on data sheet [S4100-1045](#).

Module Bay Description

The Master Controller Bay (top) includes a standard multi-featured ES power supply, the master controller board, expansion space for optional features, and operator interface equipment.

The Expansion Bays include a Power Distribution Interface (PDI) for new 4 in. x 5 in. flat design option modules and also accommodate 4100-style modules.

The Battery Compartment (bottom) accepts two batteries, up to 50 Ah, to be mounted within the cabinet without interfering with module space.

Figure 2 identifies bay locations using a three bay cabinet for reference.

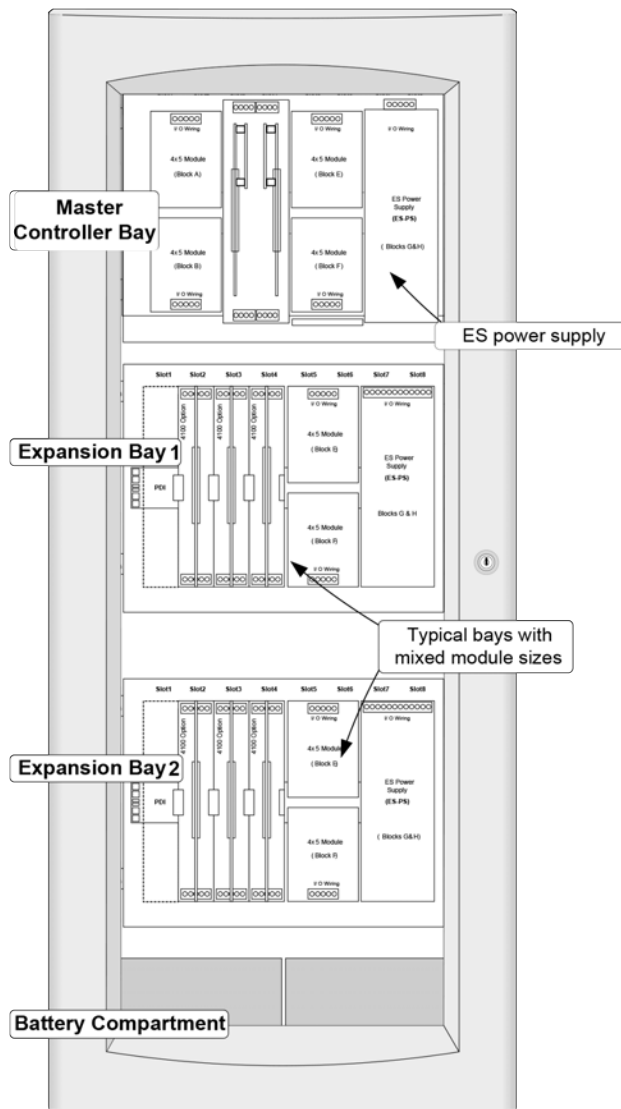


Figure 2: 4100ES Module Bay Reference

Mechanical Description

- Boxes can be close-nipped; each box provides convenient stud markers for drywall thickness and nail-hole knockouts for quicker mounting
- Smooth box surfaces are provided for locally cutting conduit entrance holes exactly where required
- The latching dress panel (retainer) assembly easily lifts off for internal access
- NACs can be mounted directly on power supply assemblies providing minimized wiring loss, compact size, and readily accessible terminations
- Packaging supports traditional 4100-style motherboard with daughter cards
- Modules are power-limited except as noted, such as relay modules
- The NEMA 1/IP30 box is ordered separately and available for early installation
- Doors are available with tempered glass inserts or solid; boxes and doors are available in platinum or red
- Boxes and door/retainer assemblies are ordered separately per system requirements; refer to data sheet *S4100-0037* for details

Operator Interface Detail Reference

4100ES Fire Alarm Control Units are provided with either an enhanced Color ES Touch Screen Display or a basic Monochrome 2 Line by 40 Character operator interface depending on the model selected. The following illustrations highlight the primary functions of each.

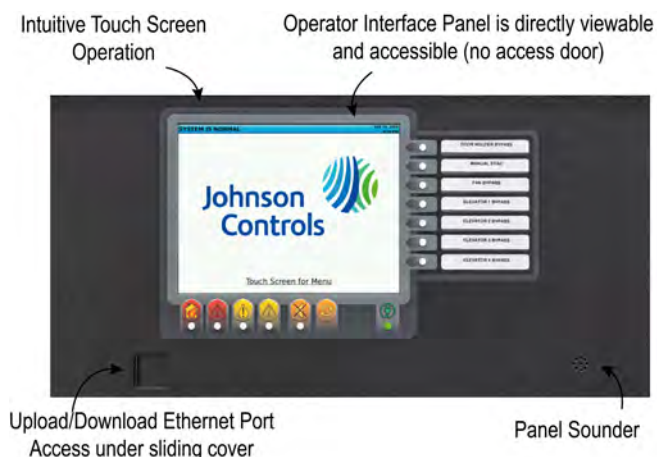


Figure 3: ES Touch Screen Display Interface

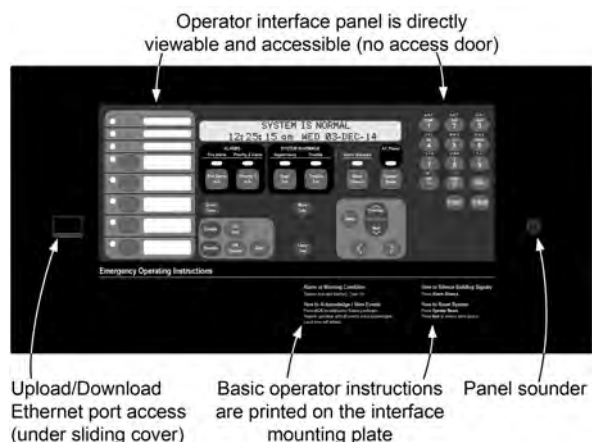


Figure 4: 2 x 40 Operator Interface

Compatible Peripheral Devices

The 4100ES is compatible with an extensive list of remote peripheral devices including printers, CRT/keyboards (up to five total), and both conventional and addressable devices including TrueAlarm analog sensors and TrueAlert addressable appliances.

Master Controller Bay Module Details

Master Controller and Motherboard

- Master Controller mounts in Slot 2 of a two slot motherboard and provides one Class B or Class A, RUI+ communications channel configurable for isolated or un-isolated operation
- Slot 1 of the motherboard is primarily for an optional network interface card, or secondarily for the 4100-6038 dual RS-232 board
- RUI+ and RUI communications controls up to 31 remote devices per master controller at up to 2500 ft (762 m) for single run, or 10,000 ft (3048 m) total if wiring is Class B and T-tapped; if more distance is required, up to four total RUI channels are supported; add up to three 4100-1291 RUI Expansion Modules (4100-1291 provides unisolated RUI communications)
- Compatible RUI+ and RUI remote equipment includes: MINIPLEX transponders, 4603-9101 LCD Annunciators, 4602-9101 Status Command Units (SCU), 4602-9102 Remote Command Units (RCU), 4602 Series LED Annunciator Panels, 4100 Series 24 I/O and LED/Switch modules, (4602 series annunciators require un-isolated communications)
- Up to four RUI channels (combination of built-in RUI+ and optional RUI modules) are supported per master controller
- Open slot space on the left of the CPU motherboard is available for either another dual slot motherboard, or for one or two block modules, see Figure 14

ES-PS Master Controller Power Supply

- Rating is up to 9.5 A total without a fan or up to 12.7A total with a fan using Special Application appliances; or up to 5 A total with Regulated 24 DC appliance loads.
- Outputs are power-limited, except for battery charger and city circuits.
- Provides system power, battery charging, auxiliary power, auxiliary relay, earth detection, electrically isolated IDNet 2 communications channel for 250 points (4100-3117), three 3 A conventional NACs (4100-5450) or three 3 A IDNAC addressable SLCs (4100-5451), two block spaces for compatible optional modules and provisions for either an optional City Connect Module or an optional Alarm Relay Module (City Connect or Alarm Relay module requires one available block space).
- **IDNet 2 SLC Output** (4100-3109 and 4100-3117) provides an electrically isolated Class B or Class A communications channel with dual short circuit isolating loops for up to 250 addressable devices, as described in Addressable Device Control (requires one block space from ES-PS power supply or Master Controller bay).
- **Conventional NAC Module** (4100-5450) provides three outputs individually selectable as a Conventional NAC (Class B or Class A) or an Auxiliary Power output. When mounted on the ES-PS power supply, each NAC is rated at 3 A for Special Application appliances (9 A max per card) or 2 A for Regulated 24 DC loads (4 A max per card). NAC operation supports synchronized strobe or SmartSync horn/strobe operation over two wires. Auxiliary power outputs are rated for 3 A continuous duty. The total auxiliary power output per power supply is limited to 5 A (requires one block space).
- **IDNAC Addressable Notification SLC Module** (4100-5451) provides three 3 A IDNAC addressable notification SLCs compatible with both TrueAlert ES and TrueAlert addressable notification appliances and remote 4009 IDNAC Repeaters used to extend power and wiring distances (requires two block spaces).
- **DCAI (Dual Class A IDNAC Isolator) Module** (4100-6103) creates two Class A outputs from one IDNAC SLC Class B Input; up to two can

be connected to one IDNAC SLC, with up to 6 total per ES-PS power supply; total Class A output loop current is limited to the 3 A rating of the IDNAC SLC (requires one block space).

- **Battery Charger** is dual rate, temperature compensated, and charges up to 50 Ah sealed lead-acid batteries mounted in the battery compartment (33 Ah for single bay cabinets); also is UL and ULC listed for charging up to 110 Ah batteries mounted in an external cabinet, refer to data sheet S2081-0012 for details.
- **Battery and Charger Monitoring** includes battery charger status and low or depleted battery conditions; status information provided to the master controller includes analog values for: battery voltage, charger voltage and current, actual system voltage and current, individual NAC currents, and individual IDNAC SLC currents.
- **Low Battery Cutout** is selectable for each ES-PS power supply.
- **2 A Programmable Output** is selectable for conventional SNAC or Auxiliary power operation. SNAC operation supports conventional non-synchronous NAC operation to provide supervised reverse polarity for sounder base power, Suppression Release Peripheral (SRP) power, or other coded NAC operation requirements. Auxiliary (AUX) power operation can be used for sounder base power, four-wire detector power, or door holder; relay is selectable as N.O. or N.C and rated for 2 A @ 32 VDC and 30 VAC (resistive); supervised AUX operation does not require an end-of-line relay to provide Power-Limited operation.
- **Auxiliary Relay** is selectable as N.O. or N.C., rated 2 A @ 32 VDC or 30 VAC (resistive), and is programmable as a trouble relay, either normally energized or normally de-energized, or as an auxiliary control.
- **Optional City Connect Module** (4100-6031, with disconnect switches, or 4100-6032, without disconnect switches) can be selected for conventional dual circuit city connections (requires one block space).
- **Optional Alarm Relay Module** (4100-6033) provides three Form C relays that are used for Alarm, Trouble, and Supervisory, rated 2 A resistive @ 32 VDC (requires one block space).

IDNet SLC for Addressable Device Communications

Overview

The 4100ES provides standard addressable device communications for IDNet compatible devices and accepts optional modules for communications with MAPNET II compatible devices. Using a two wire communications circuit, individual devices such as manual fire alarm stations, TrueAlarm sensors, conventional IDC zones, and sprinkler waterflow switches can be interfaced to the addressable controller to communicate their identity and status.

Addressability allows the location and condition of the connected device to be displayed on the operator interface LCD and on remote system annunciators. Additionally, control circuits (fans, dampers, etc.) may be individually controlled and monitored with addressable devices.

Addressable Operation

Each addressable device on the communication channel is continuously interrogated for status condition such as: normal, off-normal, alarm, supervisory, or trouble. Both Class B and Class A operation are available. Sophisticated poll and response communication techniques ensure supervision integrity and allow for "T-tapping" of the circuit for Class B operation. Devices with LEDs pulse the LED to indicate receipt of a communications poll and can be turned on steady from the panel.

IDNet Channel Capacity

The CPU bay ES-PS provides an IDNet 2 signaling line circuit (SLC) that supports up to 250 addressable monitor and control points intermixed on the same pair of wires. IDNet 2 and IDNet 2+2 Module SLCs are isolated from other system reference voltages to reduce common mode noise interaction with adjacent system wiring. Additional 250 address IDNet 2 or IDNet 2+2 Modules are available, see Table 20.

Table 1: IDNet, MAPNET II, IDNet 2, and IDNet 2+2 SLC Wiring Common Specifications

Specification	Description	
Maximum Distance from Control Panel per Device Load	1 to 125	4000 ft (1219 m); 50 ohms
	126 to 250	2500 ft (762 m); 35 ohms
Connections	Terminals for 18 to 12 AWG (0.82 mm ² to 3.31 mm ²)	

Table 2: IDNet and MAPNET II Specifications

Specification	Description	
Wire Type	New Installation	Shielded twisted pair (STP)
	Retrofit Only	Unshielded twisted pair (UTP)
Total Wire Length Allowed With "T" Taps for Class B Wiring	Up to 10,000 ft (3 km); 0.58 μF	

Note: For retrofit installations consult with your local Simplex product supplier, restrictions may apply.

Table 3: IDNet 2 and IDNet 2+2 Wiring Specifications

Specification	Description	
Wire Type	New Installation	Unshielded twisted pair (UTP)
	Retrofit Only	Shielded or unshielded, twisted or untwisted wire
Total Wire Length Allowed With "T" Taps for Class B Wiring	Up to 12,500 ft (3.8 km); 0.60 μF	
Maximum Capacitance Between IDNet 2 Channels	1 μF	
IDNet 2 and IDNet 2+2 Module Compatibility: IDNet communicating devices and TrueAlarm sensors including QuickConnect and QuickConnect2 sensors		

Note: For retrofit installations consult with your local Simplex product supplier, restrictions may apply.

TrueAlarm System Operation

Addressable device communications include operation of TrueAlarm smoke and temperature sensors. Smoke sensors transmit an output value based on their smoke chamber condition and the CPU maintains a current value, peak value, and an average value for each sensor. Status is determined by comparing the current sensor value to its average value. Tracking this average value as a continuously shifting reference point filters out environmental factors that cause shifts in sensitivity.

Programmable sensitivity of each sensor can be selected at the control panel for different levels of smoke obscuration (shown directly in percent) or for specific heat detection levels. To evaluate whether the sensitivity should be revised, the peak value is stored in memory and can be easily read and compared to the alarm threshold directly in percent.

CO sensor bases combine an electrolytic CO sensing module with a TrueAlarm analog sensor to provide a single multiple sensing assembly using one system address. The CO sensor can be enabled/disabled, used in LED/Switch modes and custom control, and can be made public for communication across a fire alarm Network. Refer to data sheet S4098-0052 for details.

TrueAlarm heat sensors can be selected for fixed temperature detection, with or without rate-of-rise detection. Utility temperature sensing is also available, typically to provide freeze warnings or alert to HVAC system problems. Readings can be selected as either Fahrenheit or Celsius.

TrueSense Early Fire Detection

Multi-sensor 4098-9754 provides photoelectric and heat sensor data using a single 4100ES IDNet address. The panel evaluates smoke activity, heat activity, and their combination, to provide TrueSense early detection. For more details on this operation, refer to data sheet *S4098-0024*.

Diagnostics and Default Device Type

Sensor Status

TrueAlarm operation allows the control panel to automatically indicate when a sensor is almost dirty, dirty, and excessively dirty. The NFPA 72 requirement for a test of the sensitivity range of the sensors is fulfilled by the ability of TrueAlarm operation to maintain the sensitivity level of each sensor. CO Sensors track their 10 year active life status providing indicators to assist with service planning. Indicators occur at: 1 year, 6 months, and when end of life is reached.

Modular TrueAlarm sensors

TrueAlarm sensors use the same base and different sensor types (smoke or heat sensor) and can be easily interchanged to meet specific location requirements. This allows intentional sensor substitution during building construction when conditions are temporarily dusty. Instead of covering smoke sensors (causing them to be disabled), heat sensors may be installed without reprogramming the control panel. The control panel will indicate an incorrect sensor type, but the heat sensor will operate at a default sensitivity to provide heat detection for building protection at that location.

IDNAC SLC for Addressable Notification Appliance Communications

IDNAC Addressable notification appliance communications

include operation of TrueAlert and TrueAlert ES Visible only (V/O, strobe), Audible only (A/O, horn), Audible/Visible (A/V, horn/strobe), and strobes of Speaker/Visible (S/V) notification appliances. (S/V appliances require separate speaker wiring.) IDNAC SLC addressable communications allow each horn and strobe to be individually controlled using a single two-wire circuit, confirms the wiring connections to the individual notification appliance's electronic circuit, and confirms communications between each appliance and the fire alarm control unit. Addressable communications increases supervision integrity versus conventional notification systems by providing supervision beyond the circuit wiring to each individual appliance and by constantly verifying the ability of each appliance to communicate with the control panel.

Individual Appliance Status and Settings

The fire alarm control panel monitors and records each addressable notification appliance status, type of appliance, and its configured appliance settings. A fault in any individual appliance automatically reports a trouble condition to the control panel.



Figure 5: TrueAlert ES Addressable Appliance Reference

Virtual NACs Provide Control Convenience

For control convenience, IDNAC notification appliances can be grouped into *Virtual NACS* (VNACs) for group control, grouping that can be made across SLCs, not defined by their wiring connection.

Panel Control Convenience

Applicable operation settings for each appliance can be programmed *without having to replace appliances or remove them from the wall or ceiling*. An appliance's VNAC notification zone can be easily changed through programming without having to add additional circuits, conduit, and wiring. Audible and visible appliances for non-Fire Emergency Communications notification can be programmed to operate separately *on the same pair of wires as the fire alarm notification appliances*. The result is lower installation, retrofit, and overall life-cycle cost of ownership compared with traditional conventional notification systems.

Installation, Retrofit, and Life-Cycle Cost Benefits

With each addressable appliance capable of being controlled separately on the same two-wire IDNAC SLC, installation time and expense for both retrofit and new construction can be significantly reduced. When Class B wiring is used, wiring can be "T-tapped" allowing more savings in distance, wire, conduit (size and utilization), and overall installation efficiency.

Location Information, Diagnostics and Troubleshooting

Each addressable notification appliance has its own 40 character custom label to identify the location of the appliance and to aid in troubleshooting fault conditions. In conventional notification systems, conventional appliances are not capable of communicating with the control panel. Fault reporting on a conventional system is limited to the circuit wiring and the entire area (zone) covered by appliances on the notification appliance circuit (NAC) making it much more difficult and costly to locate and correct the source of a problem. Using the TrueAlert *magnet test* allows each appliance to individually identify its candela setting and address and to briefly operate if desired, and using the *TrueAlert ES Appliance Self-Test feature provides detailed performance verification per appliance*.

TrueAlert ES Appliance Self-Test Operation

On-Board Test Sensors

TrueAlert ES appliances are equipped with on-board sensors to detect strobe and/or horn output allowing efficient and unobtrusive Self-Testing. When **Automatic Self-Test** is initiated from the control panel, each appliance within the selected VNAC group will briefly operate and then report its Self-Test status to the control panel, all within several seconds. Silent Self-Test can be selected to test only visible appliance if desired. The control panel is in a trouble condition during testing and in the event of an alarm, Self-Test is automatically terminated. **Additionally, Automatic Self-Test can be scheduled** to occur at a convenient time on a regular basis (Requires version 2.03.01 or higher software).

Automatic Self-Test

Automatic Self-Test results are communicated to the control panel with a time and date stamp and are stored in memory. Results are viewable at the front panel display and printed reports can be generated from the panel service port.

Individual Self-Test

Individual Self-Test is selected from the control panel when individual appliances need to be observed to operate. Each appliance in the selected VNAC group will turn on its LED until individually activated by applying a magnet. After performing the individual test, the appliance LED turns off to indicate completion. Results are recorded the same as during the automatic test.

TrueAlert ES Appliance Self-Test Last Test Results Report Example

Service Port				Page 1	
REPORT 10 TrueAlertES Self-Test Report			12:34:56pm WED 03-DEC-14		
Point ID	Custom Label	Date	Visual	Audible	
T1-1-1	VO FIRST FLOOR (up to 40 characters)	03-DEC-14	NO OUT	N/A	
T1-2-5	AV FIRST FLOOR EAST WING	03-DEC-14	NO OUT	NORMAL	
T7-3-55	AO SECOND FLOOR EAST WING	03-DEC-14	N/A	NO OUT	
T8-2-45	AV SECOND FLOOR ROOM 29	03-DEC-14	NOT TST	N/A	
T8-2-60	AV SECOND FLOOR ROOM 22	03-DEC-14	NORMAL	NORMAL	
T1-2-4	AO FIRST FLOOR ROOM 17	03-DEC-14	N/A	UNSUPP	
TRUEALERT_ES SELF-TEST REPORT COMPLETED					
Press RETURN for next Screen OR CTRL-X to abort					

Results Description

- **NORMAL** = Works correctly
- **NO OUT** = No Output, no light or sound was detected
- **NOT TST** = No result. Either the appliance did not return a result before the test ended or the test was conducted as silent (strokes only) and audible appliance was not activated
- **N/A** = Not applicable (no strobe, on audible only, etc.)
- **UNSUPP** = Appliance not compatible with Self-Test (TrueAlert addressable appliance not TrueAlert ES addressable appliance)

Note: Additional TrueAlert ES Self-Test information is detailed in ES Operating Instructions 579-197 shipped with the panel.

TrueAlert ES Appliance Self-Test All Test Results Report Example

Service Port				Page 1	
REPORT 10 TrueAlertES Self-Test Report			12:34:56pm WED 03-DEC-14		
Point ID	Custom Label	Date	Visual	Audible	
T1-1-1	VO FIRST FLOOR	03-DEC-14	NO OUT	N/A	
T1-2-5	AV FIRST FLOOR EAST WING	03-DEC-14	NO OUT	NORMAL	
T1-2-6	AV FIRST FLOOR NORTH ENTRANCE	30-OCT-14	NO OUT	NORMAL	
T7-3-55	AO SECOND FLOOR EAST WING	03-DEC-14	N/A	NO OUT	
T8-2-45	AV SECOND FLOOR ROOM 29	03-DEC-14	NOT TST	N/A	
T1-1-11	AV FIRST FLOOR SOUTH ENTRANCE	30-OCT-14	NORMAL	NORMAL	
T8-2-60	AV SECOND FLOOR ROOM 22	03-DEC-14	NORMAL	NORMAL	
T1-2-4	AO FIRST FLOOR ROOM 17	03-DEC-14	N/A	UNSUPP	
T1-2-7	AO FIRST FLOOR ROOM 12	30-OCT-14	N/A	UNSUPP	
T8-3-43	AV SECOND FLOOR ROOM 25	30-OCT-14	UNSUPP	UNSUPP	
TRUEALERT_ES SELF-TEST REPORT COMPLETED					
Press RETURN for next Screen OR CTRL-X to abort					

TrueAlert ES Appliance Self-Test Individual Appliance Report Example

CUSTOM LABEL	
4-1-2	AV
POINT ADDRESS: 4-1-2	Type: AV
CARD: 4 CHANNEL: 1 DEVICE: 2	
EXTENDED POWER SUPPLY	
UNIT NUMBER: 2	RUI NUMBER: LOCAL
PRIMARY STATUS	NORMAL
AUDIBLE GROUP CONFIG:	0 0 0
VISUAL GROUP CONFIG:	0 0 0
STYLE:	INDOOR
OPERATION:	GENERAL EVAC
CANDELA RATING	15 CD
COLOR LENS	YES
TONE TYPE	BROADBAND
CODING TYPE	TEMPORAL
VOLUME	HIGH
LAST TEST TIME:	MON 02-JUN-14 01:00 AM
LAST VISUAL TEST:	NORMAL
LAST AUDIBLE TEST:	NORMAL
LAST TEST VOLUME:	NORMAL
DEVICE TEST TROUBLE:	NORMAL

IDNAC SLC Hardware Reference

ES-PS Power Supplies

ES-PS Power Supplies configured with an IDNAC card provide three, 3 A IDNAC SLCs for control and power to TrueAlert ES and TrueAlert addressable notification appliances. Both power supplies incorporate an efficient switching design that provides a regulated output of 29 VDC, even during battery operation. With 29 VDC minimum output at the panel, addressable notification SLCs can support wiring distances two to three times farther than available with conventional notification, or support more appliances per SLC, or work with smaller gauge wiring, or combinations of these benefits, all resulting in installation and maintenance savings with high assurance that appliances that operate during normal system testing will operate during worst case alarm conditions.

IDNAC SLC Appliance Wiring Reference

IDNAC SLC Capacity

Up to 127 addresses and up to 139 unit loads (appliances are typically one unit load, devices such as Isolators may require more than one load, refer to individual device data sheet for specific information)

Table 4: IDNAC SLC Appliance Wiring Reference

Specification	Rating
Recommended wire type	Unshielded twisted pair (UTP)
Maximum wire length allowed with "T-Taps" for Class B wiring, per SLC	10,000 ft (3048 m)
Maximum wire length per SLC to any appliance	4000 ft (1219 m)
Appliance Supervisory Current	1 unit load = 0.8 mA per appliance
Wiring connections	Terminals for 18 to 12 AWG (0.82 mm ² to 3.31 mm ²)
Installation Instructions (see for more information)	579-1015

8-Point Zone/Relay Module Details

- **Select as IDC or Relay;** configure up to eight Class B IDCs, or up to four Class A IDCs; or up to eight Relay outputs rated 2 A resistive @ 30 VDC (N.O. or N.C.); or combinations of IDCs and Relays; each zone is separately configurable as an IDC or Relay output
- **IDC Support:** each IDC supports up to 30, two-wire devices. Zone relay modules may be powered directly from the control unit power supply or through the optional 25 VDC regulator module where required for two-wire detector compatibility. Refer to 2-Wire Detector Compatibility document 579-832 for additional details.
- **IDC EOL resistor values are selectable as:** 3.3 k Ω , 2 k Ω , 2.2 k Ω , 3.4 k Ω , 3.9 k Ω , 4.7 k Ω , 5.1 k Ω , 5.6 k Ω , 6.34/6.8 k Ω , and 3.6 k Ω + 1.1 k Ω ; see instructions for more details

Color ES Touch Screen Display

The Color ES Touch Screen Display interface offers intuitive operation similar to a tablet or smart phone. With a larger area format versus an individual text line display, more information is available at a glance, and minimal key presses are needed to access detailed information.

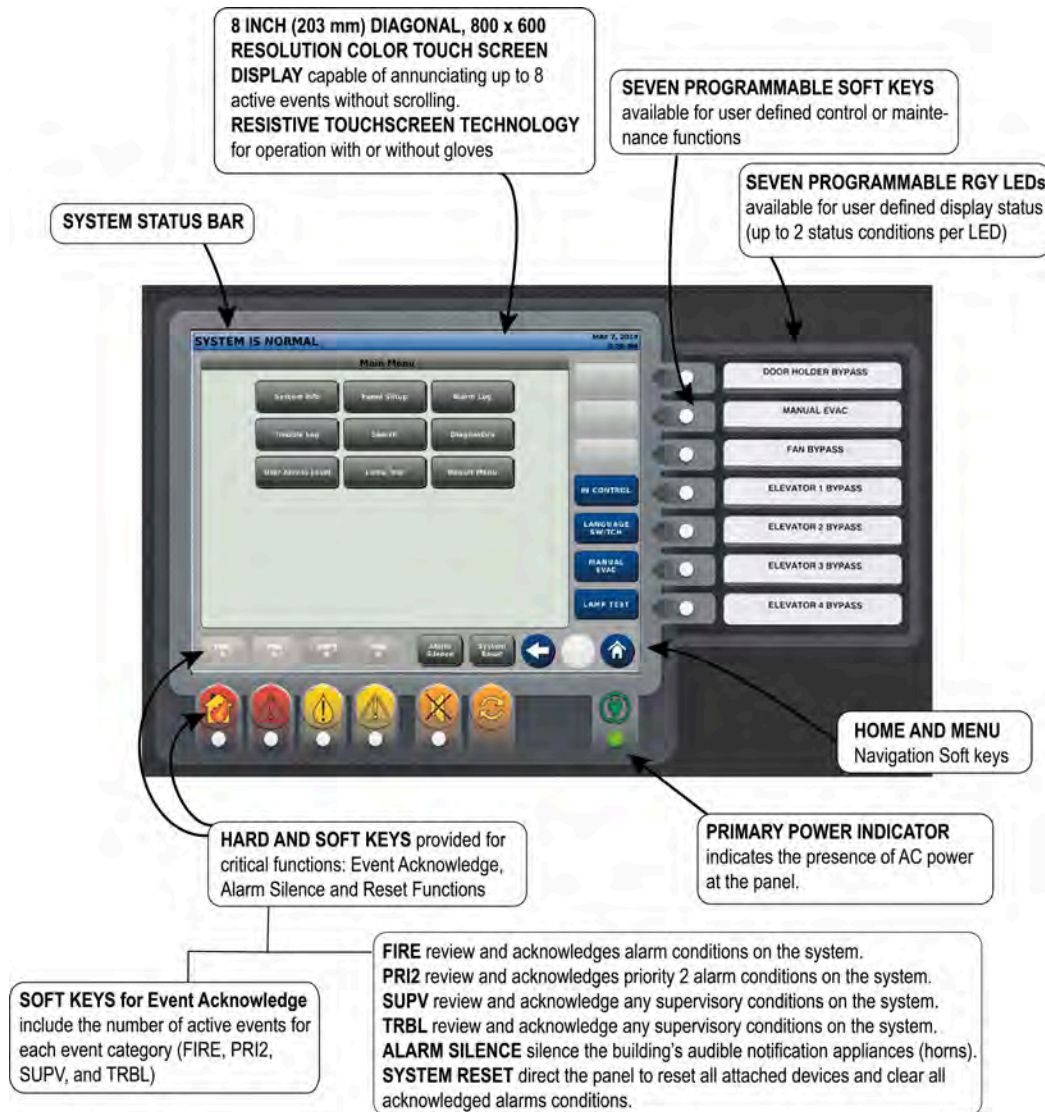


Figure 6: ES Touch Screen Display Operator Interface

Features

ES Touch Screen Displays provide customized operating experience

- Event activity display choices include: First 8 Events; or First 7 Events with emphasis on Most Recent; or First 6 Events with emphasis on First and Most Recent (individually selectable for each event type)
- System reports are easily viewable; logs can be read with minimal scrolling
- Up to two languages are available per system, easily selected by programmable key press
- Information sent to Remote ES Touch Screen Displays can be vectored by point or zone
- Both Hard and Soft keys available for critical functions: Event Acknowledge, Alarm Silence, and Reset Functions
- Resistive touchscreen technology allows operation with or without gloves
- Seven programmable RGY LEDs available for user-defined display status (up to 2 status conditions per LED)
- Seven programmable Soft keys available for user-defined control or maintenance functions
- PRI2 Soft key label can be changed to CO to annunciate Carbon Monoxide detection status
- ES Touch Screen Display can be programmed to report individual points or groups of points as a single zone
- Supports ability to display a custom watermark background file of a company logo or other desired display content
- Seismically compliant under the State of California Statewide Office of Housing and Development (OSHPD) Special Seismic Certification (SSC) program guidelines. Refer to *Simplex Seismic Application Guide* 579-1213 and *Battery Brackets for Seismic Activity Applications* S2081-0019 for details.

Display properties

- 8 inch (203 mm) diagonal, 800 x 600 resolution color touch screen display capable of annunciating up to 8 active events without scrolling
- Bright white LED backlighting provides efficient and long lasting illumination; backlight is dim in quiescent state, automatically switches to full power on touch or on event activity in system.

Description

ES Touch Screen Displays for 4100ES fire alarm systems provide a large display with extended information content, dual language support including UTF-8 character languages, and an intuitive control key interface per the following:

- Up to 10 ES Touch Screen Displays are supported per 4100ES control panel; able to allow one ES Touch Screen Display to take-control and to designate access levels for interfaces not in-control; programmable LEDs can be assigned to in-control status indications
- Menu-driven format conveniently prompts operators for the next action required
- Direct point callup displays individual points alphabetically and then homes in on the logical choice as more point information is entered
- Event categories are color coded for quick visual representation; Red for Alarm and Priority 2 Events; Yellow for Supervisory and Trouble events
- Date formats are either MM/DD/YY or DD/MM/YY
- Time formats are either 24 hour or 12 hour with AM/PM
- System Normal screen supports a color background (watermark) for company name, company logo, or other desired display content

Example Display Screens

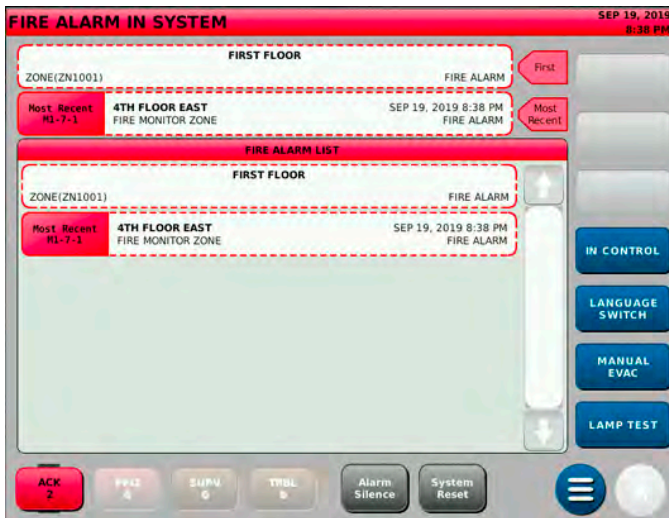


Figure 7: First and Most Recent Alarm Display



Figure 8: Main Menu



Figure 9: First Eight Active Trouble Events List



Figure 10: Direct Point Callup



Figure 11: Alarm History Log

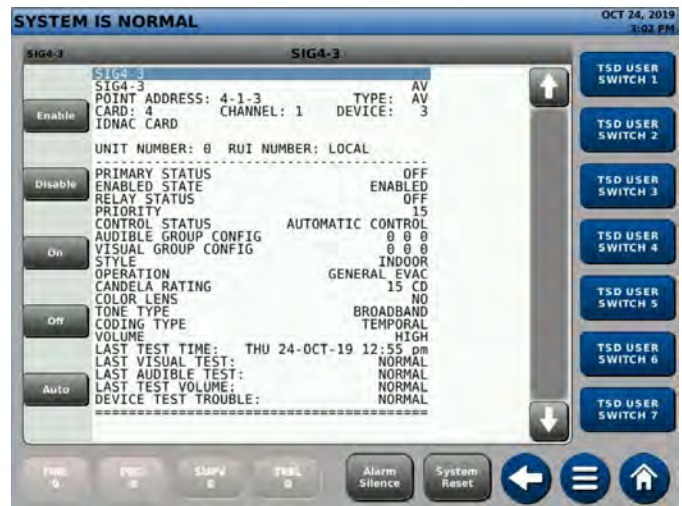


Figure 12: Detailed Point Status Screen for TrueAlert ES Appliance

Specifications

Table 5: General ES Touch Screen Display Specifications

Specification	Rating
Resolution	800 x 600 Pixels (RGB)
Size / Type	8 inch (203 mm) Diagonal / Color Touch Screen
Touch Screen Technology	Resistive
Event Display	Up to 8 Events without scrolling
Normal Screen Custom Watermark File Format	680 x 484 Pixels: BMP, JPG, TIFF, GIF or PNG file format
Environmental	Operating Temperature: 32°F to 120°F (0°C to 49°C)
	Operating Humidity: Up to 93% RH, non-condensing @ 90°F (32°C) maximum

Operator Interface with Monochrome 2 x 40 LCD

With the locking door closed, the glass window allows viewing of the display, status LEDs, and available operator switches. Features include a two-line by 40-character, wide viewing angle (super-twist) LCD with status LEDs and switches as shown in Figure 13.

LED indicators describe the general category of activity being displayed with the LCD providing more detail. For the authorized user, unlocking the door provides access to the control switches and allows further inquiry by scrolling the display for additional detail.

- Convenient and extensive operator information is provided using a logical, menu-driven display
- Multiple automatic and manual diagnostics for maintenance reduction
- Alarm and Trouble History Logs (up to 1000 entries for each, 2000 total events) are available for viewing from the LCD, or capable of being printed to a connected printer, or downloaded to a service computer
- Convenient PC programmer label editing
- Password access control

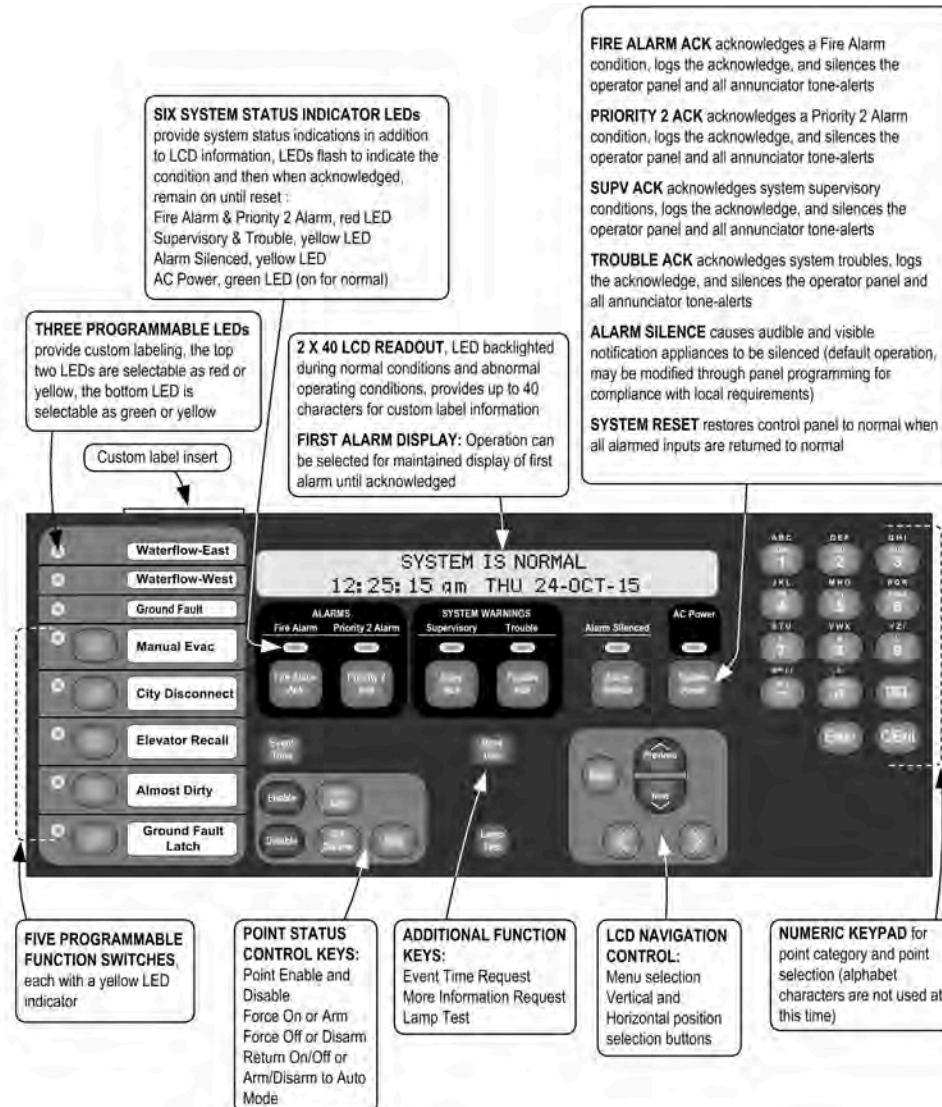
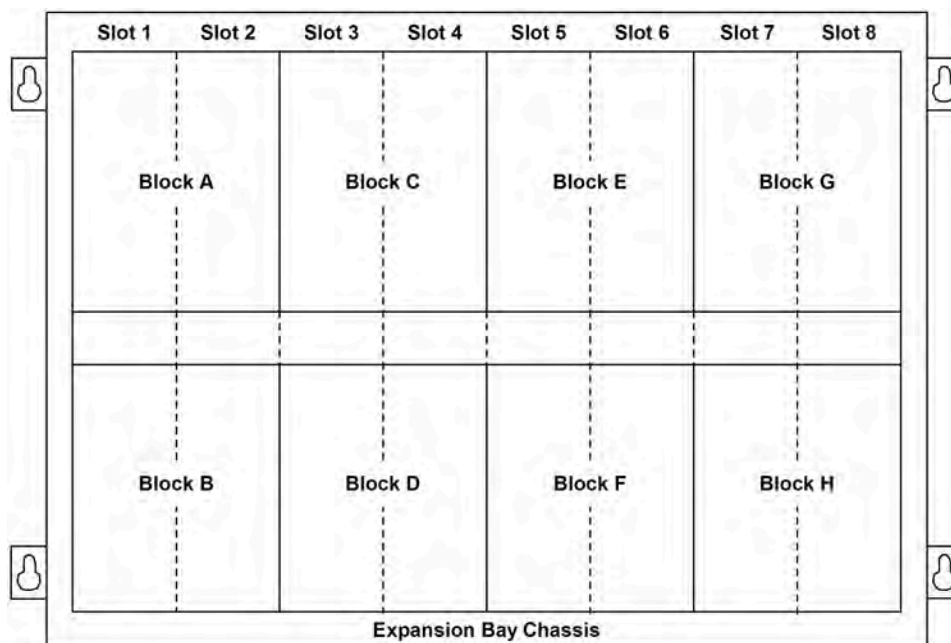


Figure 13: Operator Interface

Expansion Bay Module Loading Reference



Size Definitions: Block = 4 in. W x 5 in. H (102 mm x 127 mm) card area
 Slot = 2 in. W x 8 in. H (51 mm x 203 mm) motherboard with daughter card

Table 6: Expansion bay loading reference

Description		Mounting
IDNet 2, IDNet 2+2 Modules		1 Block
Four 2 A Relays	NON Power-limited	1 Block
Four 10 A Relays		4 in., 2 Slots
Eight 3 A Relays		1 Block
VESDA Interface		2 in., 1 Slot
Class B IDC		2 in., 1 Slot
Class A IDC		2 in., 1 Slot
MAPNET II Module		4 in., 2 Slots
MAPNET II/IDNet Isolator		2 in., 1 Slot
NAC Card		1 Block
IDNAC Card		2 Blocks (on ES Power Supply only)
ES-PS		Blocks G & H ONLY
ES-PS Configured as backup		Blocks E & F ONLY
ES-XPS		2 Blocks

Mounting and Master Controller Bay Module Reference

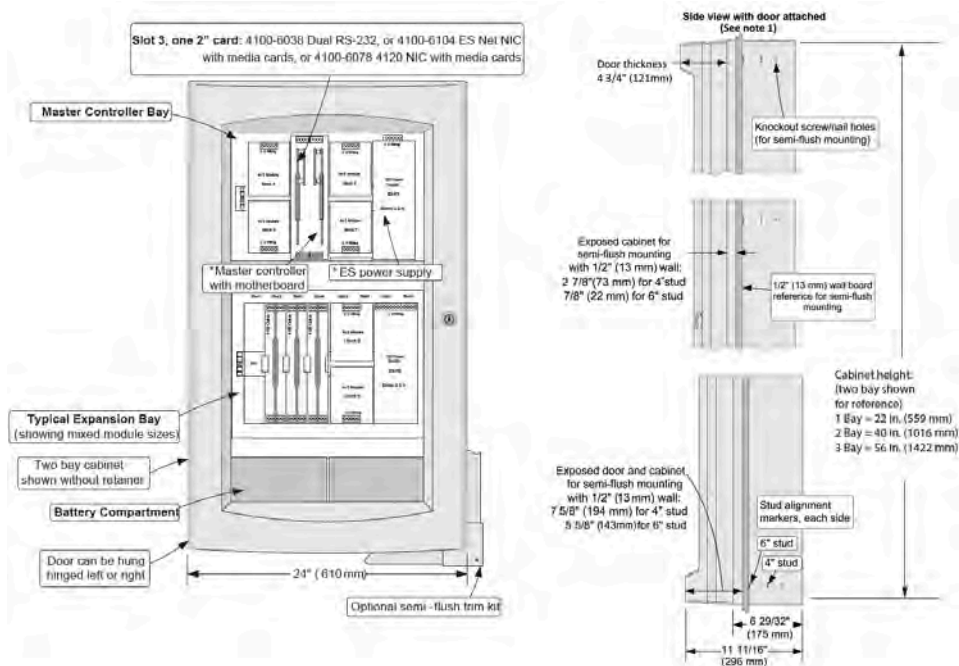


Figure 14: Mounting and CPU Bay Module Reference

Note:

1. Side View dimensions are shown with minimal cabinet and door protrusion from the exterior wall. For 6 in. stud construction with minimum protrusion shown, the door will open 90 degrees. To allow the door to open 180 degrees, the exposed cabinet dimension from the exterior wall must be a minimum of 3 in. (76 mm) for both 4 in. and 6 in. stud construction.
2. Asterisks (*) in Figure 14 indicate supplied modules.
3. A system ground must be provided for earth detection and transient protection devices. This connection shall be made to an approved, dedicated earth connection per NFPA 70, article 250, and NFPA 780.

General Specifications

Table 7: ES Power Supply Specifications (ES-PS and ES-XPS)

Specifications	Rating
AC Input Power	120 to 240 VAC
120 VAC	3.72 A
220 to 240 VAC	1.82 A
Total DC Output Power Capacity	
Without Fan	9.5 A
With 4100-5131 Fan and 4100-5451 IDNAC Module(s)	9.7 A
With 4100-5131 Fan (without 4100-5451 IDNAC Module)	12.7 A
With Regulated 24V Appliance Loads (with or without 4100-5131 Fan)	5.0 A
Special Application Appliance Loads: supports full total DC output power capacity ratings above	Simplex horns, strobes, and combination horn/strobes and speaker/strobes (contact your Simplex product representative for compatible appliances)
Regulated 24V Appliances: reduces total DC output power capacity to 5.0 A	Power for other UL listed appliances; use associated external synchronization modules where required
Auxiliary Power Tap	2 A maximum (taken from total output power capacity)
NACs Programmed for Auxiliary Power	3 A maximum per NAC, 5 A maximum total (taken from total output power capacity)
Battery Charger (ES-PS only)	Sealed Lead-Acid Batteries
Battery Ah Capacity	UL/ULC listed for battery charging of up to 110 Ah (batteries larger than 50 Ah require a remote battery cabinet)
Charger characteristics and performance	Temperature compensated, dual rate, recharges depleted batteries within 48 hours
Environmental	
Operating Temperature	32°F to 120°F (0°C to 49°C)
Operating Humidity	Up to 93% RH, non-condensing @ 90°F (32°C) maximum
Option Card Mounting	2 vertical blocks are available fore compatible modules; refer to 579-1288 installation instructions for additional details

Note:

- Battery charger is only available on the ES-PS power supply.
- When an ES-PS is used to power Flex-35 or Flex-50 Amplifiers the ES-PS battery charger is not available.

Master Controller Selection Information

Note for Table 8 and Table 9

- Supervisory and alarm currents are without IDNet devices. Add IDNet device currents separately.

Table 8: 4100ES Master Controller Selection

Model	Description	Includes	Listings	Supv.	Alarm
→ 4100-9701	ES-PS Master Controller with 2x40 Display - English	Master Controller – English, 2x40 Display, CPU Card, IDNet 2 Card supports up to 250 addressable/analog points, ES Power Supply (120 V to 240 V 50/60 Hz, 24 V Aux. Relay, 24 V Aux. Power Tap/Simple NAC, 110 Ah Battery Charger) and external RUI+ (isolated or un-isolated) communications interface.	UL/ULC	277 mA (See note)	321 mA (See note)
4100-9702	ES-PS Master Controller with 2x40 Display - Canadian French	Same as 4100-9701 above except with Canadian French user interface.	ULC		
4100-9706	ES-PS Master Controller with ES Touch Screen Display	Same as 4100-9701 above except with Color ES Touch Screen Display user interface. For dual language support, desired language is switch selectable.	UL/ULC, CSFM	362 mA (See note)	441 mA (See note)
4100-9709	ES-PS Master Controller without Display - English	Same as 4100-9701 above except with no 2x40 Display or user interface.	UL/ULC	277 mA (See note)	321 mA (See note)

Note:

- The Master Controller current draw specifications do not include IDNet, NAC, or IDNAC current draws. These must be added separately as required.
- International orders may substitute MX Loop Module (4100-3120) in place of IDNet 2 Module (4100-3117). Refer to data sheet S4100-0059 for more details. The 4100-3120 provides the same module and specifications as the 4100-6311 but is dedicated as a Master Controller feature selection.
- At the time of publication English and Canadian French languages are available for ES Touch Screen Display models. Contact your local Simplex product supplier for the latest status and availability for other languages.

Table 9: 4100ES Master Controller Upgrades for Existing 4100 Series Fire Alarm Control Panels

Model	Panel Type	Includes
4100-7150	1000 pt 4100 (4100+)	New Master Controller CPU card, 4100ES door assembly with 2 x 40 LCD operator interface, and Ethernet connection
4100-7152	512 pt 4100	Same as 4100-7150 plus a Universal Power Supply
4100-7158	4100U or 1000 pt 4100 (4100+) previously upgraded to 4100U	New Master Controller CPU card with Ethernet Connection Upgrade Kit (door assembly with user interface not included) for: 4100U with or without operator interface, or 4100+ and operator interface, or an existing 4100 (512 pt) or 4100+ (1000 pt) panel that was previously upgraded to a 4100U Master Controller and operator interface
4100-7162	1000 pt 4100 (4100+)	New Master Controller CPU card, 4100ES door assembly with Color ES Touch Screen Display user interface and Ethernet connection for 4100+ cabinet (requires 4100ES Version 6.01 or higher)
4100-7163	4100+ Cabinet upgraded with New Master Controller CPU card	4100ES door assembly with Color ES Touch Screen Display user interface and Ethernet connection for 4100+ cabinet previously upgraded with New Master Controller CPU card (requires 4100ES Version 6.01 or higher)
4100-7164	2000 pt 4100 (4100U)	New Master Controller CPU card, 4100ES door assembly with Color ES Touch Screen Display user interface and Ethernet connection for 4100U cabinet (requires 4100ES Version 6.01 or higher)

Table 10: ES Touch Screen Display User Interface Upgrade Kit

Model	Panel type	Description
4100-7165	4100ES or 4010ES	New ES Touch Screen Display User Interface for upgrading an existing 4100ES 2x40 LCD or InfoAlarm User Interface, or for upgrading an existing 4010ES InfoAlarm User Interface to a new ES Touch Screen Display User Interface

Table 11: Master Controller Accessories

Model	Description
→ 4100-2300	Expansion Bay Assembly; order for each required expansion bay (not required for 4100-9121)
4100-2303	Legacy Module Stabilizer Bracket, used when expansion bays have legacy slot style modules
4100-2301	Expansion Bay Upgrade Kit for mounting 4100ES style (4 in. x 5 in. modules) in existing 4100 style panels; Note: When using this kit to upgrade a 4100+ transponder, a 4100-0620 Transponder Interface Card (TIC) is also required for communications to the 4100ES module

Table 12: Master Controller Upgrades for Existing 4020 Series Fire Alarm Control Panel

Model	Description
4100-9833	4020 Master Controller Upgrade to 4100ES; Includes New Master Controller with 2 x 40 LCD & operator interface assembly, 8 VDC Converter and RUI+ (isolated or un-isolated) Interface in a single bay cabinet with locking glass door and retainer; mounts as an adjunct panel close-nipped to existing 4020 cabinet; also includes 8 VDC box-to-box power and communications harness and solid filler panel for the existing 4020 Master Controller bay

Module Selection Information

Current Calculation Notes

To determine total supervisory current, add currents of modules in panel to base system value and all external loads powered by panel power supplies.

To determine total alarm current, add currents of modules in panel to base system alarm current and add all panel NAC loads and all external loads powered from panel power supplies.

Table 13: Communication Modules

Model	Description	Size	Supv.	Alarm	
4100-1291	Un-isolated remote unit interface module (RUI); up to three maximum per control panel	1 Slot	85 mA	85 mA	
4100-6031	City Circuit, with disconnect switches	1 Block	20 mA	36 mA	
4100-6032			City Circuit, without disconnect switches	20 mA	36 mA
4100-6033			Alarm Relay, three Form C relays, 2 A @ 32 VDC	15 mA	37 mA
4100-6038	Dual Port RS-232 with 2120 interface (slot module)	1 Slot	132 mA	132 mA	
4100-6046	Dual Port RS-232 standard interface (4 in. x 5 in. module)	1 Block	60 mA	60 mA	
4100-6048	VESDA Aspiration System Interface	1 Slot	132 mA	132 mA	
4100-6080	DACT, Point or Event Reporting; one shipped unless 4100-7908 is selected; two max. per system; includes two 2080-9047 cables, 14 ft (4.3 m) long, RJ45 plug and spade lugs	Side Mt.	30 mA	40 mA	

Table 14: Connected Services Gateway with IP communicator

Model	Description	Size
4100-2504	Connected Services Gateway with IP communicator, side mount	1 slot
4100-2506	Connected Services Gateway with IP communicator, vertical mount	2 blocks

Table 15: ES Power Supplies

Model	Voltage	Description	Includes	Provides Power to Bay	Size	Supv.	Alarm
→ 4100-5401	120 to 240 V 50/60 Hz	ES-PS	24 V Aux. Relay, 24 V Aux. Power 2 A Tap/ Simple NAC, 110 Ah Battery Charger, 2 PDI Blocks for compatible option cards.	Yes	2 Blocks	68 mA	77 mA
→ 4100-5402	120 to 240 V 50/60 Hz	ES-XPS	Same as ES-PS above, except without battery charger	No			

Table 16: Power supply accessories

Model	Description	Size	Current
4100-5152	12 VDC Power Option, 2 A maximum	1 Block	1.5 A maximum
4100-0156	8 VDC Converter, required for multiple Physical Bridge Modules, 3 A maximum	1 Block	included with loads
4100-5130	Voltage Regulator Module, 22.8 to 26.4 VDC (25 VDC nominal); isolated and resettable output; includes earth detection circuit and trouble relay for status monitoring.	1 Block	3 A maximum with 2.5 A load, 4.9 A maximum with 4 A load
→ 4100-5131	ES-PS Fan Module, allows more than one power supply to be installed in a single bay and may increase total DC output power capacity per power supply. See Table 7 for specifications.	N/A	0 mA Supv. 200 mA Alarm
4100-0636	Box Interconnection Harness Kit (non-audio); order one for each close-nippled cabinet		
4100-0638	4100 Slot Module Additional 24 VDC Harness; needed when 4100 Slot module requirements exceed 2 A from ES-PS		
4100-5403	Harness for ES-PS Backup Power Supply		
4100-0644	120 VAC PDM Harness	One PDM harness is required per power supply, select as required for appropriate input voltage	
4100-0645	220 VAC PDM Harness		
4100-0646	230 VAC PDM Harness		
4100-0647	240 VAC PDM Harness		

Table 17: Conventional and Addressable Notification Appliance Modules

Model	Description	Outputs	Size	Max Load - Special Application*		Max Load - Regulated 24 V		Current Draw	
				On ES-PS / ES-XPS	In Bay	On ES-PS / ES-XPS	In Bay	Supv.	Alarm
4100-5450**	Conventional NAC Module	Three 3 A NACs	1 Block	3.0 A / NAC 9.0 A / Card	3.0 A / NAC 6.0 A / Card	2.0 A / NAC 5.0 A / Card	2.0 A / NAC 2.0 A / Card	66 mA	66 mA
→ 4100-5451**	IDNAC Addressable Notification SLC Module	Three 3 A SLCs	2 Blocks (on ES Power Supply only)	3.0 A / NAC 9.0 A / Card	N/A	N/A		124 mA	230 mA

*Special Application specifications apply to both Special Application and Steady Aux Power loads during alarm operation. Available power during non-alarm operation is 5.0 A maximum.

**The 4100-5450 and 4100-5451 can only be powered from a 4100-5401 and 4100-5402 power supply.

Table 18: Dual Class A Isolator for IDNAC

Model	Description	Size	Supv.	Alarm
4100-6103	Dual Class A IDNAC Isolator (DCAI) , converts a single Class B IDNAC SLC input to two Class A SLC outputs; provides short circuit isolation between each Class A output circuit; connect up to two DCAI Modules per IDNAC SLC input up to a maximum of 6 DCAI Modules per IDNAC SLC; each isolated output SLC used requires one IDNAC address; the total current remains controlled by the Class B input source SLC at 3 A maximum; each isolated loop supports up to 30 device addresses Note: Up to 30 additional device addresses may be installed between each 4905-9929 TrueAlert Addressable Isolator+ Module, not to exceed the maximum address and unit loading specifications for the IDNAC channel	1 Block	8.3 mA	18.5 mA

Table 19: 8-Point Zone/Relay Card

Model	Description	Size	Supv.	Alarm
4100-5013	8 point zone/relay 4 in. x 5 in. flat module. Supports eight Class B or four Class A IDCs. Mounts in any open block in a master controller or expansion bay. Alarm current shown is for eight Class B IDCs using 3.3K end-of-line-resistors with four in alarm and four in standby. Standby current shown is for all eight IDCs in standby. Refer to 579-1236 Zone/Relay Module Installation Instructions for additional information.	1 Block	83 mA	295 mA
4100-6305	25 V regulator harness for 8 point zone/relay module. One required for each 8 point zone/relay module to be powered by the 4100-5130 25 V regulator module. A maximum of five 8 point zone/relay modules may be powered from the 4100-5130 per bay.	N/A	N/A	N/A

Note: Modules in Table 19 requires 4100ES Version 3.06 or later.

Table 20: IDNet Addressable Interface Modules

Model	Description	Devices	Standby	Alarm
4100-3109	IDNet 2 Module, 250 point capacity; electrically isolated output with two short circuit isolating Class B or Class A output loops, 1 block; standard on ES-PS with IDNet 2 Module; alarm currents for 50 and above devices includes 20 device LEDs in alarm	none	50 mA	60 mA
		50	90 mA	150 mA
		125	150 mA	225 mA
4100-3110	IDNet 2+2 Module, 250 point capacity; electrically isolated output with four short circuit isolating Class B or Class A output loops, one block; alarm currents for 50 and above devices includes 20 device LEDs in alarm	250	250 mA	350 mA
		none	50 mA	60 mA
		50	90 mA	150 mA
4100-3111	IDNet Short Circuit Isolating Loop Output Module; mount up to two on a 4100-3109 or 4100-3117 module; this option is for aftermarket field installation only. Total initiating SLCs per CPU, including VESDA Interface is 30.	125	150 mA	225 mA
		250	250 mA	350 mA

Note: Each IDNet 2 and IDNet 2+2 Short Circuit Isolating Loop Output can be individually controlled for system diagnostics and can be assigned a public point for Fire Alarm Network

Table 21: Current draw for each IDNet device

Condition	Current
Standby	0.8 mA
Alarm, with LED off	1.0 mA
Alarm, with LED on	3.0 mA

Note: A maximum of 20 devices with LED on is supported for each channel. Additional device LEDs do not turn on.

Table 22: MAPNET Addressable Interface Modules

Model	Description	Supv.	Alarm
4100-3102	MAPNET II Module, 127 point capacity, add devices separately; Module size = 2 Slots; Loading per MAPNET II device = 1.7 mA	Module without devices	275 mA
		Fully loaded module, total	491 mA
4100-3103	Isolator Module for MAPNET II communications; converts a single connected SLC into four isolated outputs selectable as Class A or Class B; up to two Isolator Modules can be connected to one SLC; Module size = 1 Slot; Note: Compatible with MAPNET II Remote Isolators only	50 mA	50 mA

Table 23: Relay Modules; Non power-limited (for mounting in expansion bay only)

Model	Description	Resistive Ratings		Inductive Ratings		Size	Supv.	Alarm
4100-3202	4 DPDT w/feedback	10 A	250 VAC	10 A	250 VAC	2 Slots	15 mA	175 mA
4100-3204	4 DPDT w/feedback	2 A	30 VDC/VAC	1/2 A	30 VDC/120 VAC	1 Block	15 mA	60 mA
4100-3206	8 SPDT	3 A	30 VDC/120 VAC	1-1/2 A	30 VDC/120 VAC	1 Block	15 mA	190 mA

Table 24: Miscellaneous Accessories

Model	Description
4100-1279	Single blank 2 in. display cover; 4100-2302 provides a single plate for a full bay
4100-9856 *	4100ES Canadian French Appliqué Kit; Simplex, 4100ES, Contrôle Incendie
4100-9857 *	4100ES English Appliqué Kit; Simplex, 4100ES, Fire Control
4100-9858 *	4100ES InfoAlarm Remote Display English Appliqué Kit; Simplex, Operator Interface, 4100ES
4100-9859 *	4100ES InfoAlarm Remote Display Canadian French Appliqué Kit; Simplex, Interface de l'opérateur, 4100ES
4100-9868	Special Purpose Appliqué Kit: Simplex, Elevator Recall Control and Supervisory Control Unit, 4100ES
4100-9869	Special Purpose Appliqué Kit: Simplex, Sprinkler Waterflow and Supervisory Station, 4100ES
4100-9835	Termination and Address Label Kit (for module marking); provides additional labels for field installed modules

Table 24: Miscellaneous Accessories

Model	Description
4100-6034	Tamper Switch, one per cabinet assembly if required; monitors solid door for panels with solid door; monitors the internal retainer panel for panels with glass door (not the glass door); has a built-in addressable IDNet IAM
2081-9031	Series resistor for WSO, IDCs (N.O. water flow and tamper on same circuit, wires after water flow and before tamper) 470 Ω, 1 W, encapsulated, two 18 AWG leads (0.82 mm ²), 2 1/2 in. L x 1 3/8 in. W x 1 in. H (64 mm x 35 mm x 25 mm)

Note: * 4100ES English Appliqués are included with 4100ES Upgrade and Retrofit Kits for mounting 4100ES in 4100, 2120, 2001, and Simplex back boxes so that upgrades can be easily identified as 4100ES. 4100ES Appliqué Kits are available for applications such as to update Remote InfoAlarm Displays connected to a panel that was upgraded to 4100ES or for an existing 4100U when the New Master Controller is upgraded to 4100ES and only a software upgrade is required. When required, French appliqués are ordered separately.

Network Interface and Network Media Card Product Selection

4100ES fire alarm control units are compatible with Simplex ES Net network or 4120 network fire alarm products.

- Refer to datasheet [S4100-0076](#) for additional information on compatible ES Net fire alarm products.
- Refer to datasheet [S4100-0056](#) for additional information on compatible 4120 fire alarm products.

Additional 4100ES and Network Product Reference

Table 25: Additional 4100ES and Network Product Reference

Subject	Data Sheet
Serial DACT (SDACT) for 4100ES, 4010ES, 4007ES	S2080-0009
Connected Services Gateway - Central Station Communication and SafeLINC Cloud Services	S2080-0091
Battery and Battery Cabinet Reference for 4100ES	S2081-0006
110 Ah Batteries and Cabinets for 4100ES	S2081-0012
4009 IDNet NAC Extender	S4009-0002
4009 IDNAC Repeater	S4009-0004
External 110 Ah Battery Charger for 4100ES, 4010ES	S4081-0002
Graphic I/O Modules for 4100ES, 4010ES, 4007ES	S4100-0005
Interface to VESDA Air Aspiration Detection Systems	S4100-0026
4100ES LED/Switch Modules & Printer	S4100-0032
Master Clock Interface	S4100-0033
4100ES Enclosures	S4100-0037
4100ES Extinguishing Release Applications	S4100-0040
TFX Interface Module	S4100-0042
2120 BMUX Module	S4100-0048
Multiple Signal Fiber Optic Modems for 4120 Networks	S4100-0049
BACpac Ethernet Module	S4100-0051
4120 Network Products and Specifications	S4100-0056
Building Network Interface Card (BNIC)	S4100-0061
SafeLINC Internet Interface	S4100-0062
Emergency Voice/Alarm Communications Equipment with ES-PS Power Supplies	S4100-1034
MINIPLX Transponders with ES-PS Power Supplies	S4100-1035
NDU with ES-PS Power Supplies for 4120 Network	S4100-1036
4100ES Remote Annunciator Panels with ES-PS Power Supplies	S4100-1039
Remote ES Touch Screen Displays for 4100ES and 4010ES Panels	S4100-1070
ES Net Network Products and Specifications	S4100-1076
NDU with ES-PS Power Supplies for ES Net	S4100-1077
TrueSite Workstation	S4190-0016
TrueSite Incident Commander	S4190-0020
Network System Integrator (NSI) for ES Net and 4120 Networks	S4190-0026
24-Pin Dot Matrix Fire Alarm System Remote Printer	S4190-0027
SCU/RCU Annunciators for 4007ES, 4010ES, 4100ES	S4602-0001
LCD Annunciator for 4100ES	S4603-0001

Features

Emergency voice/alarm communications provide:

- Alarm/evacuation signal generation with multiple built-in tones
- Standard or customized digital message storage and message generation
- Automatic or manual operation
- Mass Notification operation

Multiple channels are available:

- Analog audio systems provide dual channel operation
- Digital audio systems provide up to eight channels over a single wire pair

Communications features:

- Up to five supervised remote microphone inputs
- Spoken voice coding from the digital message player
- Multiple digitally recorded human voice messages
- Spoken WALKTEST system testing
- Separate evacuation, drill, and optional *All Clear* voice messages and tones
- Ready-to-talk microphone indicator on front panel audio control module
- Local panel speaker for tone or message broadcast verification
- MINIPLEX Voice Transponders are available for distributed audio

Amplifiers are available with analog or digital input:

- Flex-35 (35 W) and Flex-50 (50 W) amplifiers provide a dual channel design with configurable operation modes
- 100 W primary and backup, single channel amplifiers include a built-in power supply
- Amplifiers are available for 25 VRMS or 70.7 VRMS output with onboard, power-limited NACs (only one voltage choice for each system)
- Built-in Temporal Pattern horn tone provides default backup signal operation
- Optional modules provide power-limited NAC expansion, convert Class B NACs to Class A operation, and provide Constant Supervision Operation for Non-Alarm Audio (NAA) applications (NAA requires additional hardware, and software revision 11.08 or higher)

Firefighter telephone systems:

- Master telephone can simultaneously talk with up to six remote telephones and can be connected as an audio input for broadcast messages
- Ring signal on remote firefighter telephone indicates that a call request is initiated and a hold signal indicates that a connected line has been deselected
- Telephone circuits are supervised for open and short circuits, too many telephones connected, and the master telephone is supervised for cord integrity
- Degraded mode allows remote telephones to remain connected to each other in the event of a communications loss



Figure 1: 4100ES Fire Alarm Control Panel with ES Touch Screen Display and Voice Options

Listings information*

- UL 864, Fire Detection and Control (UOJZ), Smoke Control Service (UUKL), Releasing Device Service (SYZV), Emergency Communication and Relocation Equipment (UOQY)
- UL 1076, Proprietary Alarm Units - Burglar (APOU)
- UL 2017, Process Management Equipment (QVAX), Emergency Alarm System Control Units (FSZI)
- UL 1730, Smoke Detector Monitor (UULH)
- UL 2572, Mass Notification Systems (PGWM)
- CAN/ULC-S527 Control Units for Fire Alarm Systems (UOJZ7), Releasing Device Service (SYZV7)
- CAN/ULC-S559 Central Station Fire Alarm System Units (DAYR7)
- ULC/ORD-C1076 Proprietary Burglar Alarm Units and Systems (APOU7)
- ULC/ORD-C100 Smoke Control System Equipment (UUKL7)

Description

4100ES Audio Systems

4100ES Audio Systems provide voice communication, alarm tones, and digitally prerecorded voice messages to alert occupants of fire or other emergency situations. Automatically generate evacuation signaling by using alarm initiated event programs or by firefighting personnel using the operator controls.

