



CONNECT AND PROTECT

**Contractor
Pocket Reference**


nvent

HOFFMAN

HOFFMAN Has You Covered

From utility junctions to protecting relays, contactors and wire, nVent HOFFMAN has you covered. Our variety of commercial enclosures and wireway are available through local electrical distributors. With nine regional warehouses, HOFFMAN delivers the products you need to complete your projects on time and on budget.

HOFFMAN brings over 70 years of enclosure expertise to the commercial market. As a result, contractors can select from our superior line of pull and junction boxes, enclosures, cabinets, wireway, and new, innovative products.

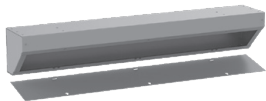


Simple Solutions Speedy Results

CUSTOM PRODUCTS COST EXTRA MONEY AND INCREASE LEAD TIME. TURN TO HOFFMAN FOR THESE NEW, COST-SAVING, OFF-THE-SHELF OFFERINGS.

ANGLED WIRING TROUGH, NEMA TYPE 1

With a patented design that allows conduit runs through the front of the enclosure, the Angled Trough can be mounted against any corner and eliminates the need for conduit bends in electrical rooms and multiple commercial applications.



FEATURES

- Flexible install allows conduit runs through six sides of enclosure, including the front
- Uniquely designed cover is removable and easy to assemble with half the number of screws
- Easy mounting via holes on the back of the enclosure
- Shipped completely assembled with no end caps to install

STAINLESS STEEL PULL BOX AND TROUGH

Type 4X screw-cover pull box and trough enclosures quickly meet your changing project requirements. These new standards are available in one or two days, versus two to three weeks for custom products.



FEATURES

- Pull boxes come in 33 sizes; troughs are available in 15 sizes
- Screw-cover design provides for easy installation with common hardware
- 304 stainless steel with secure gasketing ensures a strong seal
- Pull boxes and trough maintain UL Type 4X rating

For more information, go to nVent.com/HOFFMAN or contact your distributor.

Helping Contractors, One Job at a Time

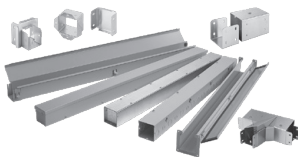
Now more than ever, HOFFMAN has the right products for today's contractor. Not only do we continue to add new products and additional sizes of our most popular boxes and cabinets, our broad distribution network ensures convenient, fast product delivery.

We have what you need for every application – junction boxes, weatherproof outdoor enclosures, basic panel enclosures and wireway.

New product introductions include our cost-saving angled wiring trough, contractor grade stainless steel pull box and trough and pull box extender.

We deliver what you expect – innovative products, competitive pricing, easy ordering and the industry's largest and most-experienced sales and applications staff.

Use this catalog as a reference to our complete range of commercial contractor products.



Product Selection Quick Reference



	Small Enclosures	Medium Enclosures	Large Enclosures	Wireway and Trough
Type 1	Pages 6-14, 16-18	Page 19	Page 20	Pages 44-55, 57-58, 62-65
Type 3, 3R, 4X	Pages 22-31, 36	Pages 32, 36	Pages 34-36	Pages 56, 59-61

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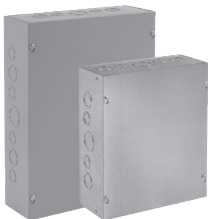
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Type 1

SCREW-COVER, TYPE 1



Reading Catalog Numbers

E = Painted

G = Galvanized

ASE 10 X 8 X 6

H W D

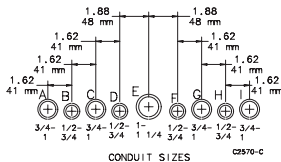
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INDUSTRY STANDARDS

UL 50, 50E Listed; Type 1;
File No. E27525
cUL Listed per CSA C22.2 No 40;
Type 1; File No. E27525

NEMA/EEMAC Type 1

IEC 60529, IP30



Knockout Pattern
(from outside of box)