Audio Controller Module Description

The Audio Controller Module provides digitized alarm tones and digitally recorded voice messages and message construction, and manages both microphone inputs and other auxiliary inputs connected to the optional Auxiliary Audio Input Module. The audio control module's message memory digitally records and stores tones and voice messages.

* This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7165-0026:251 for allowable values and/or conditions concerning material presented in this document. Accepted for use – City of New York Department of Buildings – MEA35-93E. Additional listings may be applicable; contact your local Simplex product supplier for the latest status.

Two versions are available: **Analog** and **Digital**. Systems must be either analog or digital, not intermixed. One audio control module controls the entire audio system.

Common audio control board features:

- Onboard digital message memory provides up to two minutes at normal resolution or one minute at high resolution
- Connects to a maximum of two optional 4-input audio input modules for a total of up to six microphones and 11 distinct audio inputs
- Memory expansion is available to provide up to 8 minutes or 32 minutes at normal resolution (four minutes or 16 minutes at high resolution)
- Connections for a Master Microphone and one Remote Microphone, compatible with standard or noise-canceling microphones
- Master telephone to audio interface connection uses the audio bay's Power Distribution Interface Module (PDI)
- Local panel speaker output with onboard volume control
- Onboard download port for message loading
- The microphone ready-to-talk LED is located on the front panel audio control module (see Figure 2) and requires connection to a 64 LED/64 switch controller
- You can directly connect digital or analog audio risers to 31 remote nodes. For applications requiring audio risers to more than 31 nodes, contact your Simplex product representative for details about alternate connection methods.

Analog Audio Controller Modules

Analog audio control modules are for systems that require one or two simultaneous channels of audio information per the following feature summary.

- Built-in 10 VRMS riser output eliminates the need for separate riser amplifiers available as Class B or Class A
- Messages can play on one or both risers simultaneously, with the same or a different message
- Analog audio controllers are for connection to analog input audio amplifiers and audio risers only
- Onboard status LEDs assist with setup and troubleshooting

Digital Audio Controller Modules

Digital audio control modules are for systems that require more than two simultaneous channels of audio information as per the following feature summary.

- Up to eight channels of information at normal resolution are available (four channels at high resolution) on one twisted wire pair
- Primary one Digital Audio Riser (DAR) output can be either wired Class B or Class X; Primary 2 DAR is an identical, separate output for Class B connections, for example, to local MINIPLEX voice transponders
- Digital audio controllers are for connection to digital input audio amplifiers and digital audio risers only

Audio Tone List

The Temporal 3 Pattern is available for compatible tones:

(1/2 s on, 1/2 s off, 1/2 s on, 1/2 s off, 1/2 s on, 1-1/2 s off) to indicate evacuation.

The following is a list of the standard audio tones.

- **Horn:** continuous 520 Hz tone, primarily used for coded systems or general temporal pattern signaling; 520Hz tone is compliant with NFPA 72 Low Frequency Signal Requirements for Sleeping Areas
- **Chime:** a digitally recorded mechanical chime tone, normally used free-running or for coded operation
- **Bell:** a digitally recorded mechanical bell sound, normally used free-running, for coded systems, or general temporal pattern signaling

- **Fast Whoop:** a quickly ascending tone
- **Slow Whoop:** a slowly ascending tone
- **High/Low:** with high frequency of 750 Hz for 100 ms and low frequency of 500 Hz for 400 ms
- **Beep:** 500 Hz tone of 0.7 s on, 0.7 s off
- **Stutter:** 500 Hz tone with on and off times of 100 ms
- **Wail:** ascends, then descends between 600 to 940 Hz
- **GSA Tone:** continuous 2000 Hz tone

Audio Controller Message Description

Zone Coded Signaling is available using tones or spoken numbers. Spoken coded messages can be used in place of conventional pulse tone coding to eliminate counting and interpretation of the zone coded location. For example, a fire alarm zone such as First Floor East, Smoke Detector Room 23 is Code 1123.

Two possible transmission schemes are:

1. Conventional Zone Coded Signaling where T = Tone:
T...T...TT...TTT...T...T...TT...TTT...
2. Spoken Coded Signaling: *Code, one..one..two..three; Code, one..one..two..three*

The Audio Controller precedes spoken codes with phrases and alert tones. Alternatively, in the previous example a chime tone can precede the scheme, and the phrase *Doctor Firestone, please dial....* can precede the word *code*.

Preprogrammed Special Messages can be ordered. Up to 32 minutes of special phrases and messages are available to meet specific applications. The standard Evacuation Message is: *Attention... Attention... Attention...An emergency has been reported.... All occupants walk to the nearest stairway exit and walk down to your assigned re-entry floor or main lobby... Do not use the elevator... Walk to the nearest stairway.... Do not use the elevator.... Walk to the nearest stairway.*

Custom Message Ordering is summarized in Table 1.

Table 1: Custom Message Ordering

Model	Description
4100-8804	Select when Custom Messages are required , choose message types from below as required (minimum quantity of one)
4100-0822	Custom Messages from Tape
4100-0823	Custom Messages from Transcript; NOTE: Send transcript in advance to Applications Engineering to verify phrase quantity
4100-0824	Custom Messages from Archive
	CO Relocation Message; Temporal 4 Pattern horn tone with English male voice instruction; identify as "UCSET1393" when ordering

Audio Amplifiers General Description

4100ES audio amplifiers are available as dual channel models rated for 35 W (Flex-35) or 50 W (Flex-50) and as single channel 100 W models with onboard notification appliance circuits (NACs) for convenient field wiring. Common features are summarized as follows:

- **Analog** input amplifier models are for single or dual channel system operation
- **Digital** input amplifier models are for multi-channel system operation providing up to eight channels over a single twisted wire pair
- Amplifiers are power-limited with models available providing 25 VRMS, or 70.7 VRMS output
- When Non-Alarm Audio (NAA) applications (such as for background music, paging, or for mass notification) are required, optional Constant Supervision modules provide continued speaker zone supervision during the page or while background music is playing; due to the NAA supervision requirements, when amplifiers are used for paging or playing background music, output power is derated to 70% of alarm output rating (24.5 W, 35 W, and 70 W); during alarm conditions full amplifier output power is available
- Linear power output stages are traditional Class B designs for low distortion and low EMI
- An onboard 500 Hz temporal pattern horn tone on each amplifier provides a default backup tone
- Supervision actively monitors amplifier gain in real time, comparing output level to input level
- Onboard test switches can be activated to test and observe amplifier backup
- Onboard overcurrent protection protects against overloads and short circuits
- Each amplifier communicates to the host CPU and allows voltage and current values to be accessed from the fire alarm control panel operator interface

Flex-35 and Flex-50 Amplifiers, General

Flex-35 and Flex-50 amplifiers are a *self-backup dual channel design* that provide a total of 35 W or 50 W of audio power with the following common feature summary:

- Self-backup feature allows NACs connected to a disabled amplifier channel to be routed to the remaining channel with the full 35 W or 50 W providing the single channel as selected by the fire alarm control panel programming; external backup amplifiers are not required
- Three standard onboard audio NACs are each rated for 2 A maximum and are capable of being routed to either required amplifier channel
- Digital models of the Flex-35 and Flex-50 have a digital decoder module that selects one or two of the input channels as required
- Selectable reduced output levels of -12 dB or -6 dB are available for non-emergency audio output, selectable for each channel

Flex-35 Amplifiers

- Each Flex-35 channel is capable of up to 35 W output with a total of 35 W
- Channels can be divided as 0 W and 35 W; 17.5 W and 17.5 W; 10 W and 25 W; or any combination that totals 35 W or less

Flex-50 Amplifiers

- Each Flex-50 channel is capable of up to 50 W output with a total output of 50 W
- Channels can be divided as 0 W and 50 W; 25 W and 25 W; 10 W and 40 W; or any combination that totals 50 W or less

Dual Flex-35 or Flex-50 Connections

- Two Flex-35 amplifiers, or two Flex-50 amplifiers can connect to a

single ES Power Supply (ES-PS) in the same audio expansion bay (amplifiers must be the same model number); ES-PS output is dedicated to amplifier power

- Mounting for dual Flex-35 or Flex-50 amplifiers is Blocks A and B for amplifier 1, Blocks C and D for the ES-PS, blocks E and F are not used, and Blocks G and H are for amplifier 2 (refer to Table 12)

100 W Audio Amplifiers

100 W amplifiers provide single channel operation as outlined in the following feature summary:

- Six standard onboard Class B audio NACs are each rated for 2 A maximum
- 100 W amplifiers include a built-in power supply and use system battery backup
- Amplifier and power supply size requires four continuous blocks of expansion bay size
- A single 100W primary amplifier or both a primary and a backup amplifier can be located on a single expansion bay (refer to Table 12)
- Redundant (backup) amplifiers interconnect directly to minimize wiring connections and their power is routed through the NACs of the primary amplifier
- Redundant amplifier operation can be configured as one-for-one or one-for-many depending on specific requirements
- Digital models of these amplifiers have a digital decoder module that selects the required input channel per system requirements
- Selectable reduced output levels of -12 dB or -6 dB are available for non-emergency audio output
- Compatible with ES-PS power supply. Power supplies used to power 100W amplifiers can provide power for other compatible equipment within their rated output.

Audio NAC Expansion Modules

- For applications requiring additional NACs, modules are available for onboard expansion and further expansion is available with the chassis mounted 4100-5116 Expansion Signal Module
- 100 W Amplifiers support optional modules that convert the six audio NACs to Class A or to increase the Class B audio NACs to twelve

Note: Adding NAC expansion modules does not increase amplifier power beyond the stated rating.

Audio Bay Reference with Single Channel Audio Control and Firefighter Telephone Modules

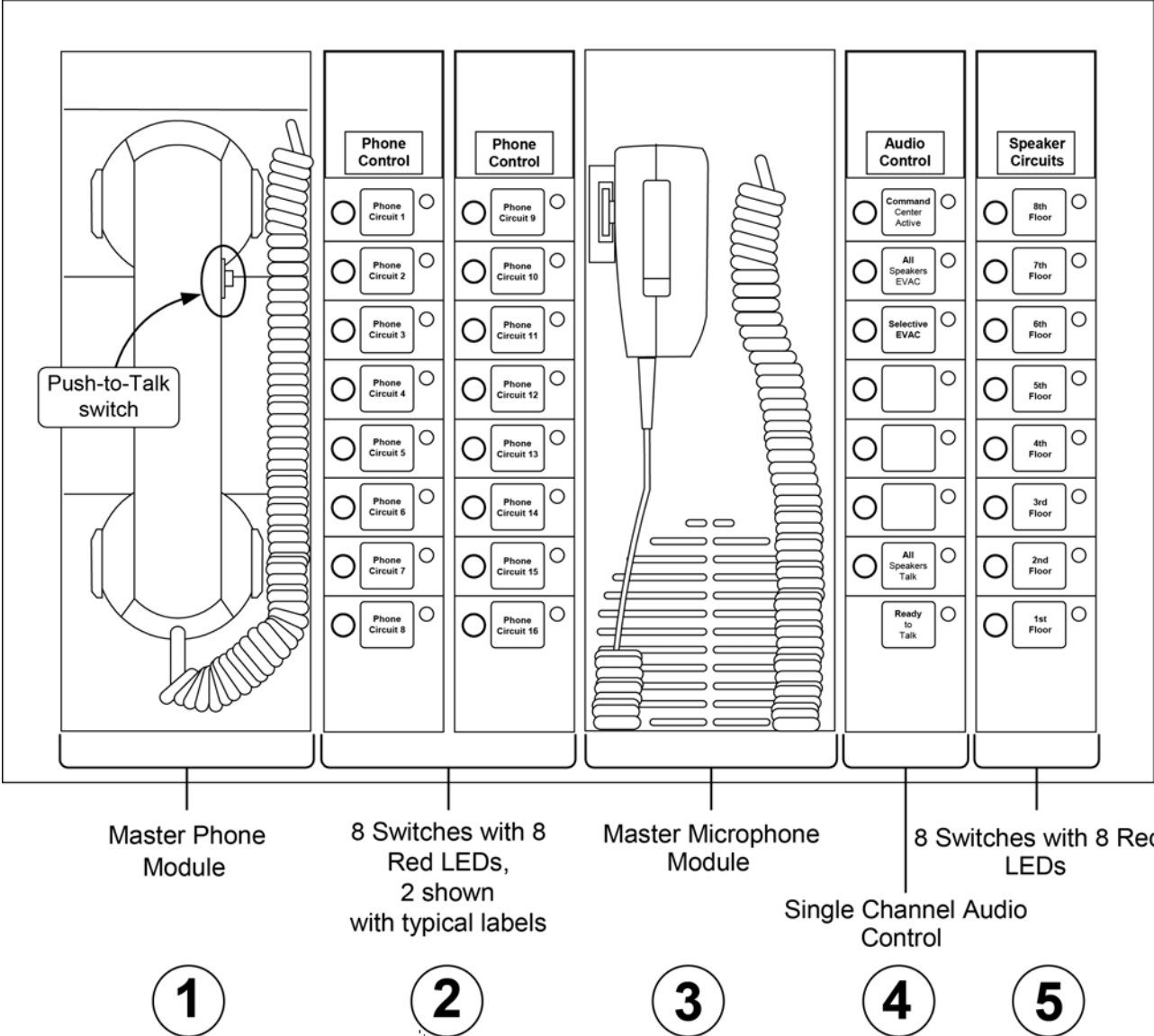
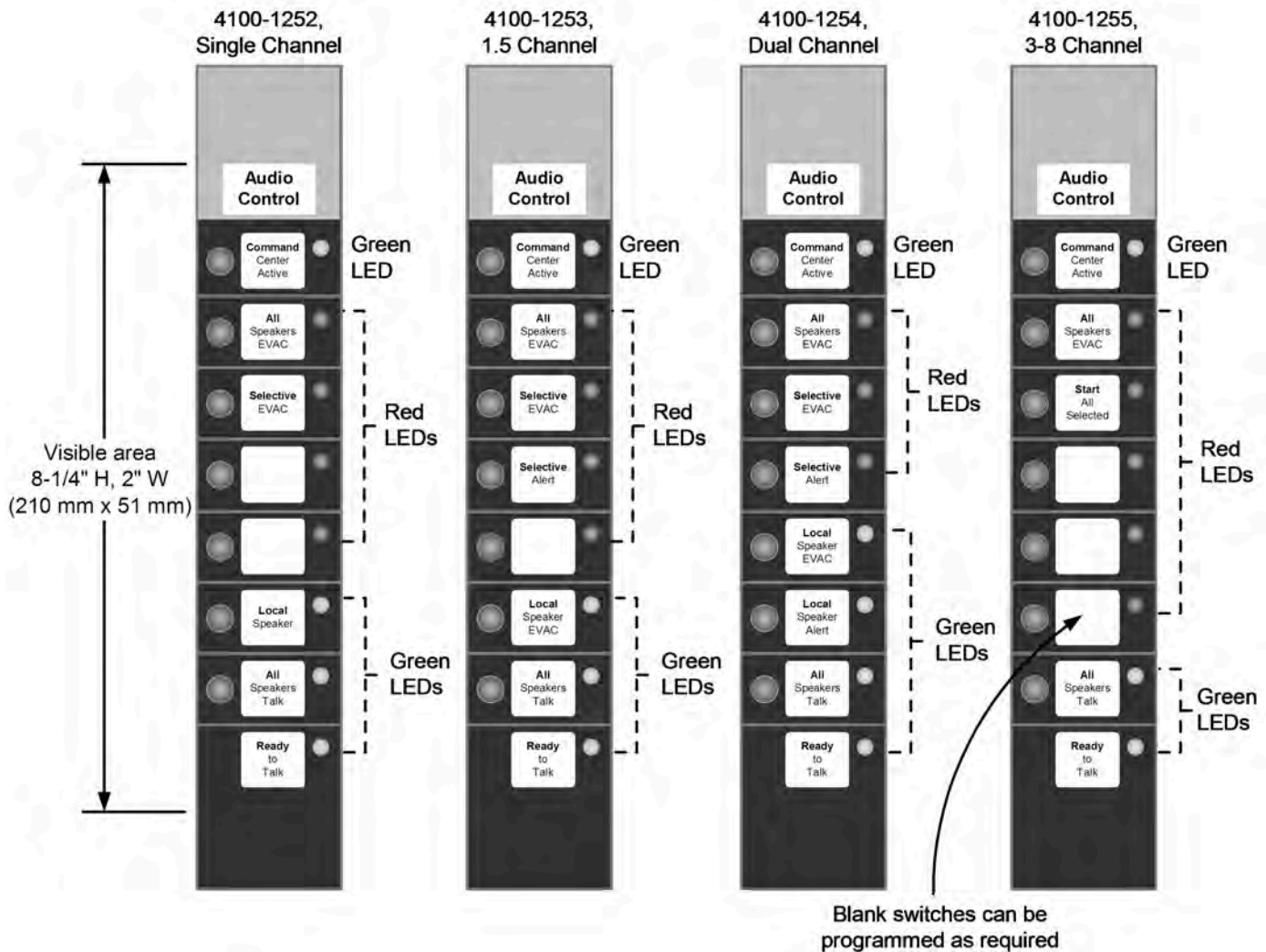


Figure 2: Audio Bay Reference with Single Channel Audio Control and Firefighter Telephone Modules

Callout	SKU
1	4100-1270
2	4100-1280
3	4100-1243
4	4100-1252
5	4100-1280

Audio Control Modules



Module	SKU
Single Channel	4100-1252
1.5 Channel	4100-1253
Dual Channel	4100-1254
3 - 8 Channel	4100-1255

Emergency Voice/Alarm Communications Equipment Product Selection

Note: Select systems as either analog or digital. When amplifiers are used for Non-Alarm Audio paging or background music with Constant Supervision, *output power is derated to 70% of alarm power* (24.5 W, 35 W, and 70 W); full output is available for alarm.

Table 2: Analog Emergency Voice/Alarm Communications Equipment, Constant Supervision Compatible

Model	Description	Details		
4100-9620	Basic Analog Audio Operation with microphone, requires dedicated expansion bay	Includes: Expansion Bay, 4100-1210 Analog Controller Board, Microphone Module, and Audio Expansion Bay Kit		
4100-1210	Analog Controller Board; order the expansion bay and audio expansion bay kit separately	Controller board mounts in Blocks A and B		
4100-1361	25 VRMS output	Flex-35, 35 W Amplifier, constant supervision compatible	NAC rating = 1.4 A	Includes three onboard Class B audio NACs; power is supplied from an ES-PS
4100-1362	70.07 VRMS output		NAC rating = 0.5 A	
4100-1312	25 VRMS output	Flex-50, 50 W Amplifier, constant supervision compatible	NAC rating = 2 A	
4100-1313	70.7 VRMS output		NAC rating = 0.707 A	

Note: Refer to data sheet S4100-1031 for power supply details.

Table 3: 100 W Analog Amplifiers with Power Supply, Constant Supervision Compatible

Model/Output Voltage		Power Supply Input/Listing		Description	Details
25 VRMS	70.7 VRMS				
4100-1314	4100-1315	120 VAC, 60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 100 speakers maximum; 2 A @ 25 VRMS (50 W); 1.414 A @ 70.7 VRMS (100 W)
4100-1316	4100-1317	120 VAC, 60 Hz	ULC		
4100-1318	4100-1319	220/230/240 VAC, 50/60 Hz	UL		
4100-1320	4100-1321	120 VAC, 60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier
4100-1322	4100-1323	120 VAC, 60 Hz	ULC		
4100-1324	4100-1325	220/230/240 VAC, 50/60 Hz	UL		

Note: ULC models have low battery dropout circuit.

Table 4: Digital Emergency Voice/Alarm Communications Equipment, Constant Supervision Compatible

Model	Description		Details		
→ 4100-9621	Basic Digital Audio Operation with microphone, requires dedicated expansion bay		Includes: Expansion Bay, 4100-1311 Digital Controller Board, Microphone Module, and Audio Expansion Bay Kit		
4100-1412*	ES Net basic audio with microphone requires a dedicated expansion bay.		Includes an expansion bay, the 4100-1411 digital controller board, a microphone module, an Ethernet cable, and an audio expansion bay kit.		
4100-1311	Eight Channel Digital Controller Board; order the expansion bay and audio expansion bay kit separately		Controller board mounts in Blocks A and B		
4100-1411*	An ES Net eight-channel digital controller board only. Order the expansion bay and audio expansion bay kit separately.		The controller board mounts in blocks A and B. The controller board contains a 32 minute message memory and does not require message memory expansion.		
4100-1363	25 VRMS output	Flex-35, 35 W Amplifier, constant supervision compatible	NAC rating = 1.4 A	35W, or 100W speakers max.	Includes three onboard Class B audio NACs; power is supplied from an ES-PS. Refer to data sheet S4100-1031 for power supply details.
4100-1364	70.07 VRMS output		NAC rating = 0.5 A		
4100-1326	25 VRMS output	Flex-50, 50 W Amplifier, constant supervision compatible	NAC rating = 2 A	50W, or 100W speakers max.	
→ 4100-1327	70.7 VRMS output		NAC rating = 0.707 A		

Note: * The ES Net DAC board does not support Audio over ES Net using DSL links or 4120 networks.

Table 5: 100 W Digital Amplifiers with Power Supply, Constant Supervision Compatible

Model/Output Voltage		Power Supply Input/Listing		Description	Details
25 VRMS	70.7 VRMS				
4100-1328	4100-1329	120 VAC, 60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 100 speakers maximum; 2 A @ 25 VRMS (50 W); 1.414 A @ 70.7 VRMS (100 W)
4100-1330	4100-1331	120 VAC, 60 Hz	ULC		
4100-1332	4100-1333	220/230/240 VAC, 50/60 Hz	UL		
4100-1334	4100-1335	120 VAC, 60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier
4100-1336	4100-1337	120 VAC, 60 Hz	ULC		
4100-1338	4100-1339	220/230/240 VAC, 50/60 Hz	UL		

Note: ULC models have low battery dropout circuit.

Audio Options for use with either Analog or Digital Systems

Table 6: Amplifier and Related Audio Options

Model	Description	Details and Mounting Reference	
4100-1245	Flex-35/50 Expansion NAC Module; adds three Class B audio NACs	Choose one per amplifier	Mounts on Flex-35/50 assembly; NAC ratings = 1.5 A, 35/50 W, or 100 speakers maximum; <i>Supv.</i> = 8.4 mA, <i>Alarm</i> = 60 mA
4100-1246	Flex-35/50 Class A Adapter Module; converts three on-board NACS to Class A operation		Mounts on Flex-35/50 assembly; NAC ratings = 2 A, 50 W, or 100 speakers maximum; <i>Supv.</i> = 1 mA, <i>Alarm</i> = 30 mA
4100-1248	100W Amplifier Expansion NAC Module; NAC ratings = 1.5 A, 50 W, or 100 speakers max.		Provides six additional Class B audio NACs, mounts on 100 W amplifier assembly; <i>Supv.</i> = 17 mA, <i>Alarm</i> = 60 mA
4100-1249	100W Class A Adapter Module; NAC ratings = 2 A, 50 W, or 100 speakers maximum		Converts six on-board NACs to Class A operation, mounts on 100 W amplifier assembly; <i>Supv.</i> = 1 mA, <i>Alarm</i> = 60 mA
4100-1259	25VRMS Output; NAC rating = 2 A, 50 W, or 100 speakers maximum	Constant Supervision Adapter for three NACs; select for each amplifier output (not compatible with amplifier NAC expansion modules)	<i>Supv.</i> = 10 mA on batteries; <i>Alarm</i> = 35 mA
4100-1260	70.7VRMS Output; NAC rating = 0.707 A, 50 W, or 100 speakers maximum		<i>Supv.</i> = 38 mA <i>Alarm</i> = 70 mA
4100-5116	Expansion Signal Module; three, 1.5 A Class B NACs; up to five maximum per amplifier; NAC rating = 1.5 A, 50 W, or 100 speakers maximum	Converts one NAC input to three NAC outputs; selects between two inputs; for Flex-35/50 amplifiers only, two input NACs are required; Single Block module mounts in expansion bay; <i>Supv.</i> = 20 mA; <i>Alarm</i> = 80 mA	
4100-1266	Expansion Signal Module NAC Expander; NAC rating = 1.5 A, 50 W, or 100 speakers maximum	Expands module capacity to six, Class B NACs; <i>Supv.</i> = 0.84 mA; <i>Alarm</i> = 60 mA	These modules mount on the 4100-5116; select one max. per 4100-5116 as required
4100-1267	Expansion Signal Module Class A Adapter; NAC rating = 1.5 A, 50 W, or 100 speakers maximum	Converts 3 Class B, NACs to Class A; <i>Supv.</i> = 1 mA; <i>Alarm</i> = 30 mA	
4100-1268	Expansion Signal Module Constant Supervision Adapter for 25 VRMS or 70.7 VRMS; NAC rating = 1.4 A, 50 W, or 100 speakers maximum	Converts 3 Class B NACs to Class B or Class A Constant Supervision NACs; <i>Supv.</i> = 38 mA on batteries (constant supervision deactivated); <i>Alarm</i> = 70 mA	
4081-9018	End-of-line resistor harness for 70.7 VRMS NACs; 10 k ohm, 1 W		
4100-2300	Expansion Bay Hardware; order one for each expansion bay		
4100-2320	Audio Bay-to-Bay Interconnection Harness Kit; order one for each audio bay addition		
4100-0637	Audio Box Interconnection Harness Kit; order one for each close-nippled audio cabinet		

Note: Refer to S4100-1031 for power supply details.

Table 7: Audio Input and Controller Options

Model	Description	Details and Mounting Reference	
4100-1240	Auxiliary Audio Input Module; four additional (unsupervised) inputs per module; 2 maximum	Inputs for 10 VRMS, 25 VRMS, 70.7 VRMS, line level (0.707 VRMS), or microphone; 1 Block; <i>current</i> = 10 mA	
4100-1241	8 Minute Message Expansion Module	Provides 8 minutes at normal resolution or 4 minutes at high resolution, <i>Supv.</i> = 2 mA; <i>Active</i> = 17 mA	Mounts to audio controller module
4100-1242	32 Minute Message Expansion Module	Provides 32 minutes at normal resolution or 16 minutes at high resolution; <i>Supv.</i> = 2 mA; <i>Active</i> = 17 mA	

Note: See Table 1 for custom message ordering.

Table 8: Operator Interface and Related Options

Model	Description	Details and Mounting Reference		
4100-1243	Microphone Module (mike); for Fire Alarm Control Panels	One maximum for each audio system; front panel module that requires two Slots (4"), locate on expansion bay only; space behind for 4100ES flat modules only		
4100-1244	Remote Microphone Module; for Remote Annunciator Panels	Front panel module that requires two Slots (4"), locate on expansion bay only; space behind for 4100ES flat modules only; distance limited to 4000 ft (1219 m)		
4003-9803	Remote Microphone Module	Mounted on plate with controls, for 2-gang box mount; see data sheet S4100-0053 for details		
4100-1252	1 Channel (audio or mike)	Operator Interface LED/Switch Modules	Single Slot LED/switch modules; connects to a 4100-1288 or 4100-1289 LED/switch controller in the same bay; space behind controller accepts 4100ES flat modules only; current = 24 mA ; Additional adjacent LED/switch modules, are used as required for specific speaker circuit selection (refer to data sheet S4100-0032 for LED/switch module availability)	
4100-1253	1.5 Channel (audio + mike)			
4100-1254	2 Channel (full audio)			
→ 4100-1255	3-8 Channel (8 channel normal res. messages, 4 channels of high res. messages)			
→ 4100-1288	64 LED/64 Switch Controller Module with mounting plate	Refer to data sheet S4100-0032 for details	Mounts behind the LED/switch modules; has provisions for one 4100-1289 Controller Module	LED/switch controllers and their connected modules must be in the same bay
4100-1289	64 LED/64 Switch Controller Module without mounting plate		Mounts on extra space of 4100-1288; controls additional 64 LEDs and 64 switches	

Table 9: Firefighter Telephone System Products

Model	Description	Details and Mounting Reference
4100-1270	Master Telephone with Control Module and three Class B telephone NACs, one maximum per audio system; for use in Fire Alarm Control Panels only; includes one 4100-1272 Module	Front panel module; space behind for 4100ES flat modules only; phone control module included, mounted on bay module mounting plate; for individual telephone circuit control, use LED/switch modules; Supv. = 80 mA; in use = 140 mA + remote phones (refer to Table 12)
4100-1271	Remote Master Telephone	Mounts in Remote Annunciator Panel only (see S4100-0038)
4100-1272	Expansion Telephone Control Module with three Class B telephone NACs	Expansion module for additional telephone circuits in main control or transponders; Supv. = 80 mA; in use = 140 mA + remote phones
4100-1273	Telephone NAC Class A Adapter Module	Mounts to 4100-1270 or 4100-1272; no additional current required

Table 10: Network and MINIPLEX Transponder Audio Connection Options

Model	Description	Details
4100-0623	Network Audio Riser Controller Module for control of either an analog or digital riser module	Typically for Network nodes without an audio controller, used for NAA applications; mounts in Block A; current = 14 mA
4100-0621	Dual Channel <i>Analog</i> Audio Riser Module	Select one, mounts in Block B Accepts two separate audio signals from host; controlled by Transponder Interface Module; current = 25 mA when active Receives and decodes digital inputs; up to eight audio channels; current = 70 mA ; NAA input for 25, 70.7, or 0.707 VRMS
4100-0622	3-8 Channel <i>Digital</i> Audio Riser Module; with NAA input	
4100-1341	MCC (Multiple Command Center) Digital Audio Riser Interface	Selects a single digital audio channel and converts it to an analog line level for input to an analog 4100ES/ 4100U/ 4100 Legacy voice panel; current = 70 mA
4100-9854	4100/4100+ Legacy bay mounting kit	Use to mount 4100-1341 MCC Digital Audio Riser Interface in legacy panel
4100-1258	NPU to 4100ES Audio Interconnect Module; mounts in 4100ES Audio cabinet	Dual terminal block module with harnesses for connecting to the Audio Controller and Telephone Control module (requires 1 Block)

Firefighter Telephone System Description

Firefighter telephone systems provide two-way communications for facilities where radio communications may not be available or are unreliable. They are used during active firefighting conditions, during a fire alarm investigation, or during fire alarm system inspection and test.

System Operation. Connections are made using a common talk line (party line) that includes a Master Telephone and up to six remote telephones. Remote telephones call into the Master by either being taken off-hook or by being plugged into a telephone jack. The Master Telephone location receives a ring-in tone with a visible LED indicator for each telephone circuit. When the call is received, the operator selects the calling telephone circuit using the assigned switch control. The operator at the master location can place the original telephone circuit on hold and connect to additional telephone circuits or add them to the talk line.

Master Telephone Operation. The Master Telephone connects directly into a telephone interface module. A Push-to-Talk (PTT) switch provides the operator with voice input control. Each master telephone uses local LED/switch modules to select telephone circuits and to silence any subsequent call-ins until selected.

Telephone Circuit Control. A call request causes the local call-in tone sounder and assigned telephone circuit LED to pulse quickly. Pushing the calling circuit's switch silences the local sounder and connects that circuit to the talk line. Activating the switch again places that circuit on hold with a hold tone being heard at the remote telephones and causing that circuit's LED to pulse slowly. Subsequent pushes toggles from active to hold. Activating a telephone circuit switch when no call is incoming places a request to pick up on remote telephones equipped with local LEDs. Master telephones can be also be connected as an input to an audio controller module to allow audio system message broadcasting without using a microphone.

Remote Master Telephones mount in Remote Annunciator Cabinets and are wired as the only connection to a telephone circuit. By adding local LED/switch modules, operation is that of the Master Telephone.

Remote telephones are available cabinet mounted or for plugging into a dedicated telephone jack. Each hears a ring tone when a call-in is selected and a hold tone when placed on hold. When on hold, the remote telephones are each separated from the talk line.

The Telephone Interface Module provides three Class B (Class A option is available) telephone circuits, connection for a master telephone, and a telephone riser input. One module is supplied when selecting a Master Telephone. Additional telephone interface modules can be added as required. Telephone circuit outputs can be programmed as remote telephones, as a Remote Master, or for telephone riser operation. Telephone circuits are supervised for opens, shorts, and overload conditions. The Master Telephone is supervised for broken cord or off-hook.

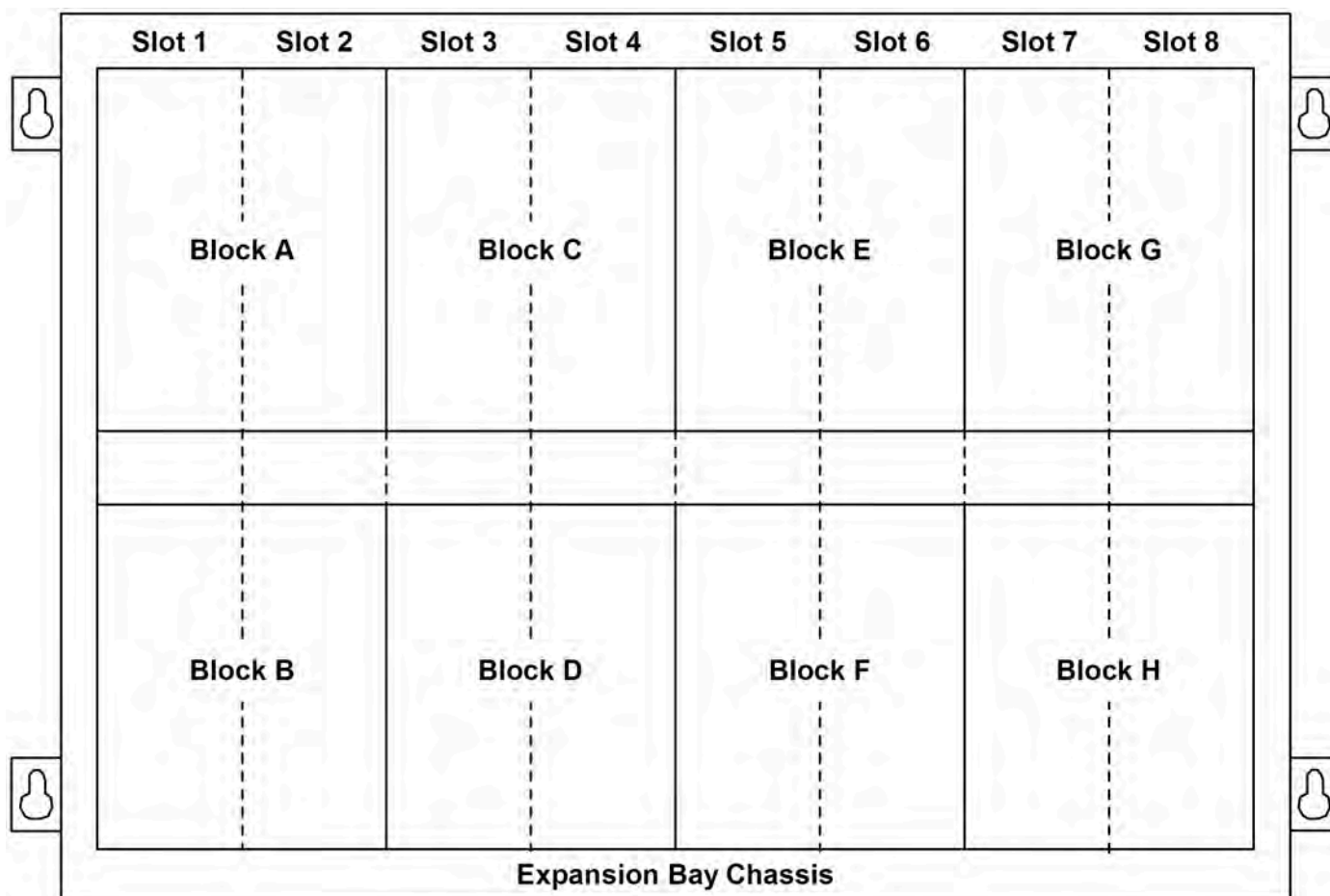
Telephone riser operation can be programmed to provide a telephone riser output that is used to interconnect telephone interface modules in different locations. This output type has ring and hold tones disabled.

Degraded Mode. If the telephone interface module loses communications with the host fire alarm control panel, telephone circuits off-hook automatically connect to the talk line, allowing any telephone to communicate with another simply by being picked up or plugged in.

Master Telephone Control Current with Remote Telephones. The following table lists Master Telephone Control current with the addition of remote firefighter telephones.

Table 11: Master telephone control current

Remote Phones	0	1	2	3	4	5	6
Current (mA)	140	180	220	250	276	304	329

Expansion Bay Module Loading Reference

Size Definitions

- Block = 4 in. W x 5 in. H (102 mm x 127 mm) card area
- Slot = 2 in. W x 8 in. H (51 mm x 203 mm) motherboard with daughter card

Table 12: Expansion Bay Module Loading Reference

Description	Mounting
Audio Controller Modules	Blocks A and B
Network Riser Controller Module	Block A
Audio Riser Modules	Block B
Flex-35 Amplifiers, 2 max /bay*	Blocks E and F; C and D; or A and B
Flex-50 Amplifiers, 2 max/bay*	Blocks E and F or C and D
100 W Amplifiers, 1 max/bay	Blocks E, F, G and H
100 W Backup Amplifiers, 1 max. per bay with primary amplifier	Blocks A, B, C and D
Master or Remote Phone Module	Blocks A and B
Master or Remote Microphone Module	Two vertical Blocks, any location (except next to telephone)
Telephone Module	1 Block
Expansion Signal Module	1 Block
Operator LED/Switch Modules	1 Slot
ES-PS*	Blocks G and H in an expansion bay with one flex amplifier, blocks C and D in an expansion bay with two flex amplifiers
ES-PS Configured as backup	Blocks E and F ONLY
Note: * When mounting dual Flex amplifiers on an expansion bay, special mounting rules apply.	

General Specifications

Table 13: ES Power Supply Specifications (ES-PS and ES-XPS)

Specifications	Rating
AC Input Power	120 - 240 VAC
120 VAC	3.72 A
220 - 240 VAC	1.82 A
Total DC Output Power Capacity	
Without Fan	9.5 A
With 4100-5130 Fan and 4100-5451 IDNAC Module(s)	9.7 A
With 4100-5130 Fan (without 4100-5451 IDNAC Module)	12.7 A
With Regulated 24V Appliance Loads (with or without 4100-5130 Fan)	5.0 A
Special Application Appliance Loads: fully supports the preceding total DC output power capacity ratings	Simplex horns, strobes, and combination horn/strobes and speaker/strobes (contact your Simplex product representative for compatible appliances)
Regulated 24V Appliances: reduces total DC output power capacity to 5.0 A	Power for other UL listed appliances; use associated external synchronization modules where required
Auxiliary Power Tap	2 A maximum (taken from total output power capacity)
NACs Programmed for Auxiliary Power	3 A maximum per NAC, 5 A maximum total (taken from total output power capacity)
Battery Charger (ES-PS only)	Sealed Lead-Acid Batteries
Battery Ah Capacity	UL/ULC listed for battery charging of up to 110 Ah (batteries larger than 50 Ah require a remote battery cabinet)
Charger characteristics and performance	Temperature compensated, dual rate, recharges depleted batteries within 48 hours per UL/ULC Standards 864
Environmental	
Operating Temperature	32°F to 120°F (0 °C to 49°C)
Operating Humidity	Up to 93% RH, non-condensing at 90°F (32°C) maximum
Option Card Mounting	Two vertical blocks are available fore compatible modules; refer to 579-1288 installation instructions for additional details

Note:

- Battery charger is available on the ES-PS power supply.
- When an ES-PS is used to power Flex-35 or Flex-50 Amplifiers the ES-PS battery charger is not available.

Table 14: Amplifier Ratings

Specification	Rating		
Built-in Tones	500 Hz horn tone operated at temporal pattern, provided when amplifiers are separated from audio controller		
Flex-35 Amplifiers: 4100-1361, 4100-1362, 4100-1363, 4100-1364	Input Voltage	19 to 35 VDC from adjacent power supply	
	Supervisory Current	425 mA with power stage supervised 85 mA in low power mode	
	Alarm Current at full output power	5.5 A with continuous horn tone	Use this value for power supply loading
		1.64 A average, with temporal pattern horn	Use this value for battery backup reference
Flex-50 Amplifiers: 4100-1312, 4100-1313, 4100-1326, 4100-1327	Input Voltage	19 to 35 VDC from adjacent power supply	
	Supervisory Current	425 mA with power stage supervised 85 mA in low power mode	
	Alarm Current at full output power	5.55 A with continuous horn tone	Use this value for power supply loading
		2.27 A average, with temporal pattern horn	Use this value for battery backup reference
100 W Amplifiers and Backup Amplifiers: 4100-1314, 4100-1316, 4100-1318, 4100-1320, 4100-1322, 4100-1324; 4100-1328, 4100-1330, 4100-1332, 4100-1334, 4100-1336, 4100-1338	Input Power	120 VAC Models	4 A maximum at 102 to 132 VAC, 60 Hz
		220-240 VAC Models	2 A maximum at 204 to 264 VAC, 50/60 Hz; with taps for 220/230/240 VAC
	Supervisory Current	400 mA (analog); 220 mA (digital) with power stage supervised 85 mA in low power mode	
	Alarm Current at full output power	9.6 A with continuous horn tone	
3.8 A average, with temporal pattern horn		Use this value for battery backup reference	
Total Amplifier Power per Cabinet	300 W maximum		

Table 15: Audio Controller Ratings

Specification		Rating	
Current Requirements	4100-9620, 4100-1210	Analog = 225 mA supervisory	Add for local speaker in alarm: 75 mA min. volume; 190 mA half volume; 333 mA full volume; Add microphone current separately; Supv.= 2.4 mA; Active = 30 mA
	4100-9621, 4100-1311	Digital = 85 mA supervisory	
Current Requirements	4100-1411, 4100-1412	125 mA supervisory	Add for local speaker in alarm: 60 mA min. volume; 160 mA half volume; 250 mA full volume; add microphone current separately; Supv.= 2.4 mA; Active = 20 mA
Analog Riser Distance		Up to 10,000 ft (3048 m) total with 18 AWG (0.82 mm ²) shielded twisted pair (STP)	
Digital Riser Distance; 18 AWG unshielded, twisted pair (UTP) required, except as noted; refer to Installation Instructions 574-844*		Up to 2500 ft (762 m) from 4100-1311 or 4100-1411 Digital Controller to 4100-0622 Digital Audio Riser or 4100-1341 MCC Digital Riser Interface; up to 2500 ft (762 m) between 4100-0622 Digital Audio Riser Modules or 4100-1341 MCC Digital Riser Interfaces (signal is reformatted and repeated); wire runs over 100 ft (30 m) require UTP wire	

Note: * Wire runs of 100 ft (30 m) or less require shielded twisted pair wire (STP).

Table 16: Firefighter Telephone Distance Ratings

Specification	Rating
Distance	7500 ft (2286 m) distance to farthest phone, 18 AWG shielded twisted pair (STP)

Table 17: Environmental and Installation Instruction Reference

Specification	Rating			
Operating Temperature Range	32°F to 120°F (0°C to 49°C)			
Operating Humidity Range	Up to 93% RH, non-condensing at 90°F (32°C) maximum			
Installation Instructions Reference	Flex Amplifiers	579-173	Constant Supervision NAC Modules	579-515
	Digital/Analog Amplifiers	579-174	Firefighter Phones	579-226

Additional 4100ES Data Sheet Reference

Table 18: Reference

Subject	Datasheet
Battery and Battery Cabinet Reference for 4100ES	S2081-0006
110 Ah Batteries and Cabinets for 4100ES	S2081-0012
4100ES Basic Panels with ES-PS Power Supplies	S4100-1031
NDU with ES-PS Power Supplies for 4120 Network	S4100-1036
4100ES Remote Annunciator Panels	S4100-1039
NDU with ES-PS Power Supplies for ES Net	S4100-1077

Features

Panel mounted annunciation modules for use with 4100ES/4100U Fire Alarm Control Panels, Remote Annunciators, and Network Display Units (NDU):

- Modules mount on front of panel bay providing convenient access and high visibility
- Panel monitors switches for user input and controls LED indicators to annunciate function status
- Compact 64 LED/64 switch controller modules mount on back of LED/switch modules

LED/Switch Modules:

- Raised momentary switches provide tactile feedback
- Alternate action operation provides on/off functions
- High intensity LEDs provide clear status annunciation
- Slide-in labels provide custom on-site labeling (label kit is ordered separately)

8 LED, 8 Switch Modules:

- One status LED per switch
- Available as all red LEDs or all yellow LEDs

16 LED, 8 Switch Modules:

- Two status LEDs per switch
- Available with two LEDs per switch as: red/yellow, yellow/yellow, red/green, or green/yellow

16 LED, 16 Switch Modules:

- One status LED per switch in 2" (51 mm) module
- Available as all red LEDs, or 8 red and 8 yellow
- Two configurations are available, one with pluggable LEDs, refer to illustrations on page 2 and product selection details on page 4

24 LED, 24 Switch Modules:

- Double slot module with one red status LED per switch

HOA (Hand-Off-Auto) Switch Modules:

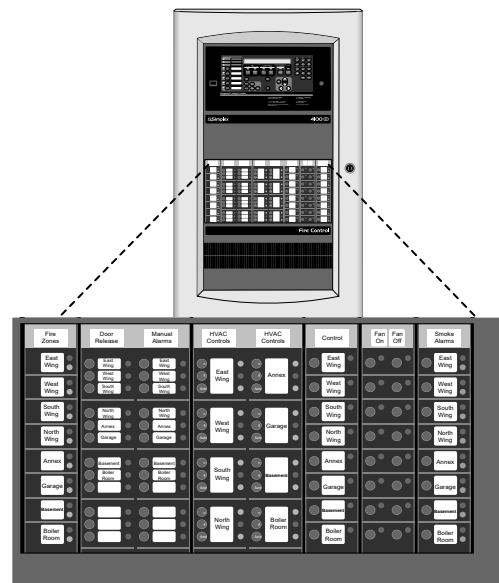
- Eight controls in a double slot module, each control has three switches for status selection and one LED per switch position
- Switch selection is On/Hand, Off, and Auto

Available with three HOA Module LED Options:

- On/Hand (green LED), Off (red LED) and Auto (green LED)
- On/Hand (green LED), Off (red LED) and Auto (white LED) to comply with International Building Code (IBC) requirements
- On/Hand (green LED), Off (yellow LED) and Auto (green LED) for applications requiring no red LEDs
- Available with or without switch buttons labels (On, Off, Auto)

LED Modules with 8 or 16 pluggable LEDs:

- 8 LED Module has red LEDs, 16 LED module has 8 red with 8 yellow
- Red, yellow, green, or blue LEDs are available in packages of eight (8) to change color on-site per application requirement (ordered separately)



4100ES 2-Bay Fire Alarm Control Panel
with Sample of Available LED/Switch Modules

Features (Continued)

24 Point I/O Module for external connections:

- Each point is selectable as either a switch input (momentary or maintained) or lamp/relay driver output
- Multiple switch monitoring modes are available

Panel mounted printer (see pages 6 and 7 for details):

- Records system events and provides 20 visible lines

Listed to:

- UL Std. 864, Fire Detection and Control (UOJZ), and Smoke Control Service (UUKL)
- UL Std. 2017, Process Management Equipment (QVAX)
- UL Std. 1076, Proprietary Alarm Units-Burglar (APOU)
- UL Std. 1730, Smoke Detector Monitor (UULH)
- ULC Std. S527-99

Description

Annunciation Options. 4100ES/4100U fire alarm panels support a variety of switch input and LED status indicators to complement the information and controls available at the operator interface. These modules provide a convenient interface efficiently packaged onto the front panel space of the cabinet bay. Additionally, the panel mounted printer can conveniently record system status without requiring a separately located printer.

Refer to additional listing details on page 4. This product has been approved by the California State Fire Marshal (CS M) pursuant to Section 13144.1 of the California Health and Safety Code. See CS M Listing 7165-0026 251 for allowable values and or conditions concerning material presented in this document. It is subject to re-amination, revision, and possible cancellation. Additional listings may be applicable contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

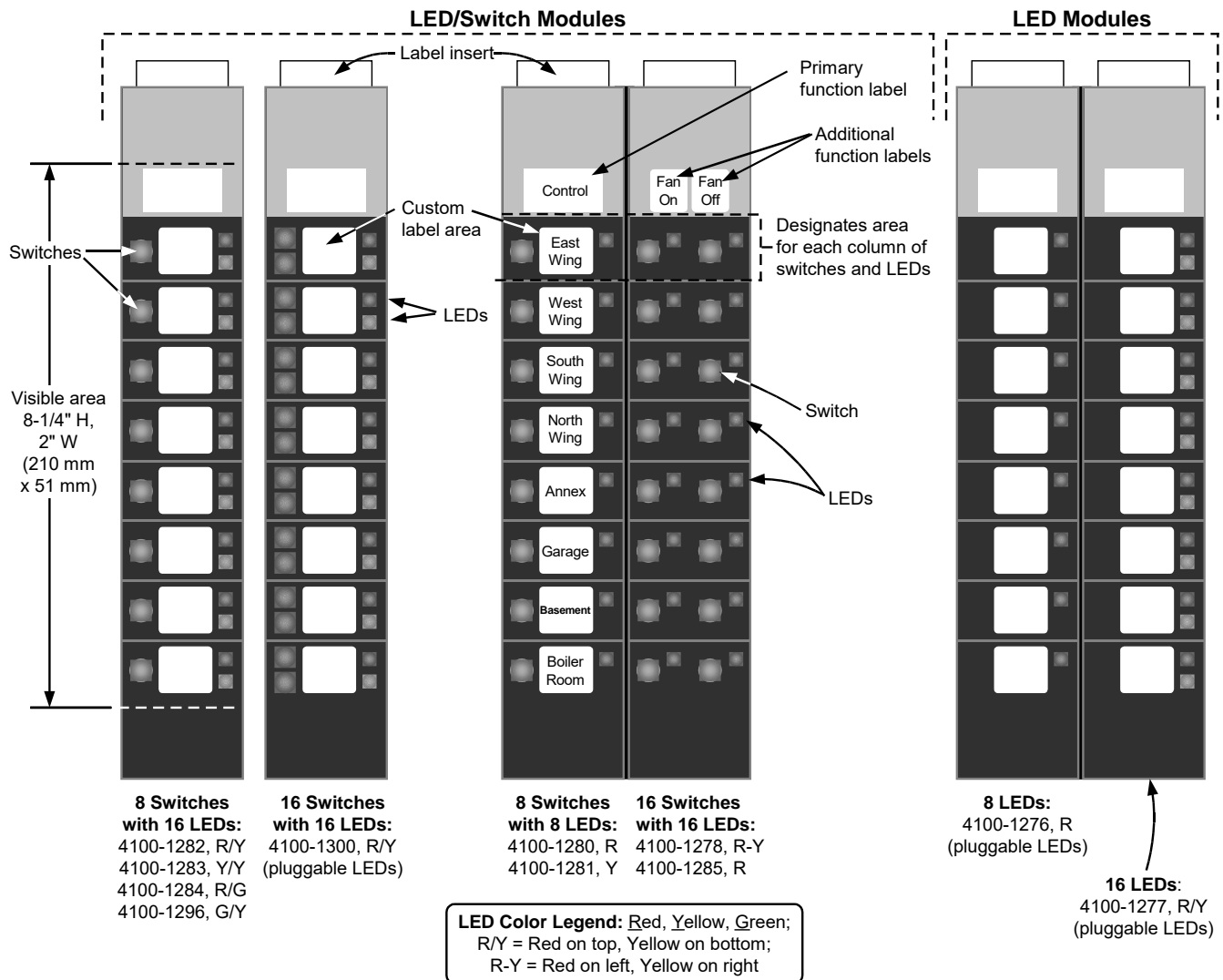
Description (Continued)

Easy Interface. Switches are alternate action ON/OFF (depending on programming selection) using a tactile feel, raised rubber button. High efficiency LEDs provide clear status annunciation readily visible through the glass door.

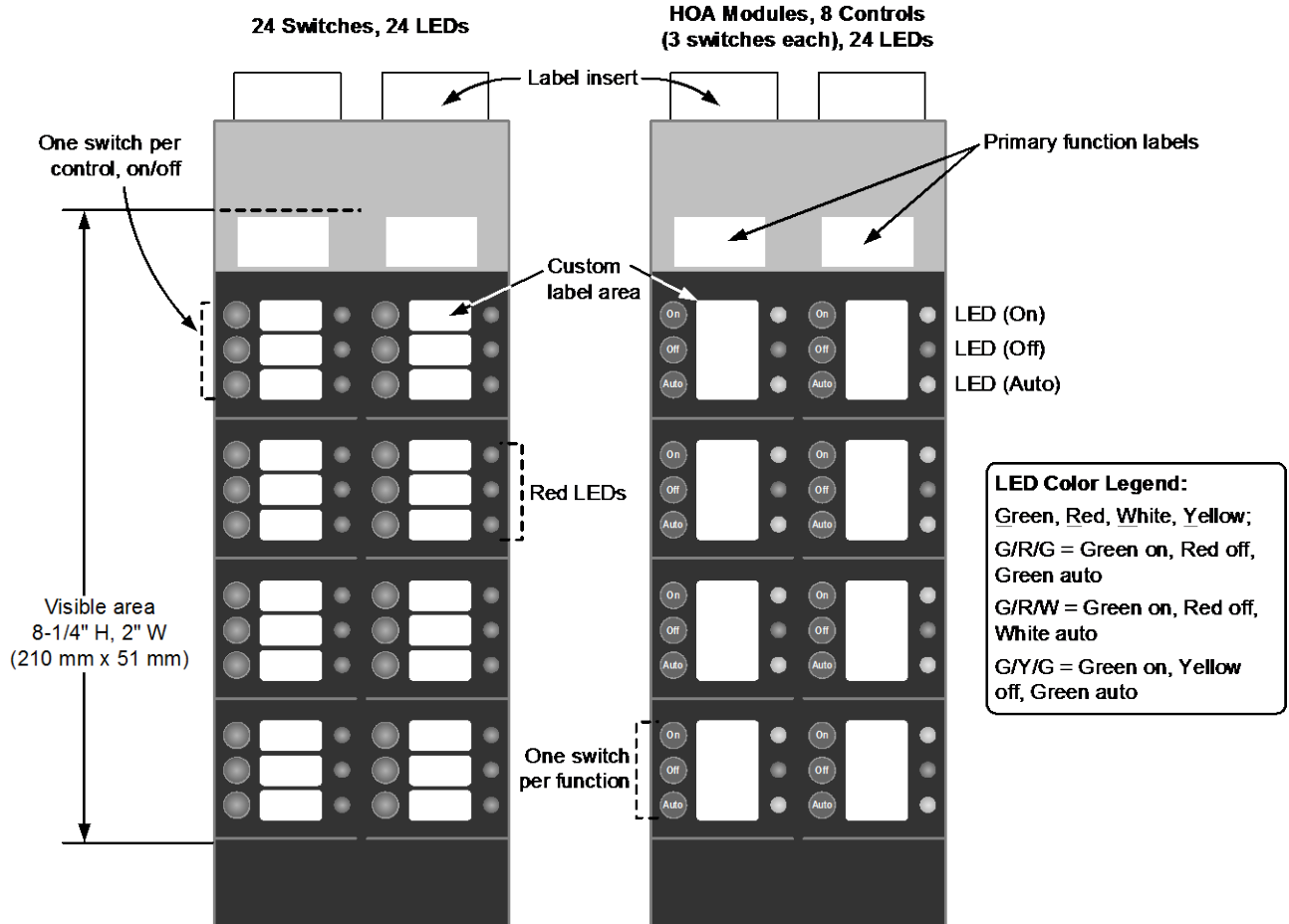
Selectable Functions. Switch functions, LED status indications, and printer output is selected when the control panel CPU is customized for site specific requirements. Slide-in labels are locally printed to indicate the exact function of the LEDs and switches.

The 24 Point I/O Module is selectable for input switch type and supervision type. Outputs are selectable for steady on or pulsing to drive remotely connected relays, incandescent lamps, or LEDs.

LED/Switch Module Detail Reference



HOA and 24/24 LED/Switch Module Detail Reference



4100-1287

HOA Modules, G/R/G LEDs:

- 4100-1286, with labeled switches as shown
- 4100-1295, with unlabeled switches (not shown)

HOA Modules for IBC Applications, G/R/W LEDs:

- 4100-1275, with labeled switches as shown
- 4100-1299, with unlabeled switches (not shown)

HOA Modules, G/Y/G LEDs:

- 4100-1302, with labeled switches as shown
- 4100-1301, with unlabeled switches (not shown)

LED/Switch Module Product Selection (panel mounted switches are momentary pushbutton)

LED/Switch Modules, General Purpose (LED/switch controller and label kit is ordered separately)

Model	LEDs per Switch	LED Color(s)	Custom Label Area	LED Quantity	Switch Quantity
4100-1280	One	Red	Per module and per switch	8	8
4100-1281	One	Yellow			
4100-1282	Two	Red on top, Yellow on bottom	Per module and per switch	16	8
4100-1283	Two	Yellow on top and bottom			
4100-1284	Two	Red on top, Green on bottom			
4100-1296	Two	Green on top, Yellow on bottom			
4100-1285	One	Red	One per column of 8 LED/switch pairs (see illustration on page 2)	16	16
4100-1278	One	8 Red on left, 8 Yellow on right			
4100-1300*	One	With pluggable LEDs; shipped Red on top, Yellow on bottom	Per module and per LED/switch pair		
4100-1287	One	Red	Per module and per switch	24	24

* UL, ULC, and CSFM listed only.

LED Only Modules and LED Kits (LED/switch controller and label kit is ordered separately)

Model	Description	
4100-1276	Eight (8) LED Module with Red LEDs; custom label area per module and per LED	LEDs are pluggable; select LED kits as required to change LED color
4100-1277	Sixteen (16) LED Module; Red LED on top and Yellow LED on bottom at each position; custom label area per module and per LED pair	
4100-9843	Yellow	Kits of 8 LEDs; order as required for modules with pluggable LEDs to change LED color on-site per application requirement; compatible with LED Modules 4100-1276, 4100-1277, and 4100-1300 (Blue is typically used for Ancillary Device status indication per ULC S527)
4100-9844	Green	
4100-9845	Red	
4100-9855	Blue	

LED/Switch Modules, HOA (Hand-Off-Auto) with Green/Red/Green LEDs

(LED/switch controller and label kit is ordered separately)

Model	Operation	Switch Function (Location)	LED Description
4100-1286	Eight function HOA (On, Off, Auto) Control Module with labeled switches; custom label area per module and per LED/switch set	On (top)	Green LED
		Off (middle)	Red LED
		Auto (bottom)	Green LED
4100-1295	Eight function HOA (On, Off, Auto) Control Module, same as 4100-1286 except switches are unlabeled		

LED/Switch Modules, HOA (Hand-Off-Auto) with Green/Red/White LEDs for IBC Applications

(LED/switch controller and label kit is ordered separately)

Model	Operation	Switch Function (Location)	LED Description
4100-1275	Eight function HOA (On, Off, Auto) Control Module with labeled switches; LED colors meet International Building Code (IBC) requirements; custom label area per module and per LED/switch set	On (top)	Green LED
		Off (middle)	Red LED
		Auto (bottom)	White LED
4100-1299	Eight function HOA (On, Off, Auto) Control Module, same as 4100-1275 except switches are unlabeled		

LED/Switch Modules, HOA (Hand-Off-Auto) with Green/Yellow/Green LEDs

(LED/switch controller and label kit is ordered separately)

Model	Operation	Switch Function (Location)	LED Description
4100-1302**	Eight function HOA (On, Off, Auto) Control Module with labeled switches; for applications requiring no red LEDs; custom label area per module and per LED/switch set	On (top)	Green LED
		Off (middle)	Yellow LED
		Auto (bottom)	Green LED
4100-1301**	Eight function HOA (On, Off, Auto) Control Module, same as 4100-1302 except switches are unlabeled		

** UL, ULC, and CSFM listed only.

Continued on next page

LED/Switch Module Product Selection (Continued)

LED/Switch Controller Modules and Accessories

Model	Description	
4100-1288	64 LED/64 Switch Controller Module with mounting plate; controls up to 64 LEDs and interfaces to up to 64 switches; mounts behind the LED/switch modules and has provisions for one 4100-1289 Controller Module	NOTE: LED/switch controllers and their connected modules must be in the same bay.
4100-1289	64 LED/64 Switch Controller Module without mounting plate; mounts on extra space of 4100-1288; controls an additional 64 LEDs and 64 switches	
4100-0636	Harness Kit, Power and Communications	One of each is required per 4100-1288 that is located in the same bay as two Flex-35/50 amplifiers and an SPS
4100-0641	Harness Kit, 26 Position Flex Cable, 14-1/2" (368 mm) long	
4100-1290	24 Point I/O Module for external connections, select each point as either input or output; 2" (51 mm) wide, 1 Slot	
4100-1294	LED/Switch Module Slide-in Labels, required when LED/switch or LED only modules are present; order one per cabinet	
4100-1279	Single blank 2" display cover; order as required (8 fill a bay front); two maximum in a row between LED/switch modules	

Panel Mounted Printer (refer to pages 6 and 7 for printer details)

Model	Description
4100-1293	Panel Mount Thermal Printhead Printer, supplied with one roll of paper
4190-9803	Replacement Paper for 4100-1293 Printer, one roll

LED/ Switch Modules and Controllers Specifications

(For additional LED/Switch Module information, refer to Installation Instructions 574-843)

64 LED/64 Switch Controller Modules (4100-1288 and 4100-1289)

Input Voltage	19 to 33 VDC, from control panel
Current, No LEDs On	20 mA @ 24 VDC
Current, All 64 LEDs On	180 mA nominal @ 24 VDC (2.5 mA per LED) 212 mA maximum @ 19 VDC (3.0 mA per LED)
Mounting Reference	Bracket of 4100-1288 attaches to the back of the LED/switch modules
Controllers per Bay	Maximum of two per bay; for control of LED/switch modules within that bay only
Bay Location Reference	Slots 1 & 2 or Slots 3 & 4; mounts onto the back of the LED/switch modules
Clearance Behind Controller Module	Space accepts low profile 4100ES/4100U modules only

24 Point I/O Module (4100-1290)

Module Current	Supervisory = 34 mA; Alarm = 75 mA (add output currents separately)
Switch Input Details	Momentary or maintained, 2 or 3 position; max. distance is 2500 ft (762 m) or 65 Ω
Output Current	150 mA @ 24 VDC per point; inrush current is limited for use with incandescent bulbs
Output Details	Diode suppress relay loads at the coil; max. distance is 600 ft (183 m) or 2 Ω

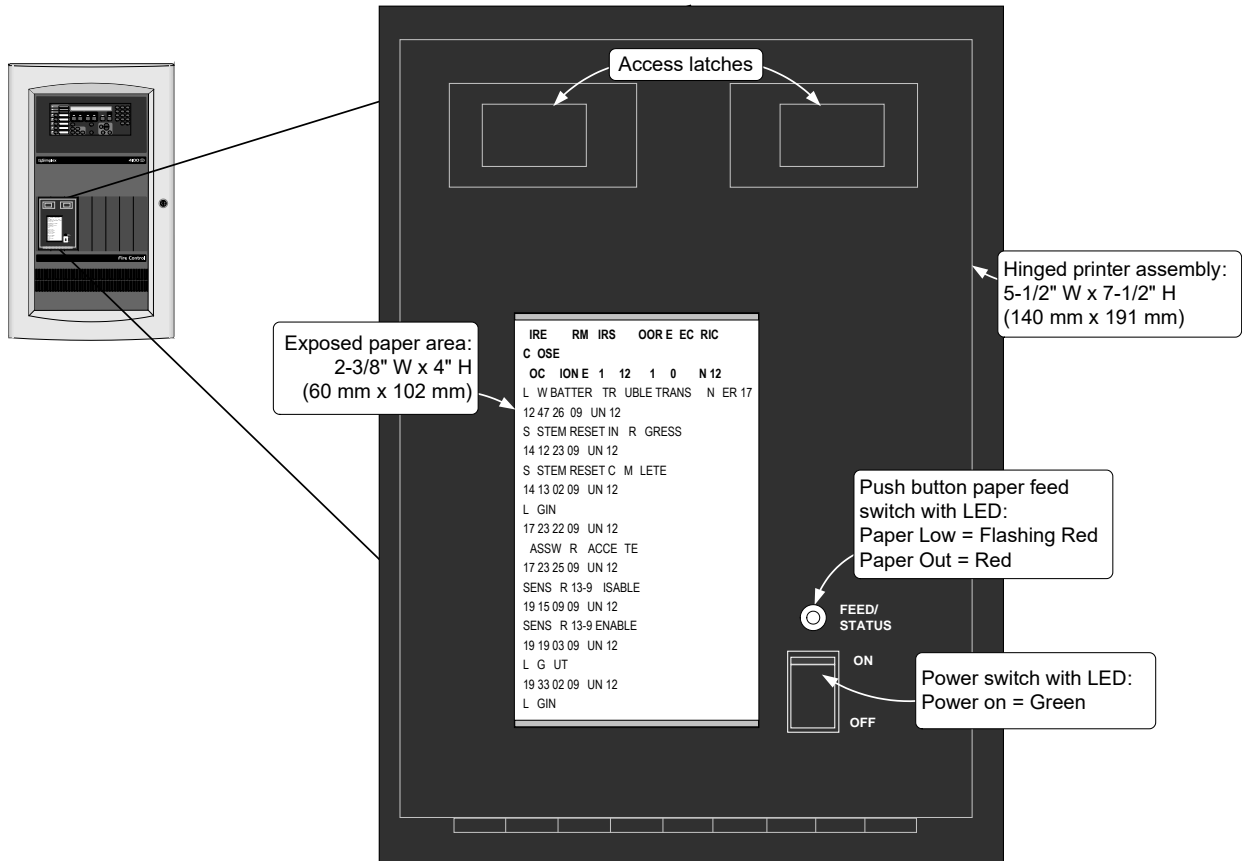
General Specifications

Operating Temperature Range	32° to 120°F (0° to 49° C)
Operating Humidity Range	Up to 93% RH, non-condensing @ 90° F (32° C) maximum

Additional 4100ES Product Reference

Subject	Data Sheet	Subject	Data Sheet
4100ES Basic Panels with SPS Power Supplies	S4100-0031	NDU with SPS Power Supplies for ES Net	S4100-0077
4100ES Emergency Voice/Alarm Equipment	S4100-0034	4100ES Basic Panels with EPS Power Supplies	S4100-0100
NDU with SPS Power Supplies for 4120 Network	S4100-0036	InfoAlarm Command Center with EPS Power Supplies	S4100-0101
4100ES Remote Annunciator Panels	S4100-0038	NDU with EPS Power Supplies for 4120 Network	S4100-0102
InfoAlarm Command Center with SPS Power Supplies	S4100-0045	NDU with EPS Power Supplies for ES Net	S4100-0104

Model 4100-1293 Panel Mount Printer Details



Printer Specifications

(For additional printer information, refer to Installation Instructions 579-249)

Electrical & Communications

Input Voltage	19 to 33 VDC, from control panel	
Current	Standby	125 mA @ 24 VDC
	Printing	800 mA @ 24 VDC
Communications	RS-232, 9600 baud, from control panel RS-232 module	

Print Characteristics

Print Format	Fixed thermal printhead producing black characters
Characters	11 x 28 dot matrix; alarm information printed in bold
Paper Format	40 columns; 6 lines per inch; 20 lines visible; paper is wound onto top take-up reel, paper can be manually unwound from take-up reel and rewound using Feed switch
Paper Speed	1.33 in/sec maximum
Print Speed	312 cps
Sound Output	55 dB maximum, with cabinet door open

Paper (one roll included)

Type and Size	Thermal; 2.35" wide, 160 ft long (60 mm x 49 m)
Replacement Paper	4190-9803, 1 roll

Mounting Specifications

Bay Location Reference	Requires 3 expansion bay slots, can be located as required
Clearance Behind Printer	Space accepts low profile 4100ES/4100U modules only

Environmental Specifications

Operating Temperature Range	32° to 120°F (0° to 49° C)
Operating Humidity Range	Up to 93% RH, non-condensing @ 90° F (32° C) maximum

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Features

Simplex 4100ES Box and door options:

- Boxes are available sized for one, two, or three equipment bays, each with a battery bay located at the bottom
- Colors include platinum or red
- Doors are glass front with modular dress panels, or solid
- Models are available with box and door combined for single package shipping, or packaged separately
- Enclosures are NEMA 1 rated; wall mount enclosures are also IP30 rated
- Refer to individual 4100ES data sheets for product application listings, see [Enclosure selection chart](#)

Door and dress panel selection is coordinated with cabinet function:

- Glass doors with modular dress panels provide visibility of annunciation and interface modules for fire alarm control units (FACU), network display units (NDU), and remote annunciators
- Solid doors are for MINIPLEX Transponders and utility function cabinets where module visibility is not required

4100ES enclosure details:

- Latching dress panels easily lift off for internal access
- Smooth box surfaces for locally cutting conduit entrance holes exactly where required
- Alignment markers at the top and bottom of each box side for 6 in. (152 mm) or 4 in. (102 mm) wall studs
- Knockout screw/nail holes are supplied for semi-flush mounting

Upright cabinet rack packaging reference:

- See Table 3 for cabinet rack listing

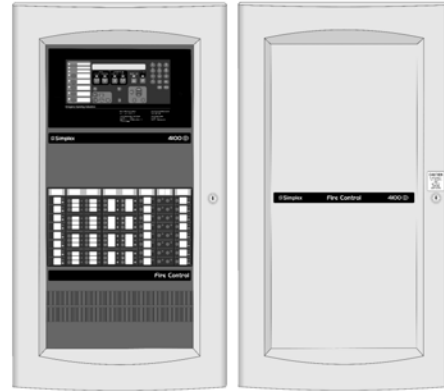


Figure 2: 4100ES Two bay cabinets



Figure 3: 4100ES Three bay cabinets



Figure 1: 4100ES One bay cabinet

* For 4100ES one, two, and three bay cabinets with associated equipment: Products are listed by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7165-0026;251 for allowable values and/or conditions concerning material presented in this document. Accepted for use - City of New York Department of Buildings - MEA35-93E. Additional listings may be applicable, contact your local Simplex product supplier for the latest status.

Enclosure selection chart

Note: See [Wall mounted enclosure installation reference](#) and for dimensions.

Door keys ship with system master controller.

Table 1: Combined box and door selection, select if box and door are to be shipped together

Description	Platinum 1 Bay	Platinum 2 Bay	Platinum 3 Bay	Red 1 Bay	Red 2 Bay	Red 3 Bay
Box with Glass Door and Dress Panel	2975-9444 →	2975-9445	2975-9446 ←	2975-9441	2975-9442	2975-9443
Box with Solid Door	2975-9450	2975-9451	2975-9452	2975-9447	2975-9448	2975-9449

Table 2: Separate box and door selection, select if boxes and doors are required to be shipped separately

Description	Platinum 1 Bay	Platinum 2 Bay	Platinum 3 Bay	Red 1 Bay	Red 2 Bay	Red 3 Bay
Box	2975-9438	2975-9439	2975-9440	2975-9407	2975-9408	2975-9409
Glass Door and Dress Panel	4100-2104	4100-2105	4100-2106	4100-2124	4100-2125	4100-2126
Solid Door	4100-2114	4100-2115	4100-2116	4100-2134	4100-2135	4100-2136

Table 3: Cabinet rack mounting

SKU	Description
4100-2140	Master controller rack mount kit, one required for each master controller
4100-2145	Option bay rack mounting kit, one required for each expansion bay
4100-2144	Power distribution module (PDM) rack mount kit, order PDM separately per system voltage, one required for each cabinet rack

Table 4: Power distribution modules

SKU	Voltage	Description
→ 4100-0634	120 VAC	Power Distribution Module (PDM); select for each system voltage; one required for each 4100ES box or cabinet rack
4100-0635	220/230/240 VAC	

Table 5: Miscellaneous accessories

SKU	Description	
252-019	Door key, one is shipped with system Master Controller, order for replacement or when extra keys are needed; ("B" key)	
4100-9856	Canadian French Appliqué Kit, for 1, 2, or 3 bay sizes	
4100-9857	4100ES Appliqué Retrofit Kit, for 1, 2, or 3 bay sizes; use to identify 4100ES features when new door is not used; included with Master Controller Upgrade kits as detailed on data sheet S4100-0031	
4100-9868	Special Purpose Appliqué Kit: Simplex , Elevator Recall Control and Supervisory Control Unit, 4100ES	
4100-9869	Special Purpose Appliqué Kit: Simplex , Sprinkler Waterflow and Supervisory Station, 4100ES	
4100-9835	Termination and Address Label Kit, for module marking	Note: One kit is supplied for each cabinet; order this if required for additional field module installation
4100-9837	Green LED Power-on Indicator Kit, required for ULC listing of MINIPLEX transponder	Mounts using knockout provided in solid door
2975-9813	Platinum semi-flush box trim	1 7/16" in. (37 mm) wide, four corners and trim pieces for top, bottom, and sides
2975-9812	Red semi-flush box trim	

Table 6: Battery reference

SKU	Capacity	Battery Notes
2081-9272	6.2 Ah	Sealed lead-acid batteries, 12 VDC each; two required for each battery location. Battery selection is required if batteries are internal. Select one size for each battery set. Refer to data sheet S2081-0006 for battery details.
2081-9274	10 Ah	
2081-9288	12.7 Ah	
2081-9275	18 Ah	
2081-9287	25 Ah	
2081-9276	33 Ah	
2081-9296	50 Ah	

Table 7: Battery Accessories

SKU	Description
4100-0650	Battery Shelf, required for 50 Ah batteries
4100-5128	Battery Distribution Terminal Block, mounts to side of box, required for all close-nippled cabinets unless cabinet receives all power from power supplies and batteries located in the adjacent cabinet

Wall mounted enclosure installation reference

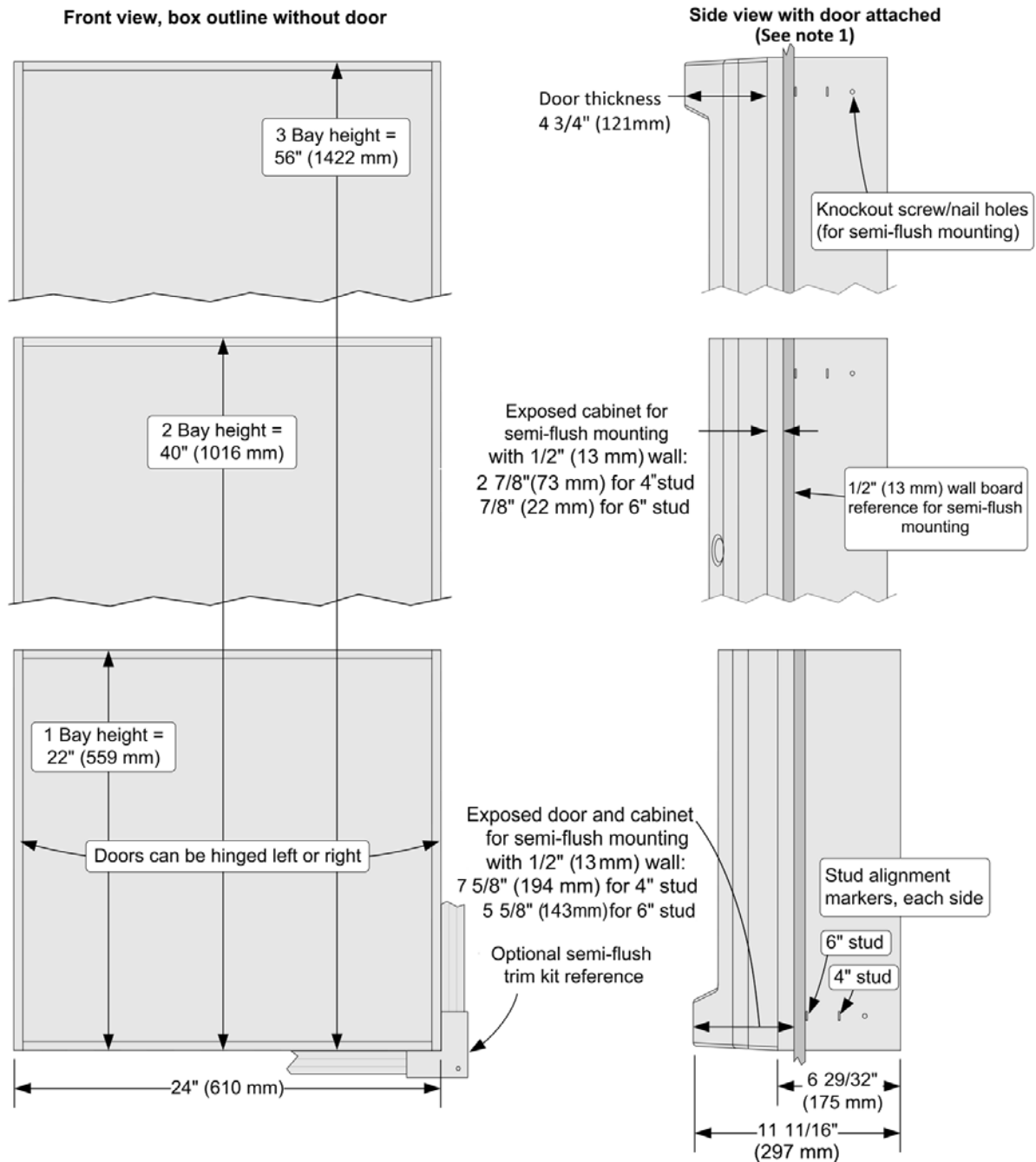


Figure 4: Installation reference

Note:

1. Figure 4 shows side view dimensions with minimal cabinet and door protrusion from the exterior wall. For 6 in. stud construction with minimum protrusion shown, the door opens 90 degrees. To allow the door to open 180 degrees, the exposed cabinet dimension from the exterior wall must be a minimum of 3 in. (76 mm) for both 4 in. and 6 in. stud construction.
2. A system ground must be provided for Earth Detection and transient protection devices. This connection shall be made to an approved, dedicated Earth connection for each NFPA 70, Article 250, and NFPA 780.
3. For additional installation information refer to Installation Instructions 579-117.

Additional data sheet reference**Table 8: Data sheet reference**

Subject	Data Sheet
Graphic I/O Modules for 4100ES, 4010ES, 4007ES	S4100-0005
4100ES Basic Panels with SPS Power Supplies	S4100-0031
4100ES Emergency Voice/Alarm Equipment	S4100-0034
MINIPLEX Transponders with SPS Power Supplies	S4100-0035
NDU with SPS Power Supplies for 4120 Network	S4100-0036
4100ES Remote Annunciator Panels	S4100-0038
InfoAlarm Command Center with SPS Power Supplies	S4100-0045
NDU with SPS Power Supplies for ES Net	S4100-0077
4100ES Basic Panels with EPS Power Supplies	S4100-0100
InfoAlarm Command Center with EPS Power Supplies	S4100-0101
NDU with EPS Power Supplies for 4120 Network	S4100-0102
MINIPLEX Transponders with EPS Power Supplies	S4100-0103
NDU with EPS Power Supplies for ES Net	S4100-0104

Features

The Connected Services Gateway (CSG) is an all-in-one interface card that supports central station communication and enables SafeLINC Cloud Services. The CSG has the following features:

- Provides wired or wireless central station communication through LAN Ethernet, cellular, and plain old telephone service (POTS)
- Enables authorized users to access their managed fire alarm control units (FACUs) remotely through the SafeLINC web or mobile app
- Preserves front panel service port

Compatibility

- For use with Simplex 4100ES, 4010ES, 4007ES, 2050FS, and 2250FS FACUs
- Backwards compatibility. A migration path for existing SDACT is only installed in ES panels
- Connects to ES Network Card with Ethernet cable

Installation flexibility

- The internally mounted option reduces installation complexity and cost
- The externally mounted option is available to provide flexibility when space or cellular signal strength is inadequate

Connectivity flexibility

- You can configure central station reporting with one, or dual paths with a primary and secondary path
- Configure paths to use any of the external connections, telephone line, cellular or LAN Ethernet connections
- Antenna extension kits are available for installations with inadequate cellular signal

Standards and codes

- UL 864 10th edition, Control Units and Accessories for Fire Alarm Systems
- UL 1076, Proprietary Burglar Alarm Units and Systems
- ULC/ORD C1076, Proprietary Burglar Alarm Units and Systems
- CAN/ULC-S559 -13, Equipment for Fire Signal Receiving Centers and Systems
- CAN/ULC-S527 -11, Control Units for Fire Alarm Systems
- ISA/IEC 62443-4-1, Cybersecurity Compliance
- FCC ID: F5318LE9080
- IC: 160A-LE9080

Note: For UL 864 applications the CSG serves as an interface between the FACU and the Internet for off-premises central station reporting.

Central station communication

Central station supported interfaces

- Dual Line Phone DACT (ADEMCO Contact ID)
- 10/100 Base-T Ethernet (Fibro protocol)
- Cellular (Fibro protocol)

Building event information

The CSG communicates the following specific building event information:

- Point status changes, phone line status, and other off normal information to the central station and enterprise server
- Reports up to ten events through a call

Central station reporting configuration

- The ES Programmer installation includes a new PC application: the Central Station Configuration Tool (CSCT)
- The ES Programmer invokes the CSCT when editing central station settings

Path configuration

The CSG receives system status messages from the host FACU and communicates the information to a DACR at the central station using single or dual communication paths. The path configuration options are listed in Table 1.

Table 1: Path configuration

Primary path	Secondary path
IP*	-
IP*	IP*
Telephone	IP*
Telephone**	Telephone**

* IP can be cellular GSM 4G/LTE or Ethernet LAN/WAN.
 ** For UL applications the secondary path cannot be another telephone line. For ULC-S559, the CSGs are evaluated as active communication systems. You can only use an IP path. For the UL 1076 application, you cannot install the CSG remotely in its own enclosure.

SafeLINC Cloud Services

SafeLINC Cloud Services is a service facilitated by the CSG that creates a digital twin of the fire alarm system and provides remote access to fire alarm system activity to authorized users. SafeLINC Cloud Services has the following features:

- An encrypted and secure connection to the FACU through iOS®, Android®, and web applications
- Developed in accordance with internationally recognized cyber security standards
- Provides real-time FACU events notification, including Fire, Pri2, Supv, and Troubles
- A single portal to view all connected FACUs
- Download and view the latest FACU status reports
- Advanced analytics facilitates preventative maintenance of the system

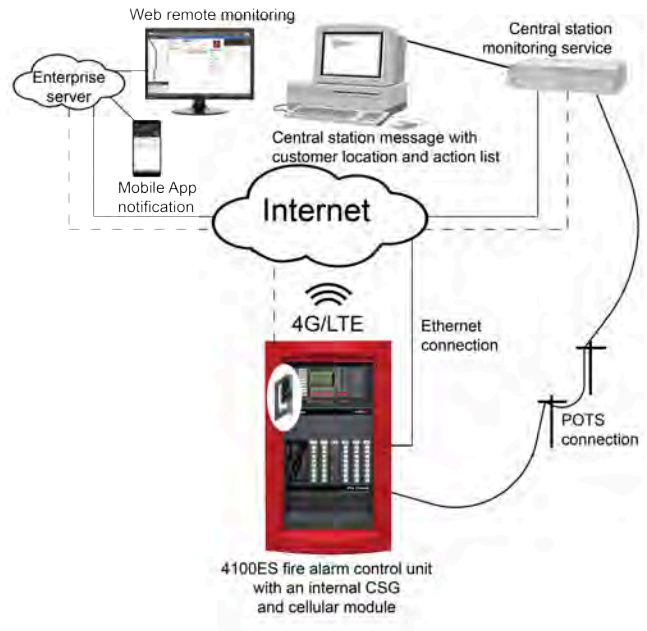


Figure 1: SafeLINC Cloud with central station reporting

* At the time of publication only UL and ULC listings are applicable. Additional listings may be applicable; contact your local product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

SafeLINC Cloud Services

The following sections detail the IP and cellular capabilities of enterprise server reporting.

Connected Services Gateway

The CSG connects an FACU to the SafeLINC Cloud Platform. The CSG maintains a secure connection to the Cloud Platform using any of the available communication methods and transfers the FACU's configuration, status, and events.

The CSG natively implements a generic FACU protocol that you can use with any FACU, and that you can adapt to support other legacy FACU protocols.

SafeLINC Cloud Platform

The Cloud Platform connects FACUs to the cloud and sends its status and events. The Cloud Platform is responsible for managing the link between the equipment and a user's account. It generates notifications in the form of emails or mobile application Push Notifications when an FACU event is reported.

SafeLINC Web Architect user interface (UI)

You can access the Web UI with most modern web browsers. The Web UI shows connected devices and their current state. You can also add new connected equipment to your workspace, invite other users, and configure notifications for equipment events.

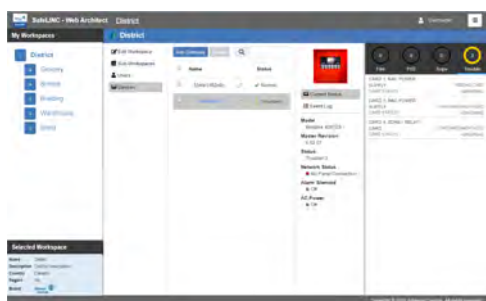


Figure 2: SafeLINC Web Architect UI

Figure 2 shows an example SafeLINC Web Architect UI, which can include the following information:

Workspaces

The SafeLINC Cloud Platform is composed of a collection of hierarchical containers called workspaces that enables authorized users to manage sub-workspaces, connected devices and authorized users. The workspace architecture provides flexibility for all users, from large commercial users managing multiple connected FACUs to single FACU users at a local level.

Selected Workspace

A detailed view of a specific workspace with the following information:

- Name and description
- Associated country and region

Sub-Workspace

View a non-aggregated list of CSGs and FACUs associated with a workspace.

A detailed view of a specific Gateway with the following information:

- Name or Unique Identifier (UID)
- Connectivity status to Cloud
- Operational status
- Cellular IMEI and ICCID, if available
- Current firmware version
- Associated FACU

A detailed view of a specific FACU with the following information:

- Brand and model
- Name
- Revision
- Connectivity status to Gateway
- Alarm Silenced Status
- AC Power status
- Current or last known active status by type (Fire, Pri2, Supv, or Trouble)
 - Active events count with acknowledge status
 - List of active events with acknowledge status
 - Details of the event
- FACU event log with filtering, search, and export capabilities

Notification settings

Notification settings include the following actions:

- Enable or disable all notifications by type
- Enable or disable specific notifications by Push or Email
- Configure notifications from individual FACUs

SafeLINC mobile app

Use the SafeLINC mobile app to supervise your managed FACUs and receive push notifications about FACU events on-the-go.



Figure 3: SafeLINC mobile app

Mobile app features

- Log on with Microsoft account credentials
- View assigned root workspace and all associated sub-workspace hierarchy
- View details of a specific workspace
- View non-aggregated list of FACUs associated with a workspace

View the following details of a specific FACU on the mobile app:

- Name
- Connectivity status
- Alarm Silenced status
- AC power status
- Current or last known active status by type (Fire, Pri2, Supv or Trouble)
 - Active events count with acknowledge status
 - List of active events with acknowledge status
 - Details of the event
- Event log with filtering and search capabilities
- Push notifications from selected FACUs and event types. Configure notifications in the Web UI.
- View list of push notifications received

Email

You can receive email notifications from selected FACUs and event types. Configure notifications in the Web UI.

Accessing the SafeLINC app

To access the SafeLINC web app, visit the following address:

<https://safelinc.johnsoncontrols.com/>

To download the SafeLINC mobile app visit the Google Play Store or Apple App Store by pointing your device's camera at the appropriate QR code, see Figure 4 and Figure 5, or type one of the following addresses:

<https://apps.apple.com/us/app/safelinc/id1494023367>

<https://play.google.com/store/apps/details?id=com.jci.safelinc>



Figure 4: QR code for SafeLINC mobile app on Google Play Store

Figure 5: QR code for SafeLINC mobile app on Apple App Store

Product selection

Table 2: Connected Services Gateway PIDs

Model	FACU type	Description	Ordering information
4100-2504	4100ES	Connected Services Gateway with IP Communicator: side mounted	Optional: either 4100-2504 or 4100-2506 is required
4100-2506	4100ES	Connected Services Gateway with IP Communicator: vertically mounted	Optional: either 4100-2504 or 4100-2506 is required
4010-2504	4010ES	Connected Services Gateway with IP Communicator	Required
4007-2504	4007ES	Connected Services Gateway with IP Communicator	Required
2250-9800	2050FS and 2250FS	Connected Services Gateway with IP Communicator	Required

Table 3: External boxes

Model	FACU type	Description	Ordering information
2975-9234	4007ES, 4010ES, 4100ES, 2050FS, and 2250FS	External box, red	Required when ordering 4007-6417 for 2050FS or 2250FS FACU.
2975-9235		External box, platinum	
2975-9236		External box, beige	
4100-6900	4100ES	20 ft (6.1 m) Power harness for CSG external enclosure	Optional
4010-6900	4010ES		
4007-6900	4007ES		
0734-383	2050FS and 2250FS	6 ft (1.8 m) Communication cable for external FS gateway module	Required when ordering 4007-6417 for 2050FS or 2250FS FACU.

Table 4: Cellular modules and antennae

Model	FACU type	Description	Market	Ordering information
4007-6416	4007ES, 4010ES, 4100ES	GSM 4G/LTE Cellular Module kit for internal installations	North America (AT&T and Rogers)	Optional: SIM card not included
4007-6417	4007ES, 4010ES, 4100ES, 2050FS, 2250FS	GSM 4G/LTE Cellular Module kit for external box installations		
4007-6405	4007ES, 4010ES, 4100ES, 2050FS, 2250FS	15 ft (4.57 m) antenna extension kit	Global	Optional
4007-6406	4007ES, 4010ES, 4100ES, 2050FS, 2250FS	25 ft (7.62 m) antenna extension kit		Optional
4007-6407	4007ES, 4010ES, 4100ES, 2050FS, 2250FS	50 ft (15.24 m) antenna extension kit		Optional

Specifications

Table 5: CSG electrical specifications

Specification	Rating
Voltage DC	Nominal 24 V
Current DC	125 mA

Table 6: Cellular module electrical specifications

Specification	Rating
Voltage DC	Nominal 24 V draw through the CSG
Current DC	20 mA

Table 7: CSG and cellular module environmental specifications

Specification	Rating
Temperature	Normal operation with ambient temperature outside the cabinet at 32°F to 120.2°F (0°C to 49°C)
Humidity	Normal operation under non-condensing humidity conditions up to 93% relative humidity at 100.4°F (38°C)

Table 8: External box

PIDs	Width	Depth	Height
2975-9234 red	9.4 in. (23.9 cm)	2.3 in. (5.8 cm)	6.1 in. (15.5 cm)
2975-9235 platinum			
2975-9236 beige			

Table 9: Antenna specifications

	4007-6405	4007-6406	4007-6407
—	Rating		
Antenna type	1/4 wave helical	1/4 wave helical	1/4 wave helical
Gain	3.0 dBi	3.0 dBi	3.0 dBi
Polarization	Linear vertical	Linear vertical	Linear vertical
Frequency range	698-2700 MHz	698-2700 MHz	698-2700 MHz
Azimuth beam width	Omnidirectional	Omnidirectional	Omnidirectional
Total weight including cable	1.68 pounds (0.76 kg)	2.16 pounds (0.98 kg)	3.44 pounds (1.56 kg)
Antenna length/diameter	13.1 in. (333 mm)	13.1 in. (333 mm)	13.1 in. (333 mm)
Coaxial cable length	15.1 ft (4.6 m)	24.6 ft (7.5 m)	49.2 ft (15 m)
Connector type	RP-SMA Male	RP-SMA Male	RP-SMA Male

Features

4100ES Series MINIPLEX transponders allow remotely located initiating and notification functions:

- Transponder operation is available as standard or with local mode operation
- Communications with the host fire alarm control panel use the Remote Unit Interface (RUI and RUI+) formats

Initiating functions include:

- Conventional initiating device circuit (IDC) support
- Addressable device support including TrueAlarm analog sensor compatibility

Notification functions include:

- Addressable strobe and horn notification using enhanced power delivery **IDNAC SLCs**
- Conventional DC notification appliance circuits including TrueAlert strobe and horn appliances
- Emergency voice/alarm communications

Local mode operation provides:

- Default local initiating and notification operation in the event of a communications loss with the host control panel
- Enabling of an optional Local Mode Controller with a local alarm sounder, LED status indicators, and keyswitch enabled control switches
- Support for conventional Initiating Device Circuits (IDC's), conventional Notification Appliance Circuits (NAC's), addressable IDNet devices, addressable IDNAC notification appliances, and default output tones from local amplifiers

Optional modules include:

- Digital or Analog audio riser modules for connection to system audio signals
- Digital or analog input audio amplifiers with integral on-board NACs
- Power supplies with or without battery chargers
- City Connect modules and RS-232 ports for printers or maintenance terminals
- Alarm relays, auxiliary relays, additional IDC modules, and NAC expansion modules

NEMA 1/IP30 cabinets are equipped with solid doors (platinum or red) and in one, two, or three bay sizes

Listed to:

- UL 864, Fire Detection and Control (UOJZ), Smoke Control Service (UUKL), Releasing Device Service (SYZV), Emergency Communication and Relocation Equipment (UOQY)
- UL 1076, Proprietary Alarm Units - Burglar (APOU)
- UL 2017, Process Management Equipment (QVAX), Emergency Alarm System Control Units (FSZI)
- UL 1730, Smoke Detector Monitor (UULH)
- UL 2572, Mass Notification Systems (PGWM)
- CAN/ULC-S527 Control Units for Fire Alarm Systems (UOJZ7), Releasing Device Service (SYZV7)
- CAN/ULC-S559 Central Station Fire Alarm System Units (DAYR7)
- ULC/ORD-C1076 Proprietary Burglar Alarm Units and Systems (APOU7)

- ULC/ORD-C100 Smoke Control System Equipment (UUKL7)

Introduction

4100ES MINIPLEX transponders connect to a host 4100ES Fire Alarm Control Panel using Simplex remote unit interface (RUI) communications. At the transponder, RUI communications are received by the transponder interface module and translated into the same internal communications format that is used in the host control panel.

Remotely located modules. With RUI communications, the transponder can remotely provide the same initiating and notification functions that occur at the host control panel without requiring multiple long distance wiring runs. Connections to the host panel are low current communications and audio wiring with distances up to 2500 ft (762 m).

Please refer to document *S4100-1031* and the other documents listed in [Additional 4100ES Product Reference](#) for additional information concerning the extensive initiating and notification features of the 4100ES fire alarm control panels.

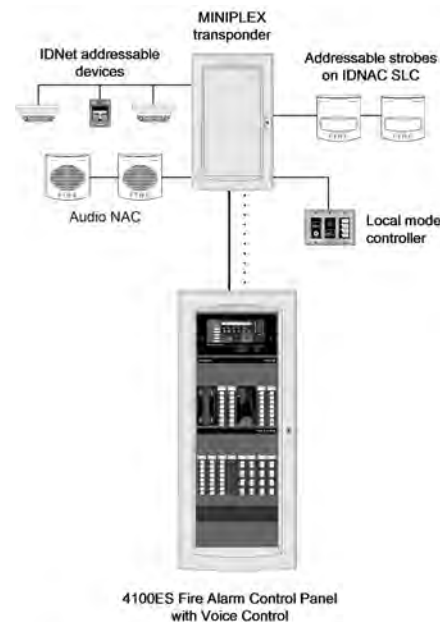


Figure 1: Typical 4100ES MINIPLEX System One-Line Drawing

Module Bay Description

Transponder model 4100-9600 includes a bay assembly, a power distribution interface module (PDI), a Basic Transponder Interface Module, and an interconnect harness. Communications with the host fire alarm control panel are via a Remote Unit Interface (RUI) connection that allows for up to 2500 ft (762 m) distance. RUI can communicate with up to a total of 31 remote devices and can be either Class B or Class X communications.

Transponder model 4100-9601 substitutes a Local Mode Transponder Module for the Basic Transponder Module.

Optional Expansion Bays each include a PDI and accept a variety of optional modules (refer to tables from [MINIPLEX Transponder Product Selection](#) onwards).

The Battery Compartment (bottom) accepts two batteries, up to 50 Ah, that can be mounted within the cabinet. Battery mounting does not interfere with available module space. A power supply with battery charger is required for each battery set.

* Additional listings may be applicable; contact your local Simplex product supplier for the latest status.

Packaging Availability

- Modules are power-limited (except as noted, such as battery chargers, city circuits and relay modules)
- Enclosure are available for one, two, or three bay sizes or for cabinet rack mounting
- NEMA 1/IP30 boxes and solid doors are available in platinum or red (ordered separately)
- Up to eight close-nipped cabinets can be connected at one transponder location (close-nipped is mounted within 20 ft (6 m) and with interconnecting wiring enclosed in conduit)
- Refer to document *S4100-0037* for enclosure details.

Local Mode Control Operation

Default Stand-Alone Operation. In the event of a communications loss with the host fire alarm control panel, model 4100-9601 MINIPLEX Local Mode Transponders provide fire alarm response default operation for its connected devices and appliances per the following:

Input Operation. During local mode operation, conventional initiating devices and addressable IDNet initiating devices shall be capable of reporting an alarm condition to the MINIPLEX transponder. TrueAlarm sensors will cause an alarm at their least sensitive alarm threshold:

- Photoelectric sensors will alarm at 3.7%/ft smoke obscuration
- Heat sensors will alarm at a fixed temperature of 135 °F (57 °C)
- TrueAlarm device LEDs will be activated to indicate a device in alarm

Notification Operation. Fire alarm conditions reported against a fire alarm point type within a transponder in local mode will cause all notification appliance circuits in that transponder to:

- Sound a general alarm temporal pattern horn tone
- Activate visible notification appliance circuits

Local Mode Module Support. Local mode operation provides support for the following MINIPLEX transponder circuits:

- Conventional NAC and addressable IDNAC notification appliance circuits, operated at a temporal pattern,
- IDNet, IDNet 2 and IDNet 2+2 addressable device circuits
- 4100ES amplifiers will provide their on-board horn tones (500 Hz) at a temporal pattern through their on-board amplifier NACs
- Firefighter Telephone control modules in local mode

Local Mode Operation Module Exclusion. Modules and circuits not listed above but that are listed as compatible with MINIPLEX transponders per this document, do not interfere with local mode operation but **are not supported** during local mode operation.

Local Mode Controller

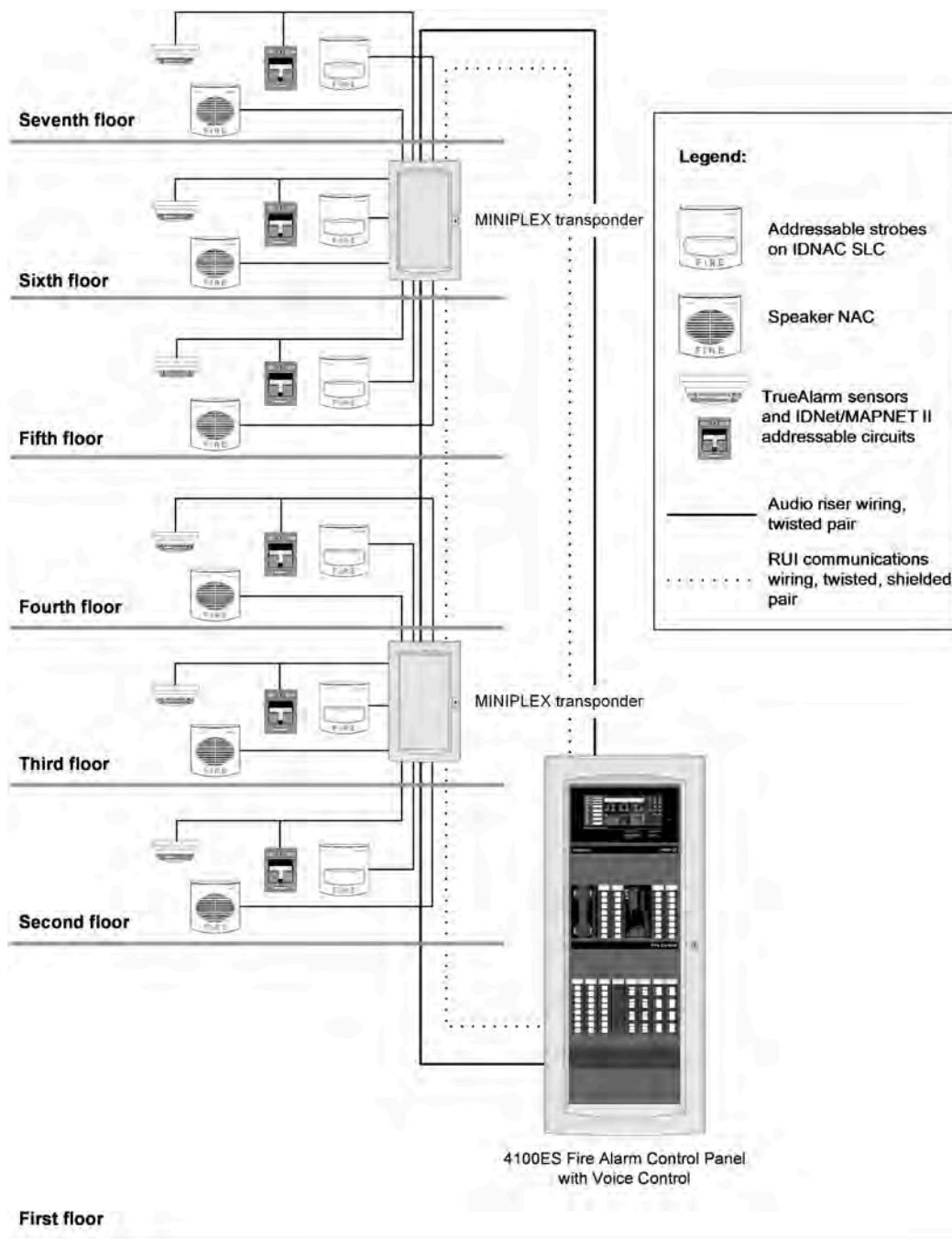
Operation. During local mode operation, an optional Local Mode Controller will indicate status (see Figure 2) and can be enabled using a keyswitch to perform local alarm silence or reset. If alarms occurring during local mode are reset using a Local Mode Controller, upon restoration of communications, **those alarms will not be sent to the master controller.** If alarms are still present upon restoration of communications, then the alarm condition will be reported and host fire alarm control panel programmed alarm functions will occur. When communications are re-established, the local mode transponder restores automatically.

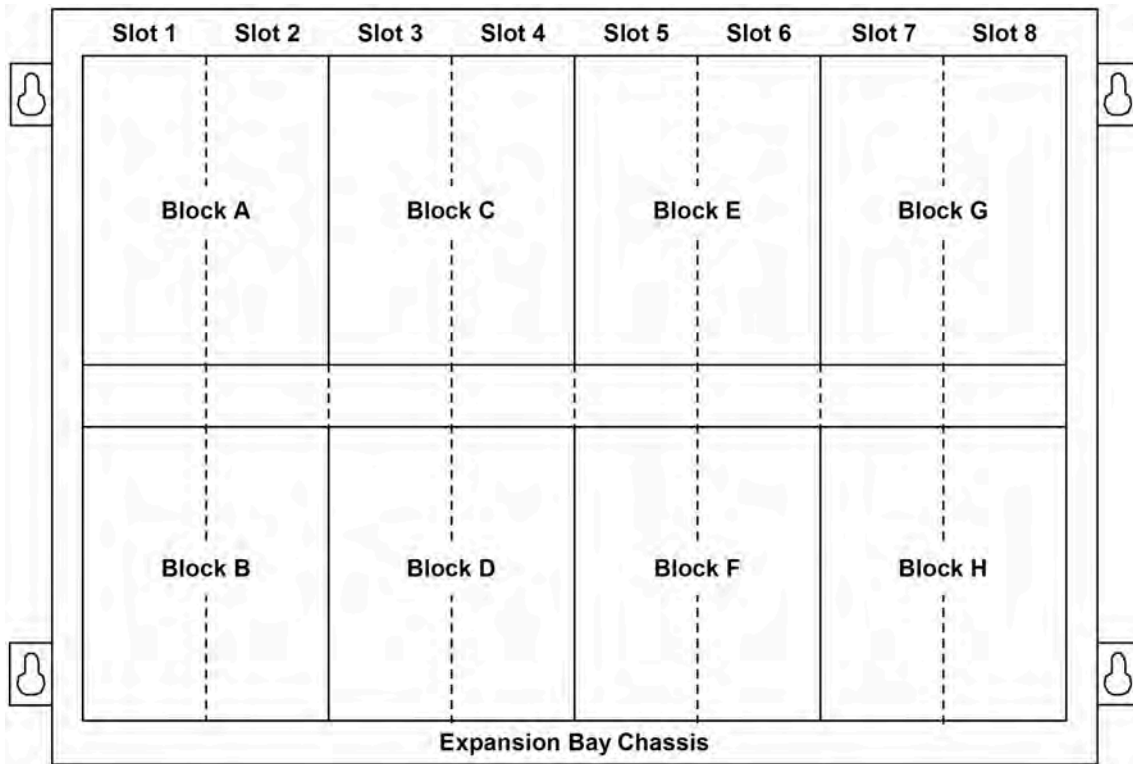
Mounting. Local Mode Controllers are mounted on three-gang plates, are available in beige or red, and for either flush or semi-flush mounting. (See [Local Mode Controller](#) and 579-343 operating instructions for details).



Figure 2: Local Mode Controller Module

Typical Multi-Floor MINIPLEX Audio System



Expansion Bay Module Loading Reference


Size Definitions: Block = 4" W x 5" H (102 mm x 127 mm) card area
 Slot = 2" W x 8" H (51 mm x 203 mm) motherboard with daughter card

Description		Mounting
Transponder Interface Modules		Block A
Audio Riser Modules		Block B
Terminal Block Module		1 Block
IDNet 2 and IDNet 2+2 Modules		1 Block
4, 2 A Relays	NON Power-limited	1 Block
4, 10 A Relays		4", 2 Slots
8, 3 A Relays		1 Block
VESDA Interface		2", 1 Slot
8 Point Zone/Relay Card		1 Block
Class B IDC		2", 1 Slot
Class A IDC		2", 1 Slot
MAPNET II Module		4", 2 Slots
MAPNET II Isolator		2", 1 Slot
Decoder Module		6", 3 Slots
Flex-35 Amplifiers, 2 max /bay*		Blocks E & F; C & D; or A & B
Flex-50 Amplifiers, 2 max/bay*		Blocks E & F or C & D
100 W Amplifiers, 1 max/bay		Blocks E, F, G & H
100 W Backup Amplifiers, 1 max. per bay with primary amplifier		Blocks A, B, C & D
Telephone Expansion Module		1 Block
Expansion Signal Module		1 Block
NAC Card		1 Block
IDNAC Card		2 Blocks (on ES Power Supply only)
ES-PS		Blocks G & H ONLY
ES-PS Configured as backup		Blocks E & F ONLY
ES-XPS		2 Blocks

Note: * When mounting dual Flex amplifiers on an expansion bay, special mounting rules apply.

General Specifications

Table 1: ES Power Supply Specifications (ES-PS and ES-XPS)

Specifications	Rating
AC Input Power	120-240 VAC
120 VAC	3.72 A
220 - 240 VAC	1.82 A
Total DC Output Power Capacity	
Without Fan	9.5 A
With 4100-5131 Fan and 4100-5451 IDNAC Module(s)	9.7 A
With 4100-5131 Fan (without 4100-5451 IDNAC Module)	12.7 A
With Regulated 24V Appliance Loads (with or without 4100-5131 Fan)	5.0 A
Special Application Appliance Loads: supports full total DC output power capacity ratings above	Simplex horns, strobes, and combination horn/strobes and speaker/strobes (contact your Simplex product representative for compatible appliances)
Regulated 24V Appliances: reduces total DC output power capacity to 5.0 A	Power for other UL listed appliances; use associated external synchronization modules where required
Auxiliary Power Tap	2 A maximum (taken from total output power capacity)
NACs Programmed for Auxiliary Power	3 A maximum per NAC, 5 A maximum total (taken from total output power capacity)
Battery Charger (ES-PS only)	Sealed Lead-Acid Batteries
Battery Ah Capacity	UL/ULC listed for battery charging of up to 110 Ah (batteries larger than 50 Ah require a remote battery cabinet)
Charger characteristics and performance	Temperature compensated, dual rate, recharges depleted batteries within 48 hours
Environmental	
Operating Temperature	32 °F to 120 °F (0 °C to 49 °C)
Operating Humidity	Up to 93% RH, non-condensing @ 90 °F (32 °C) maximum
Option Card Mounting	2 vertical blocks are available for compatible modules (refer to 579-1288 installation instructions for additional details)

Note:

- Battery charger is only available on the ES-PS power supply.
- When an ES-PS is used to power Flex-35 or Flex-50 Amplifiers the ES-PS battery charger is not available.

Table 2: IDNet, MAPNET II, IDNet 2, and IDNet 2+2 SLC Wiring Common Specifications

Specification		Description
Maximum Distance from Control Panel per Device	1 to 125	4000 ft (1219 m); 50 ohms
Load	126 to 250	2500 ft (762 m); 35 ohms
Connections		Terminals for 18 to 12 AWG (0.82 mm ² to 3.31 mm ²)

Table 3: IDNet and MAPNET II Specifications

Specification		Description
Wire Type	New Installation	Shielded twisted pair (STP)
	Retrofit Only	Unshielded twisted pair (UTP)
Total Wire Length Allowed With "T" Taps for Class B Wiring		Up to 10,000 ft (3 km); 0.58 µF

Note: For retrofit installations consult with your local Simplex product supplier, restrictions may apply.

Table 4: IDNet 2 and IDNet 2+2 Wiring Specifications

Specification		Description
Wire Type	New Installation	Unshielded twisted pair (UTP)
	Retrofit Only	Shielded or unshielded, twisted or untwisted wire
Total Wire Length Allowed With "T" Taps for Class B Wiring		Up to 12,500 ft (3.8 km); 0.60 µF
Maximum Capacitance Between IDNet 2 Channels		1 µF
IDNet 2 and IDNet 2+2 Module Compatibility: IDNet communicating devices and TrueAlarm sensors including QuickConnect and QuickConnect2 sensors		

MINIPLEX Transponder Product Selection
Table 5: Transponder Type

SKU	Description	Supv.	Alarm
4100-9600	Basic Transponder, includes bay equipment with power distribution interface, and 4100-0620 Basic Transponder Interface Module mounted in Block A	36 mA	36 mA
4100-9601	Local Mode Transponder, includes bay equipment with power distribution interface, and 4100-0625 Local Mode Transponder Interface Module mounted in Block A	normal	38 mA
		in local mode	23 mA

Table 6: ES Power Supplies

Model	Voltage	Description	Includes	Provides Power to Bay	Size	Supv.	Alarm
4100-5401	120-240 V 50/60 Hz	ES-PS	24 V Aux. Relay, 24 V Aux. Power 2 A Tap/ Simple NAC, 110 Ah Battery Charger, 2 PDI Blocks for compatible option cards.	Yes	2 Blocks	68 mA	77 mA
4100-5402	120-240 V 50/60 Hz	ES-XPS	Same as ES-PS above except without battery charger	No			

Table 7: Power supply accessories

Model	Description	Size	Current
4100-5152	12 VDC Power Option, 2 A maximum	1 Block	1.5 A maximum
4100-0156	8 VDC Converter, required for multiple Physical Bridge Modules, 3 A maximum	1 Block	included w/loads
4100-5130	Voltage Regulator Module, 22.8 to 26.4 VDC (25VDC nominal); isolated and resettable output; includes earth detection circuit and trouble relay for status monitoring.	1 Block	3 A maximum with 2.5 A load, 4.9 A maximum with 4 A load
4100-5131	ES-PS Fan Module, allows more than one power supply to be installed in a single bay and may increase total DC output power capacity per power supply. See Table 1 for specifications.	N/A	0 mA Supv. 200 mA Alarm
4100-0636	Box Interconnection Harness Kit (non-audio); order one for each close-nipped cabinet		
4100-0638	4100 Slot Module Additional 24 VDC Harness; needed when 4100 Slot module requirements exceed 2 A from ES-PS		
4100-5403	Harness for ES-PS Backup Power Supply		
4100-0644	120 VAC PDM Harness	1 PDM harness is required per power supply, select as required for appropriate input voltage	
4100-0645	220 VAC PDM Harness		
4100-0646	230 VAC PDM Harness		
4100-0647	240 VAC PDM Harness		

Table 8: Conventional and Addressable Notification Appliance Modules

Model	Description	Outputs	Size	Max Load - Special Application*		Max Load - Regulated 24 V		Current Draw	
				On ES-PS / ES-XPS	In Bay	On ES-PS / ES-XPS	In Bay	Supv.	Alarm
4100-5450**	Conventional NAC Module	Three 3 A NACs	1 Block	3.0 A / NAC 9.0 A / Card	3.0 A / NAC 6.0 A / Card	2.0 A / NAC 5.0 A / Card	2.0 A / NAC 2.0 A / Card	66 mA	66 mA
4100-5451**	IDNAC Addressable Notification SLC Module	Three 3 A SLCs	2 Blocks (on ES Power Supply only)	3.0 A / NAC 9.0 A / Card	N/A	N/A		124 mA	230 mA

*Special Application specifications apply to both Special Application and Steady Aux Power loads during alarm operation. Available power during non-alarm operation is 5.0 A maximum.

**The 4100-5450 and 4100-5451 can only be powered from a 4100-5401 and 4100-5402 power supply.

Table 9: Dual Class A Isolator for IDNAC

Model	Description	Size	Supv.	Alarm
4100-6103	Dual Class A IDNAC Isolator (DCAI) , converts a single Class B IDNAC SLC input to two Class A SLC outputs; provides short circuit isolation between each Class A output circuit; connect up to two DCAI Modules per IDNAC SLC input up to a maximum of 6 DCAI Modules per IDNAC SLC; each isolated output SLC used requires one IDNAC address; the total current remains controlled by the Class B input source SLC at 3 A maximum; each isolated loop supports up to 30 device addresses Note: Up to 30 additional device addresses may be installed between each 4905-9929 TrueAlert Addressable Isolator+ Module, not to exceed the maximum address and unit loading specifications for the IDNAC channel)	1 Block	8.3 mA	18.5 mA

Table 10: Addressable Interface Modules

Model	Description	Devices	Supv.	Alarm
4100-3109*	IDNet 2 Module , 250 point capacity; electrically isolated output with two short circuit isolating Class B or Class A output loops, 1 block; standard on EPS with IDNet 2 Module	no devices	50 mA	60 mA
		50 devices	90 mA	150 mA
		125 devices	150 mA	225 mA
		250 devices	250 mA	350 mA
4100-3110*	IDNet 2+2 Module , 250 point capacity; electrically isolated output with four short circuit isolating Class B or Class A output loops, 1 block; mounts in expansion bay or available master controller bay module locations only, not applicable for EPS mounting	no devices	50 mA	60 mA
		50 devices	90 mA	150 mA
		125 devices	150 mA	225 mA
		250 devices	250 mA	350 mA
4100-3111*	IDNet Short Circuit Isolating Loop Output Module; for Aftermarket Field Installation Only ; mount up to two on a 4100-3109 module; for use with 4100-3109 modules only			
4100-3102	MAPNET II Module, 127 point capacity, add devices separately; Module size = 2 Slots; Loading per MAPNET II device = 1.7 mA	Module without devices	255 mA	275 mA
4100-3103	Isolator Module for MAPNET II communications; converts a single connected SLC into four isolated outputs selectable as Class A or Class B; up to two Isolator Modules can be connected to one SLC; Module size = 1 Slot; Note: Compatible with MAPNET II Remote Isolators only		50 mA	50 mA

*Note: See Table for current draw for each IDNet device

Table 11: Current draw for each IDNet device

Condition	Current
Standby	0.8 mA
Alarm, with LED off	1.0 mA
Alarm, with LED on	3.0 mA

Note: A maximum of 20 devices with LED on is supported for each channel. Additional device LEDs do not turn on.

Table 12: 8-Point Zone/Relay Card

Model	Description	Size	Supv.	Alarm
4100-5013	8 point zone/relay 4x5" flat module. Mounts in any open block in a master controller or expansion bay. Alarm current shown is for 8 Class B IDCs using 3.3K end-of-line-resistors with 4 in alarm and 4 in standby. Standby current shown is for all 8 IDCs in standby. Refer to 579-1236 Zone/Relay Module Installation Instructions for additional information.	1 block	83 mA	351 mA
4100-6305	25V regulator harness for 8 point zone/relay module. One required for each 8 point zone/relay module to be powered by the 4100-5130 25V regulator module. A maximum of (5) 8 point zone/relay modules may be powered from the 4100-5130 per bay.	N/A	N/A	N/A

Note: Modules in Table 12 requires 4100ES Version 3.06 or later.

Table 13: Relay Modules; Non-power-limited

Model	Description	Resistive Ratings		Inductive Ratings		Size	Supv.	Alarm
4100-3202	4 DPDT w/ feedback	10 A	250 VAC	10 A	250 VAC	2 Slots	15 mA	175 mA
4100-3204	4 DPDT w/ feedback	2 A	30 VDC/VAC	½ A	30 VDC/120 VAC	1 Block	15 mA	60 mA
4100-3206	8 SPDT	3 A	30 VDC/120 VAC	1 ½ A	30 VDC/120 VAC	1 Block	15 mA	190 mA

Current Calculation Notes:

- For total supervisory current, add panel module currents to base system **and** add all external loads panel-powered loads.
- For total alarm current, add panel module currents to base system alarm current **and** add all panel NAC loads **and** all external loads powered from panel power supplies.

Table 14: Communication Modules

SKU	Description	Size	Supv.	Alarm			
4100-1291	Remote Unit Interface Module (RUI, unisolated), up to 3 maximum per control panel; for use with 4100-9600 only	1 Slot	85 mA	85 mA			
4100-6031	Select one per ES Power Supply (non power-limited)	City Circuit, with disconnect switches	For use with ES-PS only (not for backup ES-PS or ES-XPS)	1 Block	20 mA	36 mA	
4100-6032							City Circuit, without disconnect switches
4100-6033							Alarm Relay, 3 Form C relays, 2 A @ 32 VDC; for ES-PS
4100-6038	Dual RS-232 Interface	1 Slot	132 mA	132 mA			
4100-6045	Decoder Module	3 Slots	85 mA	163 mA			

Table 14: Communication Modules

SKU	Description	Size	Supv.	Alarm
4100-6048	VESDA Aspiration System Interface	1 Slot	132 mA	132 mA
4100-9816	Master Clock Interface Module with one standard RS-232 port (see <i>S4100-0033</i>)	1 Slot	132 mA	132 mA

Table 15: Miscellaneous Options and Accessories

Model	Description
4100-1290	24 Point I/O Module for external connections, select each point as either a switch input (momentary or maintained) or an output (for lamp/LED/relay); requires 1 Slot (refer to data sheet <i>S4100-0032</i> for additional information)
4100-0632	Terminal Block Utility Module with 2, 16 position terminal blocks on 4" x 5" single block, for of up to 12 AWG wire (3.31 mm ²)
4100-0633	Door Tamper Switch, connects into Transponder Interface Module, one per cabinet assembly if required
→ 4100-0634	120 VAC Power Distribution Module (PDM) select per system voltage; one required per box
4100-0635	220/230/240 VAC Power Distribution Module (PDM) select per system voltage; one required per box
4100-9837	Green LED Power-on Indicator Kit, required for ULC listing of MINIPLEX transponder; mounts on solid door knockout
2081-9031	Series resistor for WSO, IDCs (N.O. water flow and tamper on same circuit, wires after water flow and before tamper) 470 Ω, 1 W, encapsulated, two 18 AWG leads (0.82 mm ²), 2 ½" L x 1 ⅜" W x 1" H (64 mm x 35 mm x 25 mm)

Table 16: Audio Riser Modules

SKU	Description	Size	Supv.	Alarm
4100-0621	Dual Channel <i>Analog</i> Audio Riser Module; accepts one or two separate audio signals from host control panel; mounts in Block B, is controlled by Transponder Interface Module	1 Block	0 mA	15 mA
4100-0622	3-8 Channel <i>Digital</i> Audio Riser Module; similar to analog module, except receives and decodes a digital input signal with up to eight audio channels; with Non-Alarm Audio input	1 Block	70 mA	70 mA

Table 17: Analog Emergency Voice/Alarm Communications Equipment, Constant Supervision Compatible*

SKU	Description	Details
4100-1361	25 VRMS output	Includes three on-board Class B audio NACs; power is supplied from an ES-PS
4100-1362	70.07 VRMS output	
4100-1312	25 VRMS output	Includes three on-board Class B audio NACs; power is supplied from an ES-PS
4100-1313	70.7 VRMS output	

* Refer to document S4100-1034 for additional audio information.

Table 18: 100 W Analog Amplifiers with Power Supply, Constant Supervision Compatible

SKU/Output Voltage		Power Supply Input/Listing		Description	Details
25 VRMS	70.7 VRMS				
4100-1314	4100-1315	120 VAC, 60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS
4100-1316	4100-1317	120 VAC, 60 Hz	ULC	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS ULC models have low battery dropout circuit
4100-1318	4100-1319	220/230/240 VAC, 50/60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS
4100-1320	4100-1321	120 VAC, 60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier
4100-1322	4100-1323	120 VAC, 60 Hz	ULC	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier ULC models have low battery dropout circuit
4100-1324	4100-1325	220/230/240 VAC, 50/60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier

Table 19: Digital Emergency Voice/Alarm Communications Equipment*

Model	Description	Details
4100-1363	25 VRMS output	Includes three on-board Class B audio NACs; power is supplied from an ES-PS
4100-1364	70.07 VRMS output	
4100-1326	25 VRMS output	Includes three on-board Class B audio NACs; power is supplied from an ES-PS
→ 4100-1327	70.7 VRMS output	

* Refer to document S4100-1034 for additional audio information.

Table 20: 100 W Digital Amplifiers with Power Supply, Constant Supervision Compatible

SKU/Output Voltage		Power Supply Input/Listing		Description	Details
25 VRMS	70.7 VRMS				
4100-1328	4100-1329	120 VAC, 60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS
4100-1330	4100-1331	120 VAC, 60 Hz	ULC	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS ULC models have low battery dropout circuit
4100-1332	4100-1333	220/230/240 VAC, 50/60 Hz	UL	Primary 100 W Amplifier	Includes six, Class B audio NACs; NAC rating = 50 W or 100 speakers maximum; 2 A @ 25 VRMS; 1.4 A @ 70.7 VRMS
4100-1334	4100-1335	120 VAC, 60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier
4100-1336	4100-1337	120 VAC, 60 Hz	ULC	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier ULC models have low battery dropout circuit
4100-1338	4100-1339	220/230/240 VAC, 50/60 Hz	UL	Backup 100 W Amplifier	Uses the six Class B NACs of primary amplifier

Table 21: Options for use with either Analog or Digital Amplifiers

Model	Description	Details and Mounting Reference	
4100-1245	Flex-35/50 Expansion NAC Module; adds three Class B audio NACs	Choose one per amplifier	Mounts on Flex-35/50 assembly; NAC ratings = 1.5 A, 35/50 W, or 100 speakers maximum; Supv = 8 mA, Alarm = 60 mA
4100-1246	Flex-35/50 Class A Adapter Module; converts three on-board NACS to Class A operation		Mounts on Flex-35/50 assembly; NAC ratings = 2 A, 50 W, or 100 speakers maximum; Supv = 10 mA, Alarm = 30 mA
4100-1248	100 W Amplifier Expansion NAC Module; NAC ratings = 1.5 A, 50 W, or 100 speakers max.		Provides six additional Class B audio NACs, mounts on 100 W amplifier assembly; Supv = 17 mA, Alarm = 60 mA
4100-1249	100 W Class A Adapter Module; NAC ratings = 2 A, 50 W, or 100 speakers max.		Converts six on-board NACs to Class A operation, mounts on 100 W amplifier assembly; Supv = 1 mA, Alarm = 60 mA
4100-1259	25 VRMS Output; NAC rating = 2 A, 50 W, or 100 speakers max.	Constant Supervision Adapter for three NACs; select per amplifier output; not compatible with amplifier NAC expansion modules; deactivated when on batteries	Supv = 10 mA on batteries; Alarm = 35 mA
4100-1260	70.7 VRMS Output; NAC rating = 0.707 A, 50 W, or 100 speakers max.		Supv = 38 mA on batteries; Alarm = 70 mA
			Converts three Class B audio NACS to Class A or Class B Constant Supervision NACs; mounts on Flex-35/50 or 100 W amplifier assembly; use two for the six NACs on 100 W amplifiers

Table 22: Audio Expansion Signal Module and Options

Model	Description	Details and Mounting Reference	
4100-5116	Expansion Signal Module; three, 1.5 A Class B NACs for Audio applications; up to five maximum per amplifier; NAC rating = 1.5 A, 50 W, or 100 speakers maximum	Converts one NAC input to three NAC outputs; selects between two inputs; for Flex-35/50 amplifiers only, two input NACs are required; Single Block module mounts in expansion bay; Supv = 20 mA; Alarm = 80 mA	
4100-1266	Expansion Signal Module NAC Expander; NAC rating = 1.5 A, 50 W, or 100 speakers max.	Expands module capacity to six, Class B NACs; Supv = 0.84 mA; Alarm = 60 mA	These modules mount on the 4100-5116; select one max. per 4100-5116 as required
4100-1267	Expansion Signal Module Class A Adapter; NAC rating = 1.5 A, 50 W, or 100 speakers maximum	Converts 3 Class B, NACs to Class A; Supv = 0 mA; Alarm = 30 mA	
4100-1268	Expansion Signal Module Constant Supervision Adapter; Converts 3 Class B NACs to Constant Supervision Class B or Class A NACs; for 25 VRMS or 70.7 VRMS audio	NAC rating = 1.4 A, 50 W, or 100 speakers max.; Supv = 38 mA on batteries (constant supervision deactivated); Alarm = 70 mA	

Table 23: Firefighters Telephone Options

SKU	Description	Size	Supv.	In Use
4100-1272	Expansion Telephone Control Module with three Class B telephone NACS; required when telephone circuits are mounted in transponder;	1 Block	80 mA	130 mA
4100-1273	Telephone Class A Adapter Module; mounts on 4100-1272; no additional current required			

Table 24: General Audio Options

Model	Description
4081-9018	End-of-line resistor harness for 70.7 VRMS NACs; 10 kΩ, 1 W
4100-2320	Audio Bay-to-Bay Interconnection Harness Kit; order one for each audio bay addition
4100-0637	Audio Box Interconnection Harness Kit; order one for each close-nippled audio cabinet

Table 25: Local Mode Controller Selection

SKU	Description	Supv.	Alarm
4601-9108	Flush mount	44 mA	44 mA
4601-9109	Surface mount	44 mA	44 mA
4601-9110	Flush mount	44 mA	58 mA
4601-9111	Surface mount	44 mA	58 mA

Local Mode Controller Detail

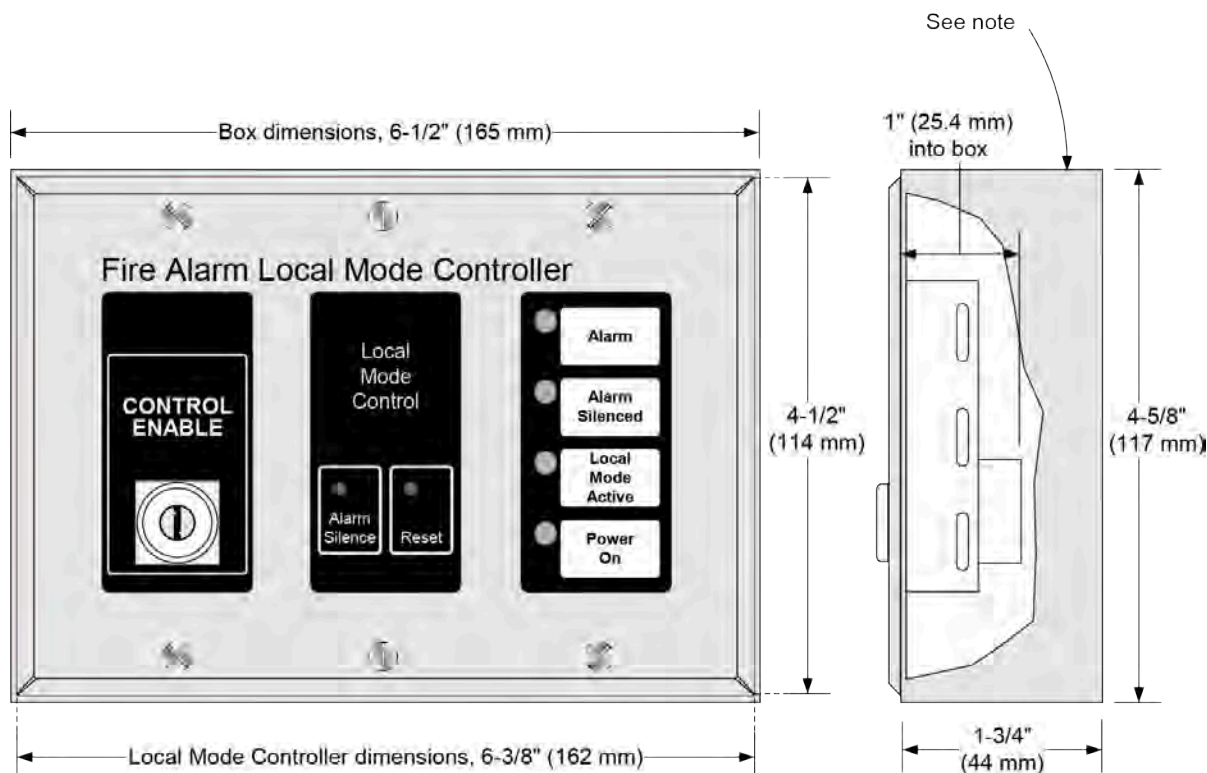


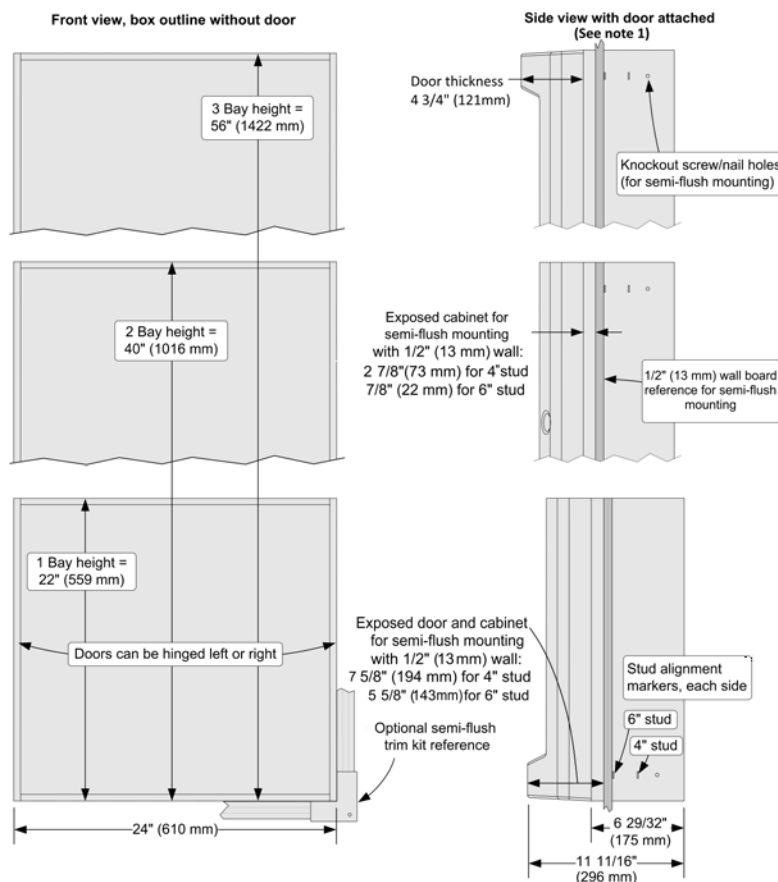
Figure 3: Local Mode Controller Detail

Note: Matching box is supplied with surface mount models 4601-9109 (red) and 4601-9111 (beige); for semi-flush models 4601-9108 (red) and 4601-9110 (beige), use a 1-1/2" (38 mm) minimum depth, 3-gang box.