WITH KNOCKOUTS

Catalog Number	Number of Cover Screws	Knockout Pattern H Sides	Knockout Pattern W Sides
ASE4X4X3	2	B-C	B-C
ASG4X4X3	2	B-C	B-C
ASE6X6X3	2	B-C-D	B-C-D
ASG6X6X3	2	B-C-D	B-C-D
ASE8X6X3	2	F-G-H-I	B-C-D
ASG8X6X3	2	F-G-H-I	B-C-D

Type 1

Catalog Number	Number of Cover Screws	Knockout Pattern H Sides	Knockout Pattern W Sides
ASE16X14X3	4	B-C-D-E-F-G-H	B-C-D-E-F-G-H
ASE18X14X3	4	A-B-C-D-E-F-G-H-I	B-C-D-E-F-G-H
ASE4X4X4	2	B-C	B-C
ASG4X4X4	2	B-C	B-C
ASE6X4X4	2	B-C-D	B-C
ASG6X4X4	2	B-C-D	B-C
ASE6X6X4	2	B-C-D	B-C-D
ASG6X6X4	2	B-C-D	B-C-D
ASE8X6X4	2	F-G-H-I	B-C-D
ASG8X6X4	2	F-G-H-I	B-C-D
ASE8X8X4	4	F-G-H-I	F-G-H-I
ASG8X8X4	4	F-G-H-I	F-G-H-I
ASE10X8X4	4	F-G-H-I	F-G-H-I
ASG10X8X4	4	F-G-H-I	F-G-H-I
ASE10X10X4	4	F-G-H-I	C-D-E-F-G
ASG10X10X4	4	F-G-H-I	C-D-E-F-G
ASE12X8X4	4	C-D-E-F-G	F-G-H-I
ASG12X8X4	4	C-D-E-F-G	F-G-H-I
ASE12X10X4	4	C-D-E-F-G	C-D-E-F-G
ASG12X10X4	4	C-D-E-F-G	C-D-E-F-G
ASE12X12X4	4	C-D-E-F-G	C-D-E-F-G
ASG12X12X4	4	C-D-E-F-G	C-D-E-F-G
ASE16X12X4	4	B-C-D-E-F-G-H	C-D-E-F-G
ASG16X12X4	4	B-C-D-E-F-G-H	C-D-E-F-G
ASE18X12X4	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASG18X12X4	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X18X4	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG18X18X4	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X12X4	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE24X24X4	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG24X24X4	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE30X24X4	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE6X6X6	2	B-C-D	B-C-D
ASG6X6X6	2	B-C-D	B-C-D
ASE8X6X6	2	F-G-H-I	B-C-D
ASE8X8X6	4	F-G-H-I	F-G-H-I
ASG8X8X6	4	F-G-H-I	F-G-H-I

Type 1

Catalog Number	Number of Cover Screws	Knockout Pattern H Sides	Knockout Pattern W Sides
ASE10X8X6	4	F-G-H-I	F-G-H-I
ASG10X8X6	4	F-G-H-I	F-G-H-I
ASE10X10X6	4	F-G-H-I	C-D-E-F-G
ASG10X10X6	4	F-G-H-I	C-D-E-F-G
ASE12X10X6	4	C-D-E-F-G	C-D-E-F-G
ASG12X10X6	4	C-D-E-F-G	C-D-E-F-G
ASE12X12X6	4	C-D-E-F-G	C-D-E-F-G
ASG12X12X6	4	C-D-E-F-G	C-D-E-F-G
ASE16X12X6	4	B-C-D-E-F-G-H	C-D-E-F-G
ASG16X12X6	4	B-C-D-E-F-G-H	C-D-E-F-G
ASE16X16X6	4	B-C-D-E-F-G-H	B-C-D-E-F-G-H
ASG16X16X6	4	B-C-D-E-F-G-H	B-C-D-E-F-G-H
ASE18X12X6	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASG18X12X6	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X18X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG18X18X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X18X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG24X18X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG24X24X6	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE30X24X6	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG30X24X6	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE36X24X6	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE8X8X8	4	F-G-H-I	F-G-H-I
ASE12X12X8	4	C-D-E-F-G	C-D-E-F-G
ASG12X12X8	4	C-D-E-F-G	C-D-E-F-G
ASE16X12X8	4	B-C-D-E-F-G-H	C-D-E-F-G
ASE18X12X8	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE24X12X8	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE24X18X8	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X8	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE36X24X8	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE18X12X10	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X18X10	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X18X10	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X10	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I