Local Mode Controller to Transponder Wiring:

1. Wire close-nippled to transponder, maximum distance = 20 ft (6.1 m).
2. Nine wires required: 24 VDC (2), one per LED indicator (4), and one per switch (3).
3. Wire size, 18 AWG (0.82 mm²).

Enclosure Installation Reference



Note:

- Side View dimensions are shown with minimal cabinet and door protrusion from the exterior wall. For 6 inch stud construction with minimum protrusion shown, the door will open 90 degrees. To allow the door to open 180 degrees, the exposed cabinet dimension from the exterior wall must be a minimum of 3 inches (76 mm) for both 4 inch and 6 inch stud construction.
- A system ground must be provided for Earth Detection and transient protection devices. This connection shall be made to an approved, dedicated Earth connection per NFPA 70, Article 250, and NFPA 780.

Additional 4100ES Product Reference

Table 26: Additional 4100ES Product Reference

Subject	Datasheet
Battery and Battery Cabinet Reference for 4100ES	S2081-0006
110 Ah Batteries and Cabinets for 4100ES	S2081-0012
Seismic Battery Brackets Reference	S2081-0019
4100ES LED/Switch Modules & Printer	S4100-0032
4100ES Enclosures	S4100-0037
4100ES Basic Panels with ES-PS Power Supplies	S4100-1031
NDU with ES-PS Power Supplies for 4120 Network	S4100-1036
NDU with ES-PS Power Supplies for ES Net	S4100-1077

Features

Remote Annunciator Panels provide fire alarm control unit (FACU) status information at locations distant from the FACU.

Typical functions include the following features:

- Remote status LED indicators and dedicated switch input controls located on LED/switch modules
- Remote status LED indicator modules with 8 red LEDs or 16 LEDs, 8 red and 8 yellow, that are pluggable to allow color selection. Order yellow, green, or red LEDs separately
- Remote microphone and operator interface for access to the emergency voice/alarm communications system
- Remote master telephone for communicating to the firefighter telephone system
- Models available with Color ES Touch Screen Display User Interface

Additional optional modules include the following items:

- Remote Command Center option for LCD status readout and keyswitch controlled functions, for models 4100-9610 and 4100-9611 without Color ES Touch Screen Display
- 24 Point I/O module
- RS-232 ports for remote printer or terminal connections
- Power supplies with battery charger for annunciator
- Panel mounted printer for system status recording

Wiring requirements:

- Remote unit interface (RUI) or RUI+ supervised communications from the host FACU provide Class B or Class X signaling line circuit (SLC) pathway connections
- Microphone and telephone circuits require their own dedicated wiring

Listed to the following standards:

- UL 864, Fire Detection and Control (UOJZ), Smoke Control Service (UUKL), Releasing Device Service (SYZV), Emergency Communication and Relocation Equipment (UOQY), Control Unit Accessories (UOXX)
- UL 1076, Proprietary Alarm Units - Burglar (APOU)
- UL 2017, Process Management Equipment (QVAX), Emergency Alarm System Control Units (FSZI)
- UL 1730, Smoke Detector Monitor (UULH)
- UL 2572, Mass Notification Systems (PGWM)
- CAN/ULC-S527 Control Units for Fire Alarm Systems (UOJZ7), Releasing Device Service (SYZV7), Control Unit Accessories (UOXX7)
- CAN/ULC-S559 Central Station Fire Alarm System Units (DAYR7)
- ULC/ORD-C1076 Proprietary Burglar Alarm Units and Systems (APOU7)
- ULC/ORD-C100 Smoke Control System Equipment (UUKL7)



Introduction

Remote Annunciator Panels

Remote Annunciator Panels are dedicated purpose transponders that support fire alarm system status information. A typical use case is when the host FACU is located away from the area where those responding to a fire situation need status information.

Status and control

The controls are suitable for firefighters or other fire brigade responders to access particular information and for system control. When equipped with a remote microphone and emergency voice/alarm communications system control, an authorized user can take command of the system and either play selected pre-recorded messages or select specific tones, or initiate live broadcast information either globally into the system, or to selected areas.

Remote Master Firefighter Phone

When equipped with a remote master phone, the authorized user can connect to remote phone call-in requests and allow callers to connect to each other. Although intended for use in assisting fire responders, these systems are also helpful during system setup and test.

Module bay description

Remote Annunciators

Remote Annunciators include a bay assembly, a power distribution interface module (PDI), a Transponder Interface Module, and an interconnect harness. Communications with the host FACU are through a RUI or RUI+ connection that allows for a distance of up to 2500 ft (762 m). RUI can communicate with up to a total of 31 remote devices for each master controller, on one or multiple RUI channels. You can wire RUI as a Class B or Class X communication pathway. You can use either shielded or unshielded wiring, twisted, or untwisted single pair wiring.

4100-9610 Remote Annunciator or 4100-9616 Remote Annunciator with Enhanced ES Touch Screen Display

These models are for applications that may require a full complement of the Remote Annunciator functions, see [Product selection](#). Power is from a cabinet mounted ES-PS power supply.

4100-9611 Basic Remote Annunciator or 4100-9617 Basic Remote Annunciator with Enhanced ES Touch Screen Display

For remote annunciator applications that require less features in the cabinet, these models are powered from a separate fire alarm control cabinet. These models do not accept the following items: a cabinet mounted power supply, expansion phone cards, Class A phone modules, RS-232 modules, panel mounted printers, or 24 I/O modules.

Optional expansion bays

Each includes a PDI and accepts a variety of optional modules for specific annunciator functions.

The battery compartment

The bottom battery compartment accepts two batteries, up to 50 Ah. Battery mounting does not interfere with available module space. Not applicable to the model 4100-9611.

Packaging availability

- Modules are power-limited except as noted, such as relay modules.
- Enclosures are available for one, two, or three bay sizes or for cabinet rack mounting.
- Boxes, doors with tempered glass inserts, and dress panels are available in beige or red. Order separately.
- Refer to document [S4100-0037](#) for enclosure details.

Color ES Touch Screen Display included on models 4100-9616 and 4100-9617

The Color ES Touch Screen Display interface offers intuitive operation similar to a tablet or smart phone. With a larger area format versus an individual text line display, more information is available at a glance and minimal key presses are needed to access detailed information.

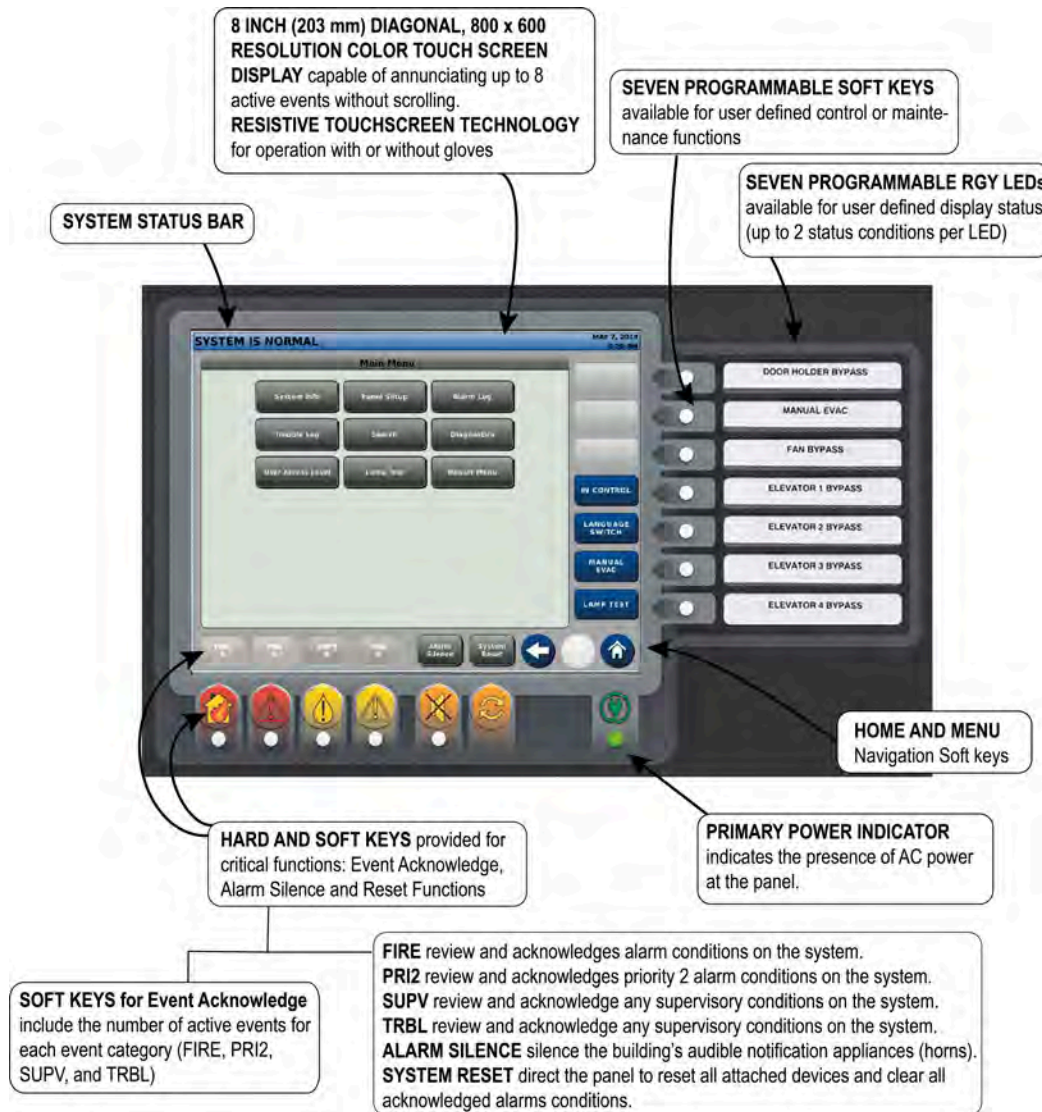


Figure 1: ES Touch Screen Display operator interface

Features

ES Touch Screen Displays provide a customized operating experience with the following features:

- Event activity display choices include **First 8 Events**, or **First 7 Events** with emphasis on **Most Recent**, or **First 6 Events** with emphasis on **First and Most Recent**, individually selectable for each event type.
- System reports are easily viewable and you can read logs with minimal scrolling.
- Up to two languages are available for each system, easily selected by programmable key press
- Vector the information sent to Remote ES Touch Screen Displays by point or zone.
- Both hard and soft keys are available for the following critical functions: Event Acknowledge, Alarm Silence, Reset Functions.
- Resistive touchscreen technology allows operation with or without gloves.
- Seven programmable RGY LEDs are available for user-defined display status, with up to two status conditions for each LED.
- Seven programmable soft keys are available for user-defined control or maintenance functions
- You can change the PRI2 soft key label to CO to annunciate carbon monoxide detection status.
- You can program the ES Touch Screen Display to report individual points or groups of points as a single zone.
- Supports the ability to display a custom watermark background file of a company logo or other desired display content.
- Seismically compliant under the State of California Statewide Office of Housing and Development (OSHPD) Special Seismic Certification (SSC) program guidelines. Refer to *Simplex Seismic Application Guide* 579-1213 and *Battery Brackets for Seismic Activity Applications* S2081-0019 for details.

Display properties

- 8 in. (203 mm) diagonal, 800 x 600 resolution color touch screen display, capable of annunciating up to 8 active events without scrolling.
- Bright white LED backlighting provides efficient and long lasting illumination. The backlight is dim in quiescent state and automatically switches to full power on touch or on event activity in system.

Description

The ES Touch Screen Displays for 4100ES fire alarm systems provide a large display with extended information content, dual language support including UTF-8 character languages, and an intuitive control key interface with the following features:

- Up to 10 ES Touch Screen Displays are supported for each 4100ES control panel with the capacity to allow one ES Touch Screen Display to take control and to designate access levels for interfaces not in-control. You can assign programmable LEDs to in-control status indications.
- The menu-driven format conveniently prompts operators for the next action required.
- Direct point callup displays individual points alphabetically and then homes in on the logical choice as more point information is entered.
- Event categories are color coded for quick visual representation: red for **Alarm** and **Priority 2** events, yellow for **Supervisory** and **Trouble** events.
- Date formats are either MM/DD/YY or DD/MM/YY.
- Time formats are either 24 hour or 12 hour with AM/PM.
- System Normal screen supports a color background or watermark for company name, company logo, or other desired display content.

Specifications

Table 1: General ES Touch Screen Display specifications

Specification	Rating
Resolution	800 x 600 pixels (RGB)
Size and type	8 inch (203 mm) diagonal, color touch screen
Touch screen technology	Resistive
Event display	Up to 8 events without scrolling
Normal screen custom watermark file format	680 x 484 pixels: BMP, JPG, TIFF, GIF, or PNG file format
Environmental	Operating temperature: 32°F to 120°F (0°C to 49°C)
	Operating humidity: up to 93% RH, non-condensing @ 90°F (32°C) maximum

Example display screens

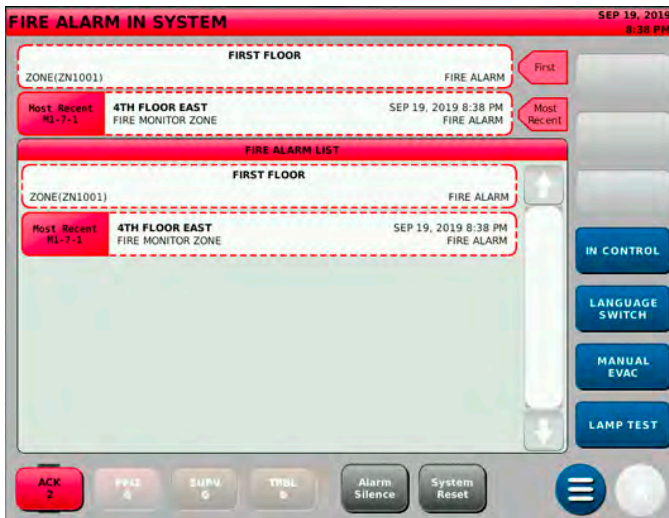


Figure 2: First and Most Recent alarm display



Figure 3: Main Menu



Figure 4: First eight active trouble events list



Figure 5: Direct point callup



Figure 6: Alarm history log

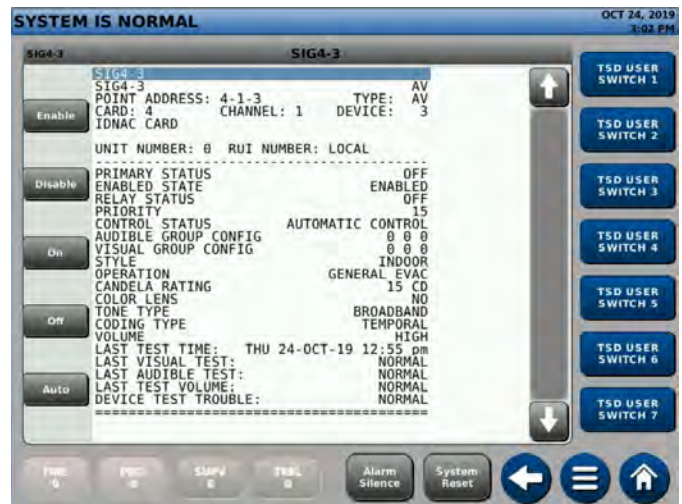


Figure 7: Detailed point status screen for TrueAlert ES appliance

Remote Command Center for models 4100-9610 and 4100-9611, order 4100-1290 Remote Command Center option separately

The optional Remote Command Center occupies the top bay of a Remote Annunciator. It provides a 2 line x 40 character LCD status readout with keyswitch activated control switches and a local tone-alert sounder. Its features are essentially identical to the Remote LCD Annunciator model 4603-9101, refer to document *S4603-0001*. For the Color ES Touch Screen Display user interface, order models 4100-9616 or 4100-9617. See Table 2 for Remote Annunciator Model selections.

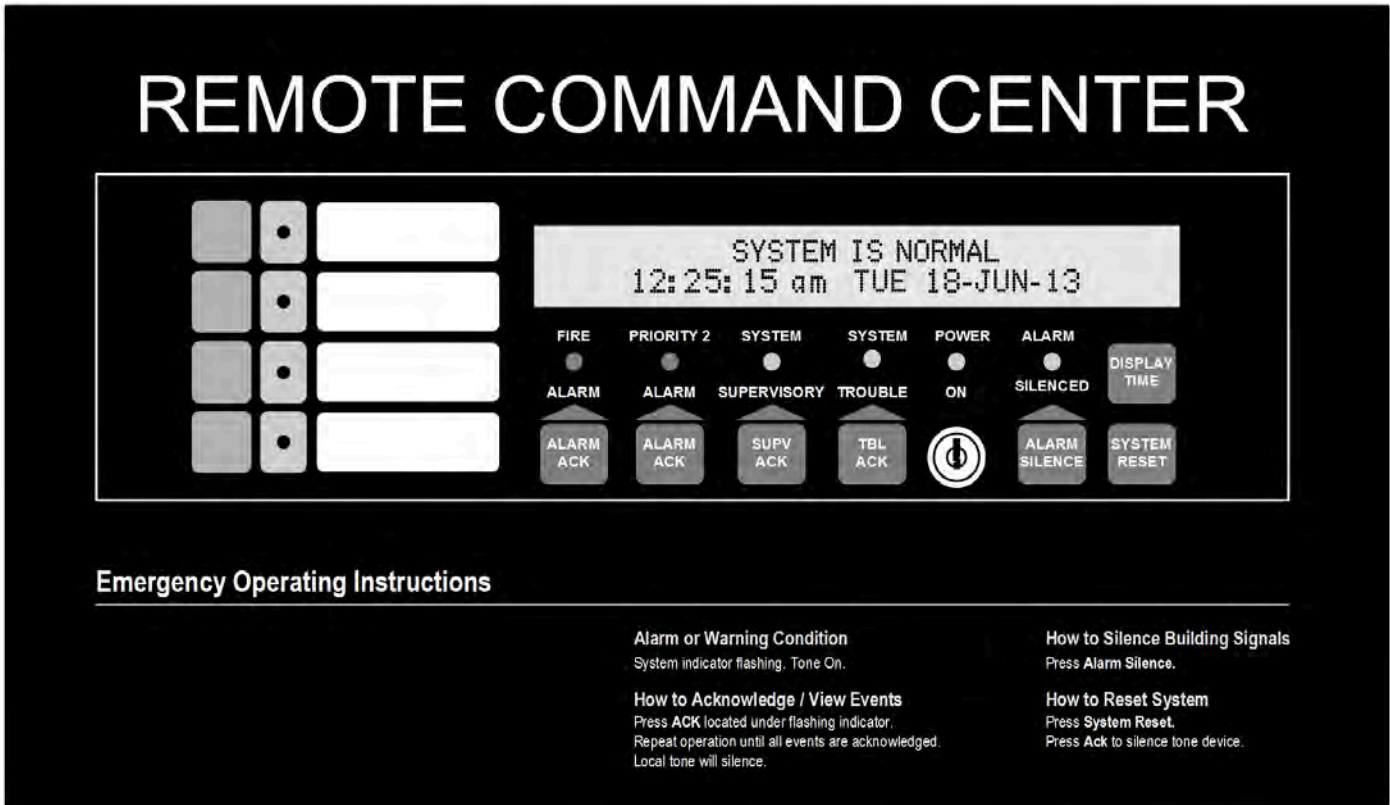


Figure 8: 4100-1292 Remote Command Center

Remote Annunciator Audio Module reference

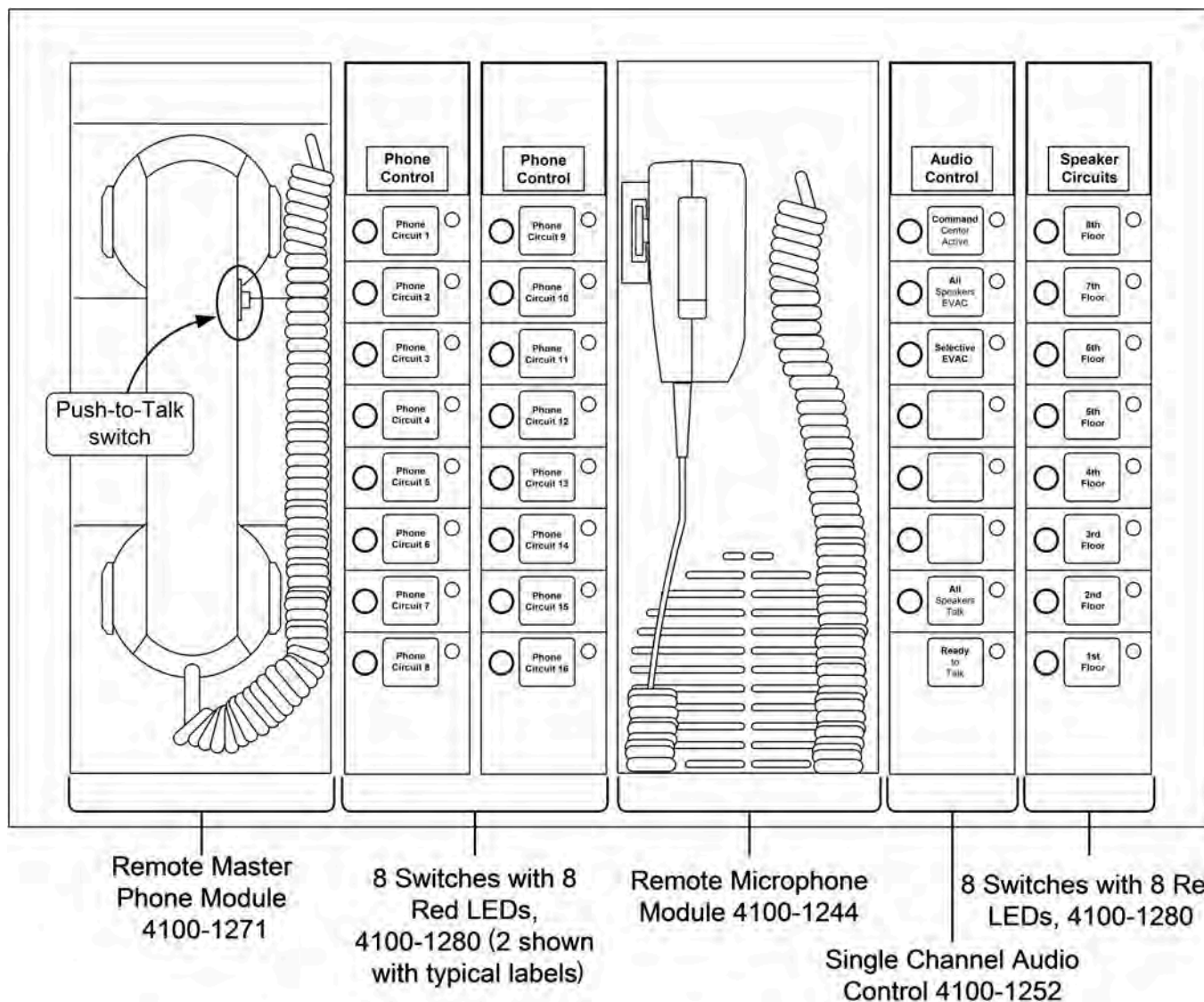


Figure 9: Remote Annunciator Audio Module reference

Product selection

Table 2: Remote Annunciator Panel type

Model	Description	Details and mounting reference
4100-9610	Remote Annunciator Panel, requires an internal power supply	Includes a bay assembly with power distribution board, a 4100-0620 Basic Transponder Interface Card, mounted in Block A, and an interconnect harness for connecting to 4100ES Slot modules. Supervisory and alarm current = 34 mA
→ 4100-9611	Basic Remote Annunciator Panel, requires power from another cabinet. See module exclusion list.	Includes a bay assembly with power distribution board, a remotely powered Transponder Interface Card mounted in Block A, and an interconnect harness for connecting to 4100ES/4100U Slot modules. Supervisory and alarm current = 34 mA
4100-9616	Remote Annunciator with ES Touch Screen Display	Remote Annunciator includes the following items: Color ES Touch Screen Display, Expansion Bay with PDI, a 4100-0620 Basic Transponder Interface Card. Power supply is specified separately when configured. Supervisory current = 95 mA, alarm current = 165 mA
4100-9617	Basic Remote Annunciator with ES Touch Screen Display, see module exclusion list.	Basic Remote Annunciator includes the following items: Color ES Touch Screen Display, Expansion Bay with PDI, Transponder Interface Card. Power is supplied from host control panel. Supervisory current = 95 mA, alarm current = 165 mA

Table 3: Remote Command Center option

Model	Description	Details and mounting reference
→ 4100-1292	Panel Mounted LCD Annunciator with 2 line by 40 character LCD with LED illumination. LED illumination is off during supervisory, turning on with alarm or when switches are activated.	Mounting requires the top bay. 4100ES/4100U flat modules are allowed behind it. RUI device and RUI/RUI+ connection is required. Supervisory current = 65 mA, without backlight Alarm current = 140 mA
4100-9616	Remote Annunciator with ES Touch Screen Display	Remote Annunciator includes the following items: ES Touchscreen Display, Expansion Bay with PDI, Remote TIC module. Power supply is specified separately when configured. Supervisory current = 95 mA, alarm current = 165 mA
4100-9617	Basic Remote Annunciator with ES Touch Screen Display	Basic Remote Annunciator includes the following items: ES Touchscreen Display, Expansion Bay with PDI, Remote TIC module. Power is supplied from host FACU. Supervisory current = 95 mA, alarm current = 165 mA
Note: For the Color ES Touch Screen Display user interface, order models 4100-9616 or 4100-9617. See Table 2 for Remote Annunciator Model selections.		

Table 4: Emergency voice/alarm communications operator interface options

Model	Description	Details and mounting reference
→ 4100-1244	Remote Microphone (mic) module	Front panel module requires 2 Slots, 4 in. (51 mm). The space behind accepts 4100ES/4100U flat modules only and requires dedicated wiring to FACU audio control module. Supervisory current = 2.4 mA, active = 6 mA
4100-1252	1 channel, audio or mic	Operator interface modules Single slot modules that require connection to an LED/switch controller. The space behind accepts 4100ES/4100U flat modules only. Adjacent LED/switch modules are required for specific speaker circuit selection. Refer to document S4100-1034 for audio reference, and document S4100-0032 for LED/switch module reference. Supervisory current = 0, alarm current = 24 mA
4100-1253	1.5 channel, audio and mic	
4100-1254	2 channel, full audio	
→ 4100-1255	3-8 channel	

Table 5: Firefighter Telephone System products

Model	Description	Details and mounting reference
4100-1271	Remote Master Telephone	Mounts in two vertical blocks of bay front, locate as required. The space behind allows 4100ES/4100U flat modules only.
4100-1272	Phone Module with 3 Class B phone NACs	Single Block module, mounts to bay mounting plate.
4100-1273	Phone Class A Adapter Module	Mounts to 4100-1272, no additional space required.
Note: Refer to document S4100-1034 for additional details.		

Table 6: LED and LED/Switch Modules, general purpose

LEDs per switch	LEDs	Switches	Model	LED Color	Model	LED Color
One	16	8	4100-1280	Red	4100-1281	Yellow
Two		8	4100-1282	Red on top, yellow on bottom	4100-1283	Yellow, top and bottom
Two		8	4100-1284	Red on top, green on bottom	4100-1296	Green on top, yellow on bottom
One		16	4100-1285	Red	4100-1278	8 red on left, 8 yellow on right
Note: LED/switch controller and label kit is ordered separately. Refer to data sheet S4100-0032 for additional LED/Switch module selections.						

Table 7: LED and LED/Switch Modules, general purpose

LEDs per switch	LEDs	Switches	Model	LED Color
LEDs only	8	LEDs only	4100-1276	Red, pluggable
LEDs only	16	LEDs only	4100-1277	Pluggable LEDs, shipped red on top, yellow on bottom
One		16	4100-1300	Pluggable LEDs, shipped red on top, yellow on bottom. UL, ULC, and CSFM listed only
One	24	24	4100-1287	Red
Note: LED/switch controller and label kit is ordered separately. Refer to data sheet S4100-0032 for additional LED/Switch module selections.				

Table 8: LED/Switch Modules, special purpose

Model	Operation	Switch function and location	LED description
4100-1286	Eight function HOA (On, Off, Auto) Control Module with labeled switches	On, top	Green LED
		Off, middle	Red LED
		Auto, bottom	Green LED
4100-1295	Eight function HOA (On, Off, Auto) Control Module, same as 4100-1286 except switches are unlabeled		
Note: LED/switch controller, label kit, and separate LEDs are ordered separately. Refer to data sheet S4100-0032 for additional LED/Switch module selections.			

Table 9: LED/Switch Controller modules and accessories

Model	Description	
4100-1288	64 LED/64 Switch Controller module with mounting plate. Controls up to 64 LEDs and interfaces to up to 64 switches. Mounts behind the LED/switch modules and has provisions for one 4100-1289 Controller module.	Note: LED/switch controllers and their connected LED/switch modules must be in the same bay, see data sheet <i>S4100-0032</i> for details.
4100-1289	64 LED/64 Switch Controller Module without mounting plate. Mounts on extra space of 4100-1288 and controls an additional 64 LEDs and 64 switches.	
A100-1294	LED/Switch Module Slide-in Labels, required when LED/switch modules are present, order one per cabinet.	
4100-1290	24 Point I/O Module for external connections, select each point as either input or output. 2 in. (51 mm) wide. 1 Slot, refer to <i>S4100-0032</i> for more detail. Not available with 4100-9611	
Note: LED kits for 4100-1276/4100-1277/4100-1300 are in Product selection . Refer to data sheet <i>S4100-0032</i> for additional LED/Switch module selections.		

Table 10: Communication modules

SKU	Description	Size	Supv.	Alarm
4100-6038	Dual RS-232 Interface, mounts in Slot 3 or Slot 2.	1 Slot	132 mA	
4100-9816	Master Clock Interface Module with one standard RS-232 port, see <i>S4100-0033</i>		132 mA	
Note: Not available with 4100-9611				

Table 11: Panel Mounted Printer

SKU	Description
4100-1293	Panel Mount Thermal Printhead Printer, supplied with one roll of paper; requires 3 expansion slots.
4190-9803	Replacement Paper for 4100-1293 Printer, one roll
Note: Not available with 4100-9611, refer to document <i>S4100-0032</i> for additional detail.	

Table 12: ES Power Supplies

Model	Voltage	Description	Includes	Provides power to bay	Size	Supv.	Alarm
4100-5401	120-240 V 50/60 Hz	ES-PS	24 V aux. relay, 24 V aux. power 2 A Tap/ Simple NAC, 110 Ah battery charger, 2 PDI blocks for compatible option cards	Yes	2 Blocks	68 mA	77 mA
4100-5402	120-240 V 50/60 Hz	ES-XPS	Same as ES-PS above except without battery charger	No			

Table 13: Power supply accessories

Model	Description	Size	Current
4100-5152	12 VDC Power Option, 2 A maximum	1 Block	1.5 A maximum
4100-0156	8 VDC Converter, required for multiple Physical Bridge Modules, 3 A maximum	1 Block	Included with loads
4100-5130	Voltage Regulator Module, 22.8 to 26.4 VDC, 25 VDC nominal. Isolated and resettable output, includes earth detection circuit and trouble relay for status monitoring.	1 Block	3 A maximum with 2.5 A load, 4.9 A maximum with 4 A load
4100-5131	ES-PS Fan Module. Allows the installation of more than one power supply in a single bay and may increase total DC output power capacity per power supply. See Table 17 for specifications.	N/A	0 mA Supv. 200 mA Alarm
4100-0636	Box Interconnection Harness Kit. Order one for each close-nippled cabinet. Also used if power is supplied from host FACU.		
4100-0638	4100 Slot Module Additional 24 VDC Harness. Needed when 4100 Slot Module requirements exceed 2 A from ES-PS.		
4100-5403	Harness for ES-PS backup power supply		
4100-0644	120 VAC PDM Harness	1 PDM harness is required per power supply, select as required for appropriate input voltage.	
4100-0645	220 VAC PDM Harness		
4100-0646	230 VAC PDM Harness		
4100-0647	240 VAC PDM Harness		

Table 14: Power Distribution Modules

SKU	Voltage	Description	
4100-0634	120 VAC	Power Distribution Module (PDM). Select	Required for 4100-9610, select one per box or cabinet rack. Not applicable for 4100-9611
4100-0635	220/230/240 VAC	per system voltage.	

Table 15: Miscellaneous accessories

SKU	Description
4100-2300	Expansion bay hardware. Order one for each expansion bay, unless included with selected option.
4100-1279	Single Blank 2 in. Display Cover. Order as required, 8 fill a bay front. 2 max between LED/switch modules
4100-9835	Termination and Address Label Kit, for module marking. Provides additional labels for field installed modules.
4100-0632	Terminal Block Utility Module. Provides 2, 16 position terminal blocks mounted on 4 in. x 5 in. single block size, capable of up to 12 AWG wire (3.31 mm ²).

Table 15: Miscellaneous accessories

SKU	Description
4100-0633	Door Tamper Switch. Connects to Transponder Interface Module.
4100-9843	Yellow
4100-9844	Green
4100-9845	Red
A100-9855	Blue

Kits of 8 LEDs, order as required for 4100-1276/1277/1300 modules.

Two Bay Remote Annunciator LED/Switch Module reference

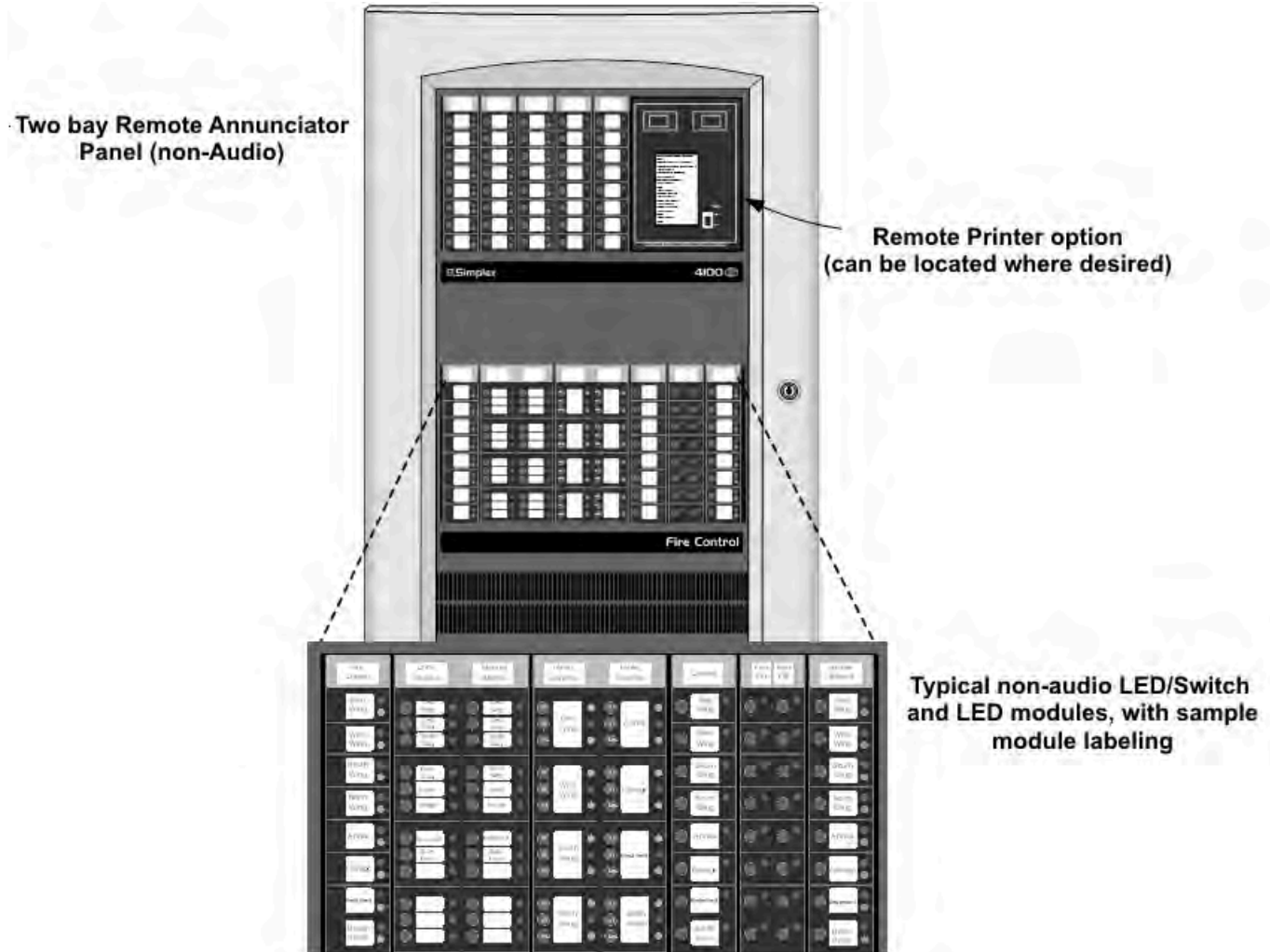


Figure 10: Module reference

Single Slot LED/Switch Module detail reference

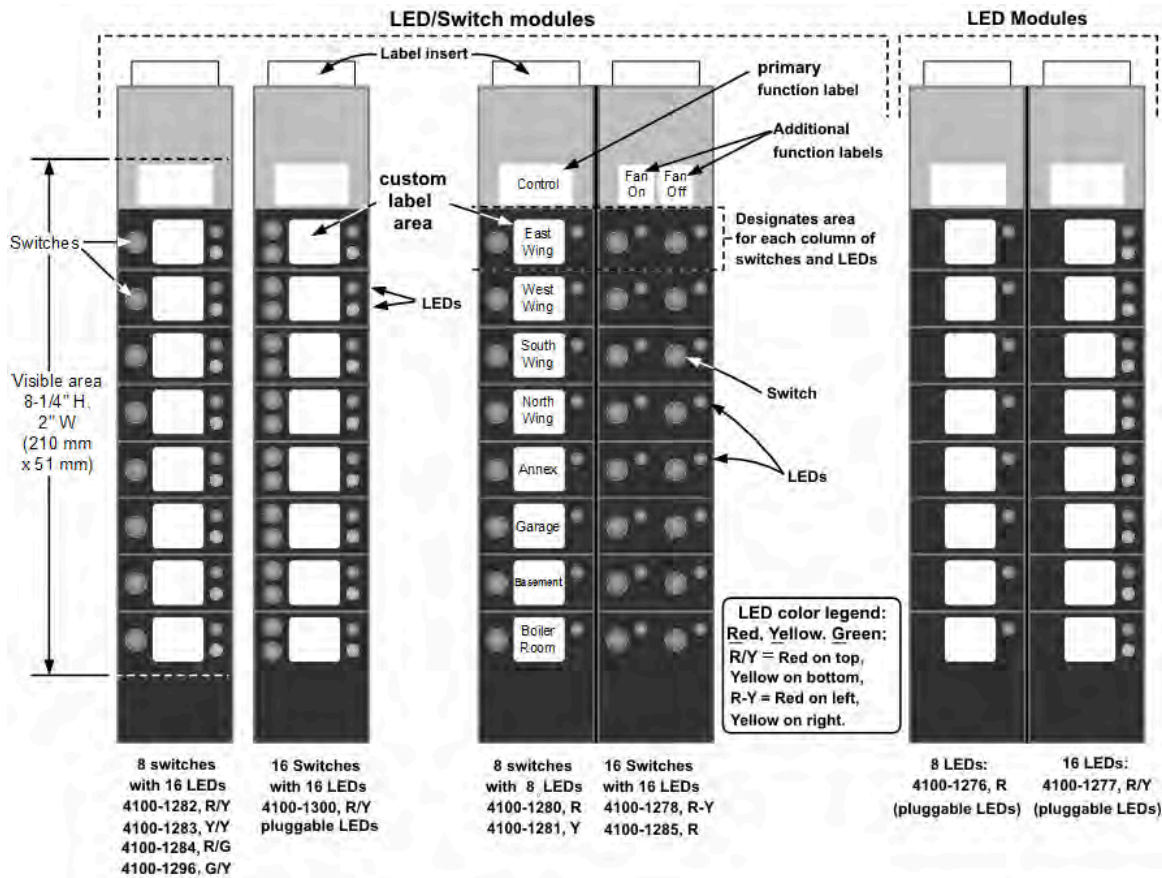


Figure 11: Single Slot LED/Switch Module detail reference

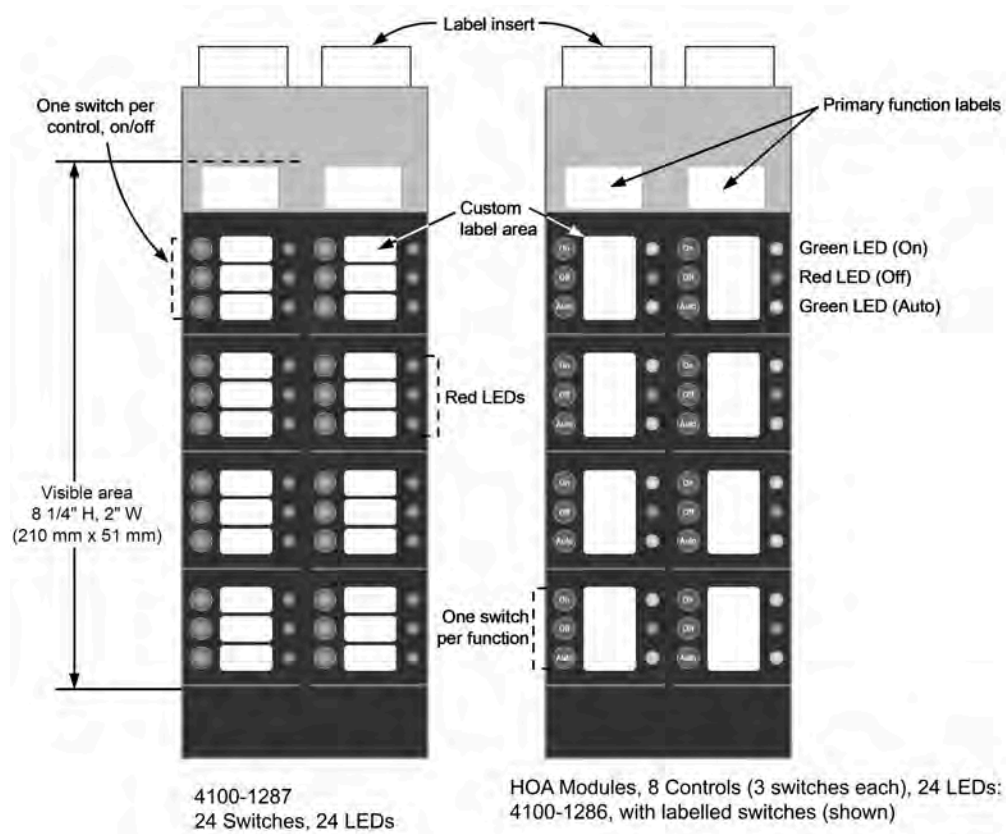
Table 16: LED/Switch reference

Module no.	No. of switches	No. of LEDs	LED color	LED position
4100-1276*	-	8	red	right
4100-1277*	-	16	red yellow	top bottom
4100-1278	16	16	red yellow	left right
→ 4100-1280	8	8	red	right
4100-1281	8	8	yellow	right
4100-1282	8	16	red yellow	top bottom
4100-1283	8	16	yellow yellow	top bottom
4100-1284	8	16	red green	top bottom
4100-1285	16	16	red	left/right
4100-1296	8	16	green yellow	top bottom
4100-1300*	16	16	red yellow	top bottom

*Models with pluggable LEDs

Dual Slot LED/Switch Module detail reference

Figure 12: Dual Slot LED/Switch Module detail reference



Audio Control Module detail

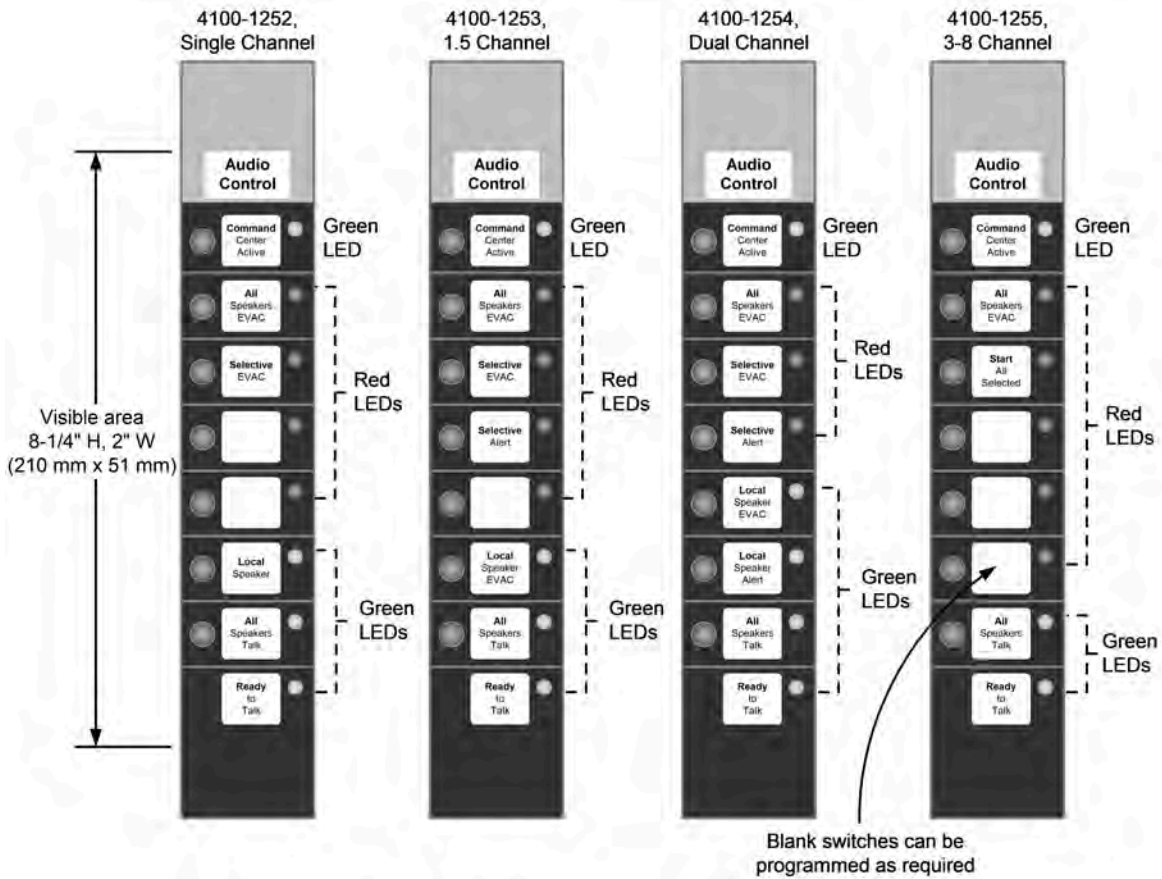


Figure 13: Audio Control Module detail

Expansion Bay Module loading reference

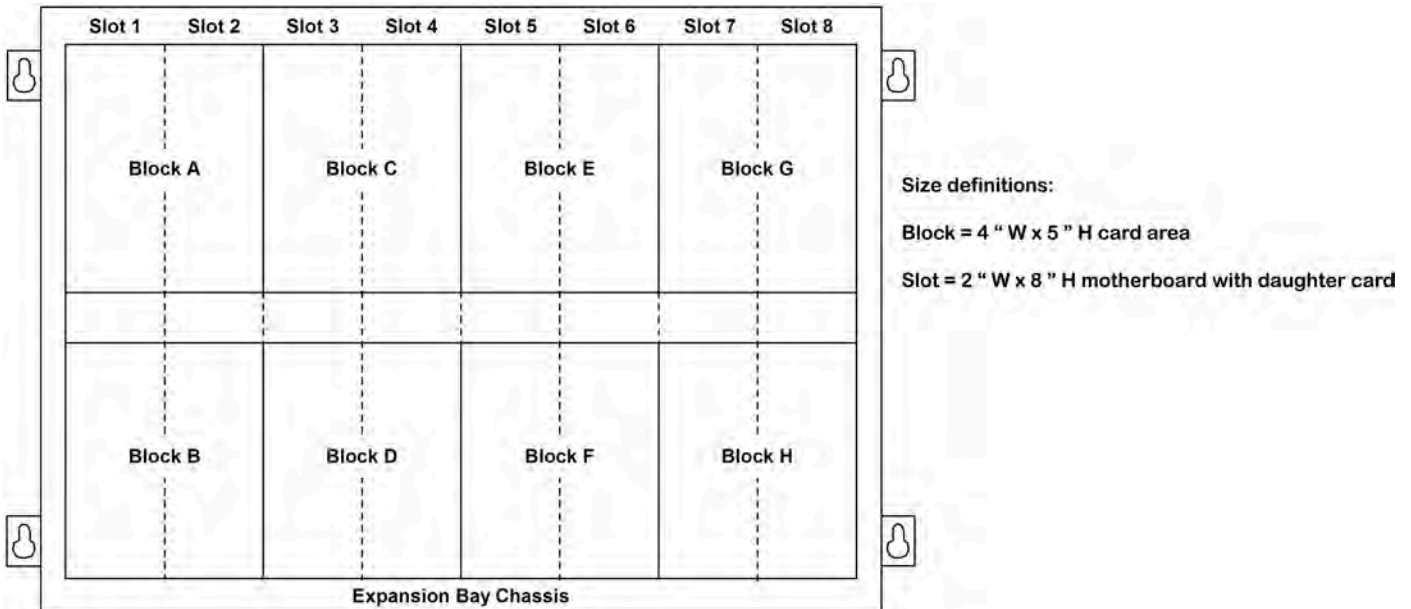


Figure 14: Expansion Bay Module loading reference

General specifications

Table 17: ES Power Supply specifications, ES-PS and ES-XPS

Specifications	Rating
AC Input Power	120 VAC to 240 VAC
120 VAC	3.72 A
220 VAC to 240 VAC	1.82 A
Total DC Output Power Capacity	
Without Fan	9.5 A
With 4100-5131 Fan and 4100-5451 IDNAC Module(s)	9.7 A
With 4100-5131 Fan (without 4100-5451 IDNAC Module)	12.7 A
With Regulated 24V Appliance Loads (with or without 4100-5131 Fan)	5.0 A
Special Application Appliance Loads: supports full total DC output power capacity ratings above	Simplex horns, strobes, and combination horn/strobes and speaker/strobes. Contact your Simplex product representative for compatible appliances.
Regulated 24V Appliances: reduces total DC output power capacity to 5.0 A	Power for other UL listed appliances. Use associated external synchronization modules where required.
Auxiliary Power Tap	2 A maximum, taken from total output power capacity.
NACs Programmed for Auxiliary Power	3 A maximum per NAC, 5 A maximum total, taken from total output power capacity.
Battery Charger (ES-PS only)	Sealed Lead-Acid Batteries
Battery Ah Capacity	UL/ULC listed for battery charging of up to 110 Ah. Batteries larger than 50 Ah require a remote battery cabinet.
Charger characteristics and performance	Temperature compensated, dual rate. Recharges depleted batteries within 48 hours.
Environmental	
Operating Temperature	32 °F to 120 °F (0 °C to 49 °C)
Operating Humidity	Up to 93% RH, non-condensing at 90 °F (32 °C) maximum
Option Card Mounting	2 vertical blocks are available for compatible modules. Refer to the 579-1288 installation instructions for additional details.

Note:

1. Battery charger is only available on the ES-PS power supply.
2. When an ES-PS is used to power Flex-35 or Flex-50 Amplifiers the ES-PS battery charger is not available.

Wall Mounted Enclosure installation reference

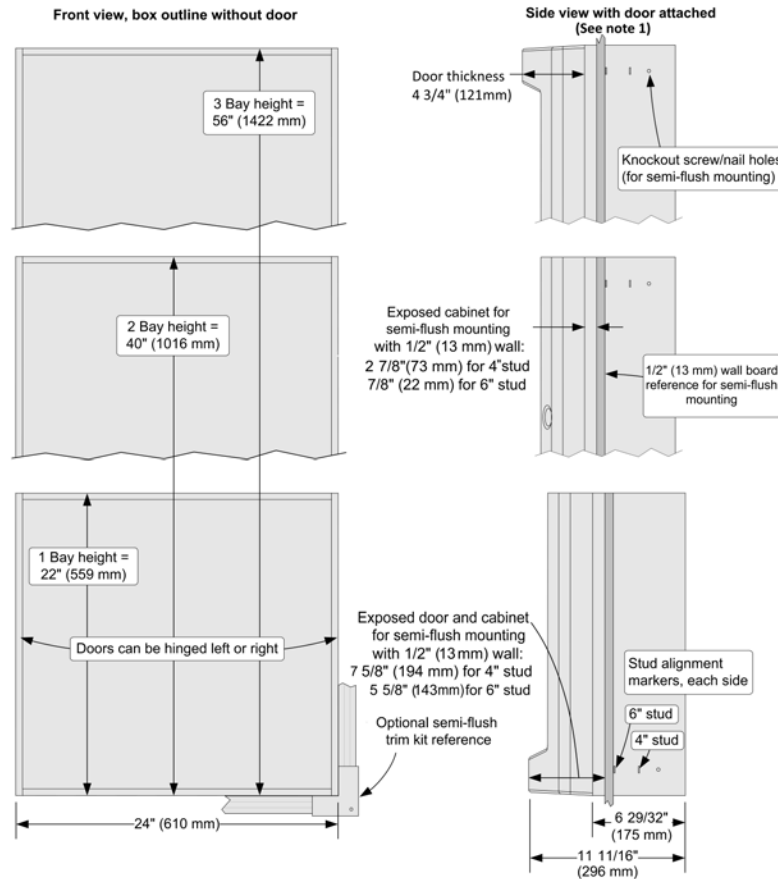


Figure 15: Installation reference

Note:

1. Side view dimensions are shown with minimal cabinet and door protrusion from the exterior wall. For 6 in. stud construction with minimum protrusion shown, the door will open 90 degrees. To allow the door to open 180 degrees, the exposed cabinet dimension from the exterior wall must be a minimum of 3 in. (76 mm) for both 4 in. and 6 in. stud construction.

2. A system ground must be provided for Earth Detection and transient protection devices. This connection shall be made to an approved, dedicated Earth connection per NFPA 70, Article 250, and NFPA 780.

Additional 4100ES data sheet reference

Table 18: Data sheet reference

Subject	Datasheet
Battery and Battery Cabinet Reference for 4100ES	S2081-0006
110 Ah Batteries and Cabinets for 4100ES	S2081-0012
Graphic I/O Modules for 4100ES, 4010ES, 4007ES	S4100-0005
4100ES LED/Switch Modules & Printer	S4100-0032
Master Clock Interface	S4100-0033
4100ES Enclosures	S4100-0037
4100ES Basic Panels with ES-PS Power Supplies	S4100-1031
4100ES Emergency Voice/Alarm Communications Equipment	S4100-1034
NDU with ES-PS Power Supplies for 4120 Network	S4100-1036
Remote ES Touch Screen Displays for 4100ES and 4010ES Panels	S4100-1070
NDU with ES-PS Power Supplies for ES Net	S4100-1077

Features

TrueAlarm analog sensing provides:

- Digital transmission of analog sensor values via IDNet or MAPNET II two-wire communications

For use with the following Simplex® products:

- 4007ES, 4010, 4010ES, 4100ES, and 4100U Series control panels; and 4008 Series control panels with reduced feature set (refer to data sheet S4008-0001 for details)
- 4020, 4100, and 4120 Series control panels, Universal Transponders, and 2120 TrueAlarm CDTs equipped for MAPNET II operation

Fire alarm control panel provides:

- Peak value logging allowing accurate analysis of each sensor for individual sensitivity selection
- Sensitivity monitoring satisfying NFPA 72 sensitivity testing requirements; automatic individual sensor calibration check verifies sensor integrity
- Automatic environmental compensation, multi-stage alarm operation, and display of sensitivity directly in percent per foot
- Ability to display and print detailed sensor information in plain English language

Photoelectric smoke sensors provide:

- Seven levels of sensitivity from 0.2% to 3.7% (refer to additional information on page 3)

Heat sensors provide:

- Three fixed temperature sensing thresholds: 135° F, 155° F and 190° F
- Rate-of-rise temperature sensing
- Utility temperature sensing
- Listed to UL 521 and ULC-S530

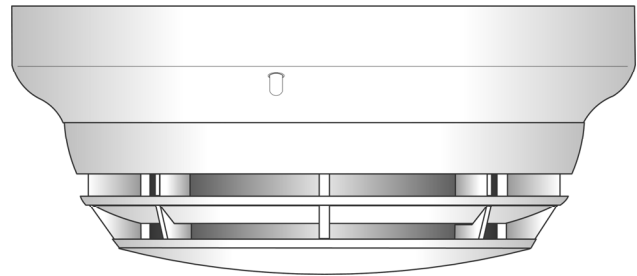
General features:

- Operation is for ceiling or wall mounting
- Listed to UL 268 and ULC-S529
- Louvered smoke sensor design enhances smoke capture by directing flow to chamber; entrance areas are minimally visible when ceiling mounted
- Designed for EMI compatibility
- Magnetic test feature is provided
- Different bases are available to support a supervised or unsupervised output relay, and/or a remote LED alarm indicator

Additional base reference:

- For isolator bases, refer to data sheet S4098-0025
- For sounder bases, refer to data sheet S4098-0028
- For photo/heat sensors, refer to data sheet S4098-0024 (single address) and S4098-0033 (dual address)

These products have been approved by the California State Fire Marshal (CS FM) pursuant to Section 13144.1 of the California Health and Safety Code. See CS FM Listings 7272-0026 218, 7271-0026 231, 7270-0026 216, and 7300-0026 217 for allowable values and/or conditions concerning material presented in this document. Accepted for use – City of New York Department of Buildings – MEA35-93E. Additional listings may be applicable, contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.



4098-9714 TrueAlarm Photoelectric Sensor Mounted in Base

Description

Digital Communication of Analog Sensing. TrueAlarm analog sensors provide an analog measurement digitally communicated to the host control panel using Simplex addressable communications. At the control panel, the data is analyzed and an average value is determined and stored. An alarm or other abnormal condition is determined by comparing the sensor's present value against its average value and time.

Intelligent Data Evaluation. Monitoring each sensor's average value provides a continuously shifting reference point. This software filtering process compensates for environmental factors (dust, dirt, etc.) and component aging, providing an accurate reference for evaluating new activity. With this filtering, there is a significant reduction in the probability of false or nuisance alarms caused by shifts in sensitivity, either up or down.

Control Panel Selection. Peak activity per sensor is stored to assist in evaluating specific locations. The alarm set point for each TrueAlarm sensor is determined at the host control panel, selectable as more or less sensitive as the individual application requires.

Timed/Multi-Stage Selection. Sensor alarm set points can be programmed for timed automatic sensitivity selection (such as more sensitive at night, less sensitive during day). Control panel programming can also provide multi-stage operation per sensor. For example, a 0.2% level may cause a warning to prompt investigation while a 2.5% level may initiate an alarm.

Sensor Alarm and Trouble LED Indication. Each sensor base's LED pulses to indicate communications with the panel. If the control panel determines a sensor is in alarm, or is dirty or has some other type of trouble, the details are announced at the control panel and that sensor base's LED will be turned on steadily. During a system alarm, the control panel will control the LEDs such that an LED indicating a trouble will return to pulsing to help identify the alarmed sensors.

TrueAlarm Sensor Bases and Accessories

Sensor Base Features

Base mounted address selection:

- Address remains with its programmed location
- Accessible from front (DIP switch under sensor)

General features:

- Automatic identification provides default sensitivity when substituting sensor types
- Integral red LED for power-on (pulsing), or alarm or trouble (steady on)
- Locking anti-tamper design mounts on standard outlet box
- Magnetically operated functional test

Sensor Bases

4098-9792, Standard Sensor Base

4098-9789, Sensor Base with wired connections for:

- 2098-9808 Remote LED alarm indicator **or** 4098-9822 relay (relay is unsupervised and requires separate 24 VDC)

Supervised Relay Bases (not compatible with 2120 CDT):

- **4098-9791, 4-Wire Sensor Base**, use with remote or locally mounted 2098-9737 relay, requires separate 24 VDC
- **4098-9780, 2-Wire Sensor Base**, use with remote or locally mounted 4098-9860 relay, no separate power required
- Supervised relay operation is programmable and can be manually operated from control panel
- Includes wired connections for remote LED alarm indicator **or** 4098-9822 relay (relay is unsupervised and requires separate 24 VDC)

Sensor Base Options

2098-9737, Remote or local mount supervised relay:

- DPDT contacts for resistive/suppressed loads, power limited rating of 3 A @ 28 VDC; non-power limited rating of 3 A @ 120 VAC (requires external 24 VDC coil power)

4098-9860, Remote or local mount supervised relay:

- SPDT dry contacts, power limited rating of 2 A @ 30 VDC, resistive; non-power limited rating of 0.5 A @ 125 VAC, resistive

4098-9822, LED Annunciation Relay:

- Activates when base LED is on steady, indicating local alarm or trouble
- DPDT contacts for resistive/suppressed loads, power limited rating of 2 A @ 28 VDC; non-power limited rating of 1/2 A @ 120 VAC, (requires external 24 VDC coil power)

4098-9832, Adapter plate:

- Required for surface or semi-flush mounting to 4" square electrical box and for surface mounting to 4" octagonal box
- Can be used for cosmetic retrofitting to existing 6-3/8" diameter base product

2098-9808, Remote red LED Alarm Indicator:

- Mounts on single gang box (shown in illustration to right)



Description

TrueAlarm sensor bases contain integral addressable electronics that constantly monitor the status of the detachable photoelectric or heat sensors. Each sensor's output is digitized and transmitted to the system fire alarm control panel every four seconds.

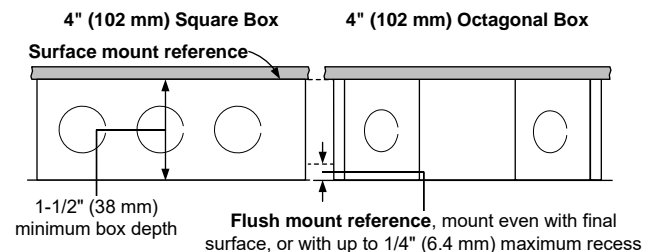
Since TrueAlarm sensors use the same base, different sensor types can be easily interchanged to meet specific location requirements. This feature also allows intentional sensor substitution during building construction. When conditions are temporarily dusty, instead of covering the smoke sensors (causing them to be disabled), heat sensors may be installed without reprogramming the control panel. Although the control panel will indicate an incorrect sensor type, the heat sensor will operate at a default sensitivity providing heat detection for building protection at that location.

Mounting Reference

Electrical Box Requirements: (boxes are by others)

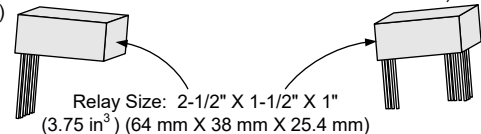
Without relay in the box: 4" octagonal or 4" square, 1-1/2" deep; single gang, 2" deep

With relay in the box: 4" octagonal or 4" square, 1-1/2" deep, with 1-1/2" extension ring

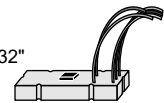


2098-9737 Supervised Relay (mounts in base electrical box or remotely)

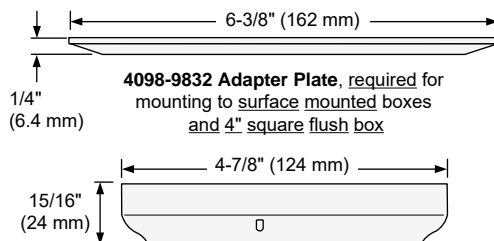
4098-9822 Relay (mounts in base electrical box)



4098-9860 Supervised Relay (mounts in base electrical box or remotely; 2-3/8" X 1-1/4" X 11/32" (1 in³) (60.4 mm X 31.8 mm X 8.6 mm))



NOTE: Review total wire count, wire size, and accessories being wired to determine required box volume.



TrueAlarm Bases
4098-9780, 4098-9789, 4098-9791, & 4098-9792

TrueAlarm Sensors

Features

Sealed against rear air flow entry

Interchangeable mounting

EMI/RFI shielded electronics

Heat sensors:

- Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation
- Rated spacing distance between sensors:

Fixed Temp. Setting	UL & ULC Spacing	FM Spacing, Either Fixed Temperature Setting
135° F / 190° F* (57.2° C / 88° C)	60 ft x 60 ft (18.3 m)	20 ft x 20 ft (6.1 m) for fixed temperature only; RTI = Quick
155° F (68° C)	40 ft x 40 ft (12.2 m)	50 ft x 50 ft (15.2 m) for fixed temperature with either rate-of-rise selection; RTI = Ultra Fast

*Note: 190° F (88° C) ratings apply only to the 4098-9734 sensor.

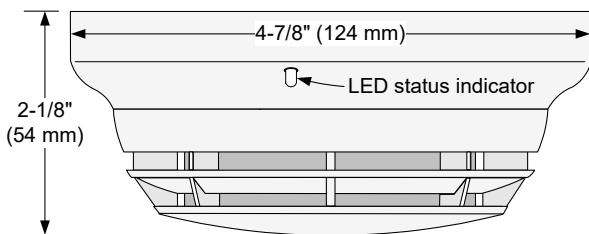
Smoke Sensors:

- Photoelectric technology sensing
- 360° smoke entry for optimum response
- Built-in insect screens

4098-9714 Photoelectric Sensor

TrueAlarm photoelectric sensors use a stable, pulsed infrared LED light source and a silicon photodiode receiver to provide consistent and accurate low power smoke sensing. Seven levels of sensitivity are available for each individual sensor, ranging from 0.2% to 3.7% per foot of smoke obscuration. Sensitivities of 0.2%, 0.5%, and 1% are for special applications in clean areas. Standard sensitivities are 1.5%, 2.0%, 2.5%, 3.0%, and 3.7%. Application type and sensitivity are selected and then monitored at the fire alarm control panel.*

The sensor head design provides 360° smoke entry for optimum response to smoke from any direction. Due to its photoelectric operation, air velocity is not normally a factor, except for impact on area smoke flow.



4098-9714 Photoelectric Sensor with Base

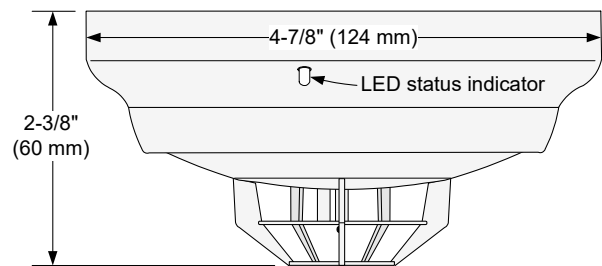
4098-9733 and 4098-9734 Heat Sensors

TrueAlarm heat sensors are self-restoring and provide rate compensated, fixed temperature sensing, selectable with or without rate-of-rise temperature sensing. Due to its small thermal mass, the sensor accurately and quickly measures the local temperature for analysis at the fire alarm control panel.

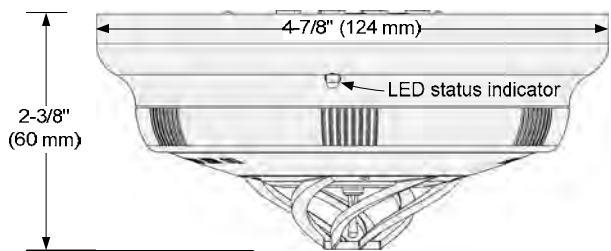
Rate-of-rise temperature detection is selectable at the control panel for either 15° F (8.3° C) or 20° F (11.1° C) per minute. Fixed temperature sensing is independent of rate-of-rise sensing and programmable to operate at 135° F (57.2° C) or 155° F (68° C). The 4098-9734 sensor provides an additional 190° F (88° C) set point.

In a slow developing fire, the temperature may not increase rapidly enough to operate the rate-of-rise feature. However, an alarm will be initiated when the temperature reaches its rated fixed temperature setting.

TrueAlarm heat sensors can be programmed as a utility device to monitor for temperature extremes in the range from 32° F to 155° F (0° C to 68° C). This feature can provide freeze warnings or alert to HVAC system problems. Refer to specific panels for availability.



4098-9733 Heat Sensor with Base



4098-9734 High Temperature Heat Sensor with Base

WARNING: In most fires, hazardous levels of smoke and toxic gas can build up before a heat detection device would initiate an alarm. In cases where Life Safety is a factor, the use of smoke detection is highly recommended.

Application Reference

Sensor locations should be determined only after careful consideration of the physical layout and contents of the area to be protected. Refer to NFPA 72, the *National Fire Alarm and Signaling Code*. On smooth ceilings, smoke sensor spacing of 30 ft (9.1 m) may be used as a guide.*

* For detailed application information including sensitivity selection, refer to Installation Instructions 574-709.

TrueAlarm Analog Sensing Product Selection Chart

TrueAlarm Sensor Bases (for use with Sensors 4098-9714 and 4098-9733)

(Refer to Application Manual 574-709 and Installation Instructions 574-707 for additional information)

Model*	Color	Description	Compatibility	Mounting Requirements
4098-9792	White	Standard Sensor Base	No options	4" octagonal or 4" square box, 1-1/2" min. depth; or single gang box, 2" min. depth
4098-9776	Black			
4098-9789	White	Sensor Base with connections for Remote LED Alarm Indicator or Unsupervised Relay	2098-9808 Remote Alarm Indicator or 4098-9822 Unsupervised Relay	4" octagonal or 4" square box Note: Box depth requirements depend on total wire count and wire size, refer to accessories list below for reference. ** NOTE: 4098-9791 and 4098-9780 are NOT compatible with the 2120 CDT
4098-9789 IND	White			
4098-9775	Black			
4098-9791**	White	4-Wire Sensor Supervised Relay Base with connections for LED Indicator or Unsupervised Relay	2098-9737 Supervised Remote Relay 2098-9808 Remote Alarm Indicator or 4098-9822 Unsupervised Relay	
4098-9780**	White	2-Wire Sensor Supervised Relay Base with connections for LED Indicator or Unsupervised Relay	4098-9860 Supervised Remote Relay 2098-9808 Remote Alarm Indicator or 4098-9822 Unsupervised Relay	

TrueAlarm Sensors

Model*	Model*	Description	Compatibility	Mounting Requirements
4098-9714	White	Photoelectric Smoke Sensor	Bases 4098-9775, 4098-9776, 4098-9792, 4098-9789, 4098-9791, and 4098-9780	Refer to base requirements
4098-9714 IND				
4098-9774	Black			
4098-9733	White	Heat Sensor		
4098-9734	White	High Temperature Heat Sensor		

TrueAlarm Sensor/Base Accessories

Model	Description	Compatibility	Mounting Requirements
2098-9737	Supervised Relay, mounts remote or in base electrical box	For use with 4098-9791 base	Remote Mounting requires 4" octagonal or 4" square box, 1-1/2" minimum depth
4098-9860	Supervised Relay, mounts remote or in base electrical box	For use with 4098-9780 base	Base Mounting requires 4" octagonal box, 2-1/8" deep with 1-1/2" extension ring
2098-9808	Remote Red LED Alarm Indicator on single gang stainless steel plate	Bases 4098-9789, 4098-9791, and 4098-9780	Single gang box, 1-1/2" minimum depth
4098-9822	Unsupervised Relay, tracks base LED status; Note: Mounts only in base electrical box	Bases 4098-9789, 4098-9791, and 4098-9780	4" octagonal box, 2-1/8" deep with 1-1/2" extension ring
4098-9832	Adapter Plate	Bases 4098-9792, 4098-9789, 4098-9791, and 4098-9780	Required for surface or semi-flush mounted 4" square box and for surface mounted 4" octagonal box

* Note: Model numbers ending in IND are assembled in India.

Specifications

General Operating Specifications

Communications and Sensor Supervisory Power	IDNet or MAPNET II communications, auto-selected, 1 address per base	
Communications Connections	Screw terminals for in/out wiring, 18 to 14 AWG (0.82 mm ² to 2.08 mm ²)	
Remote LED Alarm Indicator Current	1 mA typical, no impact to alarm current	
Remote LED Alarm Indicator and Relay Connections	Color coded wire leads, 18 AWG (0.82 mm ²)	
UL Listed Operating Temperature Range	32° to 100° F (0° to 38° C)	
Operating Temperature Range	with 4098-9733 Heat Sensor	32° to 122° F (0° to 50° C)
	with 4098-9714 Smoke Sensor	15° to 122° F (-9° to 50° C)
	With 4098-9734 Heat Sensor	32° to 150° F (0° to 66° C)
Storage Temperature Range	0° F to 140° F (-18° C to 60° C)	
Humidity Range	10 to 95% RH	
4098-9714 Smoke Sensor Air Velocity Rating	0-4000 ft/min (0-1220 m/min)	
Housing Color	Frost White or Black	

4098-9791 Base With Supervised Remote Relay 2098-9737 (see page 2 for contact ratings)

Externally Supplied Relay Coil Voltage	18-32 VDC (nominal 24 VDC)
Supervisory Current	270 µA, from 24 VDC supply
Alarm Current with 2098-9737 Relay	28 mA, from 24 VDC supply

4098-9780 Base With Supervised Remote Relay 4098-9860 (see page 2 for contact ratings)

Power	Supplied from communications
-------	------------------------------

4098-9822 Unsupervised Relay, Requirements for Bases 4098-9789, 4098-9791, and 4098-9780 (see page 2 for contact ratings)

Externally Supplied Relay Coil Voltage	18-32 VDC (nominal 24 VDC)
Supervisory Current	Supplied from communications
Alarm Current	13 mA from separate 24 VDC supply

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Features

TrueAlarm addressable CO sensor bases contain a carbon monoxide (CO) sensing module providing both CO toxic gas monitoring and enhanced fire detection:

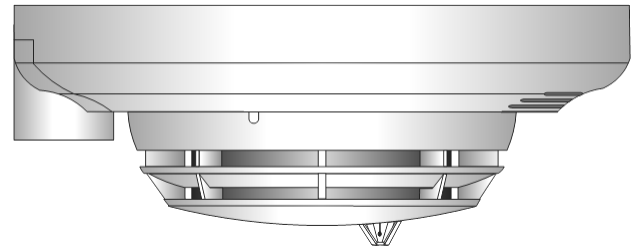
- For use with 4007ES; and 4010ES or 4100ES fire alarm control panels with software revision 2.01.02 or higher
- For use with 4100U fire alarm control panels with software revision 12.05 or higher
- CO sensor bases support (and require) a TrueAlarm photoelectric, photo/heat or heat sensor (ordered separately)
- Model 4098-9770 provides standard features, model 4098-9771 also provides a piezoelectric sounder
- CO sensor bases are multi-point devices, consume only one IDNet address, and receive both communications and sensor power from the IDNet channel (the sounder base requires separate 24 VDC system power or NAC connection)
- Listed to UL 268, *Smoke Detectors for Fire Alarm Signaling Systems* and UL 2075, *Gas and Vapor Detectors and Sensors*; allowing systems to be listed to Standard 2034, *Single and Multiple Station Carbon Monoxide Alarms*
- Listed by ULC to CSA 6.19-01 *Residential Carbon Monoxide Alarming Devices*
- Three types of CO influenced operation are available; UL 2034 CO alarm detection; UL 2075 CO (OSHA) level monitoring for ventilation control; and multi-criteria fire sensor analysis with algorithms that combines optical and CO gas monitoring information

Operation of a CO sensor base with a photoelectric or a photo/heat sensor allows:

- Independent sensor operation **or** selectable multi-sensor modes of *False Alarm Reduction or Faster Detection*
- **False Alarm Reduction** analyzes CO and photoelectric sensor information together to provide a sophisticated rejection of non-fire conditions normally troublesome as false alarms (steam, dust, aerosols, etc.)
- **Faster Detection** (increased sensitivity) algorithm analyzes CO and photoelectric sensor information to allow the presence of CO to implement an increased photoelectric sensitivity for high value locations (museums, electrical equipment rooms, etc.)

Sounder base operation details:

- When connected to a panel NAC through the 4905-9835 Temporal Code Module, the sounder base can provide temporal code 3 (TC3) for fire, or temporal code 4 (TC4) for toxic carbon monoxide alarms
- 4905-9835 module may also be used to code other (non-fire) dedicated carbon monoxide notification appliances (refer to data sheet S4905-0006)
- Sounder can be manually activated from the panel
- Sounder operation is also listed to UL 464 as an audible notification appliance



TrueAlarm CO Sensor Base with Sounder
(shown with 4098-9754 Photo/Heat Sensor)

Features (Continued)

Panel operation summary:

- CO sensor data is stored and analyzed at the panel; a new CO Service Report provides easy information access (see sample on page 3)
- 4007ES, 4010ES, and 4100ES panels provide ten (10) year end of life status indication with CO sensor expiration notices occurring within 12 months and within 6 months, allowing service replacement planning
- 4100U panels provide five (5) year end of life status indication with the 12 and 6 month replacement notices
- Analog sensor information is digitally transmitted to the host control panel via IDNet communications for processing to evaluate and track status
- Carbon monoxide concentration in ppm (parts per million) is available for viewing from the panel user interface
- For OSHA compliant CO gas sensing, CO condition level may be programmed by concentration (must be above 30 ppm)
- 4100ES Audio Control Panels can provide a CO Relocation Message with Temporal Code 4 tone and Voice Evacuation (reference UCSET1393, see S4100-0034)

General features:

- Sensors may be either wall or ceiling mounted
- Operation of a CO sensor base with heat sensor provides dual independent sensor operation
- New CO test mode allows functional testing of each sensor technology including the CO sensor
- Optional accessories include remote alarm LED, alarm relay, and mounting adapter plate
- Designed for EMI compatibility
- Provides magnetic test

CO sensor element is easily replaced when end of service life is reached:

- Access to CO sensor replacement cartridge (CORC, 4098-9747) requires removal of interchangeable sensor head providing tamper monitoring (sensor removal causes a trouble condition)

This product has been approved by the California State Fire Marshal (CS FM) pursuant to Section 13144.1 of the California Health and Safety Code. See CS FM Listing 7300-0026 330 for allowable values and or conditions concerning material presented in this document. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

CO Sensor Base Description

Carbon monoxide (CO) is an odorless, colorless, tasteless gas produced by the incomplete combustion of heating fuels such as wood, coal, heating oil, and natural gas. CO is also a byproduct of many materials experiencing unintentional fire or even incipient fire conditions. Monitoring of CO levels can warn of physically harmful concentrations, however, sensing of CO levels below the harmful level can also provide improved understanding of incipient fire conditions when evaluated in combination with photoelectric fire sensor information from the same location.

Simplex® CO sensor bases combine an electrolytic CO sensing module with a TrueAlarm analog sensor to provide a single multiple sensing assembly using one system address. The CO sensor can be enabled/disabled, used in LED/Switch modes and custom control, and can be made public for communication across a fire alarm Network.

CO sensor operation is similar to other TrueAlarm sensors (photoelectric or heat). It provides current analog values, average analog value, “No Answer” troubles, “Wrong Device” troubles, over threshold, concentration in ppm, and monitors for the presence of the CO sensor. Base mounted address selection allows the address to remain with its location when the sensor is removed for service or type change. Address access is from the front, under the removable sensor. An integral red LED indicates power-on by pulsing, or alarm or trouble when steady on, and also provides test mode status (see page 3). Detailed status is available at the fire alarm control panel.

CO Sensing, Detailed Operation

Toxic Gas Sensing, UL 2034/UL 2075. For CO toxic gas detection, the bases provide toxic gas sensing to the UL 2034 and UL 2075 standards. Toxic gas sensing may be selected at the same time as any of the combined CO photo fire detection modes are selected.

Toxic Gas Sensing, OSHA Compliant. For OSHA compliant gas sensing, the desired threshold level (above 30 ppm) is selected at the control panel as required for the application, typically for ventilation control. Refer to page 3 for additional OSHA CO monitoring information.

Enhanced Fire Sensing. Each sensor provides an analog measurement digitally communicated to the control panel for analysis. At the panel, these analog values are used separately, or combined, to evaluate for conditions indicative of fire, incipient fire, excessive heat, and freeze warning. For fire, the addition of a CO sensor provides two new selectable modes of operation: *Nuisance Alarm Reduction Mode* and *Faster Fire Detection*. These two modes were developed using the results of extensive testing of actual fires performed under a wide variety of conditions. (Refer to page 4 for additional operation mode options.)

Nuisance Alarm Reduction Mode allows the host control panel to combine photoelectric sensor input and CO sensor level input to reduce false alarms caused by non-fire conditions. Non-fire conditions can be steam from bathroom showers, particles from dusty environments, aerosols from personal care products, tobacco smoke, cooking smoke, or other similar conditions.

CO Sensing, Detailed Operation (Continued)

Nuisance Alarm Reduction Details. For applications of anticipated nuisance alarm conditions, photoelectric sensitivity is normally selected for 3.7%/ft smoke obscuration. However, the addition of CO sensing allows the host control panel to apply software verification similar to the timed alarm verification feature often used with conventional smoke detection.

Faster Fire Detection. For applications where faster response to incipient or slow building fires is desired and environment appropriate, the Faster Fire Detection mode correlates the outputs of the CO sensor and the photoelectric sensor to provide increased sensitivity. This mode provides earlier detection compared to a standard sensitive photoelectric sensor setting, and also provides more false alarm reduction compared to using a sensitive setting in an area not normally considered appropriate.

Faster Fire Detection Details. TrueAlarm photoelectric sensors can be selected to be as sensitive as 0.2%/ft obscuration for applications evaluated as appropriate to that level. However, if the environment is not suitable for that sensitivity level, the Faster Fire Detection mode allows the photoelectric sensor to be selected as a “standard” 2.5%/ft obscuration, but with the presence of a significant level of CO, the combination of CO and photo sensing input can allow an equivalent sensitivity approaching 0.5%/ft obscuration. The host control panel tracks two photoelectric sensitivities, the one selected for photoelectric operation only (typically 2.5%), and the CO correlation sensitivity that it adjusts depending on the amount of CO present.

Control Panel Operations

Smoke sensor features include: sensitivity monitoring satisfying NFPA 72 sensitivity testing requirements, automatic individual sensor calibration checking to verify sensor integrity, automatic environmental compensation, available multi-stage alarm operation, display of sensitivity directly in percent per foot, monitoring of peak activity per sensor, alarm set point, and time of day or multi-stage alarm selection.

Sensor Alarm and Trouble LED Indications. The sensor base LED pulses to indicate communications with the panel. If a sensor is in alarm, or has a trouble condition, the status is annunciated at the control panel and that base LED will turn on steady. During a system alarm, the panel will control LEDs such that a trouble indication will return to pulsing to help identify the sensors in alarm.

Reported CO Sensor troubles are: Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), Short, and Sensor Missing/Failed.

Trouble Details. “Almost Expired” is similar to the “Almost Dirty” trouble for a photoelectric sensor. “Expired” trouble is similar to the “Dirty” trouble for a TrueAlarm photoelectric sensor. CO sensor technology does not support automatic sensitivity testing and drift compensation as is available with a photoelectric sensor. End of useful CO sensor life is based upon a set 10 year operational lifetime (5 years for 4100U panels), tracked by date code built into the CO sensor module electronics. Although the CO sensor will continue to function after the expired trouble is indicated, replacement is required to ensure proper detection accuracy.

Control Panel Operations (Continued)

Panel Test Mode. To facilitate functional testing of the CO sensor, a new test mode is available in the host control panel. In this mode, the CO sensor, and installed heat or smoke sensor can be easily *functionally* tested.

Panel Test Mode Details. When in the CO test mode, the internal multiple sensor analysis algorithms are disabled allowing each sensor to be quickly tested either individually or simultaneously, depending on the test equipment used. CO testing can be performed using a Solo Model 332 aerosol dispenser (or equal). (Testing is available through your local authorized Simplex product supplier.) The base LED will display steady ON when individual sensors are activated during test. Refer to the Application Reference section for more information.

OSHA CO monitoring. For OSHA compliant gas sensing, control panel software supports custom programming based upon CO concentration levels. For example, turn on ventilation if the CO level is above X ppm and then turn off ventilation when the level drops below Y ppm (or select either value as a range if desired). This is separate from alarm set points.

Multi-Point Allocation. 4007ES, 4010ES, and 4100ES control panels require only one (1) point at the host panel per CO sensor base. For 4100U control panels, the requirement is three (3) points at the host panel per CO sensor base with the 4098-9754 multi-sensor, and two (2) points for the other sensors. Depending on CO sensor base and sensor choice, up to seven (7) points can be made public to a connected Simplex Fire Alarm Network. Each CO sensor base uses a single address with “sub-points” layered underneath (such as 1-1-0, 1-1-1, 1-1-2,1-1-6). (Additional multi-point allocation detail is described in reference data sheet S4090-0011.)

CO Sensor Base Power Requirements. Power for the standard CO sensor base is provided by IDNet communications. *No additional wiring is required for upgrading of existing installed TrueAlarm sensor bases.* CO sensor sounder bases do require system supplied separate 24 VDC (or NAC) wiring, the same as the standard sounder base.

TrueAlarm CO Service Reports

TrueAlarm CO Service Reports (sample below) contain information on the CO sensors programmed in the panel displaying pertinent data such as current concentration value in ppm, End of Life date, and current state. This report allows determination of which sensors will require attention. (Sample shows 10 year life tracking with a 4007ES/4010ES/4100ES.)

Service Port				Page 1	
REPORT 6 : TrueAlarm CO Report		12:34:56am	MON	06-JUN-14	

Channel 1 (M1)					
Zone		Current	End of		
Name	CUSTOM LABEL	Value	Life Date	State	
M1-1-2	Conference Room 17 CO Toxic Gas	457PPM	30-MAY-24	PRI	
M1-2-2	Boiler Room CO Toxic Gas	0PPM	30-MAY-24	NOR	
TRUE ALARM CO REPORT COMPLETED					
Press RETURN for next Screen OR CTRL-X to abort					

Accessories

2098-9808, Remote red LED Alarm Indicator mounts on a single gang box to provide status indications where the sensor location may not be readily visible. (See illustration to right.)



4098-9822, LED Annunciation Relay activates when base LED is on steady, indicating a local alarm or trouble. Contacts are DPDT, rated 2 A @ 30 VDC; 1/2 A @ 120 VAC for transient suppressed loads (requires external 24 VDC coil power).

Application Reference

Determine sensor locations after careful consideration of the physical layout and contents of the area to be protected.

For fire alarm applications:

- Refer to NFPA 72, the *National Fire Alarm and Signaling Code*
- On smooth ceilings, smoke sensor spacing of 30 ft (9.1 m) may be used as a guide.

For detailed application information:

- Refer to *4098 Detectors, Sensors, and Bases Application Manual*, Part Number 574-709.

For toxic gas sensor placement and mounting:

- Refer to NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Warning Equipment in Dwelling Units*
- Per NFPA 720, Section 5.1 (2005 edition):
 - 5.1.1 A carbon monoxide alarm or detector shall be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms.
 - 5.1.2 Each alarm or detector shall be located on the wall, ceiling, or other location as specified in the installation instructions that accompany the unit.

TrueAlarm Analog Sensing Product Selection Chart

TrueAlarm CO Sensor Base

Model	Description	
→ 4098-9770	CO Base, Standard operation	Select TrueAlarm sensor from list below
4098-9771	CO Base with Sounder	

TrueAlarm Sensors, select one per CO Sensor Base

Model	Description	
→ 4098-9714	Photoelectric Smoke Sensor	Refer to selection table below for available operation modes
4098-9754	Multi-Sensor Photoelectric and Heat Sensing	
4098-9733	Heat Sensor	

CO Base Replacement CO Cartridge and Accessories (ordered separately as required)

Model	Description	
4098-9747	CO Replacement Cartridge (CORC)	
Solo 332	Aerosol Dispenser, suitable for larger diameter detectors; can be used for CO or smoke testing	
Solo C3	CO Aerosol Canister (case of 12)	
Model	Description	Mounting Requirements
4098-9832	Adapter Plate, required for surface mounted 4" electrical boxes	Refer to page 6, mounting reference
2098-9808	Choose one if required Remote red LED Alarm Indicator on single gang stainless steel plate	Single gang box, 1-1/2" minimum depth
4098-9822	Relay, tracks base LED status (unsupervised, to be mounted only in base electrical box)	Mounts in base electrical box (requires 1-1/2" extension on 4" square or octagonal box)

CO Sensor Base Operation Options with Sensor Choice

Sensor Choice	Mode	Operational Mode Choices* (✓ = operation selected)							
		False Alarm Reduction	Faster Detection	TrueSense Photo/Heat	Photo Fire	Heat Fire**	Utility Temp.	Ion Fire	CO Toxic Gas†
Photoelectric Smoke Sensor 4098-9714	1	✓	—	—	—	—	—	—	option
	2	—	✓	—	option	—	—	—	option
Photo/Heat Multi-Sensor 4098-9754	3	✓	—	—	—	option	option	—	option
	4	—	✓	—	option	option	option	—	option
	5	—	—	✓	option	option	option	—	option
Heat Sensor 4098-9733	6	—	—	—	—	✓	option	—	option
	7	—	—	—	—	option	✓	—	option

* **NOTE:** Duct detection modes are not applicable and are not available. Refer to the Multi-Point Allocation discussion on page 3 for panel point requirement information.

** Heat Fire Mode is 135° F or 155° F, fixed or rate-of-rise.

† CO Toxic Gas operation is selectable as: Supervisory (which is NOT recommended if communicated off-site), Priority 2 (preferred if communicated off-site), or Utility.

TrueAlarm Analog Sensor Features

Sealed against rear air flow entry

Electronics are EMI/RFI shielded

Heat sensing:

- Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation
- Rated spacing distance between sensors:

Fixed Temp. Setting	UL& ULC Spacing	FM Spacing, Either Fixed Temperature Setting
135° F (57.2° C)	60 ft x 60 ft (18.3 m)	20 ft x 20 ft (6.1 m) for fixed temperature only; RTI = Quick
155° F (68° C)	40 ft x 40 ft (12.2 m)	50 ft x 50 ft (15.2 m) for fixed temperature with either rate-of-rise selection; RTI = Ultra Fast

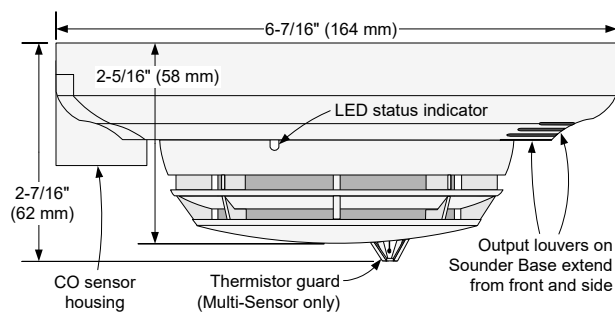
Smoke Sensors:

- Photoelectric technology sensing
- 360° smoke entry for optimum response
- Built-in insect screens

4098-9714 Photoelectric Sensor

TrueAlarm photoelectric sensors use a stable, pulsed infrared LED light source and a silicon photodiode receiver to provide consistent and accurate low power smoke sensing. Seven levels of sensitivity are available for each individual sensor, ranging from 0.2% to 3.7% per foot of smoke obscuration. Sensitivities of 0.2%, 0.5%, and 1% are for special applications in clean areas. Standard sensitivities are 1.5%, 2.0%, 2.5%, 3.0%, and 3.7%. Application type and sensitivity are selected and then monitored at the fire alarm control panel. (For detailed application information about sensitivity selection, refer to Installation Instructions 574-709.)

The sensor head design provides 360° smoke entry for optimum smoke response. Due to its photoelectric operation, air velocity is not normally a factor, except for impact on area smoke flow.



Dimension and Feature Reference, Photoelectric or Multi-Sensor on CO Sensor Base

4098-9754 Multi-Sensor

TrueAlarm multi-sensors combines the performances of TrueAlarm photoelectric smoke sensing with TrueAlarm thermal sensing to provide both features in a single assembly. Each sensing element provides data for evaluation at the fire alarm control panel where the following four independent detection modes are evaluated:

- Fixed temperature heat detection
- Rate-of-rise heat detection
- TrueAlarm photoelectric smoke detection
- And TrueSense correlation detection

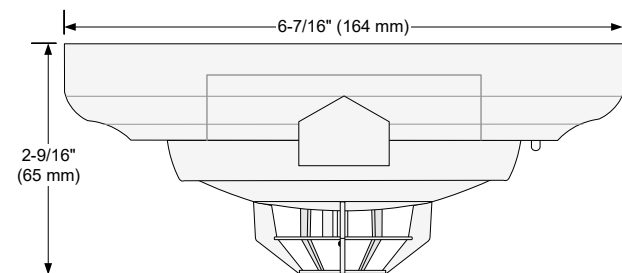
TrueSense analysis correlates both thermal activity and smoke activity at a single multi-sensor location using an extensively tested covariance relationship. As a result, TrueSense detection improves response to conditions indicative of faster acting, hot flaming fires when compared to the response of either photoelectric smoke activity or thermal activity alone.

4098-9733 Heat Sensor

TrueAlarm heat sensors are self-restoring and provide rate compensated, fixed temperature sensing, selectable with or without rate-of-rise temperature sensing. Due to its small thermal mass, the sensor accurately and quickly measures the local temperature for analysis at the fire alarm control panel.

Rate-of-rise temperature detection is selectable at the control panel for either 15° F (8.3° C) or 20° F (11.1° C) per minute. Fixed temperature sensing is independent of rate-of-rise sensing and programmable to operate at 135° F (57.2° C) or 155° F (68° C). In a slow developing fire, the temperature may not increase rapidly enough to operate the rate-of-rise feature. However, an alarm will be initiated when the temperature reaches its rated fixed temperature setting.

TrueAlarm heat sensors can be programmed as a utility device to monitor for temperature extremes in the range from 32° F to 155° F (0° C to 68° C). This feature can provide freeze warnings or alert to HVAC system problems.



4098-9733 Heat Sensor with CO Sensor Base (with CO Sensor Housing facing forward)

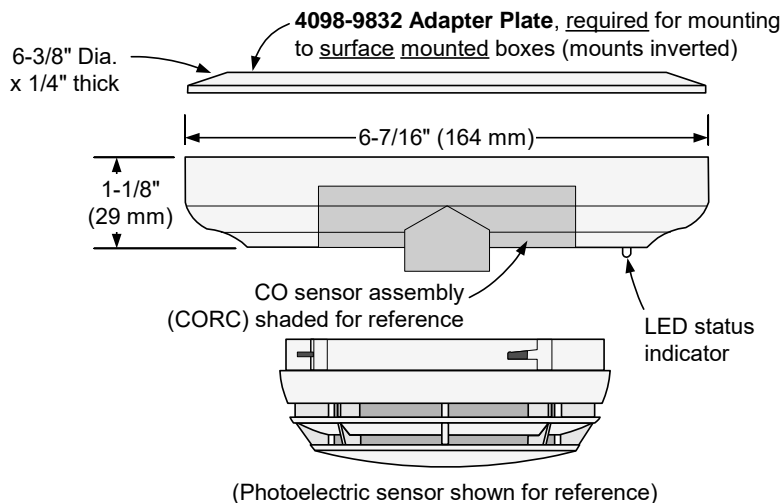
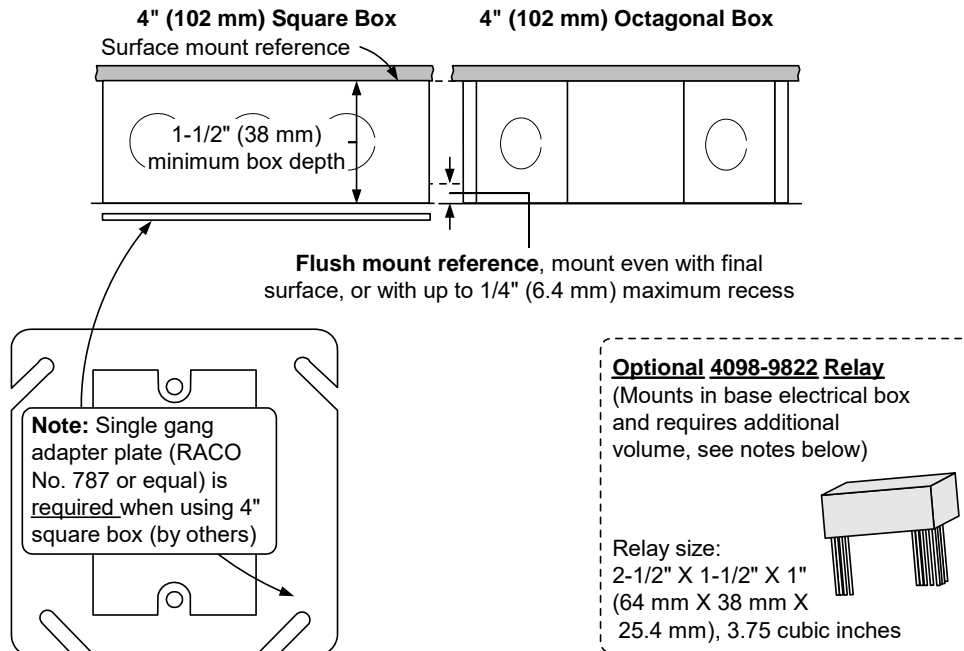
WARNING: In most fires, hazardous levels of smoke and toxic gas can build up before a heat detection device would initiate an alarm. In cases where Life Safety is a factor, the use of smoke detection is highly recommended.

Installation Reference

Electrical Box Requirements: (boxes are by others)

Without relay: 4" octagonal or 4" square, 1-1/2" deep; single gang, 2" deep

With relay: 4" octagonal or 4" square, 1-1/2" deep, with 1-1/2" extension ring



NOTES:

1. Review actual wire size, wire count, box type, and whether 4098-9822 relay is used before determining box size.
2. Mounting to flush mounted box also fits single gang handy box, 2-1/8" (51 mm) deep if wiring allows. (Not applicable if 4098-9822 relay is used.)
3. For surface mounted boxes, use 4" square box with single gang adapter plate (RACO No. 787 or equal, by others) or 4" octagonal box, both require 4098-9832 Adapter Plate.
4. When 4098-9822 relay is used, mount relay in electrical box and use 1-1/2" extension ring (by others) on 4" square or octagonal box of 1-1/2" or 2-1/8" depth as required.
5. Refer to sensor base Installation Instructions 574-707 for additional information.
6. Refer to CORC Replacement Instructions 579-791 for CO cartridge installation and replacement.

Specifications

General Operating Specifications

Communications and Sensor Supervisory Power	IDNet communications, 1 address per base	
Communications and Sounder Power Connections	Screw terminals for in/out wiring, 18 to 14 AWG (0.82 mm ² to 2.08 mm ²)	
Remote LED Alarm Indicator	Current	1 mA typical supplied from communications, no impact to alarm current
	LED Connections	Color coded wire leads, 18 AWG (0.82 mm ²)
UL Listed Temperature Range	32° F to 100° F (0° C to 38° C)	
Operating Temperature Range	with 4098-9733	32° F to 122° F (0° C to 50° C)
	with 4098-9714 or 4098-9754	15° F to 122° F (-9° C to 50° C)
Humidity Range	15 to 95% RH	
CO Sensor Base Air Velocity Ratings per Sensor	Photoelectric Sensor 4098-9714 and Multi-Sensor 4098-9754 Air velocity = 0-1000 ft/min (0-305 m/min)	
Housing Color	Frost White	

Sounder Operation

Sounder Voltage	18 to 32 VDC from steady external source or from NAC	
Alarm Current (Sounder On)	17 mA @ 24 VDC, 24 mA maximum @ 32 VDC	
Sounder Output	88 dBA minimum @ 10 ft (3 m) per UL Standard 464, <i>Audible Signaling Appliance</i> ; UL Standard 268, <i>Smoke Detectors for Fire Protective Signaling Systems</i> and CSA 6.19-01	
Sounder Power Supervision (Selectable)	Supervised	Select for continuous 24 VDC power, loss of power is communicated to panel
	Unsupervised	Select when connected to NAC for sounder power, NAC provides supervision
NAC Powered Operation	When in alarm, will sound when NAC is in alarm, allowing synchronized pattern (Temporal or March Time, etc.) controlled by the NAC control	

Reference for CO Monitoring

	Concentration	Alarm Window
Requirements Reference for UL 2034 and CSA 6.19-01	Response Time	70 ±5 ppm
		150 ±5 ppm
		400 ±10 ppm
False Alarm Resistance		No Alarm for 30 days
		No Alarm for 60 minutes
Additional UL 2034 CO Sensor Toxic Gas Monitoring Details	1. For CO levels above 40 ppm, the CO alarm level per sensor is determined by calculations performed at the panel based on the time integrated CO levels measured at the sensor. (Levels below 40 ppm are not tracked.) 2. While tracking levels above 40 ppm, if the concentration dips below 40 ppm for periods of time, the time to alarm is extended accordingly.	
UL 2075 Reference, Commercial OSHA Type Operation; Utility Point Mode	With custom control at the fire alarm control panel, Utility Point operations can be performed at lower CO concentration levels than those of UL 2034 Example: Start ventilation after 5 minutes at 25 to 35 ppm and also alarm at a reading higher than that range, but lower than UL 2034 allows	

4098-9822 Unsupervised Relay Option

Externally Supplied Relay Voltage	18-32 VDC, steady source recommended (wires to remote LED leads)
Alarm Current	13 mA from separate 24 VDC supply
Contact Ratings, DPDT contacts for resistive/suppressed loads	Power limited rating: 2 A @ 30 VDC
	Non-power limited rating: 1/2 A @ 120 VAC
Relay Operation	Tracks base LED status, relay is on with trouble or alarm at the base

Additional Information Reference

Product	Data Sheet	Product	Data Sheet
Temporal Code 4 Module	S4905-0006	4100ES Control Panels with EPS Power Supplies	S4100-0100
Standard Bases	S4098-0019	4100ES Standard Control Panels	S4100-0031
Isolator Bases	S4098-0025	4100ES Audio Control Reference	S4100-0034
Standard Sounder Base	S4098-0028	4010ES Control Panels	S4010-0004
TrueSense Multi-Sensor	S4098-0024	4007ES Hybrid Control Panels	S4007-0001

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S4098-0052-4 1/2015

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Features

Auto-aligning reflective beam smoke detector system with onboard IDNet addressable communications:

- Compatible with Simplex 4007ES, 4010ES, and 4100ES fire alarm control units (FACUs).
- Simplex addressable beam smoke detectors add IDNet communications to the FireRay 5000 Series beam smoke detection system.
- Communicates status information, and receives commands and sensitivity threshold selection from the host FACU.

Photoelectric transmitter and receiver are combined in a single, compact housing:

- Connect one or two remote detector heads to one ground level controller
- An onboard microprocessor analyzes infrared light, reflected from a matching prism.
- Operating range covers 26 ¼ ft to 330 ft (8 m to 100 m)
- Modular design with *easyfit* mounting system. The laser assisted prism mounting, enables easy mounting and adjustment.
- During installation, automatic beam alignment, conveniently rotates the beam to align to the prism center.
- AutoOptimise operation automatically maintains alignment for reliable operation
- UL 268 and ULC-S529 listed

Onboard microprocessor-controlled operation includes the following features:

- Ground level system controller with LCD
- Operating voltage range 14 VDC to 36 VDC
- Easy setup and alignment, with built-in electronic UL/ULC obscuration acceptance test, selectable from the host FACU.
- Automatic gain control, contamination compensation, building shift compensation with control and monitoring of alignment motors, and the ability to change **Delay to Fire** and **Delay to Fault** timing.

Host FACU operations include the following:

- Sensitivity selection from 10% to 60% (35% default).
- Point type selection (**Fire**, **Latched**, **Supervisory**, or **Utility**) and set **Almost Dirty** threshold.
- Initiate obscuration test.
- Reset latched conditions.
- **Enable/Disable**, and control beam head LED.

Host FACU information received includes the following:

- Smoke status, Controller-to-Detector Communications status, Rapid Obscuration status (beam blocked), Self-alignment status, Almost Dirty status, Excessively Dirty status, and general summary Trouble status
- Analog values for signal strength and compensation level, see [Descriptions](#) for more information



Figure 1: Addressable beam detector head



Figure 2: Addressable beam control station

Applications:

- Large open areas such as warehouses, hotel atriums, industrial plants, and school gymnasiums
- Public areas where cosmetics are of prime importance and detector heads need to be small and unobtrusive, such as shopping malls, libraries, theaters, and churches

Optional accessories:

- Detector adjustment bracket, back box, and cover plate.
- Controller back box.
- Extended prism mounting options.

* This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7260-0026:377 for allowable values and/or conditions concerning material presented in this document. Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products

Descriptions

Convenient installation and alignment

Simplex addressable beam smoke detector includes the proven FireRay 5000 system features, of auto-aligning infrared beam smoke detection combined with IDNet addressable communications. If the detector head is installed using the *easyfit* mounting system, an integral laser can be activated that aligns along the optical path of the infrared beam. Positioning the reflective prism is quick and accurate using the Auto-Align beam alignment feature.

AutoOptimise Beam Alignment

The AutoOptimise beam alignment system automatically directs and maintains the beam in the optimum position for reliable performance. The transmitter element generates the signal, the prism reflects it back to the receiver element, and then it is analyzed for the presence of smoke. The beam control station flags an alarm condition if it reaches the predetermined level. Alarm threshold levels are set using the host FACU. **Time to Fire** and **Time to Fault** are set using the beam control station.

Mounting reference

The maximum distance of the detector and the reflector from the ceiling must be 10% of the distance between the floor and ceiling. Lateral detection may be up to 30 ft (9.144 m) on either side of the beam, providing a maximum total coverage area of up to 19,800 square feet, 60 ft x 330 ft (18.29 m x 100 m).

Refer to the installation instructions supplied with the product and to NFPA 72 (National Fire and Signaling Code) for additional installation guidance.

Communications to the host control panel

To investigate the beam heads remotely, the host FACU receives status and numerical information from the beam controller. The beam controller receives commands and the **Smoke** and **Almost Dirty** threshold levels are set using the host FACU.



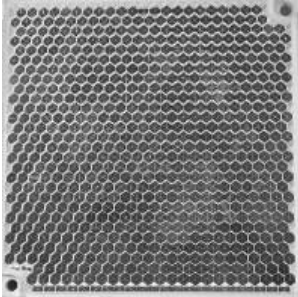

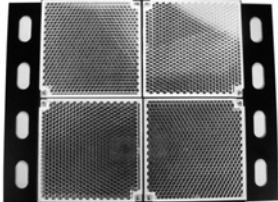
Numerical information received

Numerical information received includes **Signal Strength** in percent, to compare to alarm threshold level set by host FACU and **Compensation Level**, an indication of beam status and dirt accumulation.

Application note

Reflective beam smoke detectors may not be suitable for areas with highly reflective surfaces. Separate transmitter or receiver models may be required. Refer to NFPA 72 and contact your Simplex product representative for additional applications guidance.

Accessory reference

		
<p>Beam Detector on 1210-000 Uni-Box</p>	<p>5000-201 Adjustment Bracket</p>	
		
<p>23901 Prism Reflector</p>	<p>One Prism on 1031-000 Mounting Bracket</p>	<p>Four Prisms on 1031-000 Mounting Bracket</p>

Note: Images are not to scale.

Product selection and ordering information
Table 1: Addressable beam detector selection

SKU	Description		Dimensions
→ 4098-9019	IDNet Communications Addressable Reflective Auto Align Beam Smoke Detector System. Includes: one 4098-9020 controller, one 5000-031 detector head, and one 23901 prism reflector. Controls up to two detector heads.	Controller	9 1/4 in. x 7 7/8 in. x 2 13/16 in. H x W x D (235 mm x 200 mm x 71 mm)
		Head	5 9/32 in. x 5 5/16 in. x 5 9/32 in. H x W x D (135 mm x 134 mm x 132 mm)
		Prism	4 1/8 in. x 3 15/16 in. x 3/8 in. H x W x D (105 mm x 100 mm x 9.5 mm)
4098-9020	IDNet Communications Addressable Reflective Auto Align Beam Smoke Detector Controller only, for upgrade or replacement. Detector heads and prism reflectors not included.		9 1/4 in. x 7 7/8 in. x 2 13/16 in. H x W x D (235 mm x 200 mm x 71 mm)

Table 2: Beam detector heads, prisms, and accessories

Ordering Number, see note	Description	Dimensions
→ 5000-031	Additional detector head and prism, select up to one additional head for each 4098-9019 system.	5 9/32 in. x 5 5/16 in. x 5 9/32 in. H x W x D (135 mm x 134 mm x 132 mm)
→ 1210-000	Detector surface mount Uni-Box, with conduit knockouts on all sides. White in color. Universal back plate mounting. Captive screw lock on front plate. Mounting holes for optional 1000-018 wire cage. Use for 5000 and 3000 Series detector heads. 3000 Series heads require an additional 3000-202 Mounting Plate, not included.	NA
1220-000	Cover plate, pre-drilled to mount the reflective detector head to a double gang electric box. White in color.	NA
1030-000	Surface mount wall bracket for prisms. White in color. Hole pattern for one or four prisms and designed to fit on Unistrut. Order prisms separately.	NA
5000-201	Adjustment bracket for motorized reflective detector heads, with 360 degree rotation and 140 degree adjustment. White in color. Replaces the obsolete 5000-005 Bracket.	NA
5000-009	Controller back box. Surface or flush mount. Surface mount to single gang, double gang, or 4 in. square box.	8 7/16 in. x 7 7/16 in. x 1 3/4 in. H x W x D (214 mm x 189 mm x 45 mm)
5000-010	Controller back box semi-flush mount trim plate for the 5000-009 Box.	10 5/16 in. x 8 3/4 in. H x W (263 mm x 222 mm)
1031-000	Surface mount wall bracket for prisms. Black in color. Hole pattern for one or four prisms designed to fit on Unistrut. Order prisms separately.	NA
1040-000	Single prism alignment adaptor plate. White in color. Pre-drilled to mount one prism. Includes 1180-000 Universal Alignment Bracket. The prism is included with the reflective detector heads	NA
1050-000	Four prism alignment adaptor plate. White in color. Pre-drilled to mount four prisms. Includes the 1180-000 Universal Alignment Bracket. Order the 1010-000 Long Range Prism Kit separately.	NA
23901.01	Replacement prism reflector.	NA
1010-000	Long range prism kit, includes three additional prisms for installations between 164 ft and 328 ft (50 m and 100 m).	NA
1000-018	Protective wire cage for 5000 series detector heads.	NA
1000-019	Protective wire cage for 5000 series controllers.	NA
1140-000	Ceiling pendant mount for the reflective detector head, supplied with a 12 in. long nipple. White in color. Use for single or bi-directional applications.	NA
1141-000	Ceiling pendant mount for the end-to-end transmitter and receiver units, supplied with a 12 in. long nipple. White in color. Use for single or bi-directional applications.	NA
1142-000	Ceiling pendant mount for the reflective detector head, supplied with a 12 in. long nipple. White in color. Use for single or bi-directional applications.	NA
1143-000	Ceiling pendant mount for a single prism, includes ceiling pendant and a single prism mounting plate. White in color.	NA
1144-000	Ceiling pendant mount for long throw prism kit. Includes ceiling pendant and a four prism mounting plate. White in color. Order the long throw prisms separately.	NA

Note: For internal ordering, these products can be found in Job Design under Fire Fighting Enterprises, OP category OPFFE.

Controller display

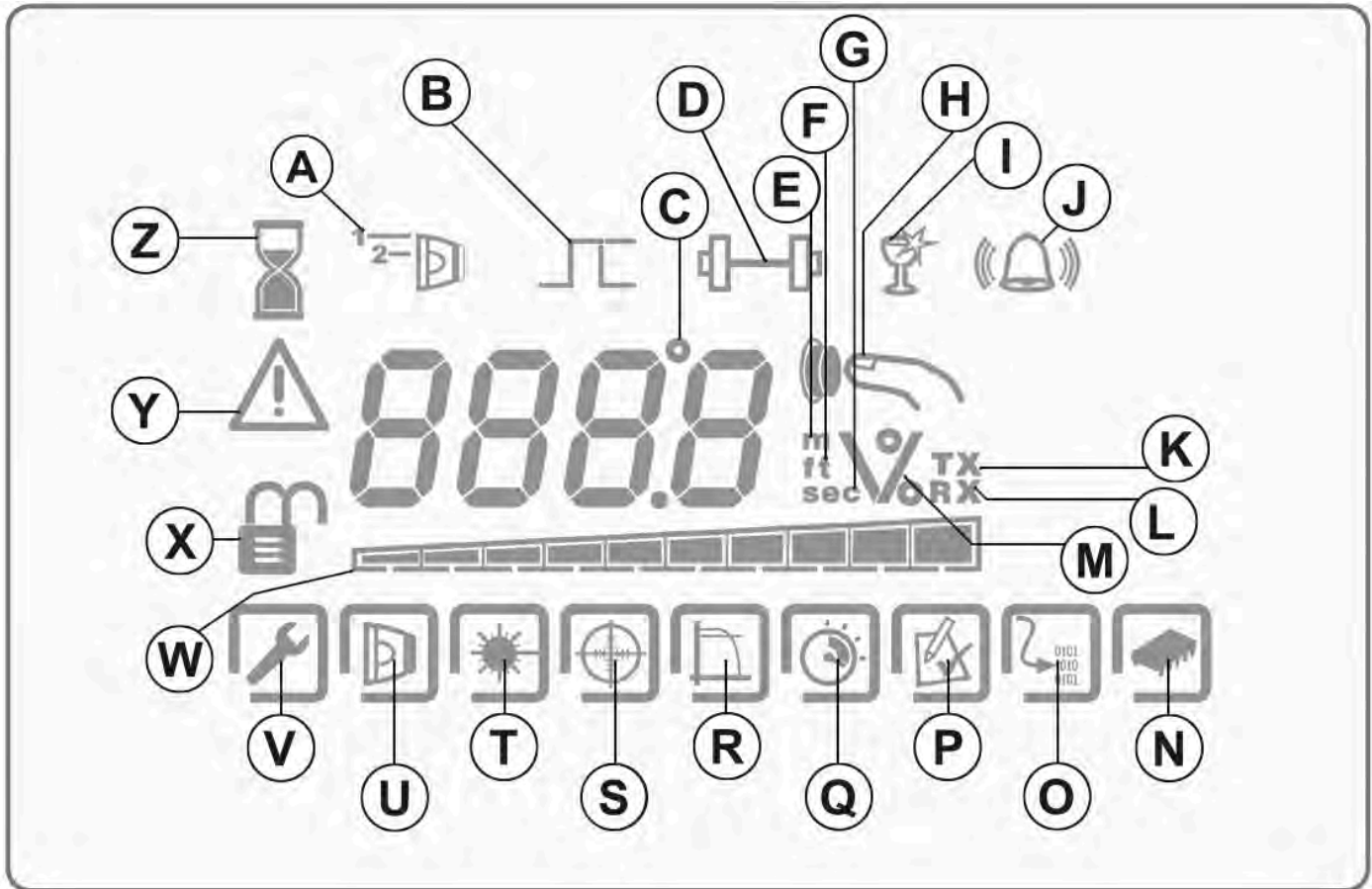


Figure 3: Controller display

Callout	Description	Callout	Description
A	Detector number	N	System controller settings
B	Latched or Reset	O	Event log
C	Degrees	P	Fire test
D	Signal strength	Q	Fire or Fault delay
E	Metres	R	Fire threshold
F	Feet	S	Beam alignment
G	Seconds	T	LASER targeting
H	User prompt	U	Detector settings
I	Compensation level	V	Set home positions
J	Fire	W	Bar graph
K	Transmit signal strength	X	System locked or Unlocked
L	Received signal strength	Y	Warning
M	% or V	Z	Busy

Specifications

Table 3: Mechanical and general reference

Specification	Rating
Housing	Flame Retardant ABS, IP rating = IP54
Finish	Light grey/black
Simplex Addressable interface and host control panel programming instructions.	579-1039, additional operating and installation instructions ship with the product.
Head and accessories reference.	Fire Fighting Enterprises (A Halma Group Company); website: www.ffeuk.com/

Table 4: Electrical

Specification	Rating		
Input voltage	14 VDC to 36 VDC, supplied from agency listed fire alarm power supply.		
Input current	50 mA		
Power wiring to controller	Terminal block connections; 18 AWG to 14 AWG (0.82 mm ² to 2.08 mm ²)		
Wiring, controller to head	328 ft (100 m) maximum distance, use twisted wire pair; 18 AWG to 16 AWG (1 mm ² to 1.5 mm ²)		
Beam optical wavelength	850 nm		
Communications reference	Details	IDNet addressable communications, communications circuit is isolated from input power, and controller-to-head communications.	
	Compatibility reference (review for addition to installed systems)	IDNet Communications source	Firmware/revision
		4100ES and 4010ES Control Panels	System Firmware 2.02 or higher
		4100ES System Power Supplies (SPS)	Firmware 3.12.05 or higher
		4010ES Main System Supply (MSS)	Firmware 3.12.05 or higher
		4010ES Main System Supply 2 (MSS2)	Firmware 3.12.05 or higher
Separate IDNet/IDNet+/IDNet 1+/IDNet 2+ 2 modules	Firmware 3.12.05 or higher		
IDNet communications PCC Chip 746-146	Revision 2.02.03 or higher		
4007ES	Compatible beginning with first release		
Addressing	Onboard DIP switch selects a base address to communicate with the local controller and the first beam detector head. For systems with two heads for each controller, the next sequential address is automatically assigned.		

Table 5: Operating Specifications

Sensitivity threshold	Selectable from 10% to 60%; with 35% as default (this is % of beam obscuration drop from 100%). The value is selected using the host FACU and communicated by IDNet communications.
Operating distance range	26 ¼ ft. to 330 ft (8 m to 100 m)
Beam status indicators	Multi-color LED on bottom front of beam detector head: Normal = Green; Alarm = Red; Fault (Trouble) = Yellow; LED flash is every 10 seconds.
Service status indicators	One LED for each detector, located under the beam controller cover, indicates the status of the beam detector channel communications.
Point types	Fire, Latched Supervisory, or Utility selected using the host FACU.
Trouble conditions	Communications fault, Rapid Obscuration fault (blocked beam), Excessively Dirty, and Summary trouble (other general troubles not detailed).
UL listed temperature Range	32°F to 100°F (0°C to 38°C)
Operating temperature range	-4°F to 131°F (-20°C to 55°C), for indoor use only.
Operating humidity range	0% to 93% RH, non-condensing.

Features

Individually addressable manual fire alarm stations with:

- Power and data supplied via IDNet or MAPNET II addressable communications using a single wire pair
- Operation that complies with ADA requirements
- Visible LED indicator that flashes during communications and is on steady when the station has been activated
- The NO GRIP Single Action Station and Retrofit Kit are available with a more easily operated pull lever for applications where anticipated users may find the standard station lever difficult to activate
- Pull lever that protrudes when alarmed
- Break-rod supplied (use is optional)
- Models are available with single or double action (breakglass or push) operation
- UL listed to Standard 38

Compatible with the following Simplex® control panels:

- Model Series 4007ES, 4008, 4010, 4010ES, 4100ES, 4100U, 4020, 4100, and 4120 fire alarm control panels equipped with either IDNet or MAPNET II communications
- Model Series 2120 Communicating Device Transponders (CDTs) equipped with MAPNET II communications

Compact construction:

- Electronics module enclosure minimizes dust infiltration
- Allows mounting in standard electrical boxes
- Screw terminals for wiring connections

Tamper resistant reset key lock (keyed same as Simplex fire alarm cabinets)

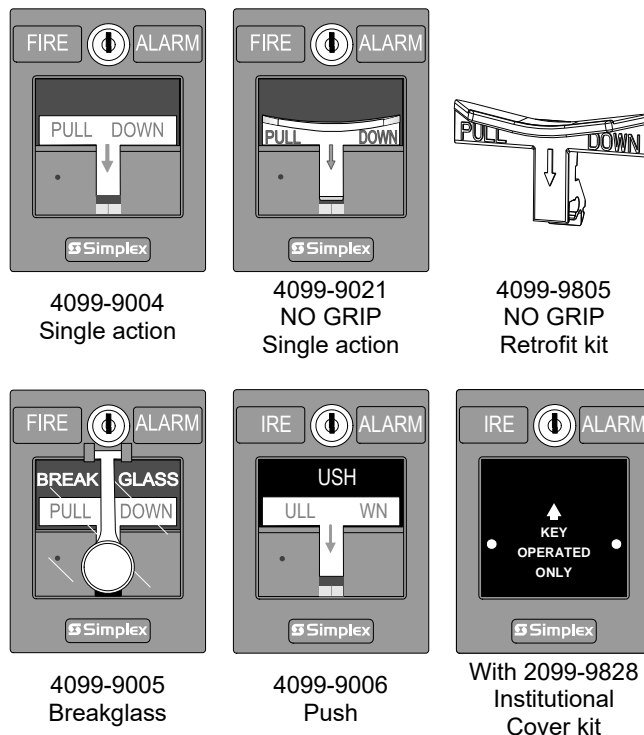
Multiple mounting options:

- Surface or semi-flush with standard boxes or matching Simplex boxes
- Flush mount adapter kit
- Adapters are available for retrofitting to commonly available existing boxes

Description

The Simplex addressable manual station combines the familiar Simplex manual station housing with a compact communication module that is easily installed to satisfy demanding applications. Its integral individual addressable module (IAM) constantly monitors status and communicates changes to the connected control panel via IDNet or MAPNET II communications wiring.

Refer to page 2 for specific model listings. This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7150-0026 224 for allowable values and/or conditions concerning material presented in this document. Additional listings may be applicable contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Protection Products.



Operation

Activation of the 4099-9004 single action manual station requires a firm downward pull to activate the alarm switch. Completing the action breaks an internal plastic break-rod (visible below the pull lever, use is optional). The use of a break-rod can be a deterrent to vandalism without interfering with the minimum pull requirements needed for easy activation. The pull lever latches into the alarm position and remains extended out of the housing to provide a visible indication.

Single Action NO GRIP Station 4099-9021. For applications such as California Building Code, Title 24, which requires “Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist” the model 4099-9021 station provides a more easily operated pull lever compared to standard stations. Retrofit of existing stations is available using the 4099-9805 Retrofit kit.

Double Action Stations (Breakglass) require the operator to strike the front mounted hammer to break the glass and expose the recessed pull lever. The pull lever then operates as a single action station.

Double Action Stations (Push Type) require that a spring loaded interference plate (marked PUSH) be pushed back to access the pull lever of the single action station.

Station reset requires the use of a key to reset the manual station lever and deactivate the alarm switch. (If the break-rod is used, it must be replaced.)

Station testing is performed by physical activation of the pull lever. Electrical testing can be also performed by unlocking the station housing to activate the alarm switch.