Type 1

Catalog Number	Number of Cover Screws	Knockout Pattern H Sides	Knockout Pattern W Sides
ASE36X24X10	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X12X12	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X18X12	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X18X12	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X12	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE30X24X12	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE36X24X12	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I

WITHOUT KNOCKOUTS

Catalog Number	Number of Cover Screws	Catalog Number	Number of Cover Screws
ASE4X4X3NK	2	ASE30X24X6NK	6
ASG4X4X3NK	2	ASG30X24X6NK	6
ASE6X6X3NK	2	ASE30X30X6NK	8
ASG6X6X3NK	2	ASG30X30X6NK	8
ASE8X6X3NK	2	ASE36X24X6NK	6
ASG8X6X3NK	2	ASG36X24X6NK	6
ASE16X14X3NK	4	ASE36X30X6NK	8
ASE20X14X3NK	4	ASE36X36X6NK	8
ASE4X4X4NK	2	ASG36X36X6NK	8
ASG4X4X4NK	2	ASE8X8X8NK	4
ASE6X4X4NK	2	ASG8X8X8NK	4
ASG6X4X4NK	2	ASE10X10X8NK	4
ASE6X6X4NK	2	ASG10X10X8NK	4
ASG6X6X4NK	2	ASE12X10X8NK	4
ASE8X6X4NK	2	ASE12X12X8NK	4
ASG8X6X4NK	2	ASG12X12X8NK	4
ASE8X8X4NK	4	ASE16X12X8NK	4
ASG8X8X4NK	4	ASE18X12X8NK	4
ASE10X6X4NK	4	ASG18X12X8NK	4
ASG10X6X4NK	4	ASE18X18X8NK	4
ASE10X8X4NK	4	ASG18X18X8NK	4
ASG10X8X4NK	4	ASE24X12X8NK	4
ASE10X10X4NK	4	ASG24X12X8NK	4
ASG10X10X4NK	4	ASE24X18X8NK	4
ASE12X6X4NK	4	ASG24X18X8NK	4

Type 1

Catalog Number	Number of Cover Screws	Catalog Number	Number of Cover Screws
ASG12X6X4NK	4	ASE24X20X8NK	4
ASE12X8X4NK	4	ASG24X20X8NK	4
ASG12X8X4NK	4	ASE24X24X8NK	4
ASE12X10X4NK	4	ASG24X24X8NK	4
ASG12X10X4NK	4	ASE30X24X8NK	6
ASE12X12X4NK	4	ASG30X24X8NK	6
ASG12X12X4NK	4	ASE30X30X8NK	8
ASE15X15X4NK	4	ASG30X30X8NK	6
ASG15X15X4NK	4	ASE36X24X8NK	6
ASE16X12X4NK	4	ASG36X24X8NK	6
ASG16X12X4NK	4	ASE36X36X8NK	8
ASE18X12X4NK	4	ASG36X36X8NK	8
ASG18X12X4NK	4	ASE12X12X10NK	4
ASE18X15X4NK	4	ASG12X12X10NK	4
ASG18X18X4NK	4	ASE18X12X10NK	4
ASE24X12X4NK	4	ASE18X18X10NK	4
ASG24X18X4NK	4	ASG18X18X10NK	4
ASE24X18X4NK	4	ASE24X12X10NK	4
ASG24X18X4NK	4	ASE24X18X10NK	4
ASE24X24X4NK	4	ASE24X24X10NK	4
ASG24X24X4NK	4	ASG24X24X10NK	4
ASE30X24X4NK	6	ASE30X24X10NK	6
ASG30X30X4NK	8	ASE30X30X10NK	8
ASE6X6X6NK	2	ASG30X30X10NK	8
ASG6X6X6NK	2	ASE36X24X10NK	6
ASE8X6X6NK	2	ASG36X24X10NK	6
ASG8X6X6NK	2	ASE36X36X10NK	8
ASE8X8X6NK	4	ASG36X36X10NK	8
ASG8X8X6NK	4	ASE12X12X12NK	4
ASE10X8X6NK	4	ASG12X12X12NK	4
ASG10X8X6NK	4	ASE24X12X12NK	4
ASE10X10X6NK	4	ASG24X12X12NK	4
ASG10X10X6NK	4	ASE18X18X12NK	4
ASE12X6X6NK	4	ASG18X18X12NK	4