Addressable Manual Station Product Selection

Addressable Manual Stations, Red Housing with White Letters and White Pull Lever

Model	Description	Housing	Pull Lever	Listings
4099-9004	Single Action, English	FIRE ALARM	PULL DOWN	UL, ULC, FM, CSFM
4099-9004CB	Single Action, Bilingual English and French	FEU FIRE	TIREZ PULL	ULC
4099-9004CF	Single Action, French	ALARME FEU	ABAISEZ	
4099-9004PO	Single Action, Portuguese	FOGO ALARME	PUXE	UL, FM
4099-9004SP	Single Action, Spanish	ALARMA FUEGO	JALE	
4099-9005	Double Action, Breakglass operation, English	FIRE ALARM	PULL DOWN	UL, ULC, FM, CSFM
4099-9005PO	Double Action, Breakglass operation, Portuguese	FOGO ALARME	PUXE	UL, FM
4099-9005SP	Double Action, Breakglass operation, Spanish	ALARMA FUEGO	JALE	
→ 4099-9006	Double Action, Push operation, English	FIRE ALARM	PUSH PULL DOWN	UL, ULC, FM, CSFM
4099-9006PO	Double Action, Push operation, Portuguese	FOGO ALARME	EMPURRE PUXE	UL, FM
4099-9006SP	Double Action, Push operation, Spanish	ALARMA FUEGO	EMPUJE JALE	
4099-9021	Single Action NO GRIP operation, English	FIRE ALARM	PULL DOWN	UL, ULC, FM, CSFM

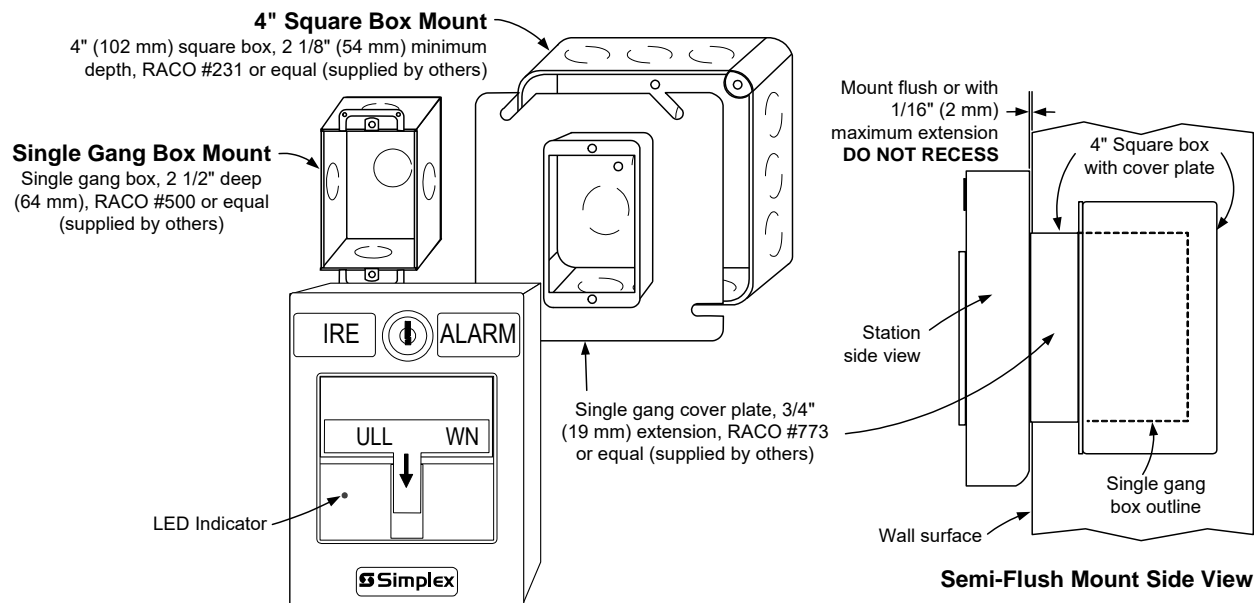
Accessories (refer to pages 3 and 4 for details)

Model	Description	Model	Description
2975-9022	Cast aluminum surface mount box, red	2099-9803	Replacement breakglass
2975-9178	Surface mount steel box, red	2099-9804	Replacement break-rod
2099-9813	Semi-flush trim plate for double gang switch box, red	2099-9828	Institutional cover kit for field installation on 4099-9004; Note: Covers LED indicator
2099-9819	Flush mount adapter kit, black	2099-9814	Surface trim plate for Wiremold box V5744-2, red
2099-9820	Flush mount adapter kit, beige	2099-9822	Replacement retaining clip for breakglass
4099-9805	Retrofit Kit for field conversion of a single action station to a NO GRIP station; refer to Installation Instructions 579-1007 for details		

Specifications (refer to Installation Instructions 579-1135 for additional information)

Power and Communications	IDNet or MAPNET II communications, 1 address per station
Address Means	DIP switch, 8 position
Wire Connections	Screw terminal for in/out wiring, for 18 to 14 AWG wire (0.82 mm ² to 2.08 mm ²)
UL Listed Temperature Range	32° to 120° F (0° to 49° C) intended for indoor operation
Humidity Range	Up to 93% RH at 100° F (38° F)
Housing Color	Red with white raised lettering
Material	Housing and pull lever are Lexan polycarbonate or equal
Pull Lever Color	White with red raised lettering
Housing Dimensions	5" H x 3 3/4" W x 1" D (127 mm x 95 mm x 25 mm)

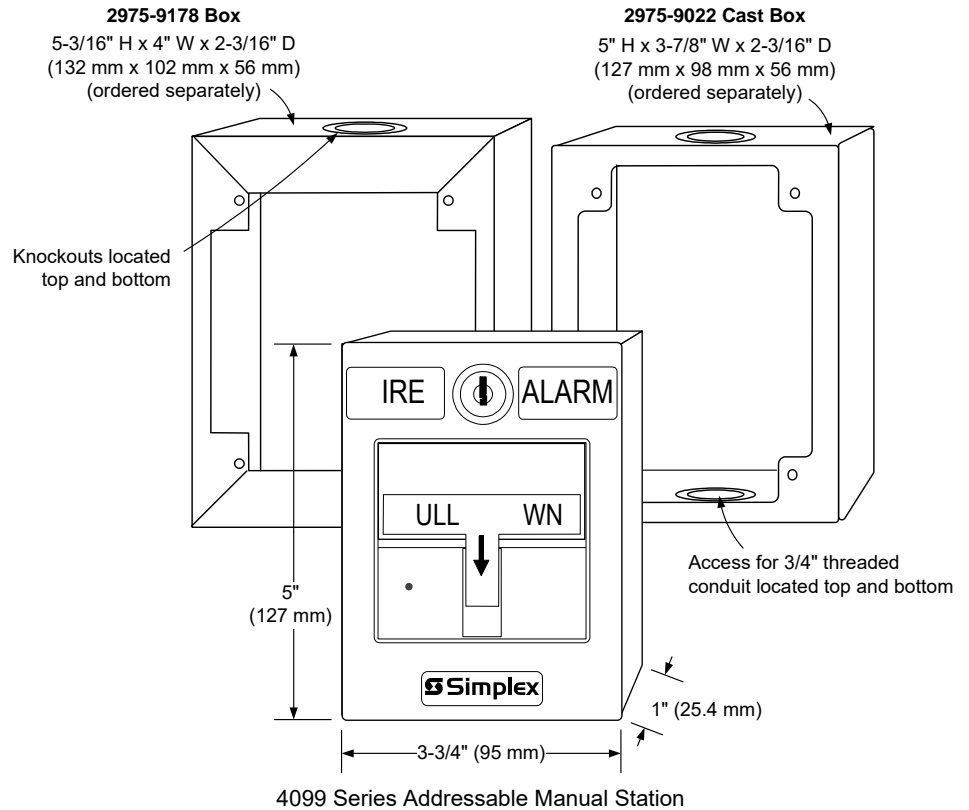
Addressable Manual Station Semi-Flush Mounting



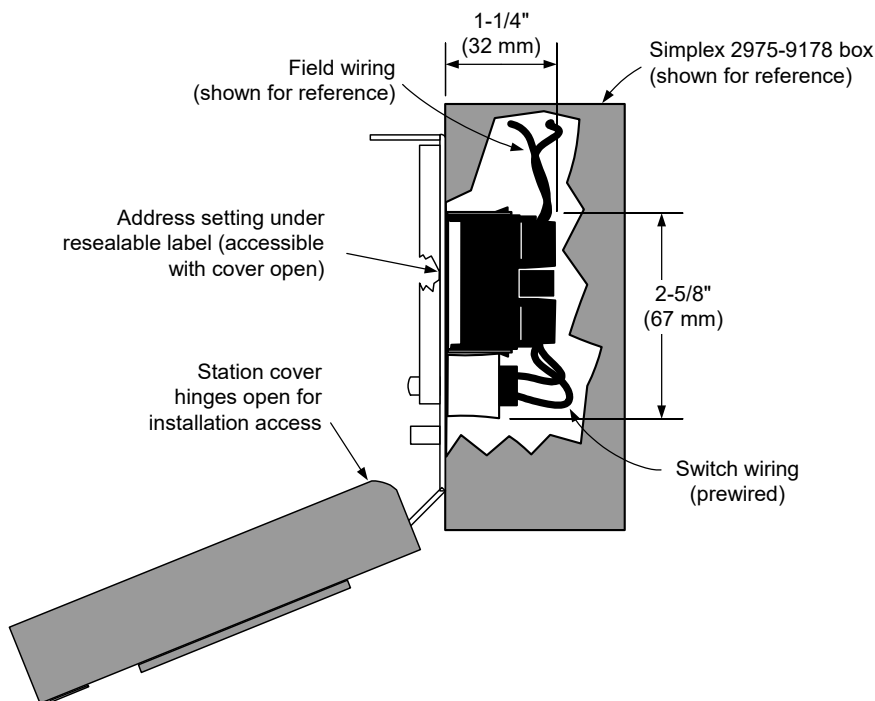
Addressable Manual Stations Surface Mounting

Preferred Mounting. For surface mounting of these addressable manual stations, the preferred electrical boxes are shown in the illustration to the right.

Additional Mounting Reference. Refer to page 4 for Wiremold box mounting compatibility.



Surface Mount Side View with Internal Detail



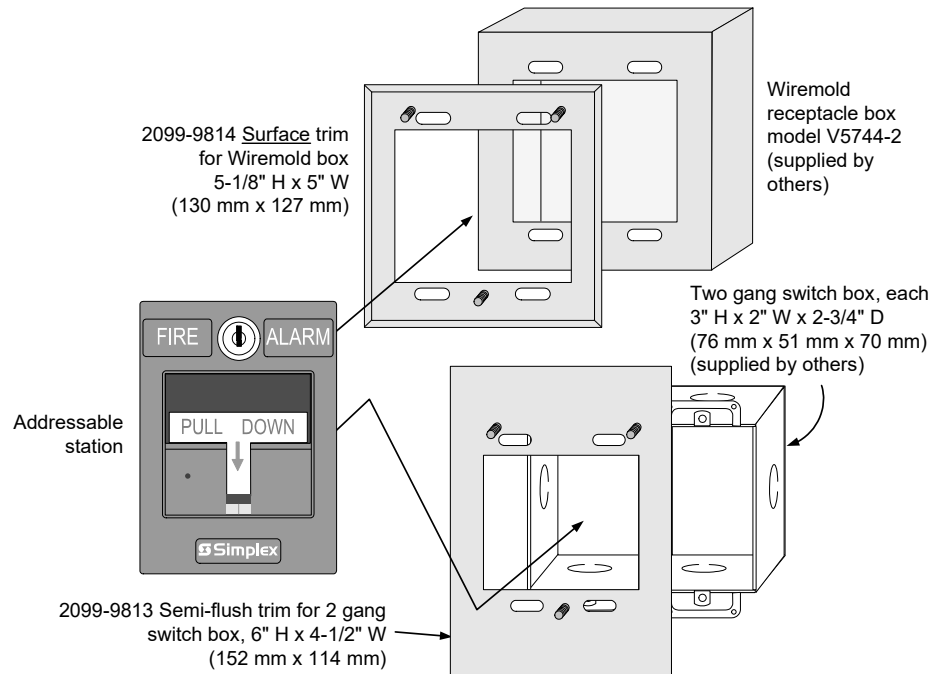
Application Reference

Refer to NFPA 72, the *National Fire Alarm and Signaling Code*, and all applicable local codes for complete requirements for manual stations. The following summarizes the basic requirements.

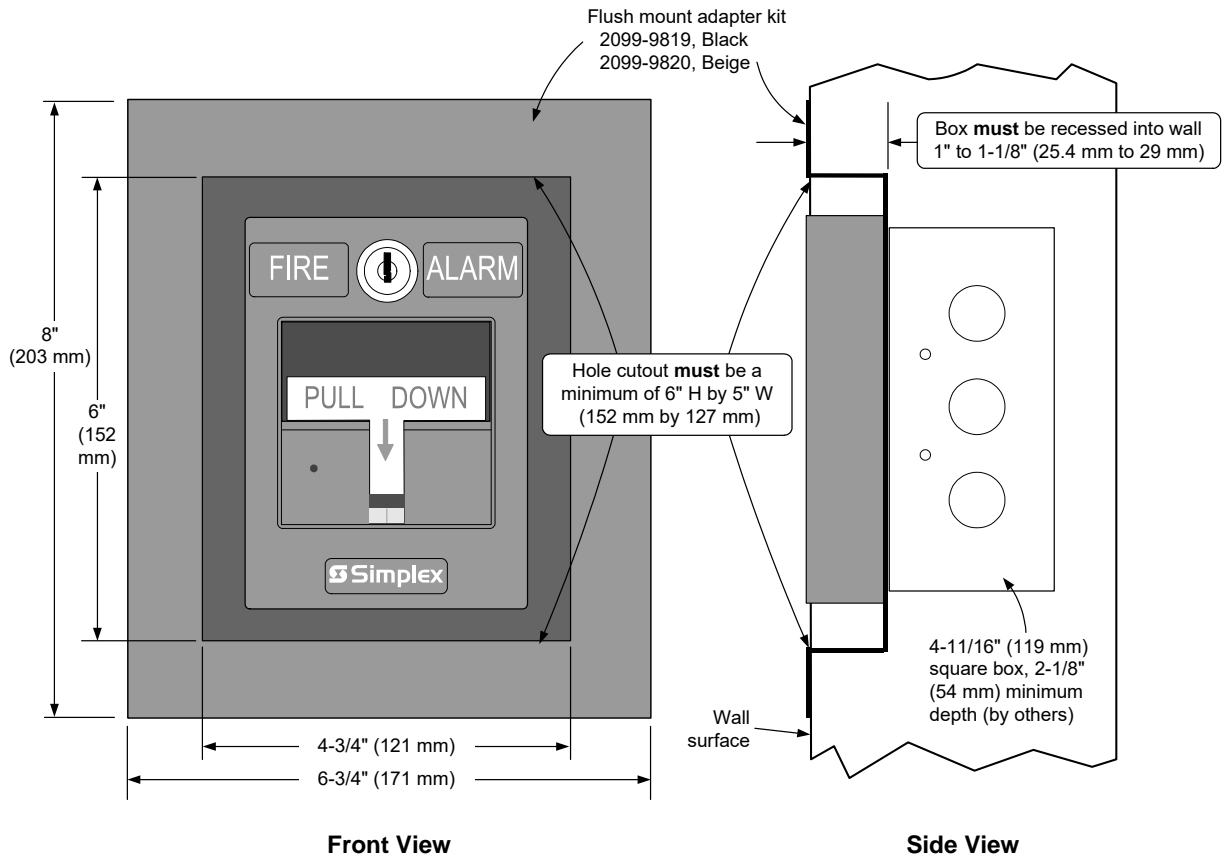
1. Stations shall be located in the normal path of exit and distributed in the protected area such that they are unobstructed and readily accessible.
2. Mounting shall be with the operable part not less than 42 in (1.07 m) and not more than 48 in (1.22 m) above floor level.
3. At least one station shall be provided on each floor. Additional stations shall be provided to obtain a travel distance not more than 200 ft (61 m) to the nearest station from any point in the building.
4. When manual station coverage appears limited in any way, additional stations should be installed.

Addressable Manual Station, Additional Mounting Information

For retrofit and new installations, additional compatible mounting boxes and the required adapter plates are shown in the illustration to the right.



Addressable Manual Station, Flush Mounting Information



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UL, ULC, CSFM Listed; FM Approved;
MEA (NYC) Acceptance*

Addressable Duct Sensor Housings with TrueAlarm
Photoelectric Sensor; Available with Multiple Relay Control

Features

Compact air duct sensor housing with clear cover to monitor for the presence of smoke**

Includes factory installed TrueAlarm photoelectric smoke sensor and features:

- Individual sensor information processed by the host control panel to determine sensor status
- Digital transmission of analog sensor values via IDNet or MAPNET II, 2-wire communications
- Programmable sensitivity, consistent accuracy, environmental compensation, status testing, and monitoring of sensor dirt accumulation

Model 4098-9755:

- Basic duct sensor housing (no relay output) powered by IDNet/MAPNET II communications

Model 4098-9756:

- Duct sensor housing with supervised output for multiple remote relays; requires separate 24 VDC; includes one relay
- Relay output is under panel control
- At the panel, relay output can be activated manually or in response to a separate alarm or other input

General features:

- UL listed to Standard 268A
- Clear cover allows visual inspection
- Test ports provide functional smoke testing access with cover in place
- Mounts to rectangular ducts or round ducts; minimum size is 8" (203 mm) square or 18" (457 mm) diameter
- Magnetic test feature for alarm initiation at housing
- Optional weatherproof enclosure is available separately (refer to data sheet S4098-0032)

Diagnostic LEDs (on interface board):

- Red Alarm/Trouble LED for sensor status and communications polling display
- Yellow LED for open or shorted trouble indication of supervised relay control (4098-9756 only)

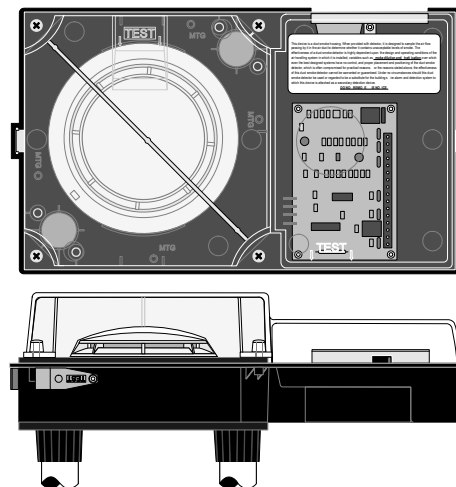
Sampling tubes (ordered separately):

- Available in multiple lengths to match duct size
- Installed and serviced with housing in place

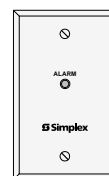
Remote module options (ordered separately):

- Remote red status/alarm LED (2098-9808)
- Remote test station with LED (2098-9806)
- 4098-9843 remote relays (refer to page 2 for details)

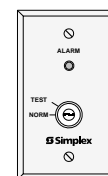
These products have been approved by the California State Fire Marshal (CS FM) pursuant to Section 13144.1 of the California Health and Safety Code. See CS FM Listing 3240-0026.241 for allowable values and/or conditions concerning material presented in this document. Accepted for use – City of New York Department of Buildings – MEA35-93E. Additional listings may be applicable – contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Protection Products.



Duct Sensor Housing, Front and Bottom View



2098-9808



2098-9806

Remote Status/Alarm Indicator and Test Station

Introduction

Operation. Simplex® compact air duct smoke sensor housings provide TrueAlarm operation for the detection of smoke in air conditioning or ventilating ducts. Sampling tubes are installed into the duct allowing air to be directed to the smoke sensor mounted in the housing.

TrueAlarm Sensor Operation

Digital Communication of Analog Sensing.

Analog information from the sensor is digitally communicated to the control panel where it is analyzed. Sensor input is stored and tracked as an average value with an alarm or abnormal condition being determined by comparing the sensor's present value against its average.

Intelligent Data Evaluation. Monitoring each photoelectric sensor's average value provides a software filtering process that compensates for environmental factors (dust, dirt, etc.) and component aging, providing an accurate reference for evaluating new activity. The result is a significant reduction in the probability of false or nuisance alarms caused by shifts in sensitivity, either up or down.

Please note that smoke detection in air ducts is intended to provide notification of the presence of smoke *in the duct*. It is not intended to, and will not, replace smoke detection requirements for open areas or other non-duct applications.

TrueAlarm Sensor Operation (Continued)

Control Panel Selection. Peak activity per sensor is stored to assist in evaluating specific locations. The alarm set point for each sensor is determined at the control panel, selectable as the individual application requires.

Sensor Status LED. Each sensor housing's red status LED (located on the electrical interface board) pulses to indicate communications with the panel. If the control panel determines that a sensor is in alarm, or that it is dirty or has some other type of trouble, the details are annunciated at the control panel and that sensor housing's status LED will be turned on steadily. During a system alarm, the control panel will control the LEDs such that an LED indicating a trouble will return to pulsing to help identify any alarmed sensors. (Remote Status/Alarm LEDs track the operation of the sensor housing LED.)

Photoelectric Sensing

TrueAlarm photoelectric sensors use a stable, pulsed infrared LED light source and a silicon photodiode receiver to provide consistent and accurate low power smoke sensing.

Duct Sensor Selection Chart

Duct Smoke Sensor Housing with Photoelectric Sensor*

Model	Description	Compatibility
→ 4098-9755	Basic Duct Sensor Housing; operating power is supplied by either IDNet or MAPNET II communications (no relay output)	4007ES, 4008, 4010, 4010ES, 4020, 4100, 4100ES, 4100E, and 4120. Also 2120 CDT if configured for MAPNET II, TrueAlarm operation
4098-9756	Duct Sensor Housing with supervised multiple relay output, requires separate 24 VDC fire alarm power and 4081-9008 end-of-line resistor harness; includes one 4098-9843 relay	Same as above except relay operation is not compatible with 2120 CDT; Relay output is for up to 15 total 4098-9843 Relays (additional relays are ordered separately)

Remote LED Indicator and Test Station, Select One if Required

Model	Description	Compatibility	Mounting
2098-9808	Red LED status indicator on single-gang stainless steel plate	4098-9755 4098-9756	Use single gang box, 3" H x 2" W x 2" D (76 mm x 51 mm x 51 mm)
→ 2098-9806	Test Station with keyswitch and red LED status indicator, on single-gang stainless steel plate; (turning switch to "TEST" initiates alarm for system testing)		

Epoxy Encapsulated Remote Relay and End-of-Line Resistor

Model	Description	Compatibility	Location
4098-9843	Relay; single Form C (7 A @ 120 VAC); refer to pages 3 and 4 for additional relay information; one included with 4098-9756; wiring is 18 AWG (0.82 mm ²) color coded wire leads	4098-9756 only; connect up to 15	Locate relays within 3 ft (1 m) of device being controlled per NFPA 72
4081-9008	End-of-Line Resistor Harness; 10 kΩ, 1/2 W; (ref. 733-894); required to supervise remote relay coil connection	4098-9756	At last relay location

* Each duct housing includes an internally mounted model 4098-9714 TrueAlarm photoelectric sensor and an exhaust tube. A correctly sized sampling tube (ordered per application) is required, refer to chart below.

Sampling Tube Selection Chart, Ordered Separately Per Duct Width, Select One

Overall Duct Width	Tube Required	Suggested Cut Length
12" (305 mm)	4098-9854	1/2" (12.7 mm) longer than duct width
13" to 23" (330 mm to 584 mm)	4098-9855	1/2" (12.7 mm) longer than duct width
24" to 46" (610 mm to 1168 mm)	→ 4098-9856	3 in" (76 mm) longer than duct width
46" to 71" (1168 mm to 1803 mm)	4098-9857	3 in" (76 mm) longer than duct width
71" to 95" (1803 mm to 2413 mm)	4098-9858	3 in" (76 mm) longer than duct width

Photoelectric Sensing (Continued)

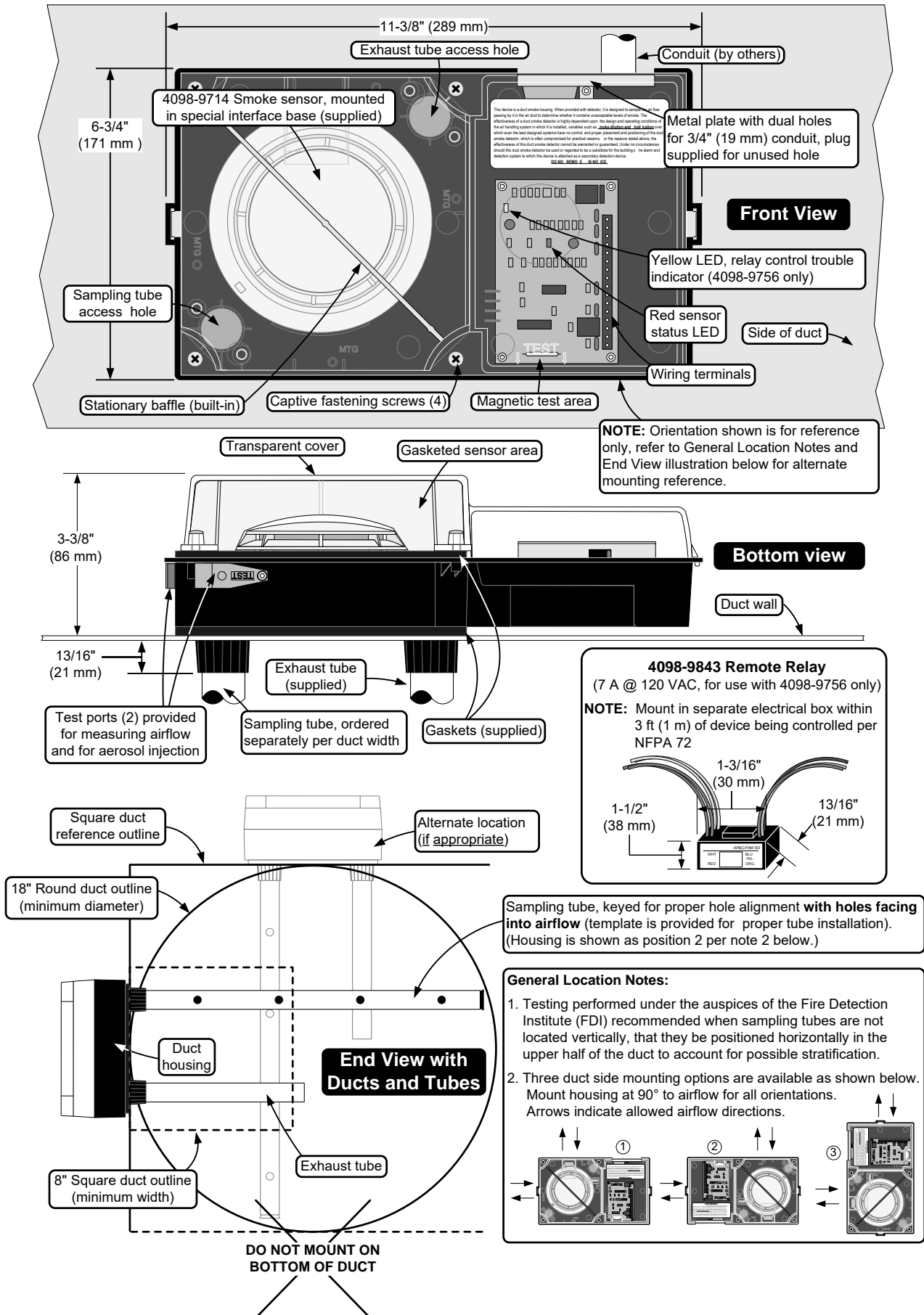
Typically duct sensor applications require less sensitive settings (such as 2.5% per foot obscuration) due to the ducts being a relative dirty environment. However, the standard seven levels of TrueAlarm sensor sensitivity are available for each individual sensor, ranging from 0.2% to 3.7% per foot of smoke obscuration. Sensitivity is selected and monitored at the fire alarm control panel.

Fire Alarm Control Panel Features

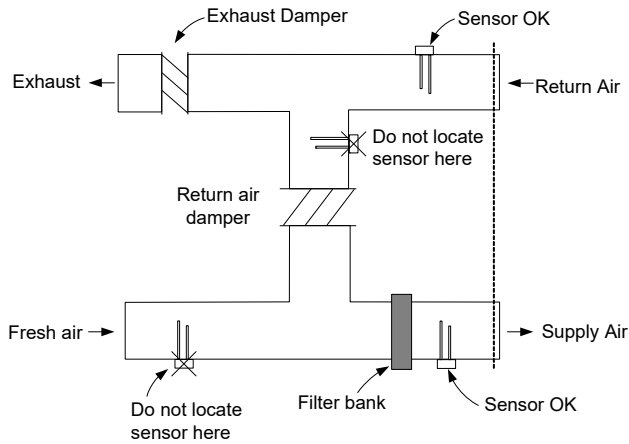
- Individual smoke sensitivity selection
- Sensitivity monitoring that satisfies NFPA 72 sensitivity testing requirements
- Peak value logging allows accurate analysis for sensitivity selection
- Automatic, once per minute individual sensor calibration check verifies sensor integrity
- Automatic environmental compensation
- Smoke sensitivity is displayed in percent per foot
- Ability to display and print detailed sensor information in plain English language
- Relays of model 4098-9756 are under panel control for ON, OFF, or override

Duct Sensor Housing Detail Reference

NOTE: Refer to Installation Instructions 574-776 for additional installation detail and maintenance information.



Duct Sensor Location Reference



Additional Information. Refer to NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*; NFPA 72, the *National Fire Alarm and Signaling Code*; and the *NEMA Guide for Proper Use of Smoke Detectors in Duct Applications*, and Installation Instructions 574-776.

Specifications

General Mechanical and Environmental

Air Velocity Range (linear ft/min)	300 to 4000 ft/min (91 to 1220 m/min)
Sensor Sensitivity Range	0.2% to 3.7% per foot of obscuration, selectable at host control panel
UL Listed Temperature Range	32° F to 100° F (0° C to 38° C)
Operating Temperature Range	32° F to 122° F (0° C to 50° C)
Storage Temperature Range	0° F to 140° F (-18° C to 60° C)
Humidity Range	10% to 95% RH, non-condensing
Wiring Connections	Terminal blocks, 18 to 12 AWG (0.82 mm ² to 3.31 mm ²)
Housing Color and Material	Black ABS base with clear polycarbonate cover
Sampling and Exhaust Tube Material	Black CPVC, custom extrusion; sampling tubes are pre-drilled

Remote Status/Alarm LED and Test Station with Remote Status/Alarm LED

Remote Alarm LED Current	1.2 mA, no impact to 24 VDC alarm current (2098-9808 or 2098-9806)
Test Station Keyswitch Current	3.3 mA, no impact to 24 VDC alarm current (2098-9806)
Remote Alarm LED and Test Station Distance	250 ft (76 m) maximum

Addressable Operation

Data Communications	IDNet or MAPNET II communications, auto-select, one address per housing; provides operating power to model 4098-9755
---------------------	--

Model 4098-9756 with Supervised Multiple Relay Control, Requires Separate Fused 24 VDC from Fire Alarm Power Supply

Input Voltage	18-32 VDC (24 VDC nominal)
Standby Current	3 mA @ 24 VDC
Alarm Current	15 mA @ 24 VDC; add 15 mA for each 4098-9843 relay
Supervised Remote Relay Control Output	For use with 4098-9843 relay only, quantity of 15 maximum; distance of 500 ft (152 m) maximum; requires 4081-9008 (ref. 733-894) 10 k Ω , 1/2 W end-of-line resistor

4098-9843 Relay Output Ratings, Single Form C, use with Model 4098-9756 Only

Coil Current	15 mA @ 24 VDC, up to 15 maximum per relay control output
Relay Contacts	7 A at 0.35 PF @ 28 VDC & 120 VAC; 250 μ A @ 5 VDC
Location Distance	500 ft (152 m) maximum to relay coils; locate relays within 3 ft (1 m) of device being controlled per NFPA 72

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Duct Sensor Location Considerations:

1. Proper duct smoke detection location must ensure adequate airflow within the duct housing.
2. Duct air velocity rating is 300 to 4000 ft/min (91 to 1220 m/min). Pressure differential between intake and exhaust tubes is required to be between 0.015 to 1.55 inches of water (0.381 to 39.37 mm).
3. Ensure accessibility for test and service.
4. Proper Locations: downstream side of filters to detect fires in the filters; in return ducts, ahead of mixing areas; upstream of air humidifier and cooling coil.
5. Other locations and orientations may be required for proper duct smoke detection depending on duct access, system design, and duct airflow testing. Contact your local Simplex product supplier for assistance.

Locations to Avoid:

1. Where dampers closed for comfort control would interfere with airflow.
2. Next to outside air inlets (unless the intent is to monitor smoke entry from that area).
3. In return air damper branch ducts and mixing areas where airflow may be restricted.

Features

IDNet or MAPNET II addressable communications supply both data and power over a single wire pair to provide:**

- Supervised Class B monitoring of normally open, dry contacts
- Total wiring distance from IAM to supervision resistor(s) of up to 500 ft (152 m)
- Monitored connection is compatible with Simplex® 2081-9044 Overvoltage Protectors for outdoor wiring or electrically noisy applications
- For use in indoor locations up to 158° F (70° C) such as attic spaces or similar applications

For use with following Simplex control panels:

- Model Series 4007ES, 4008, 4010, 4010ES, and 4100ES fire alarm control panels for IDNet communications
- Model Series 4100/4100U/4100ES, 4120, 4020, and 2120 Communicating Device Transponders (CDTs) equipped with MAPNET II communications

Model 4090-9001:

- Enclosed design minimizes dust infiltration
- Mounts in standard single gang electrical box
- Screw terminals for wiring connections
- Visible LED flashes to indicate communications
- Optional covers are available to allow LED to be viewed after installation (requires mounting bracket, ordered separately)

Model 4090-9051:

- Encapsulated design for extended exposure to high humidity (LED is not present on this model)
- Color coded 18 AWG leads for wiring

IDNet communications provides current limited monitoring:

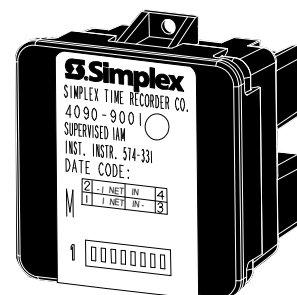
- Provides monitoring of tamper switch (supervisory) and waterflow switch (alarm) on same circuit using one point
- Available with IDNet communications only

Multiple operation modes are available and are selectable at the control panel:

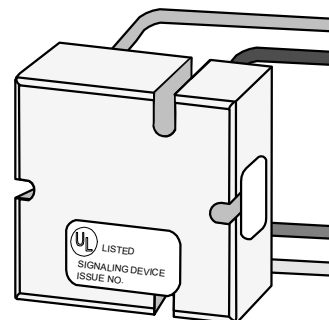
- Contact closure status can be tracked
- Momentary contact closure conditions can be selected at the panel to be latched or tracked (not available with the 2120 CDT)

UL listed to Standard 864

These products have been approved by the California State Fire Marshal (CS FM) pursuant to Section 13144.1 of the California Health and Safety Code. See CS FM Listing 7300-0026 223 for allowable values and or conditions concerning material presented in this document. Accepted for use – City of New York Department of Buildings – MEA35-93E. Additional listings may be applicable – contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.



4090-9001 Supervised IAM
(shown approximately 3/4 size)



4090-9051 Supervised IAM
(shown approximately 3/4 size)

Description

Individual addressable modules (IAMs) receive both power and communications from a two-wire MAPNET II or IDNet circuit. They provide location specific addressability to a single initiating device (such as single station smoke detector alarm contacts or heat detector contacts) or multiple devices at the same location by monitoring normally open dry contacts and the wiring to an end-of-line resistor.

Model 4090-9001 is packaged in a thermoplastic housing and provides screw terminal connections and a status indicating LED.

Model 4090-9051 is an encapsulated package with wire leads. It does not provide a status indicating LED.

Operation

Contact Closure. Closure of the monitored contact(s) initiates an alarm or other response as programmed at the fire alarm control panel. An open in the monitored circuit wiring will cause a trouble to be reported.

Panel Selections. Selections can be made at the control panel to maintain the alarm condition if the initiating device contacts are momentary, such as from a rate-of-rise heat detector, or to track the device contact status (not available with the 2120 CDT).

Current Limited Operation Applications

For use with IDNet communications only, these IAMs can provide quad-state sensing of normal, open circuit, short circuit, and current limited conditions. (Program type is “T-sense.”) With the proper end-of-line and current limiting resistors, dual functions such as tamper switch and waterflow switch monitoring can be determined and communicated by a single addressable point.

IAM Product Selection

Model	Description
4090-9001	Supervised IAM, mounted in thermoplastic housing with screw terminals; see applicable options below
4090-9051	Supervised IAM, encapsulated with wire leads

Optional Trim Plates and Mounting Bracket for Model 4090-9001

Model	Description
4090-9806	For semi-flush mounted box Trim plate with LED viewing window, requires 4090-9810 mounting bracket, includes mounting screws; galvanized steel
4090-9807	For surface mounted box
4090-9810	Mounting bracket, mounts IAM to electrical box and provides screw holes for trim plate, required for optional trim plates

End-of-Line Resistor Harnesses (ordered separately as required)

Model	Reference No.	Description
4081-9004	733-886	6.8 kΩ, 1/2 W; Standard end-of-line resistor harness for N.O. contact supervision
4081-9003	733-896	4.7 kΩ, 1/2 W
4081-9005	733-984	1.8 kΩ, 1/2 W

Use for current limited monitoring applications

Specifications

Electrical

Power and Communications	MAPNET II or IDNet, auto selected, 1 address per IAM
Input Requirements	Normally open, dry contacts
Wire Connections	4090-9001 Screw terminals for in/out wiring, 18 to 14 AWG wire (0.82 mm ² to 2.08 mm ²)
	4090-9051 Color coded wire leads, 18 AWG (0.82 mm ²), 8" long (203 mm)
Reference Documents	Installation Instructions 574-331 for 4090-9001; 579-572 for 4090-9051
	Field Wiring Diagrams 842-073 for IDNet operation; 841-804 for MAPNET II operation

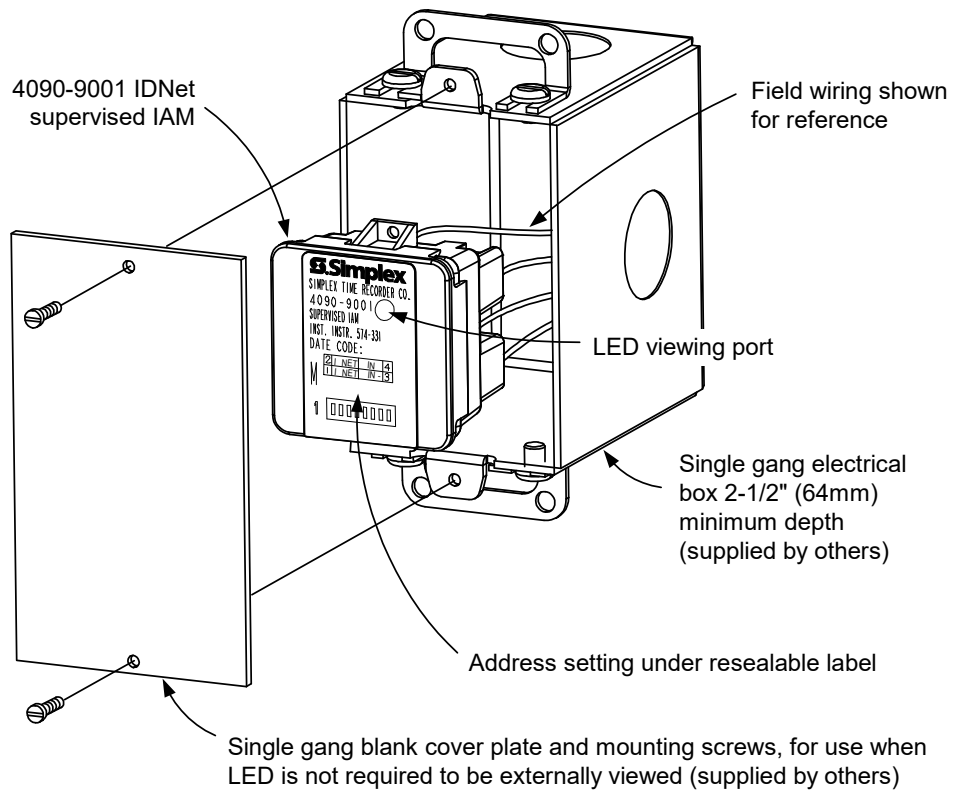
Wiring Distances

Distance from IAM to Contacts	500 ft (152 m) maximum without protectors
	400 ft (122 m) maximum with 2081-9044 Overvoltage Protectors
Wiring Distance Reference per channel, MAPNET II or IDNet Communications	2500 ft (762 m) maximum from fire alarm control panel
	10,000 ft (3048 m) maximum total wiring distance (including T-Taps)

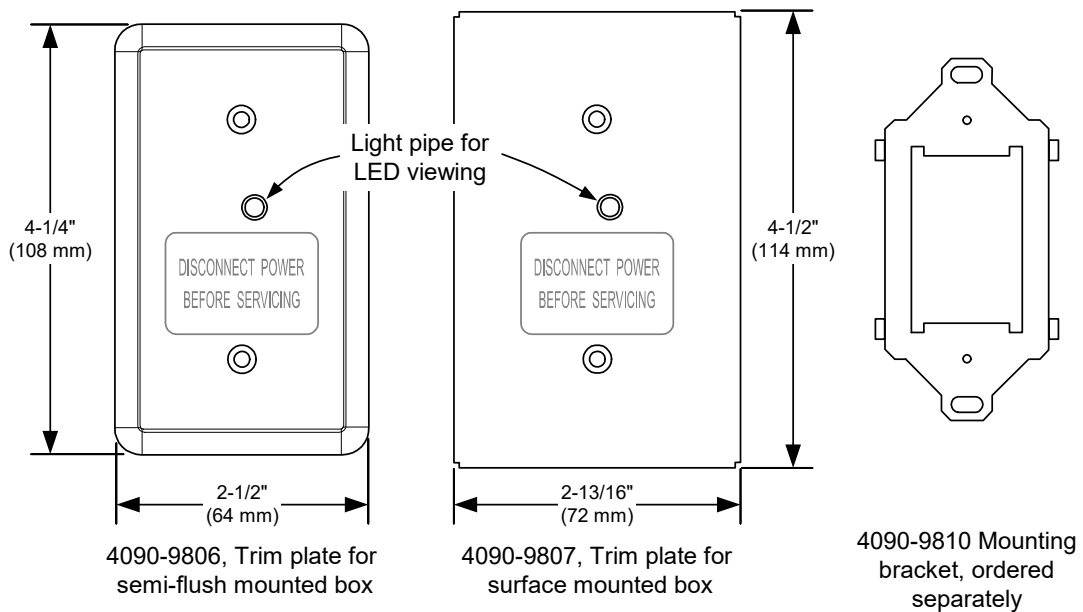
Mechanical

Dimensions	4090-9001 1-9/16" W x 1-3/4" H x 1-1/4" D (40 mm x 44 mm x 32 mm)
	4090-9051 1-9/16" W x 1-9/16" H x 9/16" D (40 mm x 40 mm x 14 mm)
Housing Material, 4090-9001	Black thermoplastic
Encapsulation Material, 4090-9051	Epoxy, beige
Temperature Range	32° to 158° F (0° to 70° C); intended for indoor operation
Humidity Range	Up to 93% RH at 100° F (38° C)

Mounting Information



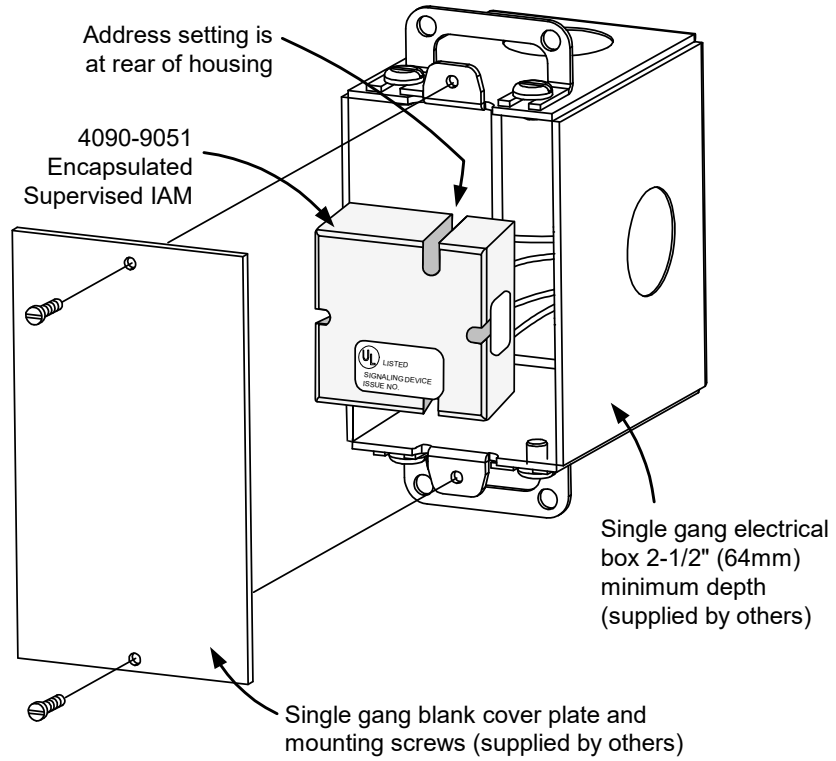
Mounting Reference, Single Gang Blank Cover Plate



NOTE: These mounting plates require mounting bracket 4090-9810.

Optional Trim Plates and Mounting Bracket for Visible LED

4090-9051 Mounting Information



SIP

IAM Single Plate



The SIP addressable IAM module plate is designed to easily mount one IAM module into a 4 1/2" by 2 3/4" electrical box with the ability to view the LED after installation. Snap-in IAM assembly for easy access to address the switch. The SIP is painted with a durable red textured finish. Designed to save time on installation and service calls.

SPECIFICATIONS

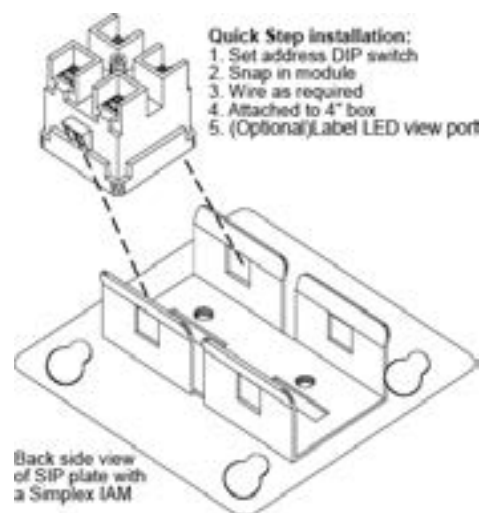
Heavy 16 gauge steel construction. Red, textured powder coat finish. Dimensions are 4 1/2" by 2 3/4" and 1 3/8" deep with IAM installed. Mounting hardware included.

ORDERING INFORMATION

P/N#	Description
YJ1283	SIP Plate for IAM

FEATURES

- SIP holds one IAM module
- View port for LED when assembled to box
- Quick and Easy snap-in design
- Label area for identification
- Easy access to address DIP switches



Features

Individual Addressable Relay Module (Relay IAM):

- IDNet addressable control for use with Simplex® fire alarm control panel models 4007ES, 4008, 4010, 4010ES, 4100ES, and 4100U
- A single addressable point provides control and status tracking of a Form “C” contact
- Low power latching relay design allows IDNet communications to supply both data and module power
- Relay is set to OFF on initial power up and upon loss of IDNet communications

Compact, sealed construction:

- Enclosed design minimizes dust infiltration
- Mounts in standard 4” (102 mm) square electrical box, optional adapter bracket is available to mount in a 4 11/16” (119 mm) square electrical box
- Screw terminals for wiring connections
- Visible LED flashes to indicate communications
- Optional covers are available to allow LED to be viewed after installation

UL listed to Standard 864

Description

IDNet Relay IAMs allow fire alarm control panels to control a remotely located Form “C” contact using IDNet addressable communications for both data and module power. Typical applications would be for switching local power for control functions such as elevator capture, or control of HVAC components, pressurization fans, dampers, etc. Relay status is also communicated requiring only one device address.

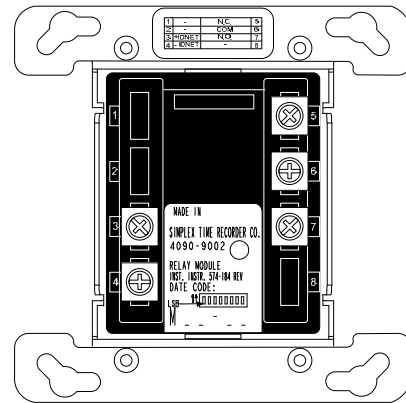
Product Selection

Model	Description
4090-9002	Relay IAM

Optional Adapter and Trim Plates

Model	Description	
4090-9813	Adapter plate to fit 4 11/16” (119 mm) square electrical box	
4090-9801	For semi-flush mounted box	Trim Plate, galvanized steel, with LED viewing window; includes mounting screws
4090-9802	For surface mounted box	

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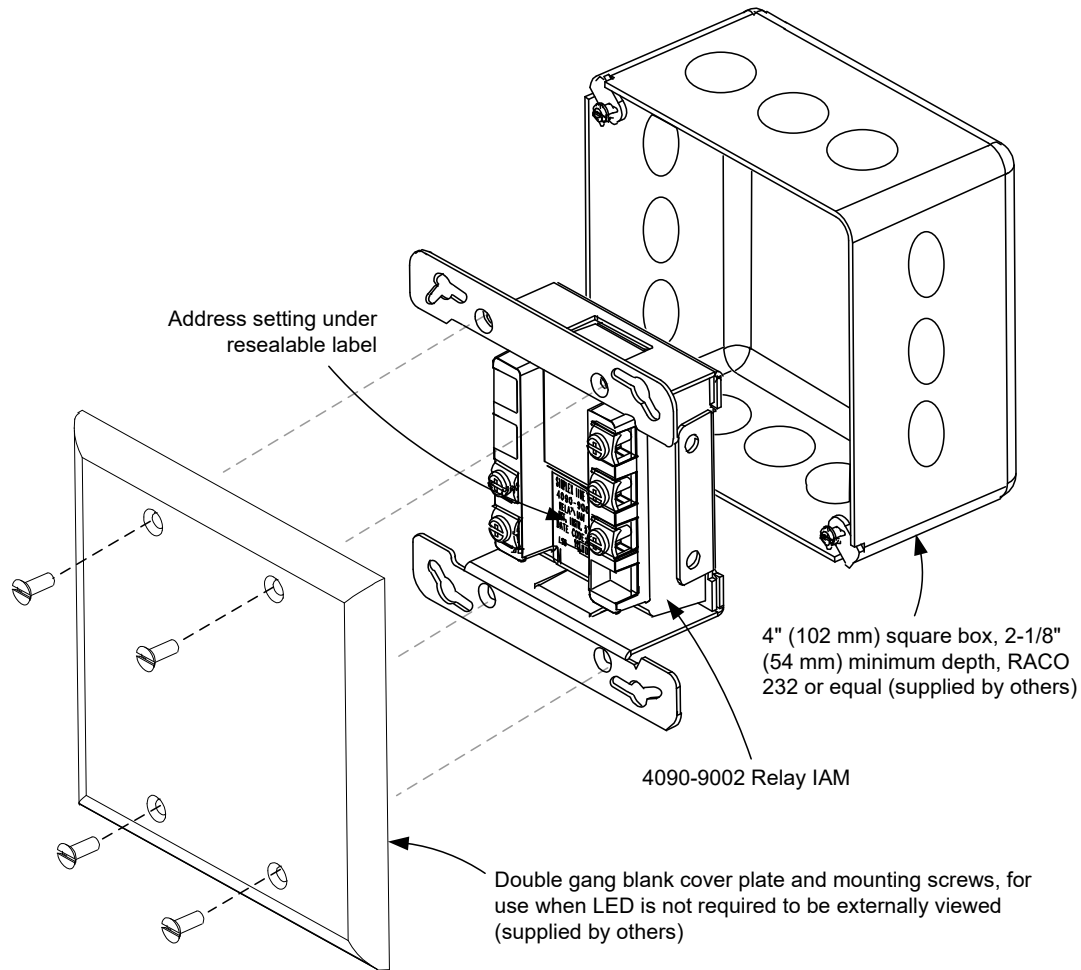


4090-9002 IDNet Relay IAM Package
(shown approximately 1/2 size)

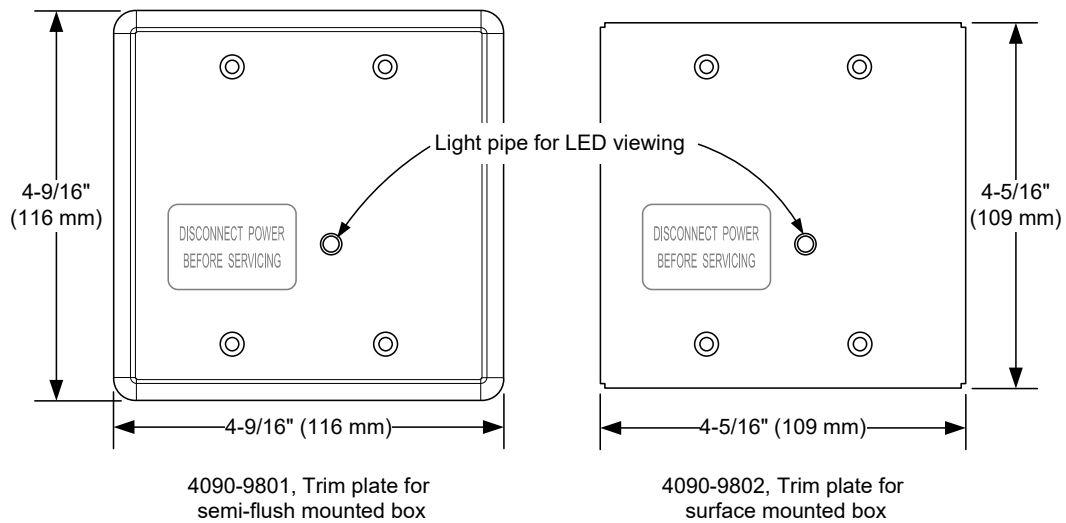
Specifications

Communications	IDNet communications, 1 address per device	
Relay IAM Power	Supplied by IDNet communications	
Contact Ratings* (not rated for incandescent switching)		
Type	Form C, SPDT	
Power-Limited	2 A @ 24 VDC, resistive	from listed fire alarm supply
	1 A @ 24 VDC, inductive	
Nonpower-Limited	0.5 A @ 120 VAC, resistive	
* Provide circuit fusing and transient suppression as required per application. DC inductive loads can typically be diode suppressed; 120 VAC loads may require RC networks or varistors, depending on device type. Refer to the installation instructions for additional information.		
Wire Connections	Screw terminals for in/out wiring, 18 to 14 AWG wire (0.82 to 2.08 mm ²)	
IDNet Communications Wiring Reference	Up to 2500 ft (762 m) from control panel	
	Up to 10,000 ft (3048 m) total wiring distance (including T-Taps)	
	Compatible with Simplex 2081-9044 Overvoltage Protectors	
Dimensions	4 1/8" H x 4 1/8" W x 1 3/8" D (105 mm x 105 mm x 35 mm)	
Housing Material	Black thermoplastic	
Mounting Plate	Sheet metal, galvanized	
Temperature Range	32° to 120° F (0° to 49° C), intended for indoor operation	
Humidity Range	Up to 93% RH at 100° F (38° C)	
Installation Instructions	574-184	

Relay IAM Mounting Information



Mounting Reference, Double Gang Blank Cover Plate



Optional Trim Plates for Visible LED

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UL, CSFM Listed;
MEA (NYC) Acceptance*

Fire Alarm Control Relays, Track Mount and Encapsulated; Model 4098-9843 and 2088 Series

Features

UL listed under Standard 864 as Control Unit Accessory (UOXX)

Track mount package availability:

- Single relay module or four relay module, with or without cover, with SPDT or DPDT contacts
- LED indicates relay module status
- Cover provide status LED viewing ports
- Multiple coil voltage inputs, diode polarized for DC
- Modules are track mounted with snap-apart feature design allowing the four relay module to be separated

Single encapsulated SPDT relay package with color coded 18 AWG wire leads, available in two versions:

- 2088-9021 (PAM-1) Provides diode polarized multiple input voltage ability and LED indication
- 4098-9843 (PAM-SD) Provides a diode polarized 24 VDC coil with in/out wiring

Description

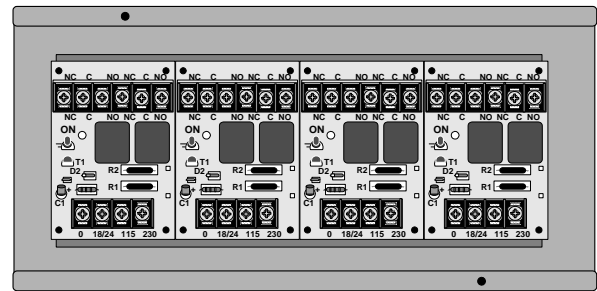
These multi-purpose control relays offer SPDT or DPDT, 10 A (or 7 A) contacts in a variety of mechanical packages. Models are available for coil operation by one of four input voltages allowing a single relay to be energized from a voltage source of 18-35 VDC or VAC, 120 VAC, or 230 VAC (not available with 4098-9843). Voltage selection is made by wiring to the appropriate input terminals or wire leads.

Each relay model (except model 4098-9843) contains a red LED which indicates that the relay is energized.

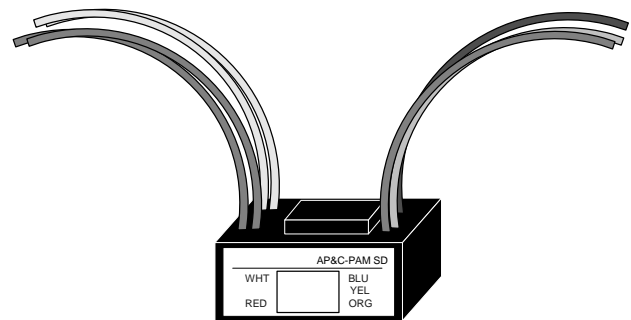
Mounting options are varied for application flexibility. Track mounted relays may be “snapped apart” from a standard four-module assembly and used independently if desired.

Specifications

Track Mount Relays , see page 2 for dimensions	
Coil Voltage	18-35 VAC/VDC, 120, or 230 VAC
Coil Current	SPDT models = 18 mA DPDT models = 40 mA
Terminal Blocks	Up to 14 AWG (2.08 mm ²)
Contact Ratings	10 A @ 120 VAC
	N.O. rated 1/6 HP, N.C. rated 1/8 HP
	7A @ 28 VDC and @ 230 VAC
Temperature Ratings	
UL Listed Range	32° F to 120° F (0° C to 49° C)
Humidity	85% RH Non-condensing



2088-9020, MR204/C, Four DPDT Relay Package with Enclosure (shown with cover removed)



Encapsulated Relay Package (typical of 2088-9021, PAM-1 and 4098-9843, PAM-SD)

Specifications Continued

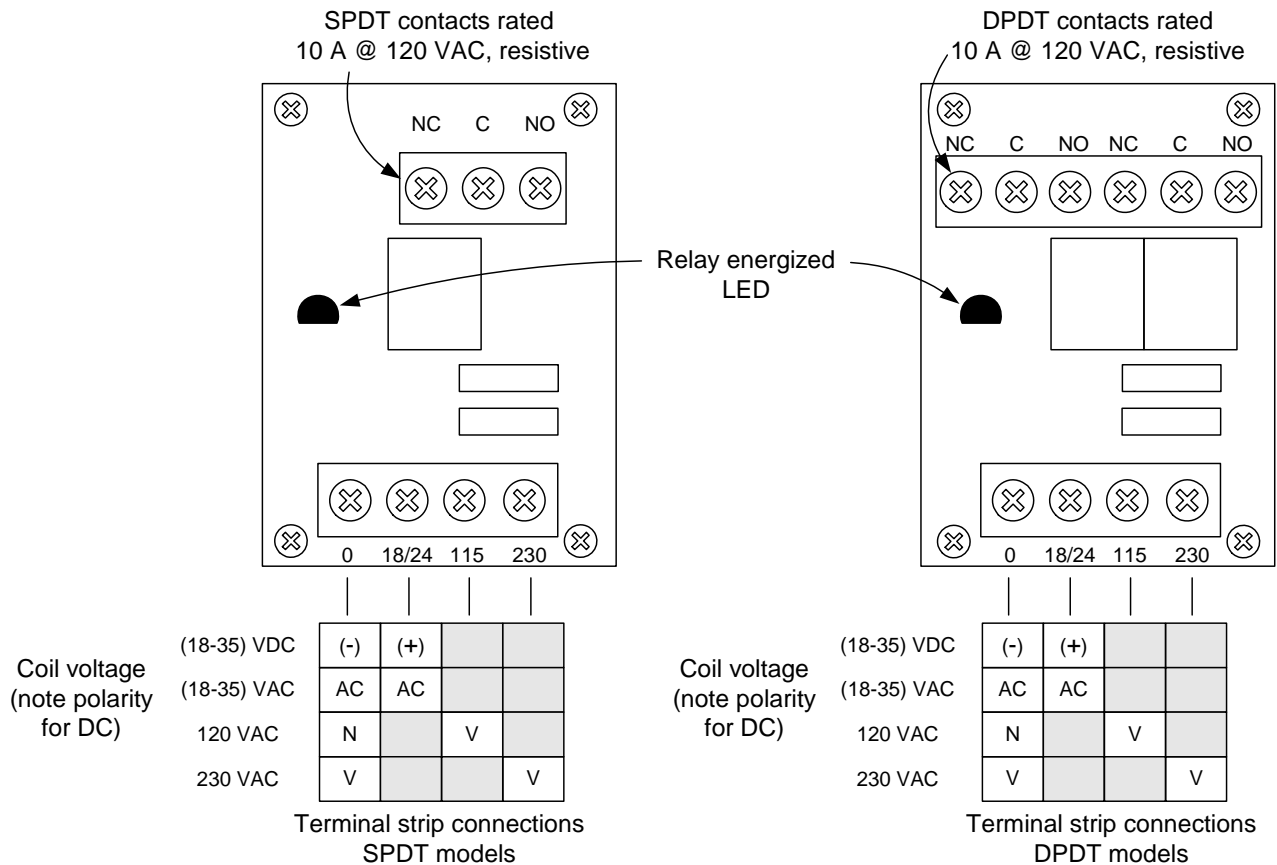
Encapsulated Relays , see page 2 for dimensions		
Connections	18 AWG (0.82 mm ²) color-coded wire leads	
Relay 2088-9021		
Contact Ratings	10 A @ 120 VAC, resistive	
Coil Ratings	Voltage	18-35 VAC/VDC, 120, or 240 VAC
	Current	15 mA @ 24 VAC/VDC, & @ 120 or 230 VAC
Relay 4098-9843		
Coil Ratings	18-32 VDC input, polarized, 15 mA @ 24 VDC	
Contact Ratings	7 A at 0.35 p.f @ 28 VDC & 120 VAC	
	250 µA @ 5 VDC	
Temperature Ratings		
UL Listed Range	32° F to 120° F (0° C to 49° C)	
Humidity	100% RH, condensing	

* Listings are under Apollo America Inc. per model numbers shown on page 2. See CSFM Listing 7300-1004:0101 for allowable values and/or conditions concerning material presented in this document.

Relay Selection Chart

Module Positions	Reference Number	Model Number	Relay Type	Packaging	Dimensions
One →	2088-9007	MR-101/T	SPDT	Track mount, without cover	3-1/4" H x 2-1/8" W x 1-1/2" D (83 mm x 54 mm x 38 mm)
	2088-9009	MR-201/T	DPDT		
	2088-9008	MR-101/C	SPDT	Track mount with cover	5-1/8" H x 3-1/8" W x 2-1/2" D (131 mm x 79 mm x 64 mm)
	2088-9010	MR-201/C	DPDT		
Four	2088-9017	MR-104/T	SPDT	Track mount, without cover	3-1/4" H x 8-1/2" W x 1-1/2" D (83 mm x 216 mm x 38 mm)
	2088-9019	MR-204/T	DPDT		
	2088-9018	MR-104/C	SPDT	Track mount with cover	5-1/8" H x 9-1/2" W x 2-1/2" D (131 mm x 241 mm x 64 mm)
	2088-9020	MR-204/C	DPDT		
NA	2088-9021	PAM-1	SPDT	Encapsulated, multi-voltage coil, color coded 18 AWG (0.82 mm ²) wire leads, with coil status LED	1-1/2" H x 1" W x 7/8" D (38 mm x 25.4 mm x 22 mm)
	4098-9843	PAM-SD		Encapsulated, 24 VDC coil, color coded 18 AWG (0.82 mm ²) wire leads (no LED)	1-1/2" H x 1-3/16" W x 13/16" D (38 mm x 30 mm x 21 mm)

Track Mount Relay Wiring Reference



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Features

Individually addressed and controlled multi-candela TrueAlert ES V/O (visible only) notification appliances provide:

- Multi-candela xenon strobe with synchronized 1 Hz flash rate and with intensity **programmable from the control panel** or jumper selected as 15, 30, 75, 110, 135, or 185 cd
- Advanced addressable notification controlled by **IDNAC SLCs** providing **regulated 29 VDC** allowing strobes to operate with lower current even under battery backup
- Wiring supervision to each appliance allowing "T-tapped" connections for Class B circuits to simplify wiring (Class A circuits require in/out wiring)
- **Self-Test Mode** allows an on-board sensor to detect the strobe output and then report its status to the control panel
- **TrueAlert Device Reports** at the control panel detailing appliance point ID, custom label, type, and candela setting
- **Magnet Test diagnostics** to assist checkout and testing of appliances and wiring and **Electrical test point access** without removing cover
- Compatibility with ADA requirements; (refer to [Installation Reference](#))
- Compatibility with legacy TrueAlert addressable systems for upgrade and replacement (see [TrueAlert ES Strobe LEGACY Compatibility Reference](#))
- Listed to UL Standard 1971 and ULC Standard S526

LED Indicator and Magnet Test feature:

- Appliance LED can be selected to display each polling cycle to indicate appliance supervision
- When the controller is in diagnostic mode, the Magnet Test pulses the LED to indicate appliance address and can be set to also briefly flash the strobe

Mechanical design features include:

- Rugged, high impact, flame retardant thermoplastic housing in red with white letters or white with red letters, with clear lens, available with FIRE, ALERT, FEU, FEU/FIRE, or blank lettering
- Separate covers are available to change appliance type on-site or for replacement; covers can be easily removed without disturbing the connected housing and avoiding trouble conditions
- A separate mounting plate allows wiring to be completed before appliance is mounted; use with single gang, double gang, or 4-inch square box, flush or surface mount
- In/out wiring terminals for 18 AWG to 12 AWG
- Optional mounting adapters are available to cover surface mounted electrical boxes and to adapt to Simplex, 2975-9145 boxes
- Optional red wire guards (see [Product Selection](#))

Description

TrueAlert ES addressable strobes

TrueAlert ES addressable strobes are individually addressed visible notification appliances that receive power, supervision, and control signals from the Simplex fire alarm control panel providing **IDNAC** Signaling Line Circuits (SLCs). (See [IDNAC SLC Controller Compatibility Reference](#).)

Strobe Application Reference

Proper selection of visible notification is dependent on occupancy, location, local codes, and proper applications of: the **National Fire Alarm Code** (NFPA 72), ANSI A117.1; the appropriate model building code:

BOCA, ICBO, or SBCCI; and the application guidelines of the Americans with Disabilities Act (ADA).



Figure 1: TrueAlert ES Addressable Strobes are Available in Red with White Lettering and White with Red Lettering

TrueAlert ES Operation Advantage

TrueAlert ES addressable appliances on IDNAC SLCs provide separate visible (and audible) notification using a single two-wire circuit that also **confirms connection to the individual notification appliance's electronic circuit**. This operation increases circuit supervision integrity by providing supervision that extends beyond the appliance wiring connections.

Reduced current allows efficient IDNAC SLC operation. With **IDNAC SLCs**, a **constant 29 VDC** source voltage is maintained, even during battery standby, allowing strobes to operate at higher voltage with lower current and ensuring a consistent current draw and voltage drop margin under both primary power and secondary battery standby. Efficiencies include wiring distances up to 2 to 3 times farther than with conventional notification, or support for more appliances per IDNAC SLC, or use of smaller gauge wiring, or combinations of these benefits, all providing installation and maintenance savings with high assurance that appliances that operate during normal system testing will operate during worst case alarm conditions.

Reducing Installation and Testing Time. With separate controls on the same two-wire SLC, installation time and expense for both retrofit and new construction can be significantly reduced. When Class B wiring is used, **wiring can be "T" tapped**, allowing more savings in distance, wire, conduit (size and utilization), and overall installation efficiency. Use of Self-Test and Magnet Test features improves installation efficiency. TrueAlert device reports conveniently identify information about each connected appliance.

* These products have been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7125-0026:0373 for allowable values and/or conditions concerning material presented in this document. Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

TrueAlert ES Diagnostics

Test Features. When IDNAC SLCs are in diagnostic mode, *Self-Test* and *Magnet Test* features provide individual appliance testing. With the *Self-Test* feature, *appliance operation can be confirmed without leaving the control panel*. Additionally, each appliance's LED can be selected to pulse when it receives a supervision poll during normal operation.

Self-Test Details. Selecting Self-Test Mode from the control panel allows on-board sensors, depending on the device type, to detect its own strobe and/or horn output and then report their status to the control panel. Operation is by selected VNAC appliance groups and is either automatic (all briefly simultaneously activated) or individually activated by applying a magnet (Refer to control panel data sheet for more Self-Test information, see [IDNAC SLC Controller Compatibility Reference](#)).

Silent Appliance Magnet Test. In this test mode, in response to application of a magnet, the appliance LED pulses sequentially to conveniently indicate the appliance's address.

Operational Appliance Magnet Test. In this test mode, after the address is indicated by pulsing the appliance LED, the strobe will briefly flash to indicate proper operation.

TrueStart Instrument Two (TSIT). The 2nd generation of the Simplex TrueStart Test Instrument adds testing of IDNAC SLC wiring and TrueAlert ES appliances to its ability to test IDCs, NACs, and IDNet communications *before connection to the control panel*. Please contact your local Simplex representative for additional information.

TrueAlert Addressable Wiring Isolator

Isolator Model 4905-9929 is available for remote mounting on TrueAlert addressable circuits to isolate short circuited wiring from functioning wiring. (See data sheet [S4905-0001](#) .)

Installation Reference

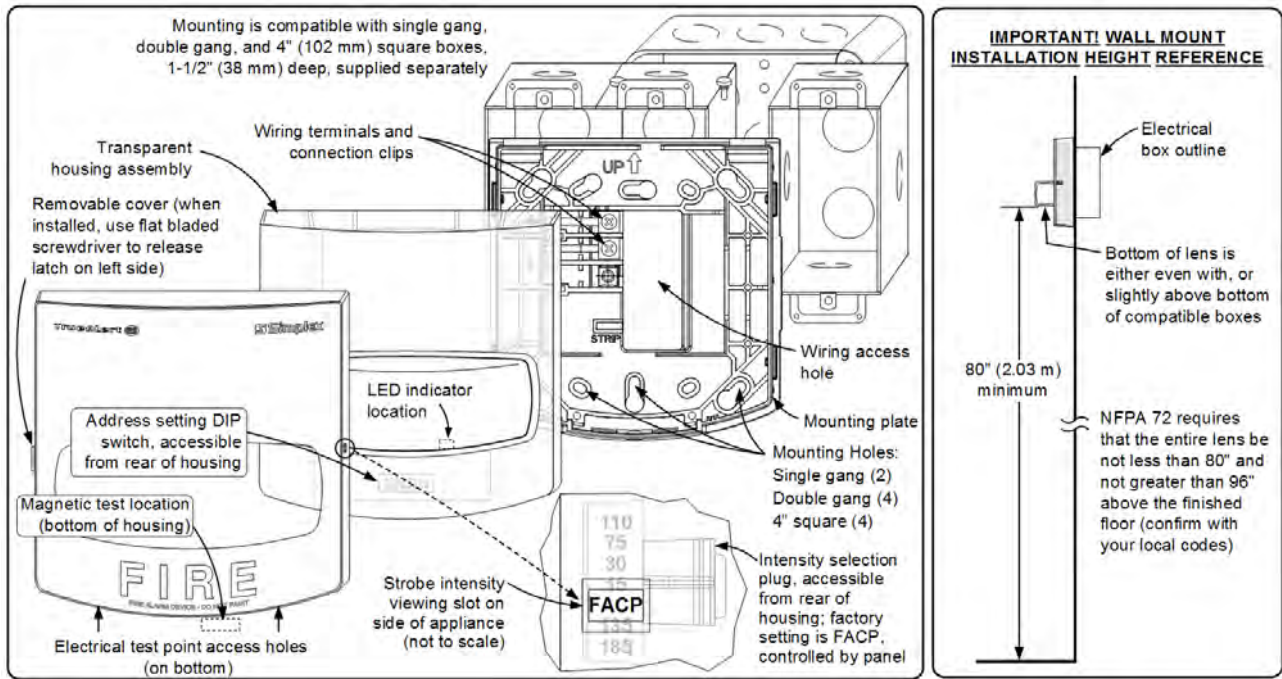


Figure 2: Installation Reference

Adapter Plate and Surface Mount Installation Reference

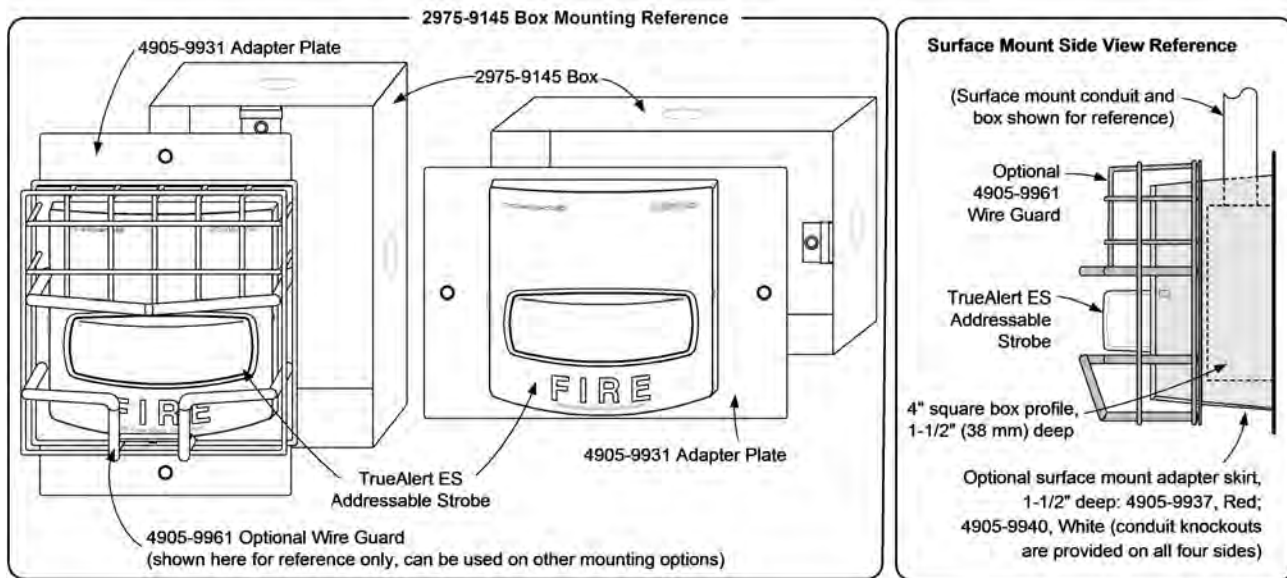


Figure 3: Adapter Plate and Surface Mount Installation Reference

The 2975-9145 box is shown mounted to the 4905-9931 Adapter Plates. Also shown is the optional surface mount adapter skirt (available in red 4905-9937 or white 4905-9940), as well as the 4905-9961 optional wire guard.

Product Selection
Table 1: TrueAlert ES Wall Mount Addressable Strobes

SKU*	Cover Color	Wording	Lens Color
49VO-WRF	Red	FIRE	Clear
49VO-WRF-BA			
49VO-WWF	White		
49VO-WWF-BA			
49VO-WRA	Red	ALERT	
49VO-WRA-BA			
49VO-WWA	White		
49VO-WWA-BA			
49VO-WRQ	Red	FEU	
49VO-WWQ	White		
49VO-WRS	Red	Simplex logo only	
49VO-WRS-BA			
49VO-WWS	White		
49VO-WWS-BA			
→ 49VO-APPLW	Select cover and mounting plate separately		
49VO-APPLW-BA			

TrueAlert ES addressable VO (strobe) appliances include cover and matching mounting plate except as noted; Dimensions with Cover = 5 1/8" H x 5" W x 2 5/8" D (130 mm x 127 mm x 67 mm)

Table 2: Separate Mounting Plate

Model	Color	Note
49MP-AVOWR	Red	Mounting Plate is required when ordering model 49VO-APPLW(-BA)
→ 49MP-AVOWW	White	

Table 3: Separate Covers (Required when ordering model 49VO-APPLW(-BA))

SKU*	Color	Wording
49VOC-WRFIRE	Red	FIRE
→ 49VOC-WWFIRE	White	
49VOC-WRALT	Red	ALERT
49VOC-WWALT	White	
49VOC-WRFEU	Red	FEU
49VOC-WWFEU	White	
49VOC-WRBLNG	Red	FEU/FIRE
49VOC-WWBLNG	White	
49VOC-WRS	Red	Simplex logo only
49VOC-WWS	White	

Table 4: Mounting Adapters and Wire Guard

Model	Color	Description	Dimensions
4905-9937	Red	Surface Mount Adapter Skirt	5 3/8" H x 5 1/4" W x 1 5/8" D (136 mm x 133 mm x 41 mm)
4905-9940	White		Total depth with strobe = 4 3/8" (111 mm)
4905-9931	Red Adapter Plate for mounting to Simplex, 2975-9145 Box (typically for retrofit, mount vertical or horizontal)		8 5/16" x 5 3/4" x 0.060" Thick (211 mm x 146 mm x 1.5 mm)
2975-9145	Red Mounting Box, requires 4905-9931 Adapter Plate		7 7/8" x 5 1/8" x 2 3/4" D (200 mm x 130 mm x 70 mm)
4905-9961	Red wire guard with mounting plate, compatible with semi-flush or surface mount boxes		6 1/16" H x 6 1/16" W x 3 1/8" D (154 mm x 154 mm x 79 mm)

IDNAC SLC Controller Compatibility Reference

Compatible Controllers	Data Sheet Reference	Controller Output	IDNAC SLC Output Voltage	Appliance Voltage Design Reference
4100ES with EPS+ or EPS Power Supply	S4100-0100	IDNAC SLC	29 VDC (regulated)	23 VDC (with 6 VDC drop)
4009 IDNAC Repeater	S4009-0004			
4007ES with IDNAC Notification	S4007-0002			
4010ES with ESS Enhanced System Supply	S4010-0011			

TrueAlert ES Strobe Specifications

Table 5: Electrical Ratings

Specification	Rating
Typical Operating Voltage Range	23 VDC to 31 VDC, Special Application (see below for 17 VDC rating)
Supervisory Requirements	1 unit load (= 0.8 mA control panel current)
IDNAC SLC Loading	Maximum of 127 addresses per SLC, 139 unit loads

Table 6: Candela Setting

Candela	15 cd	30 cd	75 cd	110 cd	135 cd	185 cd
23 VDC RMS Current Ratings, for typical design of IDNAC Addressable SLCs (6 VDC drop)	47 mA	57 mA	100 mA	132 mA	160 mA	208 mA

Table 7: General Specifications

Temperature Range	32° to 122° F (0° to 50° C)
Humidity Range	10% to 93%, non-condensing @ 104° F (40° C)
IDNAC SLC Wiring Specifications (refer to control panel installation instructions for more information)	UTP, unshielded twisted pair recommended
	Maximum wire length allowed with "T-Taps" for Class B wiring per SLC = 10,000 ft (3048 m)
	Maximum wire length to any appliance = 4000 ft (1219 m)
Connections	Terminal blocks on mounting plate for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²); two wires per terminal for in/out wiring
Installation Instructions	579-1031
Note: Refer to compatibility table above for fire alarm control panel and power supply operation type.	

TrueAlert ES Strobe LEGACY Compatibility Reference

Table 8: Compatibility Reference

Compatible Controller	Data Sheet Reference	Controller Output	Available Strobe Intensity	Appliance Voltage Minimum
4100ES or 4100U with TrueAlert Power Supply	<i>S4100-0031</i>	TrueAlert Addressable SLC	15, 30, 75, and 110 cd	17 VDC
4009 TPS, Remote TrueAlert Power Supply	<i>S4100-0037</i>			
TrueAlert Addressable Controller (4009T)	<i>S4009-0003</i>			

Table 9: Electrical Ratings Reference for Retrofit Applications

Voltage Range	17 VDC to 31 VDC, Special Application			
Candela Setting	15 cd	30 cd	75 cd	110 cd
17 VDC RMS Current Ratings, use when connected to TrueAlert Addressable SLCs per above	62 mA	75 mA	133 mA	178 mA

Description

Ceiling mount addressable visible (V/O) notification appliances

are individually powered, addressed, and controlled from a Simplex fire alarm control unit (FACU) IDNAC Signaling Line Circuit (SLC). V/O notification appliances use a multi-candela strobe with synchronized 1 Hz flash rate and selectable candela rating. Xenon tube strobes devices are interoperable on the same IDNAC channel. Separate appliance and cover selection greatly simplifies the ordering and installation process.

Features

Individually addressed visible only (V/O) notification appliances

- Multi-candela Xenon strobe available in low: 15 cd, 30 cd, 75 cd, and 110 cd; and high: 110 cd, 135 cd, and 185 cd range candela models
- Small compact design and low current draw due to energy efficient Xenon tube strobes, with LED indicators
- Advanced addressable notification controlled by IDNAC SLCs.
- IDNAC SLCs provide regulated 29 VDC allowing horns to operate with lower current
- Electrical test point access by removing the cover
- Strobe intensity can be programmed from the FACU or the device
- Wiring supervision to each appliance allows T-tapped connections for Class B circuits to simplify wiring. Class A circuits require in/out wiring
- Self-Test Mode allows on-board sensors to detect the strobe output and then report their status to the FACU
- TrueAlert Device Reports at the FACU detail appliance point ID, custom label, type, and candela setting
- Magnet test diagnostics assist checkout and testing of appliances and wiring
- Compatibility with ADA requirements
- Strobe operation is listed to UL Standard 1971 and ULC Standard S526
- Synchronized strobe operation on its IDNAC channel

LED indicator and magnet test feature:

- Indicator LED indicates magnet test acknowledgment, 3 digit IDNAC address, and candela rating
- Indicator LED can be configured to blink every polling cycle to indicate appliance supervision
- When the controller is in diagnostic mode, the magnet test pulses the Indicator LED to indicate appliance address and can be set to also briefly flash the strobe LEDs

Mechanical design features

- Rugged, high impact, flame retardant thermoplastic housing in red and white colors
- Various covers and lettering options available – Red with white letters or white with red letters
- Covers can be easily removed without disturbing the connected housing and avoiding trouble conditions
- In/out wiring terminals for 18 AWG to 12 AWG
- Mounts on 4 in. square or single gang USA electrical boxes. Adapter plate required for mounting on single gang electrical boxes
- Optional wire guards
- Weatherproof back boxes are required for surface mounting



Figure 1: Indoor ceiling mount strobe

Strobe application reference

Proper selection of visible notification is dependent on occupancy, location, local codes, and proper applications of: the National Fire Alarm and Signaling Code (NFPA 72), ANSI A117.1; the appropriate model building code: BOCA, ICBO, or SBCCI; and the application guidelines of the Americans with Disabilities Act (ADA).

TrueAlert addressable wiring isolator

Isolator model 4905-9929

Isolator model 4905-9929 is available for remote mounting on TrueAlert addressable circuits to isolate short circuited wiring from functioning wiring. Refer to data sheet *TrueAlert Addressable Isolator+ Module, Model 4905-9929 S4905-0001* for additional information.

TrueAlert ES diagnostics

Test features

Controllers can be selected to pulse each appliance's LED when it receives a supervision poll. When the controller is selected for diagnostic mode, the appliance magnet test feature provides a response at the individual appliance being tested.

Silent appliance magnet test

The appliance LED pulses sequentially to conveniently indicate the appliance's address when a magnet is applied.

Operational appliance magnet test

In this test mode, after the address is indicated by pulsing the appliance LED, the strobe will briefly flash to indicate proper operation.

TrueStart instrument two (TSIT)

The 2nd generation of the Simplex TrueStart Test Instrument adds testing of IDNAC SLC wiring and TrueAlert ES appliances to its ability to test IDCs, NACs, and IDNet communications before connection to the FACU. Contact your local Simplex representative for additional information.

Installation reference

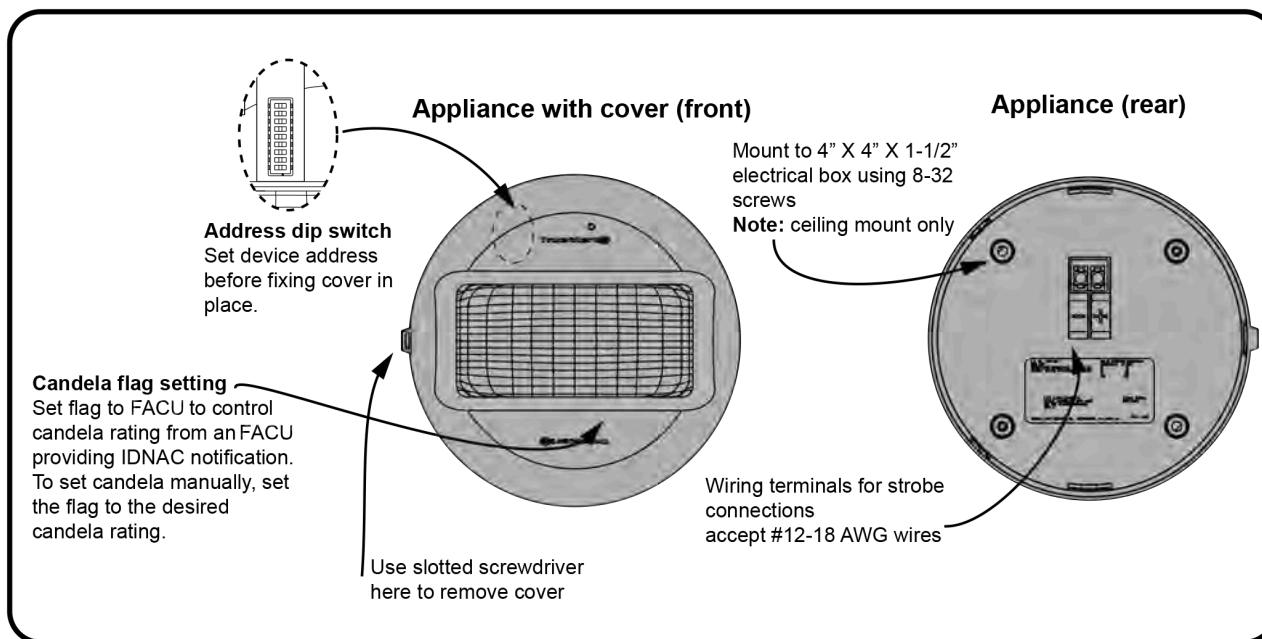


Figure 2: Indoor Ceiling Mount Strobe installation

IDNAC SLC operation advantage

TrueAlert Addressable visible appliances on IDNAC SLCs

TrueAlert Addressable visible appliances on IDNAC SLCs provide visible notification using one two-wire circuit that also confirms connection to the individual notification appliance's electronic circuit. This operation increases circuit supervision integrity by providing supervision that extends beyond the appliance wiring connections.

Reduced current usage on IDNAC SLCs

A constant 29 VDC source voltage is maintained, even during battery standby. This allows appliances to operate at higher voltage with lower current and ensuring a consistent current draw and voltage drop margin under both primary power and secondary battery standby. Efficiencies include wiring distances up to 2 to 3 times farther than with conventional notification, support for more appliances per IDNAC SLC, use of smaller gauge wiring, or combinations of these benefits.

Reducing Installation and Testing Time

With separate controls on the same two-wire SLC, installation time and expense for both retrofit and new construction can be significantly reduced. When Class B wiring is used, wiring can be T-tapped, allowing more savings in distance, wire, conduit size and utilization, and overall installation efficiency. Use of the magnet test feature improves installation efficiency. TrueAlert device reports conveniently identify information about each connected appliance.

Product selection

Table 1: Ceiling mount addressable visual only V/O appliances

Model*	Lens color	Description	Installation Instructions
49VO-APPLC	Clear	VO appliance only. Select cover separately.	579-1227
49VO-APPLC-BA			
49VOH-APPLC			
49VOH-APPLC-BA	Amber		579-1280
49VOH-APPLCA-BA			
49VOH-APPLCB-BA			
49VOH-APPLCG			
49VOH-APPLCR	Red		

Table 2: Surface/WP back boxes

Model	Color	Description	Installation instructions
49WPBB-VOCR	Red	Surface/WP back box in red	579-1270
49WPBB-VOCW	White	Surface/WP back box in white	

Note: Use WP back boxes for surface mounting only. Using weatherproof back boxes does not make an appliance weatherproof.

Table 3: Adapter plates

Model	Description	Installation Instructions
49VO-APCS	VO Ceiling Mount Adapter Plate. Required for mounting on a single gang electrical box.	579-1227

Table 4: V/O covers (required when ordering APPLC models)

Model*	Color	Wording
49VOC-CRALT	Red	ALERT
49VOC-CRBF		FEU/FIRE
49VOC-CRFEU		FEU
49VOC-CRFBL		FUEGO/FOGO
49VOC-CRF		FIRE
49VOC-CRS		Simplex logo only
49VOC-CRBAA		إنذار/ALERT
49VOC-CRBCF		火警/FIRE
49VOC-CRBAF		حريق/FIRE
49VOC-CK		Black
49VOC-CWALT	White	ALERT
49VOC-CWBF		FEU/FIRE
49VOC-CWFEU		FEU
→ 49VOC-CWF		FIRE
49VOC-CWS		Simplex logo only
49VOC-CWBAA		إنذار/ALERT
49VOC-CWBCF		火警/FIRE
49VOC-CWBAF		حريق/FIRE

Table 5: Wire guards

Model	Description
49WG-VOCR	VO Ceiling Mount Red Wire Guard
49WGBB-VOCR	VO Ceiling Mount Wire Guard Back Box

Note: * (-BA) indicates model is available either with or without the -BA suffix. Model numbers ending in -BA are assembled in the USA

IDNAC SLC controller compatibility reference

Table 6: Compatibility reference

Compatible Controllers	Data Sheet Reference	Controller Output	IDNAC SLC Output Voltage	Appliance Voltage Design Reference
4100ES with EPS+ or EPS Power Supply	S4100-0100	IDNAC SLC	29 VDC (regulated)	23 VDC (with 6 VDC drop)
4009 IDNAC Repeater	S4009-0004			
4100ES Flex 35, 50, and 100 Amplifiers	S4100-0034			
4100ES Constant Supervision and Signal Cards				

Note: See [TrueAlert ES V/O LEGACY compatibility reference](#) for 17 VDC ratings

Ceiling mount V/O specifications

Table 7: Specifications

Specification	Rating
Environmental	32°F to 120°F (0°C to 49°C); 10% to 93%, non-condensing at 104°F (40°C)
Connections	Terminal blocks for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²); two wires per terminal for in/out wiring. Use Unshielded Twisted Pair (UTP) for IDNAC.
IDNAC SLC Loading	Maximum of 127 addresses per SLC, 139 unit loads. See device and compatible FACU Installation Instructions for circuit current load limits.

Table 8: Percentage of rated light output at room temperature

Angle	On-Axis	Vertical, Below Axis			Horizontal, Left/Right of Axis	
	0°	45°	90°	45°	90°	
UL required output	100%	45%	25%	45%	25%	
Typical output	327%	134%	83%	129%	47%	

Table 9: Appliance specifications

Specification		Rating						
Operating Voltage Range		23 VDC to 30 VDC, Special Application						
Supervisory Requirements		1 unit load (= 0.8 mA FACU current)						
Flash Rate and Synchronized SLC Loading		1 Hz; with up to 63 synchronized strobes maximum per powered circuit, max 127 S/V appliances per IDNAC channel						
Current consumption, see note	Candela Setting	15 cd	30 cd	75 cd	90/95 cd	110 cd	135 cd	185 cd
	49VO model	55 mA	83 mA	153 mA	N/A	199 mA	N/A	N/A
	49VOH model	N/A	N/A	N/A	N/A	253 mA	296 mA	377 mA
	49VOH amber lens	N/A	N/A	N/A	253 mA (90 cd)	296 mA	377 mA	N/A
	49VOH blue lens	N/A	N/A	253 mA	296 mA (95 cd)	377 mA	N/A	N/A

Note: Measured at 23 VDC on IDNAC Addressable SLC

TrueAlert ES V/O LEGACY compatibility reference
Table 10: Compatibility reference

Compatible Controller	Data Sheet Reference	Controller Output	Available Strobe Intensity	Appliance Voltage Minimum
4100ES or 4100U with TrueAlert Power Supply	S4100-0031	TrueAlert Addressable SLC	15 cd, 30 cd, 75 cd, and 110 cd	17 VDC
4009 TPS, Remote TrueAlert 17 VDC Power Supply, see note.	S4100-0037			
TrueAlert Addressable Controller (4009T)	S4009-0003			
Electrical ratings differences for legacy applications, see IDNAC SLC controller compatibility reference for 29 VDC ratings				
Voltage Range		17 VDC to 31 VDC, Special Application		
Candela Setting	15 cd	30 cd	75 cd	110 cd
17 VDC RMS Current Ratings , with horn on continuous at high setting, use when connected to TrueAlertAddressable SLCs per above	73 mA	114 mA	210 mA	269 mA

Note: * For connection to legacy fire panel models Simplex 4009T and 4100/TPS. High candela (49VOH) appliances are not compatible with Simplex models 4009T and TPS, see the fire panel compatibility charts.

Features



Figure 1: Weatherproof A/V (top) and Strobe (bottom), side view of A/V on Weatherproof Mounting Boxes (right)

TrueAlert ES weatherproof addressable appliances provide visible and audible/visible notification for indoor and outdoor, extended temperature and extended humidity applications. They are individually addressed and receive power, supervision, and control signals from a Simplex fire alarm control unit providing IDNAC Signaling Line Circuits (SLCs).

Individually addressed and controlled multi-candela TrueAlert ES weatherproof notification appliances for extended temperature and humidity range provide:

- Multi-candela xenon strobe with synchronized 1 Hz flash rate and with intensity programmable from the control unit or jumper selected as 15, 75, WP 75, or WP 185 cd
- Advanced addressable notification controlled by IDNAC SLCs providing regulated 29 VDC allowing strobes to operate with lower current even under battery backup
- Wiring supervision to each appliance allowing "T-tapped" connections for Class B circuits to simplify wiring (Class A circuits require in/out wiring)
- Self-Test Mode allows on-board sensors to detect the strobe and horn output and then report their status to the control unit
- TrueAlert Device Reports at the control unit detailing appliance point ID, custom label, type, and candela setting
- Magnet Test diagnostics to assist checkout and testing of appliances and wiring
- Electrical test point access without removing cover

LED Indicator and Magnet Test:

- Appliance LED can be selected to display each polling cycle to indicate appliance supervision
- When the controller is in diagnostic mode, the Magnet Test pulses the LED to indicate appliance address and can be set to also briefly flash the strobe and sound the A/V horn

Mechanical design:

- Rugged, high impact, flame retardant thermoplastic housing in red with white letters or white with red letters, with clear lens
- Standard models are available with FIRE lettering or blank; configured models are available with additional lettering of FEU, FEU/FIRE, ALERT,

and blank

- Mounting matches weatherproof boxes (required), ordered separately
- Separate covers are available to change application type on-site or for replacement
- In/out wiring terminals for 18 AWG to 12 AWG
- Enclosure is rated NEMA 3R
- Convenient wiring terminal access at front of housing

Agency listings:

- UL 1638 listed for outdoor applications with strobe rated at 75 cd (WP75) or 185 cd (WP185)
- UL 1971 listed for indoor applications with strobe intensity selectable as 15 or 75 cd; indoor applications are compatible with ADA requirements
- Horn operation is listed to UL Standard 464
- Refer to data sheet *S49WP-0002* for ULC listed models

For A/V Models with horn:

- Harmonically rich output sound for either coded or steady operation
- Horns sound as Temporal Code 3, March Time pattern, continuous; or Temporal Code 4, controlled separately from visible appliances on the same two-wire circuit
- Selectable March Time rates of 20, 60, or 120 beats per minute
- Output is "high" or "low" (~5 dBA difference) selectable at the appliance or from the controller with FACU mode selected at the appliance

Strobe Application Reference

Proper selection of visible notification is dependent on occupancy, location, local codes, and proper applications of: the National Fire Alarm Code (NFPA 72), ANSI A117.1; the appropriate model building code: BOCA, ICBO, or SBCCI; and the application guidelines of the Americans with Disabilities Act (ADA).

TrueAlert ES Operation

Separate visible and audible notification

TrueAlert ES addressable appliances on IDNAC SLCs provide separate visible and audible notification using a single two-wire circuit that also confirms connection to the individual notification appliance's electronic circuit. This operation increases circuit supervision integrity by providing supervision that extends beyond the appliance wiring connections.

Reduced current allows efficient IDNAC SLC operation

With IDNAC SLCs, a constant 29 VDC source voltage is maintained, even during battery standby, allowing strobes to operate at higher voltage with lower current and ensuring a consistent current draw and voltage drop margin under both primary power and secondary battery standby. Efficiencies include wiring distances up to 2 to 3 times farther than with conventional notification, or support for more appliances per IDNAC SLC, or use of smaller gauge wiring, or combinations of these benefits, all providing installation and maintenance savings with high assurance that appliances that operate during normal system testing will operate during worst case alarm conditions.

Reduced Installation and Testing Time.

With separate controls on the same two-wire SLC, installation time and expense for both retrofit and new construction can be significantly reduced. When Class B wiring is used, wiring can be "T" tapped, allowing more savings in distance, wire, conduit (size and utilization), and overall installation efficiency. Use of Self-Test and Magnet Test features improves installation efficiency. TrueAlert device reports conveniently identify information about each connected appliance.

* This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7125-0026:0371 for allowable values and/or conditions concerning material presented in this document. Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

TrueAlert ES Diagnostics

Test Features

When IDNAC SLCs are in diagnostic mode, Self-Test and Magnet Test features provide individual appliance testing. With the Self-Test feature, appliance operation can be confirmed without leaving the control unit. Additionally, each appliance's LED can be selected to pulse when it receives a supervision poll during normal operation.

Self-Test Details

Selecting Self-Test Mode from the control unit allows on-board sensors, depending on the device type, to detect its own strobe and/or horn output and then report their status to the control unit. Operation is by selected VNAC appliance groups and is either automatic (all briefly simultaneously activated) or individually activated by applying a magnet.

Silent Appliance Magnet Test

In this test mode, in response to the application of a magnet, the appliance LED pulses sequentially to conveniently indicate the appliance's address.

Operational Appliance Magnet Test

In this test mode, after the address is indicated by pulsing the appliance LED, the strobe will briefly flash and the A/V horn will briefly sound to indicate proper operation.

TrueStart Instrument Two (TSIT)

The 2nd generation of the Simplex TrueStart Test Instrument adds testing of IDNAC SLC wiring and TrueAlert ES appliances to its ability to test IDCs, NACs, and IDNet communications before connection to the control unit. Please contact your local Simplex representative for additional information.

TrueAlert Addressable Wiring Isolator

Isolator Model 4905-9929 is available for remote mounting on TrueAlert addressable circuits to isolate short circuited wiring from functioning wiring. Refer to data sheet *S4905-0001* for additional information.

Weatherproof Appliance Installation

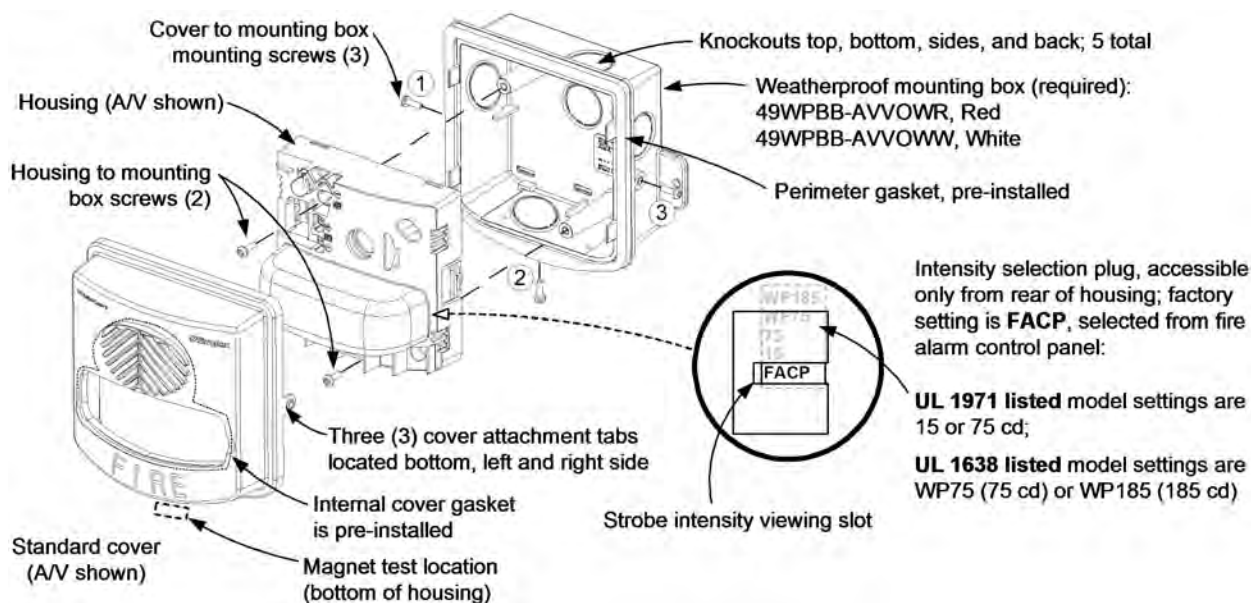


Figure 2: Weatherproof Appliance Installation

Dimension and Mounting Height Reference

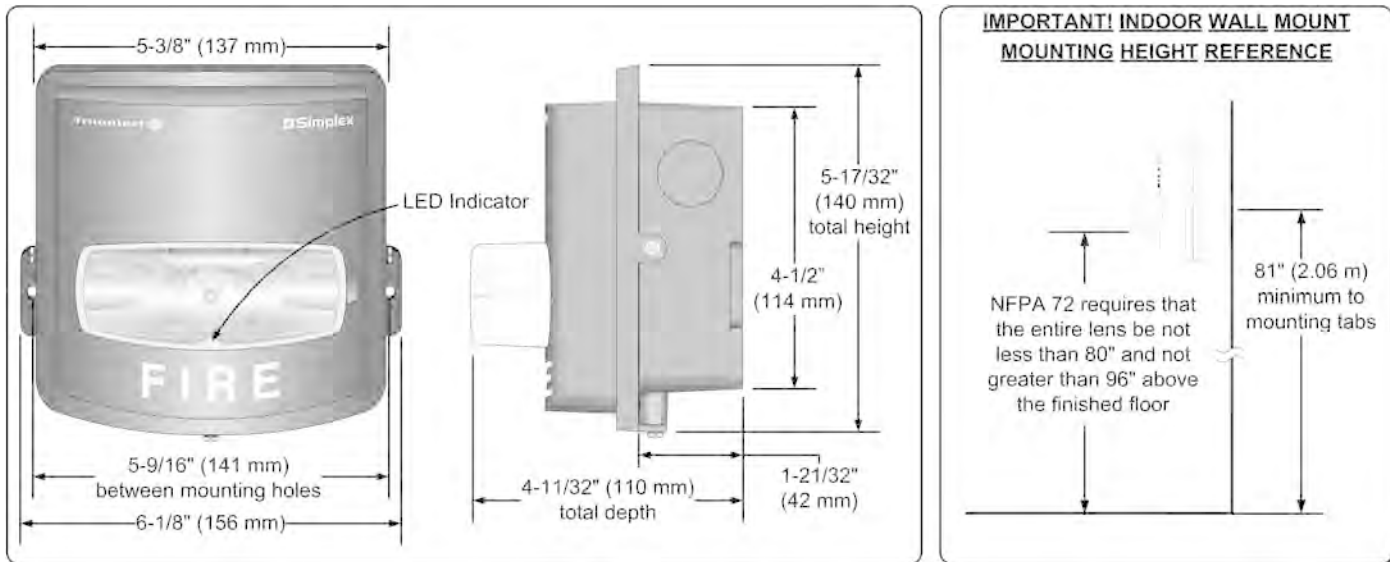


Figure 3: Dimension and Mounting Height

IDNAC SLC Controller Compatibility Reference

Table 1: IDNAC SLC Controller Compatibility Reference

Compatible Controllers	Data Sheet	Controller Output	IDNAC SLC Output Voltage	Appliance Voltage
4100ES with EPS+ or EPS Power Supply	S4100-0100	IDNAC SLC	29 VDC (regulated)	23 VDC (with 6 VDC drop)
4009 IDNAC Repeater	S4009-0004			
4007ES with IDNAC Notification	S4007-0002			
4010ES with ESS Enhanced System Supply	S4010-0011			

Product Selection

Note: Model numbers ending in -BA are assembled in the USA

Table 2: UL Listed TrueAlert ES Addressable Weatherproof Notification Appliances

Type	Model	Cover Color	"FIRE" Lettering	Description	Intensity Ratings	
					UL 1971	UL 1638
Strobe (V/O) A	49VO-WRFO	Red	White	UL listed weatherproof TrueAlert ES addressable appliance; requires weatherproof box, see below Note: (-BA) indicates model is available either with or without the -BA suffix; model numbers ending in -BA are assembled in the USA	15 cd or 75 cd	75 cd (setting WP75) or 185 cd (setting WP185)
	49VO-WRFO-BA		Blank			
	49VO-WRSO	Red	Blank			
	49VO-WRSO-BA					
	49VO-WWFO	White	Red			
	49VO-WWFO-BA					
	49VO-APPLW-O	order cover separately				
49VO-APPLW-O-BA	order cover separately					
Horn/Strobe (A/V)	49AV-WRFO	Red	White			
	49AV-WRFO-BA		White			
	49AV-WWFO	White	Red			
	49AV-WWFO-BA					
	49AV-APPLW-O	order cover separately				
49AV-APPLW-O	order cover separately					

Note: Separate covers are required when ordering 49VO-APPLW-O, 49VO-APPLW-O-BA, 49AV-APPLW-O-BA or 49AV-APPLW-O.

Table 3: Wall Mount Weatherproof Boxes (Required)

Model	Color	Description	Dimensions
49WPBB-AVVOWR	Red	Surface Mount Weatherproof Mounting Box (required)	5 1/2" H x 6 1/8" W x 1 5/8" D (140 mm x 156 mm x 41 mm)
49WPBB-AVVOWW	White		

Table 4: Separate Covers

Wording	Red VO Cover Models	Red AV Cover Models	White VO Cover Models	White AV Cover Models
FIRE	49VOC-WRFIRE-O	49AVC-WRFIRE-O	49VOC-WWFIRE-O	49AVC-WWFIRE-O
ALERT	49VOC-WRALT-O	49AVC-WRALT-O	49VOC-WWALT-O	49AVC-WWALT-O
FEU	49VOC-WRFEU-O	49AVC-WRFEU-O	49VOC-WWFEU-O	49AVC-WWFEU-O
FEU/FIRE	49VOC-WRBLNG-O	49AVC-WRBLNG-O	49VOC-WWBLNG-O	49AVC-WWBLNG-O
Blank	49VOC-WRS-O	49AVC-WRS-O	49VOC-WWS-O	49AVC-WWS-O

Specifications

Table 5: Electrical specifications

Specifications	Rating
Typical Operating Voltage Range	23 VDC to 31 VDC, Special Application
Supervisory Requirements	1 unit load (= 0.8 mA control panel current)
IDNAC SLC Loading	Maximum of 127 addresses per SLC, 139 unit loads
Temperature Range	UL 1971 Listed Rating
	UL 1638 Listed Rating
Humidity Range	UL 1971 Listed Rating
	UL 1638 Listed Rating
IDNAC SLC Wiring Specifications (refer to control panel installation instructions for more information)	UTP, unshielded twisted pair recommended
	Maximum wire length allowed with "T-Taps" for Class B wiring per SLC = 10,000 ft (3048 m)
	Maximum wire length to any appliance = 4000 ft (1219 m)
Connections	Terminal blocks for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²); two wires per terminal for in/out wiring
Installation Instructions	579-1032

Table 6: A/V Horn Output Ratings @ 10 ft (3 m) @ 23 VDC

Sound Type	Steady/High	Steady/Low	Coded/High	Coded/Low
Reverberant Chamber, UL 464 Test	81.3 dB	73.8 dB	76.4 dB	69.9 dB
Anechoic Chamber, ULC 525 Test	87.4 dB	81.0 dB	87.2 dB	80.6 dB

Note: UL 464 test coded values are typical of the output measured with a Temporal or a March Time pattern and with a sound level meter reading on a "fast" setting. Under the same test conditions, coded horn output "peak" sound level readings are typically 4 dBA higher. Anechoic horn output ratings are typically more representative of actual installed sound output.

Table 7: 23 VDC RMS Current Ratings

Model	Rating	Temperature	Candela Setting	Current
V/O Models	UL 1971 Ratings	32 °F to 120 °F (0 °C to 49 °C)	15 cd	60 mA
			75 cd	160 mA
	UL 1638 Ratings	32 °F to 150 °F (0 °C to 66 °C)	WP75 cd	160 mA
			WP185 cd	185 mA
A/V Models, horn on continuous, high setting	UL 1971 Ratings	32 °F to 120 °F (0 °C to 49 °C)	15 cd	80 mA
			75 cd	165 mA
	UL 1638 Ratings	32 °F to 150 °F (0 °C to 66 °C)	WP75 cd	163 mA
			WP185 cd	189 mA
		-31 °F to below 32 °F (-35 °C to 0 °C)	WP75 cd	212 mA
			WP185 cd	239 mA
		-31 °F to below 32 °F (-35 °C to 0 °C)	WP75 cd	238 mA
			WP185 cd	274 mA

Table 8: UL 1638 WP75 and WP185 Light Output Reference

Angle	On-Axis	Vertical, Below Axis		Horizontal, Left/Right of Axis	
	0°	45°	90°	45°	90°
WP75 Minimum Candela Rating (over temp. range)	75 cd	69 cd	17 cd	60 cd	28 cd
WP75 Typical Candela at 77 °F (25 °C)	142 cd	86 cd	22 cd	74 cd	35 cd
WP185 Minimum Candela Rating (over temp. range)	185 cd	90 cd	21 cd	81 cd	40 cd
WP185 Typical Candela at 77 °F (25 °C)	220 cd	112 cd	27 cd	101 cd	50 cd
A/V Sound Dispersion per ULC-S525 Anechoic testing performed at 3 m (10 ft); referenced to on-axis = 0°	Level Decrease	Horizontal Angle		Vertical Angle	
	-3 dB	+50° (to right)		+55° (above axis)	
		-40° (to left)		-70° (below axis)	
	-6 dB	+85° (to right)		+60° (above axis)	
-85° (to left)		-90° (below axis)			

Introduction

Wall mount indoor and outdoor addressable speaker (S/O) notification appliances

Use a Simplex fire alarm control unit (FACU) IDNAC signaling line circuit (SLC) to individually power, address and control wall mount indoor and addressable S/O notification appliances. A separate compatible Simplex FACU audio NAC supplies audio. Electronic monitoring of wiring supervision means you can T-tap audio and IDNAC wiring for Class B wiring, which reduces wiring costs and wiring distances.

Install wall mount indoor and addressable S/O notification appliances on standard 4 inch square 2 1/8 inch deep USA electrical boxes for flush installations, provided by others, or surface or weatherproof (WP) backboxes, see Table 7, for surface or WP installations.

Appliances are available in 400 Hz to 4000 Hz and 200 Hz to 10000 Hz high fidelity models. Separate appliance and cover selection greatly simplifies the ordering and installation process. Model numbers ending in -BA are assembled in the USA.

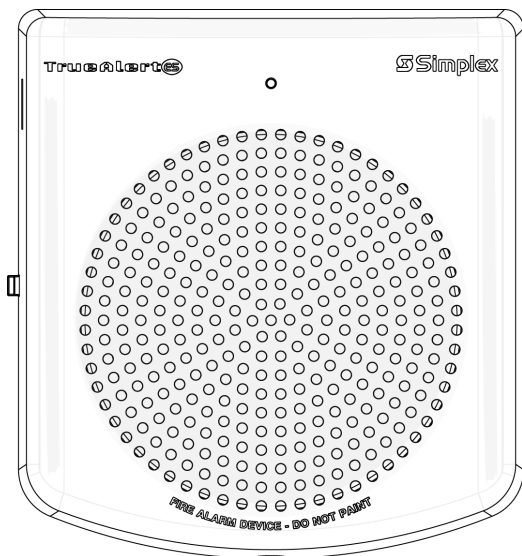


Figure 1: Wall mount addressable speaker notification appliance

Features

General

- Separate appliances, covers, back boxes, and wire guards provide complete flexibility for meeting customers installation requirements
- The TrueAlert device reports provide important appliance information details including point ID, custom label, type, and candela settings
- Rugged, high impact flame retardant thermoplastic housings
- The covers can be easily removed without disturbing the connected housing
- Terminals for wiring sizes 18 AWG to 12 AWG
- The appliance LED can be selected to display during each polling cycle indicating appliance supervision
- Magnet test diagnostics to assist checkout and testing of appliances
- Compatible with the Americans with Disabilities Act (ADA) requirements

IDNAC Signalling Line Circuit (SLC)

- The advanced addressable notification controlled by IDNAC SLCs provides regulated 29 VDC for low current operation even during battery backup conditions
- The wiring supervision is electronically monitored and allows IDNAC SLC wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- The strobe intensity can be selected within programming from the FACU

Audio (speaker)

- The wiring supervision is electronically monitored and allows audio (speaker) wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- High quality voice and tone reproduction with taps for 1/4 W, 1/2 W, 1 W, or 2 W at 25 VRMS or 70.7 VRMS
- The audio (speaker) circuits are wired separately from IDNAC SLCs
- High fidelity models (200 Hz to 10,000 Hz) are also available
- Compliant with NFPA 72, 520 Hz Low frequency signal requirements for sleeping areas
- Listed to UL 1480 and ULC S541*
- UL 1480 Reverberant dBA measurements (10 ft or 3 m)
- ULC S541 Anechoic dBA measurements (10 ft or 3 m)

Wall mount addressable speaker product selection

Table 1: Wall mount addressable speaker S/O appliances

Model	Description	Installation instructions
49SO-APPLW 49SO-APPLW-BA	S/O appliance only. Select cover, mounting plate, and surface or WP box separately, if required.	579-1190

Table 2: High fidelity appliances

Model	Description	Installation instructions
49HF-APPLW 49HF-APPLW-BA	High fidelity S/O appliance only. Select cover, mounting plate, and surface or WP box separately, if required.	579-1190



* Additional listings may be applicable, contact your local Simplex® product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co.

Table 3: S/O covers (required when ordering APPLW models)

Model	Color	Wording
49SOC-WRBLANK	Red	No lettering
49SOC-WWBLANK	White	
49SOC-WRBA	Red	حريق/FIRE
49SOC-WWBA	White	
49SOC-WRBC	Red	火警/FIRE ALARM
49SOC-WWBC	White	
49SOC-WRBF	Red	FEU/FIRE
49SOC-WWBF	White	
49SOC-WRFEU	Red	FEU
49SOC-WWFEU	White	
→ 49SOC-WRFIRE	Red	FIRE
49SOC-WWFIRE	White	
49SOC-WRS	Red	Logo only
49SOC-WWS	White	
49SOC-WRALT	Red	ALERT
49SOC-WWALT	White	

Weatherproof product selection
Table 4: Weatherproof wall mount addressable speaker S/O appliances

Model	Description	Installation instructions
49SO-APPLW-O 49SO-APPLW-O-BA	S/O appliance only. Select cover, mounting plate and surface or WP back box separately.	579-1237

Table 5: S/O covers, required when ordering APPLW-O models

Model	Color	Wording
49SOC-WRBLANK-O	Red	No lettering
49SOC-WWBLANK-O	White	
49SOC-WRBA-O	Red	حريق/FIRE
49SOC-WWBA-O	White	
49SOC-WRBC-O	Red	火警/FIRE ALARM
49SOC-WWBC-O	White	
49SOC-WRBF-O	Red	FEU/FIRE
49SOC-WWBF-O	White	
49SOC-WRFEU-O	Red	FEU
49SOC-WWFEU-O	White	
49SOC-WRFIRE-O	Red	FIRE
49SOC-WWFIRE-O	White	
49SOC-WRS-O	Red	Logo only
49SOC-WWS-O	White	
49SOC-WRALT-O	Red	ALERT
49SOC-WWALT-O	White	

Table 6: S/O wall mount plate, non-weatherproof and weatherproof

Model	Description	Installation instructions
→ 49MP-SOWR	Mounting back plate in red.	579-1193
49MP-SOWW	Mounting back plate in white.	

Table 7: Surface or WP back boxes

Model	Color	Description	Installation instructions
49WPBB-SOWR	Red	Surface or WP back box in red.	579-1239
49WPBB-SOWW	White	Surface or WP back box in white.	

Table 8: Wire guard back box and wire guard

Model	Description
49WGBB-SOWR-O	Wire guard back box, wall, red, WP
→ 49WG-SOWR	Wire guard, wall, red

Wall mount speaker specifications
Table 9: Non-weatherproof appliance general specifications

Specification	Rating
Dimensions	5 1/2 in. x 5 in. x 1 1/2 in. or 139 mm x 128 mm x 38 mm (H x W x D)
Environmental	32°F to 120°F or 0°C to 49°C, 10% to 93%, non-condensing at 104°F or 40°C
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² , two wires for each terminal for in/out wiring. Use Unshielded Twisted Pair (UTP) for IDNAC and audio wiring.

Table 10: Weatherproof appliance general specifications

Specification	Rating
Dimensions	5 1/2 in. x 5 in. x 1 1/2 in. or 139 mm x 128 mm x 38 mm (H x W x D)
Environmental	UL/ULC temperature rating: Outdoor private: -40°F to 150.8°F (-40°C to 66°C) Indoor and uncontrolled wet Public Mode: 32°F to 122°F (0°C to 50°C)
	FM temperature rating: -40°F to 120°F (-40°C to 49°C)
	UL/ULC humidity range: 95 %, non-condensing at 140°F (60°C)
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² , two wires for each terminal for in/out wiring. Use Unshielded Twisted Pair (UTP) for IDNAC and audio wiring.

Table 11: Speaker audio specifications

Specification	Rating
Input voltage	25 VRMS or 70.7 VRMS
Power taps	1/4 W, 1/2 W, 1 W, and 2 W
Frequency response	400 Hz to 4000 Hz (S/O), 200 Hz to 10000 Hz (H/F) General signaling = 125 Hz to 12 kHz

Table 12: Speaker output ratings 25 Vrms or 70.7 Vrms at 10 ft or 3 m

Wattage tap Model	1/4 W		1/2 W		1 W		2 W	
	S/O	H/F	S/O	H/F	S/O	H/F	S/O	H/F
Reverberant Chamber Test, per UL 1480 (dBA)	79	76	83	80	87	83	90	86
Anechoic Chamber Test, per ULC-S541 (dBA)	80	76	84	79	88	82	91	85

Table 13: Polar dispersion reference, per ULC-S541 anechoic chamber testing

Attenuation	Angle	Attenuation	Angle
-3 dB	70°	-6 dB	80°

Table 14: IDNAC SLC specifications

Specification	Rating
Typical operating voltage range	23 VDC to 30 VDC, special application
Appliance voltage design reference	23 VDC (with 6 VDC drop)
Current consumption at 23 VDC on IDNAC addressable SLC	9 mA
Supervisory requirements	1 unit load (= 0.8 mA control unit current)
IDNAC SLC loading	Maximum of 127 addresses for each SLC, 139 unit loads. See device and compatible Fire Alarm Control Unit Installation Instructions for circuit current load limits.
IDNAC SLC wiring specifications (refer to the control unit installation instructions for more information)	UTP, unshielded twisted pair recommended
	Maximum wire length allowed with T-Taps for Class B wiring for each SLC = 10,000 ft or 3048 m Maximum wire length to any appliance = 4000 ft or 1219 m. This can be doubled to 8000 ft or 2438 m by using a 4009 IDNAC Repeater.

Equipment compatibility reference

Compatible equipment	Data sheet reference
4100ES with EPS+ or EPS Power Supply	S4100-0100
4009 IDNAC Repeater	S4009-0004
4100ES Flex 35 and 50 Watt Amplifiers	S4100-0034
4100ES 100 Watt Amplifiers	
4100ES Constant Supervision and Audio NACs	

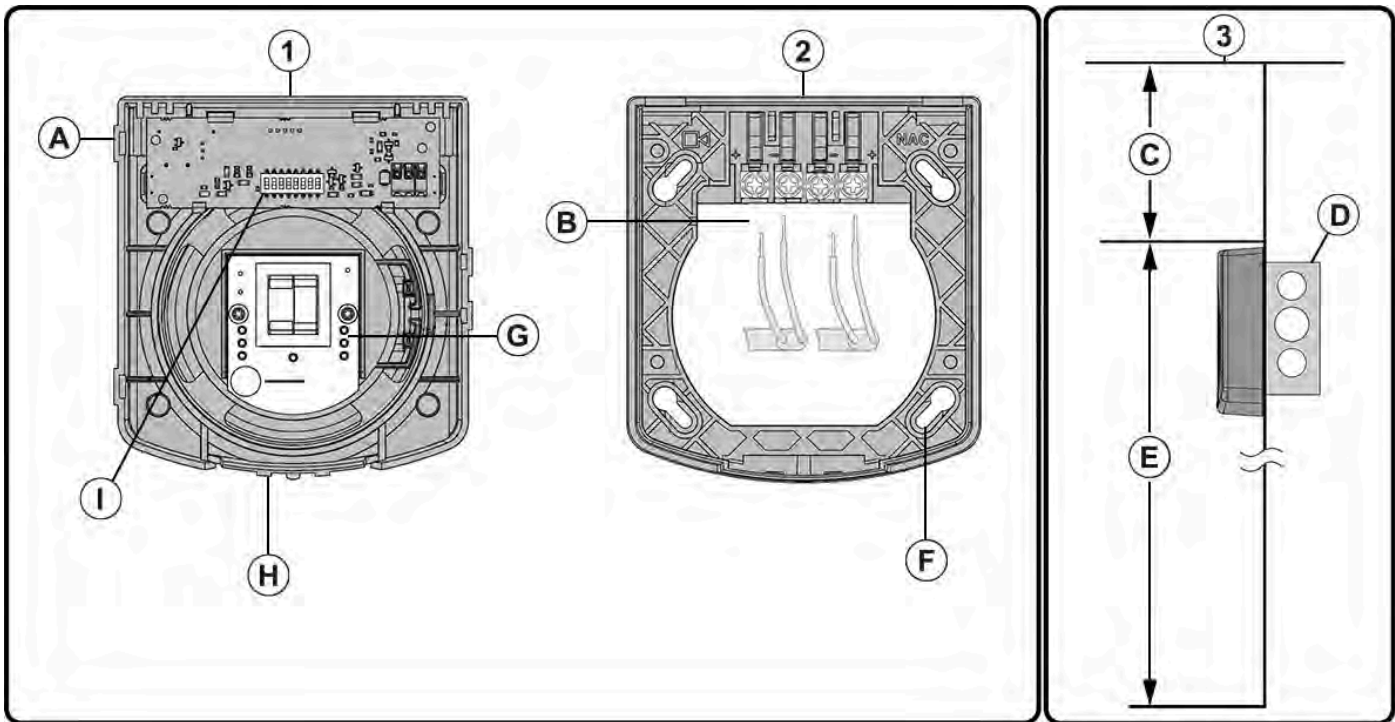
Wall mount S/O installation reference


Figure 2: Installation reference

Callout	Description	Callout	Description
1	Appliance, rear	2	49MP-SO Wall Mount Back Plate
3	Wall mount height reference	A	Magnet test location
B	Wiring terminals and connection clips for speaker and strobe connections accept two #12-18 AWG wires	C	6 in. or 152 mm minimum
D	4 in. X 4 in. (101 mm X 101 mm) electrical backbox 2 1/8 in. (54 mm) deep	E	NFPA 72 requires the top of audible appliance to be 90 in. or 2286 mm minimum above the finished floor and not less than 6 in. or 152 mm below the ceiling, confirm with your local codes.
F	Mount to 4 in. X 4 in. X 2 1/8 in. (101 mm X 101 mm X 54 mm) electrical box using 8-32 screws.	G	Set audio circuit voltage and power tap here.
H	You can remove the appliance and cover from the back plate using a slotted or philips head screwdriver.	I	Address Dip Switch Set a unique address for the appliance through an eight-position DIP switch (ADDR1) on the rear of the appliance.

TrueAlert Addressable Notification Appliances

Ceiling Mount Addressable Speaker (SO) Notification Appliances

Introduction

Ceiling mount Addressable Speaker (SO) notification appliances

To power, address, and control ceiling mount SO notification appliances, use the Simplex Fire Alarm Control Unit (FACU) IDNAC Signaling Line Circuit (SLC). A separate compatible Simplex FACU audio NAC supplies audio. Electronic monitoring of wiring supervision means you can T-tap audio and IDNAC wiring for Class B wiring, which reduces wiring costs and wiring distances.

Install ceiling mount SO notification appliances on a standard 4 in. or 101.6 mm square 2 1/8 in. or 53.97 mm deep electrical box, provided by others, for flush installations. Install on a surface or weatherproof backbox, see Table 6, for surface or weatherproof (WP) installations.

Appliances are available in 400 Hz to 4000 Hz and 200 Hz to 10000 Hz high fidelity models. Select the appliance and cover separately to simplify the ordering and installation process. Model numbers ending in -BA are assembled in the USA.

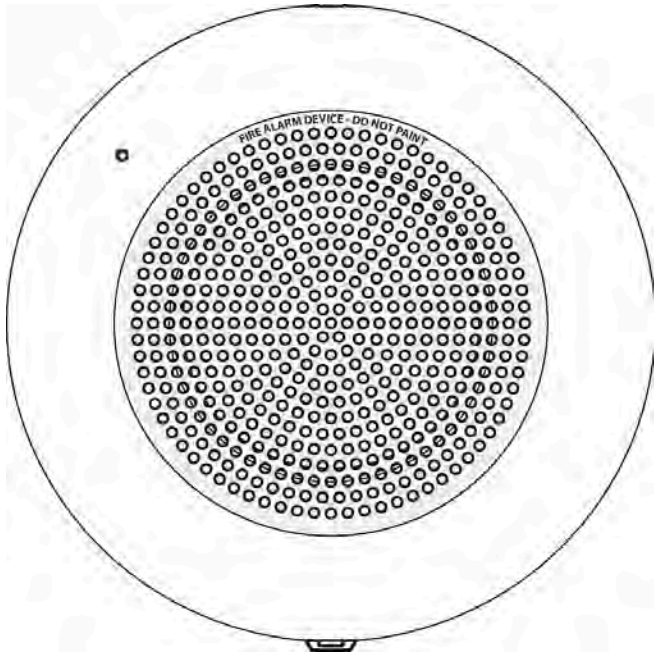


Figure 1: Ceiling mount addressable speaker notification appliance

Features

General

- Separate appliances, covers, back boxes, and wire guards provide complete flexibility for meeting customers installation requirements
- The TrueAlert device reports provide important appliance information details including point ID, custom label, type, and candela setting
- Rugged, high impact flame retardant thermoplastic housings
- The covers can be easily removed without disturbing the connected housing
- Terminals for wiring sizes 18 AWG to 12 AWG
- The appliance LED can be selected to display during each polling cycle indicating appliance supervision
- Magnet test diagnostics to assist checkout and testing of appliances
- Compatible with the Americans with Disabilities Act (ADA) requirements

IDNAC Signalling Line Circuit (SLC)

- The advanced addressable notification controlled by IDNAC SLCs provides regulated 29 VDC for low current operation even during battery backup conditions
- The wiring supervision is electronically monitored and allows IDNAC SLC wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- The strobe intensity can be selected within programming from the FACU

Audio (speaker)

- The wiring supervision is electronically monitored and allows audio (speaker) wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- High quality voice and tone reproduction with taps for 1/4 W, 1/2 W, 1 W, or 2 W at 25 VRMS or 70.7 VRMS
- The audio (speaker) circuits are wired separately from IDNAC SLCs
- High fidelity models (200 Hz to 10,000 Hz) are also available
- Compliant with NFPA 72, 520 Hz Low frequency signal requirements for sleeping areas
- Listed to UL 1480 and ULC S541*
- UL 1480 Reverberant dBA measurements (10 ft or 3 m)
- ULC S541 Anechoic dBA measurements (10 ft or 3 m)

Ceiling mount addressable speaker product selection

Table 1: Ceiling mount SO appliances

Model	Description	Installation instructions
49SO-APPLC	SO appliance only. If required, select the cover and surface or WP box separately.	579-1203
49SO-APPLC-BA		

Table 2: High fidelity ceiling mount SO appliances

Model	Description	Installation instructions
49HF-APPLC	High fidelity SO appliance only. If required, select the cover and surface or WP box separately.	579-1203
49HF-APPLC-BA		

Table 3: SO ceiling mount covers, required when ordering APPLC models

Model	Color	Wording
49SOC-CK	Black	No logo or label
49SOC-CR	Red	
49SOC-CW	White	
49SOC-CRALT	Red	ALERT
49SOC-CWALT	White	FIRE
49SOC-CRFIRE	Red	
49SOC-CWFIRE	White	Simplex
49SOC-CRS	Red	
49SOC-CWS	White	

* Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co.

Weatherproof product selection

Table 4: Weatherproof ceiling mount addressable SO appliances

Model	Description	Installation instructions
49SO-APPLC-O 49SO-APPLC-O-BA	High fidelity SO appliance only. If required, select the cover and weatherproof box separately.	579-1241

Table 5: SO covers, required when ordering APPLC-O models

Model	Color	Wording
49SOC-CR-O	Red	No logo or label
49SOC-CW-O	White	
49SOC-CRALT-O	Red	ALERT
49SOC-CWALT-O	White	
49SOC-CRFIRE-O	Red	FIRE
49SOC-CWFIRE-O	White	
49SOC-CRS-O	Red	Simplex
49SOC-CWS-O	White	

Table 6: Surface or WP back boxes

Model	Color	Description	Installation instructions
49WPBB-SOCR	Red	Surface or WP back box in red	579-1240
49WPBB-SOCW	White	Surface or WP back box in white	

Table 7: Wire guards and wire guard back boxes

Model	Description
49WG-SOCR-O	Wire guard back box, ceiling, red, WP
49WG-SOCR	Wire guard, ceiling, red

Ceiling mount speaker specifications

Table 8: Non-weatherproof appliance general specifications

Specification	Rating
Dimensions	7 1/8 in. x 7 1/8 in. x 1 1/4 in. or 180 mm x 180 mm x 32 mm (H x W x D)
Environmental	32°F to 120°F or 0°C to 49°C; 10% to 93%, non-condensing at 104°F or 40°C
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² ; two wires for each terminal for in/out wiring. Use unshielded twisted pair (UTP) for IDNAC and audio wiring.

Table 9: Weatherproof appliance general specifications

Specification	Rating
Dimensions	7 1/8 in. x 7 1/8 in. x 1 1/4 in. or 180 mm x 180 mm x 32 mm (H x W x D)
Environmental	UL/ULC temperature rating, W110 CD/W135 CD/W185 CD: -40°F to 150.8°F (-40°C to 66°C)
	UL/ULC temperature rating for indoor and uncontrolled wet Public Mode - 110 CD: 32°F to 120°F (0°C to 49°C)
	FM temperature rating: -40°F to 120°F (-40°C to 49°C)
	UL/ULC humidity range: 95 %, non-condensing at 140°F (60°C)
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² ; two wires for each terminal for in/out wiring. Use unshielded twisted pair (UTP) for IDNAC and audio wiring.