Type 1

Catalog Number	Number of Cover Screws	Catalog Number	Number of Cover Screws
ASE12X8X6NK	4	ASE24X18X12NK	4
ASG12X8X6NK	4	ASE24X24X12NK	4
ASE12X10X6NK	4	ASG24X24X12NK	4
ASG12X10X6NK	4	ASE30X24X12NK	6
ASE12X12X6NK	4	ASE30X30X12NK	8
ASG12X12X6NK	4	ASG30X30X12NK	8
ASE16X12X6NK	4	ASE36X24X12NK	6
ASG16X12X6NK	4	ASG36X24X12NK	6
ASE16X16X6NK	4	ASE36X36X12NK	8
ASG16X16X6NK	4	ASG36X36X12NK	8
ASE18X12X6NK	4	ASE48X48X12NK	12
ASG18X12X6NK	4	ASG48X48X12NK	12
ASE18X18X6NK	4	ASE30X30X16NK	8
ASG18X18X6NK	4	ASE36X36X16NK	8
ASE24X12X6NK	4	ASG36X36X16NK	8
ASG24X12X6NK	4	ASE48X48X16NK	12
ASE24X18X6NK	4	ASG48X48X16NK	12
ASG24X18X6NK	4		
ASE24X20X6NK	4		
ASG24X20X6NK	4		
ASE24X24X6NK	4		
ASG24X24X6NK	4		

Type 1

SCREW-COVER PULL BOX, TYPE 1, ACCESSORIES

FLUSH-MOUNT DOOR FRAMES



Catalog Number	Door Size in./mm	Fits Box Size in./mm
AFDF0606P	3.00 x 3.00 (76 x 76)	6.00 x 6.00 (152 x 152)
AFDF1212P	9.00 x 9.00 (229 x 229)	12.00 x 12.00 (305 x 305)
AFDF1812P	15.00 x 9.00 (381 x 229)	18.00 x 12.00 (457 x 305)
AFDF1818P	15.00 x 15.00 (381 x 381)	18.00 x 18.00 (457 x 457)
AFDF2418P	21.00 x 15.00 (533 x 381)	24.00 x 18.00 (610 x 457)
AFDF2424P	21.00 x 21.00 (533 x 533)	24.00 x 24.00 (610 x 610)
AFDF3024P	27.00 x 21.00 (686 x 533)	30.00 x 24.00 (762 x 610)

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FLUSH COVER



Catalog Number	Fits Box Size in./mm
AFE6X6	6.00 x 6.00 (152 x 152)
AFE8X6	8.00 x 6.00 (203 x 152)
AFE8X8	8.00 x 8.00 (203 x 203)
AFE10X8	10.00 x 8.00 (254 x 203)
AFE12X8	12.00 x 8.00 (305 x 203)
AFE10X10	10.00 x 10.00 (254 x 254)
AFE12X12	12.00 x 12.00 (305 x 305)
AFE18X12	18.00 x 12.00 (457 x 305)
AFE18X18	18.00 x 18.00 (457 x 457)
AFE24X18	24.00 x 18.00 (610 x 457)
AFE 24X24	24.00 x 24.00 (610 x 610)