Table 10: Speaker audio specifications

Specification	Rating
Input voltage	25 VRMS or 70.7 VRMS
Power taps	1/4 W, 1/2 W, 1 W, and 2 W
Frequency response	400 Hz to 4000 Hz (SO), 200 Hz to 10000 Hz (H/F) General signaling = 125 Hz to 12 kHz

Table 11: Speaker output ratings

Wattage tap Model	1/4 W		1/2 W		1 W		2 W	
	SO	H/F	SO	H/F	SO	H/F	SO	H/F
Reverberant Chamber Test, in accordance with UL 1480 (dBA)	79	77	83	81	86	84	90	87
Anechoic Chamber Test, in accordance with ULC-S541 (dBA)	81	78	85	82	88	85	91	88

Table 12: Polar dispersion

Attenuation	Angle
-3 dB	70°
-6 dB	80°

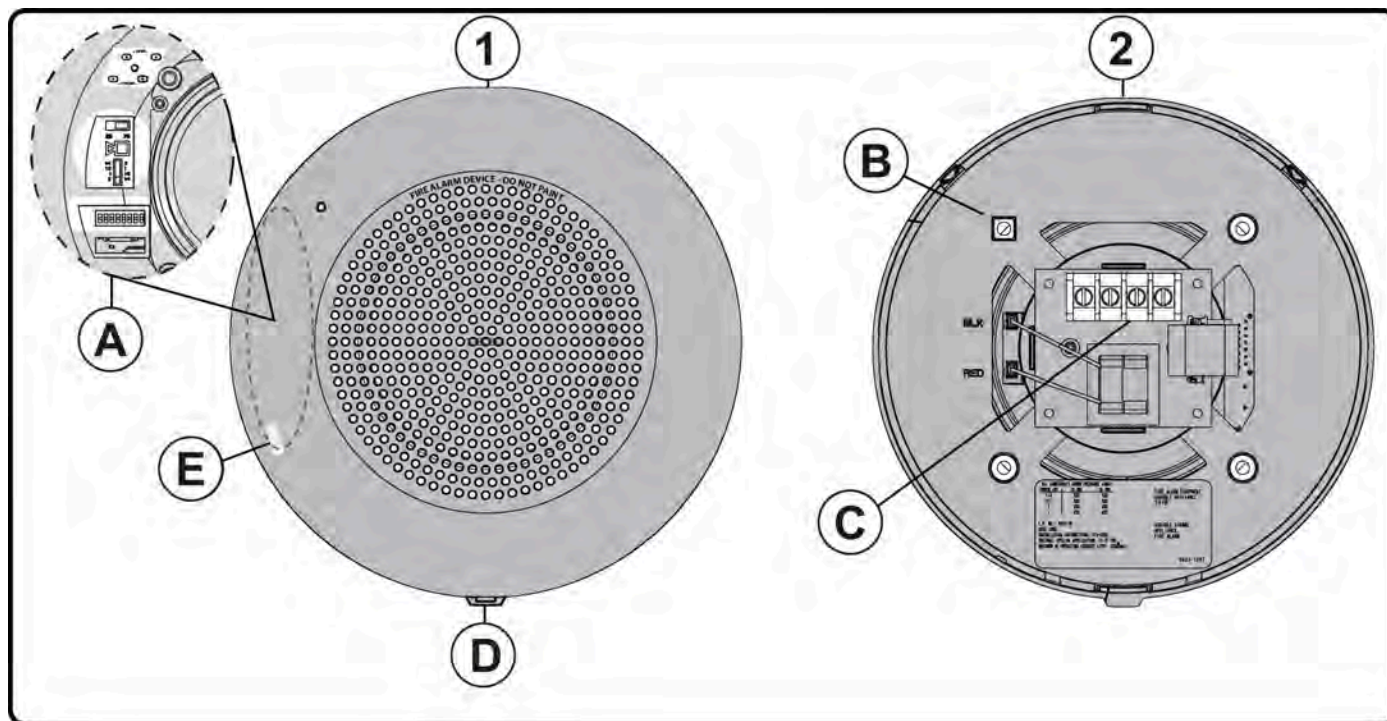
Table 13: IDNAC SLC specifications

Specification	Rating
Typical operating voltage range	23 VDC to 30 VDC, special application
Appliance voltage design reference	23 VDC (with 6 VDC drop)
Current consumption	9 mA
Supervisory requirements	1 unit load (= 0.8 mA control unit current)
IDNAC SLC loading	Maximum of 127 addresses for each SLC, 139 unit loads. See device and compatible fire control unit installation instructions for circuit current load limits.
IDNAC SLC wiring specifications refer to the control unit installation instructions for more information.	UTP, unshielded twisted pair recommended Maximum wire length allowed with T-Taps for Class B wiring for each SLC = 10,000 ft or 3048 m Maximum wire length to any appliance = 4000 ft or 1219 m. This can be doubled to 8000 ft or 2438 m by using a 4009 IDNAC Repeater.

Table 14: Equipment compatibility references

Compatible equipment	Data sheet reference
4100ES with EPS+ or EPS Power Supply	S4100-0100
4009 IDNAC Repeater	S4009-0004
4100ES Flex 35, and 50 Watt Amplifiers	S4100-0034
4100ES 100 Watt Amplifiers	
4100ES Constant Supervision and Audio NACs	

Ceiling mount speaker installation reference


Figure 2: Installation reference

Callout	Description	Callout	Description
1	Appliance with cover, front	2	Appliance, rear
A	Appliance test points, audio circuit power taps, and address dip switch. Set audio circuit power taps and device address before fixing the cover in place.	B	Mount to 4 in. x 4 in. x 2 1/8 in. (101 mm x 101 mm x 53 mm) electrical box using 8-32 screws. For ceiling mount only.
C	The wiring terminals for speaker and strobe connections accept two #12-18 AWG wires.	D	Use slotted screwdriver here to remove cover.
E	Magnet test location indicated by area that is not textured.	—	—

Introduction

Wall mount indoor and outdoor addressable speaker visible (S/V) notification appliances

Use a Simplex fire alarm control unit (FACU) IDNAC signaling line circuit (SLC) to individually power, address, and control wall mount indoor and outdoor addressable S/V notification appliances. Use a separate compatible Simplex FACU audio NAC for audio. The electronic monitoring of wiring supervision means you can T-tap audio and IDNAC wiring for Class B wiring, reducing wiring costs and wiring distances.

Install on standard 4 in. square 2 1/8 in. deep USA electrical boxes for flush installations, provided by others, or surface or weatherproof (WP) backboxes, see Table 15, for surface or WP installations .

The appliances are available in 400 Hz to 4000 Hz and 200 Hz to 10000 Hz high-fidelity models. You can select appliance and covers separately for simple ordering and installation. Model numbers that end in -BA are assembled in the USA.

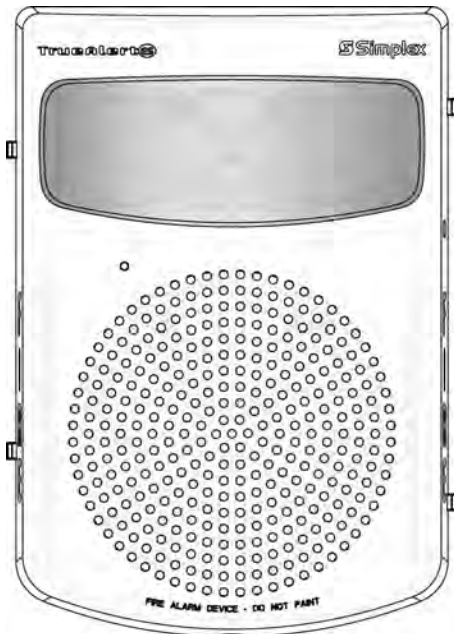


Figure 1: Wall mount addressable S/V notification appliance

Features

General

- Separate appliances, covers, back boxes, and wire guards provide complete flexibility for meeting customers installation requirements
- The TrueAlert device reports provide important appliance information details including point ID, custom label, type, and candela setting
- Rugged, high impact flame retardant thermoplastic housings
- The covers can be easily removed without disturbing the connected housing
- Terminals for wiring sizes 18 AWG to 12 AWG
- The appliance LED can be selected to display during each polling cycle indicating appliance supervision
- Magnet test diagnostics to assist checkout and testing of appliances
- Compatible with the Americans with Disabilities Act (ADA) requirements

IDNAC Signalling Line Circuit (SLC)

- The advanced addressable notification controlled by IDNAC SLCs provides regulated 29 VDC for low current operation even during battery backup conditions
- The wiring supervision is electronically monitored and allows IDNAC SLC wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- The strobe intensity can be selected within programming from the FACU

Audio (speaker)

- The wiring supervision is electronically monitored and allows audio (speaker) wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and reduces costs for wiring installation
- High quality voice and tone reproduction with taps for 1/4 W, 1/2 W, 1 W, or 2 W at 25 VRMS or 70.7 VRMS
- Audio (speaker) circuits are wired separately from IDNAC SLCs
- High fidelity models (200 Hz to 10,000 Hz) are also available
- Compliant with NFPA 72, 520 Hz Low frequency signal requirements for sleeping areas
- Listed to UL 1480 and ULC S541*
- UL 1480 Reverberant dBA measurements (10 ft or 3 m)
- ULC S541 Anechoic dBA measurements (10 ft or 3 m)

Product selection

Table 1: TrueAlert ES wall mount addressable speaker S/V appliances, NEMA 1

SKU	Description	Installation instructions
49SV-APPLW	Select cover, mounting plate, and surface or WP box separately, if required.	579-1190
49SV-APPLW-BA		

Table 2: High Fidelity H/F appliances, NEMA 1

SKU	Description	Installation instructions
49HFV-APPLW	High fidelity S/V appliance only. Select cover, mounting plate, and surface or WP box separately, if required.	579-1190
49HFV-APPLW-BA		

Table 3: S/V covers, required when ordering APPLW models, NEMA 1

Model	Color	Wording
49SVC-WRALT	Red	Alert
49SVC-WWALT	White	
49SVC-WRBA	Red	حريق /FIRE
49SVC-WWBA	White	
49SVC-WRBC	Red	/FIRE ALARM
49SVC-WWBC	White	
49SVC-WRBF	Red	FEU/FIRE
49SVC-WWBF	White	
49SVC-WRFBL	Red	FUEGO/FOGO

*Additional listings may be applicable, contact your local Simplex ® product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co.

Table 3: S/V covers, required when ordering APPLW models, NEMA 1

Model	Color	Wording
49SVC-WRFEU	Red	FEU
49SVC-WWFEU	White	
49SVC-WRFIRE	Red	FIRE
→ 49SVC-WWFIRE	White	
49SVC-WRS	Red	Simplex logo only
49SVC-WWS	White	

Table 4: S/V wall lens

Lens	Color	Installation instructions
49LENS-AMBER	Amber	579-1192
49LENS-BLUE	Blue	
49LENS-GREEN	Green	
49LENS-RED	Red	

Note: Use colored lenses only with indoor appliances.

Wall mount S/V specifications
Table 5: Non-weatherproof appliance general specifications

Specification	Rating
Dimensions	7 3/8 in. x 5 in. x 1 3/4 in. or 139 mm x 128 mm x 42 mm (H x W x D)
Environmental	32°F to 120°F or 0°C to 49°C, 10% to 93%, non-condensing at 104°F or 40°C
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² . Two wires for each terminal for in/out wiring. Use Unshielded Twisted Pair (UTP) for IDNAC and audio wiring.

Table 6: Weatherproof appliance general specifications

Specification	Rating
Dimensions	7 3/8 in. x 5 in. x 1 3/4 in. or 139 mm x 128 mm x 42 mm (H x W x D)
Environmental	UL or ULC temperature rating: Outdoor private: -40°F to 150.8°F (-40°C to 66°C) Indoor and uncontrolled wet Public Mode: 32°F to 122°F (0°C to 50°C)
	FM temperature rating: -40°F to 120°F (-40°C to 49°C)
	UL or ULC humidity range: 95 %, non-condensing at 140°F (60°C)
Connections	Terminal blocks for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ² , two wires for each terminal for in/out wiring. Use Unshielded Twisted Pair (UTP) for IDNAC and audio wiring.

Table 7: Speaker audio specifications

Specification	Rating
Input voltage	25 VRMS or 70.7 VRMS
Power taps	1/4 W, 1/2 W, 1 W, and 2 W
Frequency response	400 Hz to 4000 Hz (S/V), 200 Hz to 10000 Hz (H/F) General signaling = 125 Hz to 12 kHz

Table 8: S/V speaker output ratings 25 Vrms or 70.7 Vrms at 10 ft or 3 m

Wattage tap	1/4 W		1/2 W		1 W		2 W	
	S/V	H/F	S/V	H/F	S/V	H/F	S/V	H/F
Reverberant Chamber Test, in accordance with UL 1480 (dBA)	79	76	83	80	86	82	89	86
Anechoic Chamber Test, in accordance with ULC-S541 (dBA)	81	78	84	81	88	84	90	87

Table 9: Polar dispersion reference, in accordance with ULC-S541 anechoic chamber testing

Attenuation	Angle	Attenuation	Angle
-3 dB	75°	-6 dB	85°

Table 10: Percentage of rated light output at room temperature

Angle	On-axis	Vertical, below axis			Horizontal, left/right of axis	
	0°	45°	90°	45°	90°	
UL required output	100%	34%	12%	75%	25%	
Typical output	194%	90%	45%	121%	41%	

Table 11: IDNAC SLC specifications

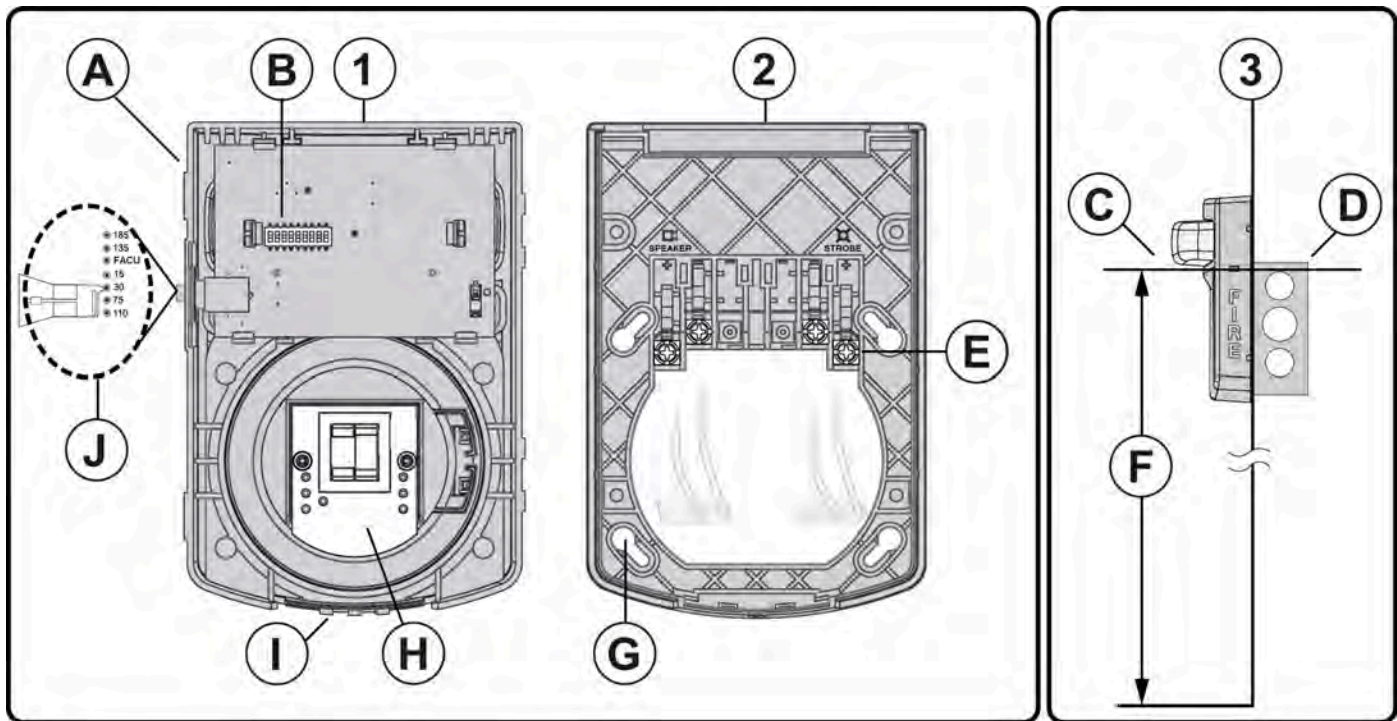
Typical operating voltage range	23 VDC to 30 VDC, special application
Appliance voltage design reference	23 VDC, with 6 VDC drop
Supervisory requirements	1 unit load (= 0.8 mA control unit current)
Flash rate and synchronized SLC loading	1 Hz; with up to 63 synchronized strobes maximum for each NAC
IDNAC SLC loading	Maximum of 127 addresses for each SLC, 139 unit loads. See device and compatible fire control unit installation instructions for circuit current load limits.
IDNAC SLC wiring specifications; refer to the control unit installation instructions for more information	UTP, unshielded twisted pair recommended
	Maximum wire length allowed with T-Taps for Class B wiring for each SLC = 10,000 ft or 3048 m
	Maximum wire length to any appliance = 4000 ft or 1219 m. This can be doubled to 8000 ft or 2438 m by using a 4009 IDNAC Repeater.

Table 12: Current consumption***

Candela setting	15 cd	30 cd	75 cd	110 cd	135 cd	185 cd
Clear or white lens	47 mA	57 mA	100 mA	132 mA	160 mA	208 mA
Tinted lens	54 mA	78 mA	128 mA	184 mA	211 mA	N/A
Outdoor private mode	69 mA	N/A	240 mA	300 mA	N/A	445 mA

***Measured at 23 VDC on IDNAC addressable SLC

Note: The speakers are for connection to compatible fire alarm audio circuits. Anechoic ratings are representative of actual installed sound output.

Wall mount S/V installation reference

Figure 2: Installation reference

Callout	Description	Callout	Description
1	Appliance, rear	2	49MP-SV wall mount back plate
3	Wall mount height reference	—	—
A	Magnet test location	B	Address dip switch Set a unique address for the appliance through an eight-position DIP switch on the rear of the appliance.
C	The bottom of the lens is even with, or slightly higher than, the bottom of compatible boxes.	D	4 in. X 4 in. (101 mm X 101 mm) electrical backbox 2 1/8 in. (54 mm) deep
E	The wiring terminals for speaker and strobe connections. These wiring terminals accept two #12-18 AWG wires.	F	NFPA 72 requires that the entire lens be not less than 80 in. and not greater than 96 in. above the finished floor.
G	Mount to a 4 in. X 4 in. X 2 1/8 in. (101 mm X 101 mm X 54 mm) electrical box using 8-32 screws.	H	Set audio circuit voltage and power tap selection here.
I	You can remove appliance and cover from the backplate using a slotted or philips head screwdriver.	J	Candela setting Set flag to FACU to control candela rating from an FACU providing IDNAC notification. To set candela manually, move flag to the required candela.

Weatherproof product selection
Table 13: Weatherproof wall mount addressable speaker S/V appliances, NEMA 3R

Model	Description	Installation instructions
→ 49SV-APPLW-O 49SV-APPLW-O-BA 49SV-APPLW-CO, Canada only	S/V appliance only. Select cover, mounting plate and surface or WP back box separately.	579-1237

Table 14: S/V covers, required when ordering APPLW-O models, NEMA 3R

Model	Color	Wording
49SVC-WRBA-O	Red	حريق/FIRE
49SVC-WWBA-O	White	
49SVC-WRBC-O	Red	火警/FIRE ALARM
49SVC-WWBC-O	White	
49SVC-WRBF-O	Red	FEU/FIRE
49SVC-WWBF-O	White	
49SVC-WRFEU-O	Red	FEU
49SVC-WWFEU-O	White	
→ 49SVC-WRFIRE-O	Red	FIRE
49SVC-WWFIRE-O	White	
49SVC-WRALT-O	Red	ALERT
49SVC-WWALT-O	White	
49SVC-WRS-O	Red	Simplex logo only
49SVC-WWS-O	White	

Table 15: Surface or WP back boxes (NEMA 3R) when used with weatherproof appliances

Model	Color	Description	Installation instructions
→ 49WPBB-SVWR	Red	Surface or WP back box in red	579-1239
49WPBB-SVWW	White	Surface or WP back box in white	

Table 16: Wire guards and wire guard back boxes

Model	Description
49WGBB-SVWR-O	Wire guard back box, wall, red, WP
49WGBB-SVCR-O	Wire guard back box, ceiling, red, WP
49WG-SVWCR	Wire guard, wall, red

Table 17: S/V wall mount back plate

Model	Description	Installation instructions
→ 49MP-SVWR	Mounting back plate in red	579-1193
→ 49MP-SVWW	Mounting back plate in white	

Weatherproof wall mount S/V specifications
Table 18: Environmental specifications

Specification	Rating
Rated DC control or strobe voltage range	Special application 23 VDC to 30 VDC
UL or ULC temperature rating	Outdoor private: -40°F to 150.8°F or -40°C to 66°C Indoor and uncontrolled wet Public Mode: 32°F to 122°F or 0°C to 50°C
FM temperature rating	-40°F to 120°F or -40°C to 49°C
UL or ULC humidity range	95%, non-condensing at 140°F or 60°C
Connections	Terminal for 18 AWG to 12 AWG or 0.82 mm ² to 3.31 mm ²
CAUTION: The appliance enclosures are available in red and white. Do not paint or otherwise alter the factory finishes in any way.	

Table 19: TrueAlert addressable wall mount S/V and SO units - speaker jumper setting and output ratings (25 V or 70 V audio)

Voltage	Jumper J1 to tap	Tap setting in Watts	UL1480 reverberant at 10 ft SV/SO models	ULC-S541 anechoic at 3 m SV/SO models
25 V	E	1/4	78	80
	F	1/2	81	83
	G	1	84	86
	H	2	87	89
70.7 V	A	1/4	76	79
	B	1/2	80	83
	C	1	84	86
	D	2	87	89

Note:

- Reverberant dBA measurements are a minimum UL rating based on sound level measurements made in UL's reverberant test chamber.
- Anechoic dBA measurements are a minimum ULC rating based on sound pressure level measurements made in ULC's anechoic test chamber.
- The sound pressure level decreases by 3 dB at an angular displacement of 25° from the line perpendicular to the speaker's center. The SPL decreases by 6 dB at an angle of 35° from that line.

Table 20: Percent of rated light output at 15 and 75 candela setting (Public Mode - room temperature)

Vertical dispersion			Horizontal dispersion		
Y-plane angle	UL req output	Typical Output	X-plane angle	UL req output	Typical output
0	100%	194%	0	100%	194%
5	90%	192%	±5	90%	203%
10	90%	132%	±10	90%	168%
15	90%	129%	±15	90%	155%
20	90%	145%	±20	90%	166%
25	90%	150%	±25	90%	169%
30	90%	112%	±30	75%	164%
35	65%	124%	±35	75%	151%
40	46%	114%	±40	75%	145%
45	34%	90%	±45	75%	121%
50	27%	91%	±50	55%	97%
55	22%	78%	±55	45%	83%
60	18%	72%	±60	40%	79%
65	16%	68%	±65	35%	70%
70	15%	75%	±70	35%	59%
75	13%	74%	±75	30%	50%
80	12%	68%	±80	30%	51%
85	12%	63%	±85	25%	45%
90	12%	45%	±90	25%	41%

Table 21: Outdoor private mode candela rating for W15/W75/W110/W185

Candela	Straight out from unit	Vertical below unit		Left/right horizontal	
	0°	45°	90°	45°	90°
WP15 Typical CD at 77°F or 25°C	69	25	18	32	12
WP75 Typical CD at 77°F or 25°C	240	100	60	119	47
WP110 Typical CD at 77°F or 25°C	300	118	74	160	58
WP185 Typical CD at 77°F or 25°C	445	169	105	228	75

Table 22: Maximum RMS operating current

Candela selection	Appliance type	23 V, see note
(CD4) 15 cd	S/V	47 mA
(CD3) WP15 cd	S/V	81 mA
(CD2) 75 cd	S/V	100 mA
(CD1) WP75 cd	S/V	187 mA
(CD6) WP110 cd	S/V	230 mA
(CD7) WP185 cd	S/V	298 mA
Speaker Only	SO	15 mA

Note: For connection to IDNAC SLCs.

Equipment compatibility references

Table 23: Equipment compatibility references

Compatible controllers	Data sheet reference
4100ES with EPS+ or EPS Power Supply	S4100-0100
4009 IDNAC Repeater	S4009-0004
4100ES Flex 35 and 50 Watt Amplifiers	S4100-0034
4100ES 100 Watt Amplifiers	
4100ES Constant Supervision and Audio NACs	

Introduction

Ceiling mount addressable speaker visible (S/V) notification appliances

Use the Simplex fire alarm control unit (FACU) IDNAC signaling line circuit (SLC) to individually power, address and control ceiling mount addressable S/V notification appliances. A separate compatible Simplex FACU audio NAC supplies audio. The electronic monitoring of wiring supervision means you can T-tap audio and IDNAC wiring for Class B wiring, which reduces wiring costs and wiring distances.

Install ceiling mount addressable S/V notification appliances on a standard 4 in. (101.6 mm) square 2 1/8 in. (53.97 mm) deep electrical box, provided by others, for flush installations. Install on a surface or weatherproof backbox, see Table 8 for surface or weatherproof (WP) installations.

Appliances are available in 400 Hz to 4000 Hz and 200 Hz to 10000 Hz high fidelity models. Select the appliance and cover separately to simplify the ordering and installation process. Model numbers ending in -BA are assembled in the USA.



Figure 1: Ceiling mount addressable S/V notification appliance

Features

General

- Separate appliances, covers, back boxes, and wire guards provide complete flexibility for meeting customers installation requirements
- The TrueAlert device reports provide important appliance information details including point ID, custom label, type, and candela setting
- Rugged, high impact flame retardant thermoplastic housings
- The covers can be easily removed without disturbing the connected housing
- Terminals for wiring sizes 18 AWG to 12 AWG
- The appliance LED can be selected to display during each polling cycle indicating appliance supervision
- Magnet test diagnostics to assist checkout and testing of appliances
- Compatible with the Americans with Disabilities Act (ADA) requirements

IDNAC Signalling Line Circuit (SLC)

- Advanced addressable notification controlled by IDNAC SLCs provides regulated 29 VDC for low current operation even during battery backup conditions
- The wiring supervision is electronically monitored and allows IDNAC SLC wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- The strobe intensity can be selected within programming from the FACU

Audio (speaker)

- The wiring supervision is electronically monitored and allows audio (speaker) wiring to be **T-tapped** for Class B wiring, which provides flexibility in reducing wiring sizes and or distance, and which reduces costs for wiring installation
- High quality voice and tone reproduction with taps for 1/4 W, 1/2 W, 1 W, or 2 W at 25 VRMS or 70.7 VRMS
- The audio (speaker) circuits are wired separately from IDNAC SLCs
- High fidelity models (200 Hz to 10,000 Hz) are also available
- Compliant with NFPA 72, 520 Hz Low frequency signal requirements for sleeping areas
- Listed to UL 1480 and ULC S541*
- UL 1480 Reverberant dBA measurements (10 ft or 3 m)
- ULC S541 Anechoic dBA measurements (10 ft or 3 m)

Ceiling mount addressable speaker product selection

Table 1: Ceiling mount addressable speaker S/V appliances

Model	Description	Installation instructions
49SV-APPLC 49SV-APPLC-BA	S/V appliance only. If required, select a cover and surface or WP box separately.	579-1203

Table 2: High fidelity appliances

Model	Description	Installation instructions
49HFV-APPLC 49HFV-APPLC-BA	High fidelity S/V appliance only. If required, select a cover and surface or WP box separately.	579-1203

Table 3: High candela appliances

Model	Description	Installation instructions
49SVH-APPLC-BA 49SVH-APPLC	High candela S/V appliance only. If required, select a cover and weatherproof box separately.	579-1203

* Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co.

Table 4: High fidelity high candela appliances

Model	Description	Installation instructions
49HFVH-APPLC 49HFVH-APPLC-BA	High fidelity high candela S/V appliance only. If required, select a cover and surface/WP box separately.	579-1203
49HFVH-APLCA-BA	High fidelity high candela S/V appliance with amber colored lens. If required, select a cover and surface or WP box separately.	
49HFVH-APLCB-BA	High fidelity high candela S/V appliance with blue colored lens. If required, select a cover and surface or WP box separately.	

Table 5: S/V covers, required when ordering APPLC models

Model	Color	Wording
49SVC-CRALT	Red	ALERT
49SVC-CWALT	White	
49SVC-CRBA	Red	حريق / FIRE
49SVC-CWBA	White	
49SVC-CRBC	Red	火警 / FIRE ALARM
49SVC-CWBC	White	
49SVC-CRBF	Red	FEU/FIRE
49SVC-CWBF	White	
49SVC-CRFEU	Red	FEU
49SVC-CWFEU	White	
49SVC-CRFBL	Red	FUEGO/FOGO
49SVC-CRFIRE	Red	
→ 49SVC-CWFIRE	White	FIRE
49SVC-CRS	Red	
49SVC-CWS	White	Simplex logo only
49SVC-CK	Black	No logo or lettering

Weatherproof product selection

Table 6: Weatherproof ceiling mount addressable S/V appliances

Model	Description	Installation instructions
49SVH-APPLC-O 49SVH-APPLC-CO (Canada only)	S/V Appliance Only. Select a cover and surface or WP box separately	579-1241

Table 7: S/V covers, required when ordering APPLC-O models

SKU	Color	Wording
49SVC-CRALT-O	Red	ALERT
49SVC-CWALT-O	White	
49SVC-CRBA-O	Red	حريق/FIRE
49SVC-CWBA-O	White	
49SVC-CRBC-O	Red	火警/FIRE ALARM
49SVC-CWBC-O	White	
49SVC-CRBF-O	Red	FEU/FIRE
49SVC-CWBF-O	White	
49SVC-CRFEU-O	Red	FEU
49SVC-CWFEU-O	White	
49SVC-CRFIRE-O	Red	FIRE
49SVC-CWFIRE-O	White	
49SVC-CRS-O	Red	Simplex logo only
49SVC-CWS-O	White	

Table 8: Surface or WP back boxes

SKU	Color	Description	Installation instructions
49WPBB-SVCR	Red	Surface or WP back box in red	579-1240
49WPBB-SVCW	White	Surface or WP back box in white	

Table 9: Wire guards and wire guard back boxes

SKU	Description
49WGBB-SVCR-O	Wire guard back box, ceiling, red, WP
49WG-SVWCR	Wire guard, ceiling, red

Ceiling mount S/V specifications

Table 10: Non-weatherproof appliance general specifications

Specification	Rating
Dimensions	8 1/8 in. x 7 1/8 in. x 3in. (206 mm x 180 mm x 76 mm) (H x W x D)
Environmental	32°F to 120°F (0°C to 49°C); 10% to 93%, non-condensing at 104°F (40°C)
Connections	Terminal blocks for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²); two wires for each terminal for in/out wiring. Use unshielded twisted pair (UTP) for IDNAC and audio wiring.

Table 11: Weatherproof appliance general specifications

Specification	Rating
Dimensions	8 1/8 in. x 7 1/8 in. x 3in. (206 mm x 180 mm x 76 mm) (H x W x D)
Environmental	UL/ULC temperature rating, W110 CD/W135 CD/W185 CD: -40°F to 150.8°F (-40°C to 66°C)
	UL/ULC temperature rating for indoor and uncontrolled wet Public Mode - 110 CD: 32°F to 120°F (0°C to 49°C)
	FM temperature rating: -40°F to 120°F (-40°C to 49°C)
	UL/ULC humidity range: 95 %, non-condensing at 140°F (60°C)
Connections	Terminal blocks for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²); two wires for each terminal for in/out wiring. Use unshielded twisted pair (UTP) for IDNAC and audio wiring.

Table 12: Speaker audio specifications

Specification	Rating
Input voltage	25 Vrms or 70.7 Vrms
Power taps	1/4 W, 1/2 W, 1 W, and 2 W
Frequency response	400 Hz to 4000 Hz (S/V, S/VH), 200 Hz to 10000 Hz (H/F, HFVH) General Signaling = 125 Hz to 12 kHz

Table 13: Speaker output ratings

Wattage tap	1/4 W		1/2 W		1 W		2 W	
Model	S/V	H/F	S/V	H/F	S/V	H/F	S/V	H/F
Reverberant chamber test, in accordance with UL 1480 (dBA)	79	76	83	80	86*	84	89*	87*
Anechoic chamber test, in accordance with ULC-S541 (dBA)*	79	78	83	82	86*	85*	89*	88*
* Select taps as indicated to satisfy the ULC fire alarm applications requirement of 85 dBA minimum								
Polar dispersion reference in accordance with ULC-S541 Anechoic Chamber Testing	Attenuation		Angle		Attenuation		Angle	
	-3 dB		70°		-6 dB		80°	

Table 14: Percentage of rated light

Angle	On-axis	Vertical, below axis		Horizontal, left/right of axis	
	0°	45°	90°	45°	90°
UL required output	100%	45%	25%	45%	25%
Typical output	327%	134%	83%	129%	47%

Table 15: IDNAC SLC specifications

Specification	Rating
Typical operating voltage range	23 VDC to 30 VDC, Special Application
Appliance voltage design reference	23 VDC (with 6 VDC drop)
Supervisory requirements	1 unit load (= 0.8 mA control unit current)
Flash rate and synchronized SLC loading	1 Hz; with up to 63 synchronized strobes maximum for each powered circuit, max 127 S/V appliances for each IDNAC channel
IDNAC SLC loading	Maximum of 127 addresses for each SLC, 139 unit loads. See device and compatible fire control unit installation instructions for circuit current load limits.
IDNAC SLC wiring specifications refer to the control unit installation instructions for more information	UTP, unshielded twisted pair recommended Maximum wire length allowed with T-taps for Class B wiring for each SLC = 10,000 ft (3048 m) Maximum wire length to any appliance = 4000 ft (1219 m). This can be doubled to 8000 ft (2438 m) by using a 4009 IDNAC Repeater.

Table 16: Current consumption**

Candela setting	15 cd	30 cd	75 cd	110 cd	135 cd	185 cd
49SV and 49HFV models	59 mA	82 mA	145 mA	193 mA	N/A	N/A
49SVH and 49HFVH models	N/A	N/A	N/A	259 mA	281 mA	325 mA
Weatherproof SV appliances	N/A	N/A	N/A	Inside 110CD = 305 mA Outside 110CD = 308 mA	335 mA	398 mA

** Measured at 23 VDC on IDNAC Addressable SLC

Speakers are for connection to compatible fire alarm audio circuits. Anechoic speaker output ratings are typically more representative of actual installed sound output.

Table 17: Equipment compatibility references

Compatible equipment	Data sheet reference
4100ES with EPS+ or EPS Power Supply	S4100-0100
4009 IDNAC Repeater	S4009-0004
4100ES Flex 35 and 50 Watt Amplifiers	S4100-0034
4100ES 100 Watt Amplifiers	
4100ES Constant Supervision and Signal Cards	

Ceiling mount S/V installation reference

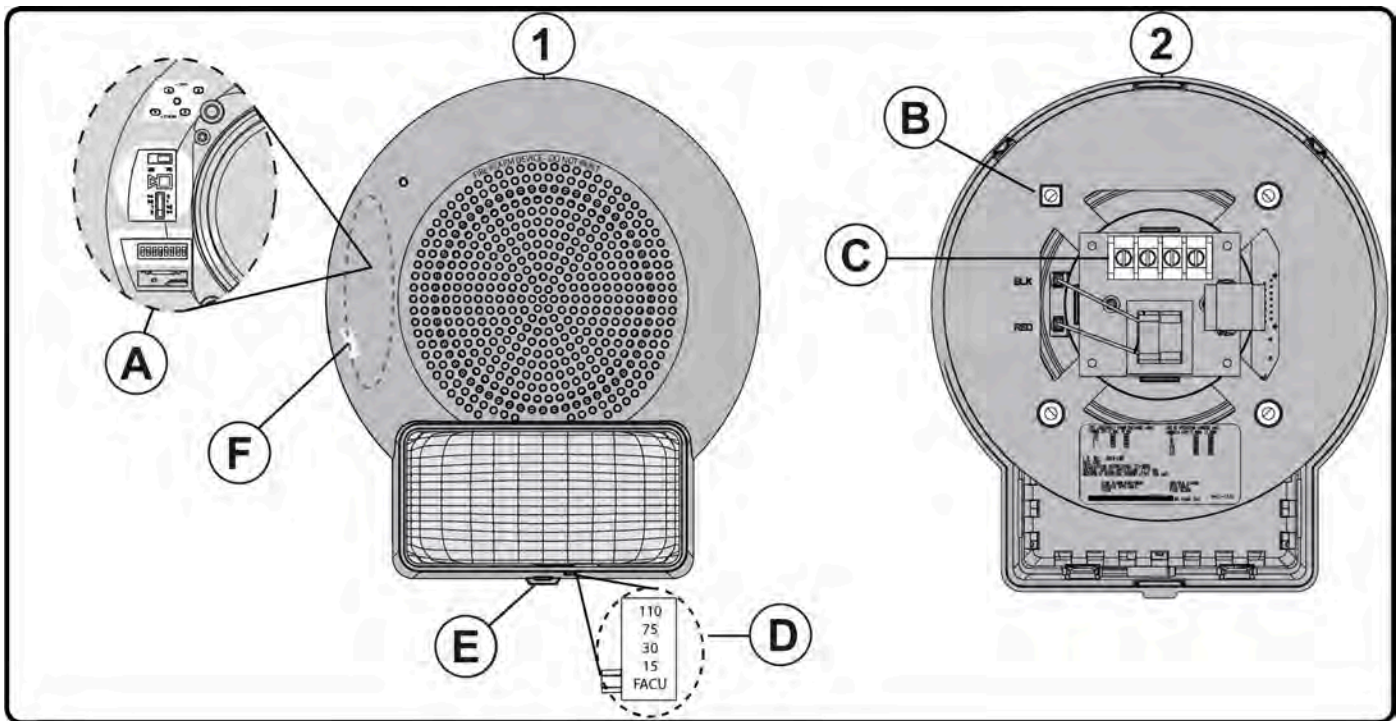


Figure 2: Installation reference

Callout	Description	Callout	Description
1	Appliance with cover, front	2	Appliance, rear
A	Appliance test points, audio circuit power taps, and address dip switch Set audio circuit power taps and device address before fixing cover in place.	B	Mount to 4 in. x 4 in. x 2 1/8 in. electrical box using 8-32 screws. Ceiling mount only.
C	Wiring terminals for speaker and strobe connections. These terminals accept two #12-18 AWG wires.	D	Candela flag setting Set flag to FACU to control candela rating from an FACU providing IDNAC notification. To set candela manually, set the flag to the desired candela rating.
E	Use slotted screwdriver here to remove cover.	F	Magnet test location indicated by area that is not textured.

Features

For use as Class B end-of-line resistor:

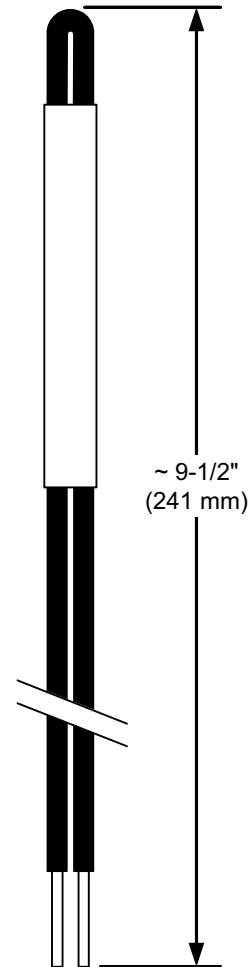
- Connect these resistor harnesses where end-of-line resistors are required at remote locations to monitor wiring continuity
- Refer to specific circuit specifications for end-of-line resistor requirements

UL Listed to Standard 864

Product Selection

Model	Reference Number	Description**
4081-9001	733-892	2.2 kΩ, 1/2 W
4081-9002	733-893	3.3 kΩ, 1 W
4081-9003	733-896	4.7 kΩ, 1/2 W
→ 4081-9004	733-886	6.8 kΩ, 1/2 W
4081-9005	733-984	1.8 kΩ, 1/2 W
4081-9006	733-890	560 Ω, 1 W
4081-9007	733-891	1.2 kΩ, 1 W
4081-9008	733-894	10 kΩ, 1/2 W
4081-9009	733-912	20 Ω, 1 W
4081-9010	733-973	1 kΩ, 1 W
4081-9011	733-974	100 Ω, 1/2 W
4081-9012	733-985	22 kΩ, 1/2 W
4081-9013	734-086	4.99 kΩ, 1/2 W, ± 1%
4081-9014	734-092	2.4 kΩ, 1/2 W
4081-9015	734-093	1.5 kΩ, 1/2 W
4081-9016	734-149	150 kΩ, 1/2 W
4081-9017	734-171	3.9 kΩ, 1 W
4081-9018	734-168	10 kΩ, 1 W

** ± 5% tolerance except as noted.



Typical 4081 Series Resistor Harness Assembly (full size except for lead length)

Specifications

Overall Length	Approximately 9-1/2" (241 mm)
Wire Length	7" (178 mm) ± 1" (25 mm)
Wire Size	18 AWG (0.82 mm ²)
Insulation	600 V, black
Leads	Stripped 0.5" (13 mm); tinned
Resistor Attachment	Resistor leads are crimped to wires and covered with heat shrink tubing

* This product was not approved by ULC, FM, MEA (NYC), or CSFM as of document revision date. Additional listings may be applicable, contact your local Simplex® product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Safety Products Westminster.

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S4081-0003 7/2004

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NO EXCUSES!



E120V-GT



Hybrid Surge Protection Device

Safety and performance is what Eclips is all about. While there are many varying criteria to be considered for surge protective devices (SPD), if the design engineer neglects the importance there can be serious implications for the client and equipment.

Every piece of electrical equipment is designed to operate at a specified nominal voltage. Typically equipment is designed to handle minor variations. However external sources such as lightning, motors, and short circuits cause wild and damaging variations.

Critical systems wired to your electrical service like Fire Alarm Control Panels (FACP), Mass Notification systems, amplifiers, motors, pumps (HVAC), power boosters and many more must require appropriate levels surge protection. The E120 series is an ideal choice for your 120V AC applications. because it has the robustness not only to absorb a spike, but to clamp long enough to trip the branch circuit breaker and still be functional for additional surges.



Standard Features:

- Available in 120 VAC
- UL Listed 1449 3rd Edition Type 2 & 3 2X to open circuit breaker @5000A
- Includes lockout & labels per NFPA 72 2013 10.6.5.2
- Surface or conduit mounting
- Diagnostic indicator light
- Self restoring
- 3 Wire device (18" length)

The number one cause of destruction, degradation and downtime of critical electrical equipment is from power surges and lightning strikes.

The E120V-GT device is an ideal solution to protect equipment. UL listed it maintains system integrity and protects against transients introduced into / onto electrical lines via poor atmospheric and utility conditions as well as internally generated inductive loads and transient TVSS. It reduces system downtime associated with power surges and lightning strikes. Prevents destruction and degradation of electrical components in the system. Fix your nuisance and non-billable service calls as a result of transients and poor power quality and show your customer you care about system integrity.



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ECLIPS

Space Age Electronics, Inc.
www.1SAE.com
800.486.1723 Toll Free
508.485.0966 Local
508.485.4740 Fax

RU® - Uses UL Recognized Components

Specifications:

All 120volt AC equipment will have Transient Voltage Surge Suppression (TVSS) protection manufactured by Space Age Electronics, Inc., part number E120V-GT ECLIPS Brand. The Unit shall be UL listed to standard 1449 rev 3. The unit will be labeled clearly with indelible ink. Mounting can be conduit mounted with a 3/4" pipe threaded nipple to secure in panel, or surface panel mount with 2 external mounting holes. The unit shall have thermal fuses to protect against fire in short circuit conditions. The E120V will have 18" long, 14 gauge wires (3x) ground wire must be green. The enclosure will be a non dielectric material UL94 QMFZ2/8 grade material providing UV protection. The unit shall provide visual indication (LED) that unit is protecting and functioning.

Specifications - Performance:

Short Circuit Current Rating (SCCR) :	5KA
Maximum Surge Current (8x20µs) :	25,000 Amps
Enclosure Material :	UL94 QMFZ2/8 (green)
Energy Dissipation Joules :	500 Joules
VPR=700(L – N) 700 (L – G) 600 (N – G)	
Capacitance :	< 2,000 pf
Clamping Response Time :	< 5 nanoseconds
Current :	Non-Load Bearing
Max Operating Voltage (MCOV) :	140 volts AC, 50/60 Hz
Clamping Voltage :	230 Volts RMS
Design :	Thermally Fused Hybrid
Operation Indicators :	LED
Survivability :	UL rated X2 @5000 Amps to open Series external circuit breaker

Specifications - Operating:

Service Voltage :	120 Single Phase
Circuits Protected :	L-N L-G N-G
Connection Type :	Hardwired
Installation Configuration :	Parallel

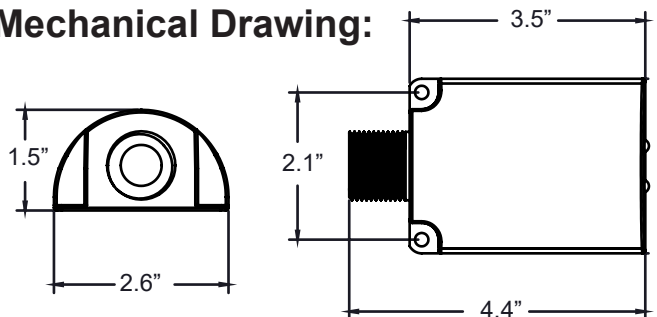
Specifications - Physical:

Weight :	5.2oz
Dimensions :	2.75" x 1.55" x 4" long
Operation Temperature :	-40 to +85° C

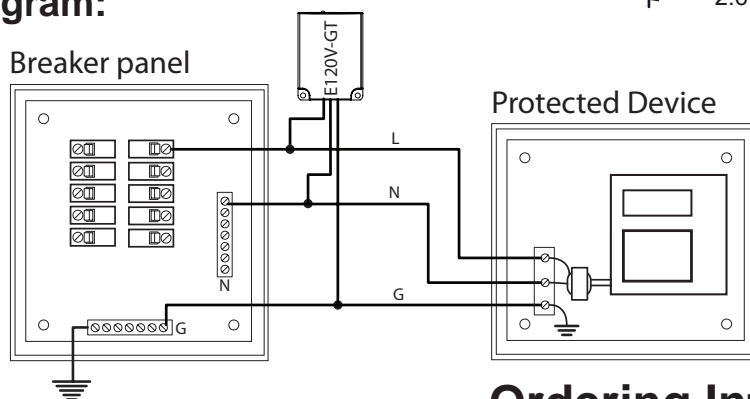
Specifications - Compliance:

UL Listed :	1449 Third Edition - VZCA
File Number :	E319370 Vol. 1 Sec. 1

Mechanical Drawing:



Wiring Diagram:



Ordering Information:

Part #	Description
→ E120V-GT	120V Hybrid Surge Protective Device
ELOCK-FA	Circuit Lockout Kit



Space Age Electronics, Inc.
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No Excuses, Just Solutions!

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DTK-2MHLPB Series

Voice, Data and Signaling Circuit Modular Surge Protection



DTK-2MHLP24B

➔ DTK-2MHLP24BWB

Product Features

- Protects two pairs per module
- Multi-stage, SAD technology, hybrid design, provides the best possible protection
- Field replaceable, modular edge card connection design with a single point ground for fast installation, saves time
- Six voltage levels available to protect all types of voice/data applications
- Hard-wired multi-base mounting system allows you to protect up to ten pairs with a common ground. See next page for base part numbers
- Suitable for use on both AC and DC circuits

Applications

- Fire Alarm Panel NAC, SLC, PIV and IDC Circuits
- Burglar Alarm Panels NAC and IDC Circuits
- 70V Speakers and Audio Equipment
- Low-Voltage Landscape Lighting and Lighting Control Circuits
- 4-20mA Current Loops

Accessories

- To order Module with Base, add "WB" to end of part number
- Test Module Kit – Part Number DTK-2MHLPTM
- DIN Rail Mounting Kit – Part Number DTK-DRK

DITEK's DTK-2MHLPB series of signal, data and loop circuit surge protectors provide robust protection in a compact package. This series was designed for ease of installation, with convenient field-replaceable modules and a Snap-Track base system, allowing the installer to protect multiple circuits while utilizing a common ground point.

Technical Specifications

DTK-2MHLP	5B	12B	24B	36B	48B	75B
Service Voltage:	5V	12V	24V	36V	48V	75V
MCOV:	6V	18V	33V	48V	64V	90V
Clamping Voltage:	6.8V	21.6V	39V	57V	76V	108V
Protection Modes:	Line-Ground (All)					
Surge Current Rating:	20,000 Amps					
Max Continuous Current:	5 Amps					
Data Rate:	200kbps to 2Mbps					

Mechanical Characteristics

Base Connection Method:	10AWG max screw terminals	
Module Connection Method:	Edge card into mounting base	
Housing:	ABS	
Operating Temperature:	-40°F - 158°F (-40°C - 70°C)	
Maximum Humidity:	95% non-condensing	
Dimensions:	Module 2.1"L x 1.4"W x 1.9"H (53mm x 36mm x 48mm)	Module with Base 3.25L" x 1.5"W x 2.6"H (83mm x 38mm x 66mm)
Weight:	1.2 oz (34g)	2.8 oz (79g)

Quality, Standards & Approval

Agency Approvals:	UL497B
Warranty:	Ten Year Limited Warranty

Every precaution has been taken to ensure that this literature is accurate and complete. DITEK Corporation assumes no responsibility and disclaims all liability for damages resulting from the use of this information or for any errors or omissions.



DTK-2MHLPB Series

Voice, Data and Signaling Circuit Modular Surge Protection

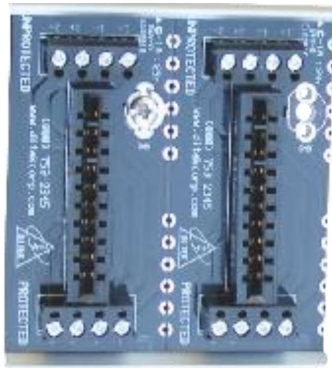


Base Part Numbers and Dimensions

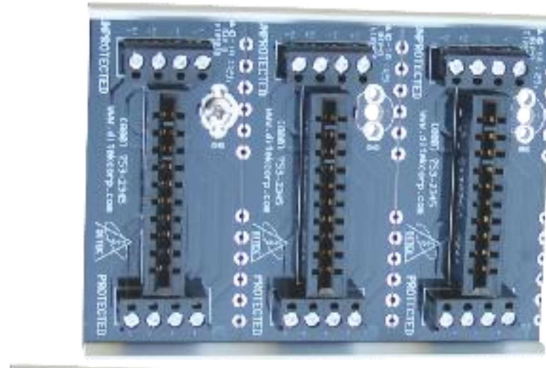
Part Number	# Pairs Protected	Dimensions
DTK-MB10	2	3.25"H x 1.50"W (82.5mm x 38.1mm)
DTK-2MB	4	3.25"H x 3.00"W (82.5mm x 76.2mm)
DTK-3MB	6	3.25"H x 4.50"W (82.5mm x 114.3mm)
DTK-4MB	8	3.25"H x 6.00"W (82.5mm x 152.4mm)
DTK-5MB	10	3.25"H x 7.50"W (82.5mm x 190.5mm)



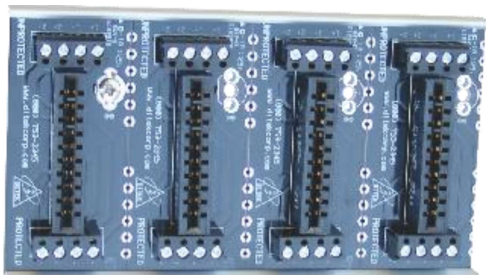
DTK-MB10



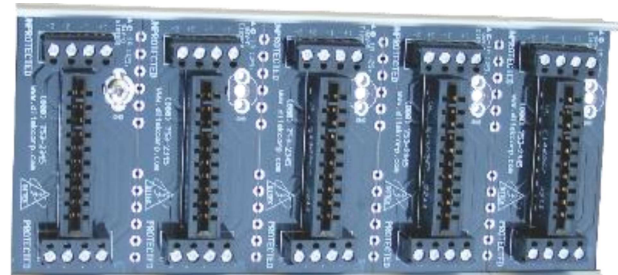
DTK-2MB



DTK-3MB



DTK-4MB



DTK-5MB

Features

Rechargeable, sealed lead-acid batteries:

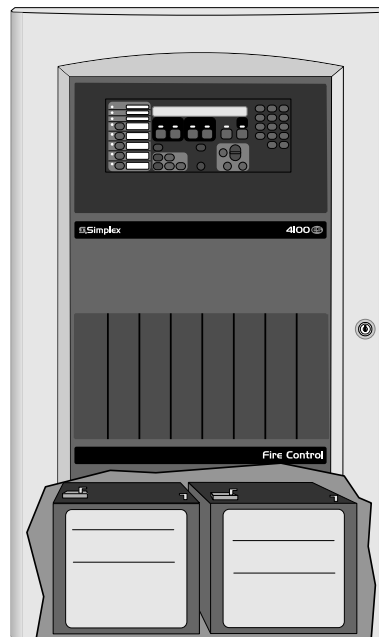
- Lead-calcium grid structure with immobilized electrolyte in absorbent separator
- Low maintenance with no need to add water
- Low self-discharge characteristics
- One-piece, high impact polystyrene cell cover with high reliability dual seal construction
- UL 924 recognized pressure relief valves

Available in a variety of capacities:

- Batteries for internal mounting range from 6.2 Ah up to 50 Ah, depending on control panel cabinet size
- Larger batteries, up to 110 Ah, mount in external battery cabinets with models available with internal chargers

Battery cabinets with chargers:

- Battery cabinets with charger communicate with their connected fire alarm control panel and are available for 4100ES/4010ES/4100U Series and 4010 Series panels

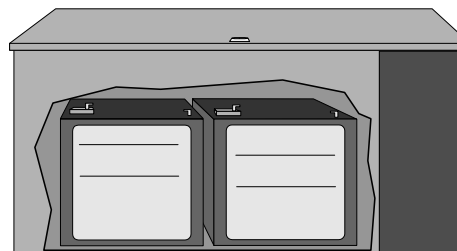


Compatible Sealed Lead-Acid Batteries can be Installed Inside Fire Alarm Control Panel Cabinets

Description

Simplex® rechargeable sealed-lead acid batteries provide reliable and repeatable discharge and recharge characteristics for use in fire alarm and other systems applications. They are designed with immobilized electrolyte in an absorbent separator, allowing them to provide rated capacity on the first cycle.

Because of their sealed construction, packaging is allowed within the system electronics enclosure (see illustration on page 2). When this is applicable, the quantity of system cabinets and the battery wiring distances are both minimized. Where required, external battery cabinets can be close-nipped to the control panel to house larger batteries with battery chargers available in some battery cabinet sizes.



Remote Battery Cabinets are Available for Larger Battery Requirements

Battery Details

Charging. These batteries are intended to be used with compatible Simplex battery chargers.

Series Connections. These batteries are required to be connected in series to produce 24 V system voltage. Battery sets must be of identical voltage, model number, appearance, and approximately the same date of manufacture for proper operation.

Testing. Battery capacity testing is recommended to be performed by using a sealed lead-acid battery tester designed to withdraw a minimum of battery charge. The preferred tester applies a variety of amplitude and duration controlled test pulses that compares terminal voltage against those predicted for the specific battery size. (Testing is available through your local Simplex product supplier.)

Battery Details (Continued)

Shipping. Sealed lead-acid batteries are shipped via ground or sea transportation only. They are not shipped via air.

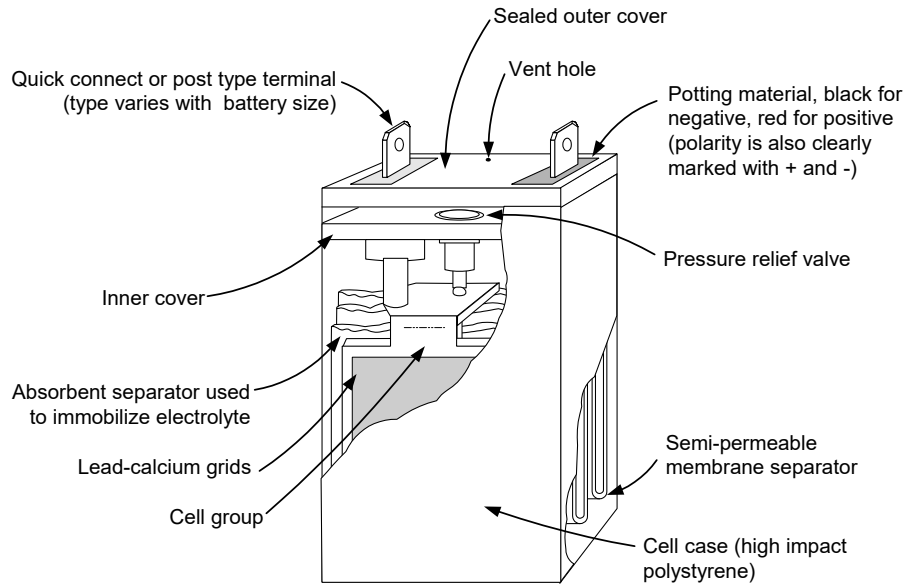
Disposal. Battery chemicals and materials can be recycled. Refer to information shipped with the battery or on its case. Return to the battery manufacturer or to a similarly qualified battery processing facility for proper disposal.

Seismic Activity Applications. Battery brackets are available for systems tested for compliance with specific batteries. Please refer to data sheet S2081-0019 for details.

Refer to details on page 4 and to the referenced individual product data sheets for agency listing status of battery cabinets and chargers. The batteries detailed in this document meet the requirements of UL, ULC, and Factory Mutual for use with respective equipment battery chargers as listed on page 3. Contact your local Simplex product supplier for proper battery selection per system requirements. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

Battery Construction Reference

Actual appearance will vary with battery size.



Battery Size Specifications

Battery Model	Capacity @ 20 Hour Discharge Rate	Width*	Depth*	Height with Terminals	Approximate Weight*
2081-9272	6.2 Ah	6-1/8" (156 mm)	2-5/8" (67 mm)	4" (102 mm)	5.75 lbs (2.6 kg)
2081-9274	10 Ah	6" (153 mm)	4-1/16" (103 mm)	4" (102 mm)	9.2 lbs (4.2 kg)
2081-9288	12.7 Ah	6" (153 mm)	4" (102 mm)	4" (102 mm)	9 lbs (4.1 kg)
2081-9275	18 Ah	7-1/4" (184 mm)	3-3/8" (86 mm)	6-5/8" (168 mm)	14.3 lbs (6.5 kg)
2081-9287	25 Ah	6-5/8" (168 mm)	5" (127 mm)	7" (178 mm)	19.4 lbs (8.8 kg)
2081-9271 (rectangular case, typically for service)	33 Ah	12-1/2" (318 mm)	3-3/8" (86 mm)	7-1/16" (179 mm)	26.6 lbs (12.1 kg)
2081-9276 ("square" case, use for new)	33 Ah	7-3/4" (197 mm)	5-1/4" (133 mm)	6-3/4" (171 mm)	26.5 lbs (12 kg)
→ 2081-9296	50 Ah	9" (229 mm)	5-1/2" (140 mm)	8-7/8" (225 mm)	41.8 lbs (19 kg)
→ 2081-9279	110 Ah	11-3/16" (284 mm)	10-1/2" (267 mm)	9" (230 mm)	82 Lbs (37 kg)

* Dimensions and weight are per battery and are for reference only. Exact size may vary. Refer to the tables on page 3 for mounting compatibility. These batteries are 12 V each and series connected for 24 V system use.

NOTE: When wired in series for 24 V output, these batteries are to be of identical voltage, appearance, model number, and approximately the same date of manufacture.

General Battery Specifications

Nominal Voltage Rating	12 Volts per battery
Discharge Rating	20 Hour Rate
Typical Charge/Discharge Cycles	100 to 150
Preferred Charge Temperature Range	60° F to 90° F (15.6°C to 32.2° C)

Battery Compatibility for Fire Alarm Control Panel Mounting

NOTE: Refer to individual fire alarm control panel product data sheets for additional battery application information

Battery Model	Capacity	Simplex Control Panel Model Series (see legend and notes below)								
		4003EC	4004R	4007ES & 4005	4006 & 4008	4009 (all models)	4010	4010ES	4100ES/4100U	4100 & 4120 (2, 4 or 6-Unit)
2081-9272	6.2 Ah	✓	✓	✓	✓	✓	✓	✓	✓	✓
2081-9274	10 Ah	✓	✓	✓	✓	✓	✓	✓	✓	✓
2081-9288	12.7 Ah	✓	✓	✓	✓	✓	✓	✓	✓	✓
2081-9275	18 Ah	Ext	Note 3	✓	Ext	Ext	Note 2	✓	✓	✓
2081-9287	25 Ah	Ext	Note 3	Ext	Ext	NA	✓	✓	✓	✓
2081-9271 rectangular	33 Ah	Ext	Note 3	Ext	NA	NA	Note 3	✓	✓	Ext
2081-9276 "square"	33 Ah	Ext	Note 3	NA	NA	NA	Note 3	✓	✓	✓
→ 2081-9296	50 Ah	NA	Note 3	NA	NA	NA	Note 3	Note 6	2 or 3 bay	Ext
→ 2081-9279	110 Ah	Requires external battery cabinet, compatible with 4100ES, 4010ES, 4100, and 4120 Series only								

✓ = Can be placed in the respective equipment cabinet

Ext = External battery cabinet is required, refer to selection chart on page 4

NA = Not applicable/not compatible

NOTES:

- These batteries meet the requirements of UL, ULC, and Factory Mutual for use with respective equipment battery chargers listed above. Contact your local Simplex product supplier for proper battery selection per system requirements.
- 4010 Cabinets will accommodate 2081-9275, 18 Ah batteries, but will not allow bottom entry conduit.
- Use 4081 series companion cabinet and charger, refer to page 4.
- Some control panel models are listed for battery replacement reference only.
- For 2 bay international applications only, 50 Ah batteries will fit in the cabinet.

External Battery Cabinet Compatibility Reference

Battery Cabinets without Chargers (connects to charger in panel)

Cabinet	Panel Compatibility	Battery					
		2081-9275 18 Ah*	2081-9287 25 Ah	2081-9271 Rectangular 33 Ah	2081-9276 Square 33 Ah	2081-9296 50 Ah	2081-9279 110 Ah
2081-9280	4100ES, 4010ES, 4100U, and 4100+	NA	NA	NA	NA	NA	✓
2081-9281 2081-9282	multiple	✓	✓	✓	✓	✓	NA
4009-9801	multiple	✓	✓**	NA	NA	NA	NA
4009-9802	multiple	✓	NA	✓	NA	NA	NA

Battery Cabinets with Chargers

Cabinet	Panel Compatibility	2081-9275 18 Ah*	2081-9287 25 Ah	2081-9271 Rectangular 33 Ah	2081-9276 Square 33 Ah	2081-9296 50 Ah	2081-9279 110 Ah
4081-9301 4081-9302	4004R and 4010	✓	✓	✓	✓	✓	NA
4081-9306 4081-9308	4100ES, 4010ES, and 4100U	NA	NA	NA	NA	✓	✓

* Batteries smaller than those listed are normally mounted in the product cabinet

** 25 Ah capacity was effective as of 7/2005.

✓ = Can be placed in the respective equipment cabinet

NA = Not applicable/not compatible

External Battery Cabinet Specification Reference

Battery Cabinets Without Chargers; Shallow Design with Front Door

Model	Color	Listings	Description	Dimensions	
2081-9281	Beige	UL and FM	2-Unit, 4100 style cabinet without charger; with locking solid door and battery shelf, primarily for use with 50 Ah batteries	25-3/4" W x 20-3/4" H x 6-3/4" D (654 mm x 527 mm x 171 mm)	
2081-9282	Red				
4003-9860	Beige	Multiple	Intended for use with 4003EC systems, for up to 33 Ah batteries (refer to 4003EC data sheet S4003-0002)	9-1/2" H x 24" W x 9" D (241 mm x 610 mm x 229 mm)	
4009-9801*	Beige	UL and FM	For up to 25 Ah batteries*	16-1/4" W x 13-1/2" H x 5-3/4" D (413 mm x 343 mm x 146 mm)*	
4009-9802	Beige	UL	For up to 33 Ah batteries		
				External battery cabinet without charger, with locking solid door and battery harness; for close-nipped mounting to fire alarm control panel cabinet	25-3/4" W x 20-3/4" H x 4-1/8" D (654 mm x 527 mm x 105 mm)

* Depth increased for 25 Ah batteries effective 7/2005.

Chargers for use with 4010 Fire Alarm Control Panels and 4004R Suppression Release Systems

(refer to data sheet S4081-0001)

Model	Color	Input Voltage	Description	Dimensions
4081-9301	Beige	120 VAC	Battery cabinet with charger for the 4010 and 4004R fire alarm control panel; for up to 50 Ah batteries ; with front door <i>Listings include: UL, ULC, FM, CSFM, and MEA (NYC), see data sheet for details</i>	22-1/2" W x 16-3/4" H x 8-3/8" D (572 mm x 425 mm x 213 mm)
4081-9302	Red			

Battery Cabinet Without Charger for 110 Ah Batteries; for use with compatible panel mounted chargers

(refer to data sheet S2081-0012)

Model & Listings	Color	Cabinet Description	Compatible Chargers	Charger Description	Dimensions
2081-9280 <i>Listings include: UL and CSFM</i>	Red	Battery cabinet for 2081-9279, 110 Ah batteries; includes 80 A battery fuse, terminals and battery connection cables; see data sheet for details	4010-9xxx Series	4010ES Main System Supply (MSS)	26-1/2" W x 12" H x 12" D (673 mm x 305 mm x 305 mm)
			4100-9xxx Series	4100ES/4100U System Power Supplies (SPS)	
			4100-5111 4100-5112 4100-5113	4100ES/4100U Additional SPS	
			4100-5125 4100-5126 4100-5127	4100ES/4100U Remote Power Supply (RPS)	
			4100-5120 4100-5121 4100-5122	4100ES/4100U TrueAlert Addressable Power Supply (TPS)	
			4100-0104 4100-0114 4100-0124	4100 Legacy power supplies	

4100ES/4010ES/4100U Compatible Battery Cabinet With Charger for 110 Ah Batteries (for ULC listed systems and for other applications unable to use panel mounted power supply charger; refer to data sheet S4081-0002)

Model	Color	Input Voltage	Description	Dimensions
4081-9306	Red	120 VAC	Battery cabinet with charger for up to 110 Ah batteries;	27-7/8" W x 13-1/2" H x 14-5/8" D (708 mm x 343 mm x 371 mm)
4081-9308	Red	220/230/240 VAC, multi-tapped	NOTE: Required for ULC listed charging of 110 Ah batteries; <i>Listings include: UL, ULC, FM, CSFM, and MEA (NYC), see data sheet for details</i>	
4100-9837	Green LED Power-on Indicator Kit, required for ULC listing , mounts above access panel using knockout provided			

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S2081-0006-22 10/2016

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