BULLETIN: A90P1

TYPE 1 LOCKING WINDOW PULL BOX ACCESSORY



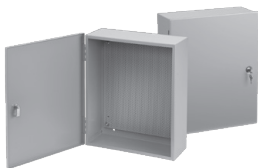
Catalog Number	Frame Size in. (mm)	Dead Front Panel Size in. (mm)
ALDF88W	9.00 x 9.00 (229 x 293)	6.00 x 6.14 (152 x 99)
ALDF1212W	13.00 x 13.00 (330 x 330)	10.00 x 10.14 (254 x 200)

BULLETIN: A90P1

Type 1

LOCKING INTEGRATED PERFORATED PANEL ENCLOSURE, TYPE 1

FLUSH-MOUNT DOOR FRAMES



Reading Catalog Numbers

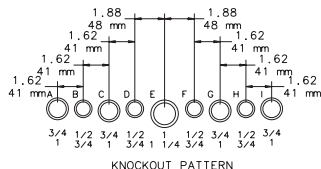
A 12 12 6 T1 PP
H W D

BULLETIN: A90P1

INDUSTRY STANDARDS

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

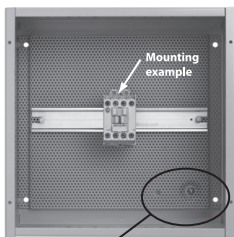
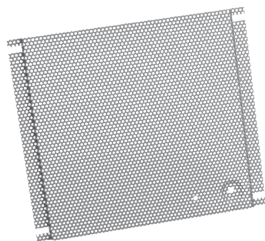
NEMA/EEMAC Type 1
IEC 60529, IP30



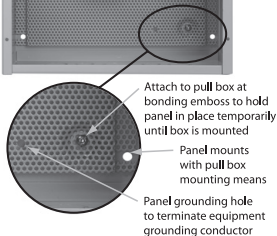
Catalog Number	Panel Size in. (mm)	Mounting Holes in. (mm)	Knockout Pattern H Sides	Knockout Pattern W Sides
A12126T1PP	10.25 x 10.25 (260 x 260)	9.00 x 11.00 (229 x 279)	C-D-E-F-G	C-D-E-F-G
A16126T1PP	14.25 x 10.25 (362 x 260)	13.00 x 11.00 (330 x 279)	B-C-D-E-F-G-H	C-D-E-F-G
A2016AT1PP	17.00 x 14.50 (432 x 368)	17.88 x 11.00 (454 x 279)	A-B-C-D-E-F-G-H-I	B-C-D-E-F-G-H
A2420AT1PP	21.00 x 18.50 (533 x 470)	21.88 x 15.00 (556 x 381)	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
A3624AT1PP	32.00 x 22.50 (813 x 572)	33.50 x 16.75 (851 x 425)	—	—
A3630AT1PP	32.00 x 31.50 (813 x 800)	33.50 x 22.75 (851 x 578)	—	—

Type 1

TYPE 1 PULL BOX PERFORATED PANEL



BULLETIN: PNLPP



Catalog Number	Panel Gauge	Panel Size (in.)	Panel Size (mm)	Fits Pull Box	Fits Hinged Cover Cutout Box
PB66PP	16	4.40 x 5.50	112 x 140	ASE6X6X__	AHE6X6X__
PB88PP	16	6.40 x 7.50	163 x 191	ASE8X8X__	AHE8X8X__
PB1212PP	16	10.40 x 11.50	264 x 292	ASE12X12X__	AHE12X12X__
PB1818PP	16	16.40 x 17.50	417 x 445	ASE18X18X__	AHE18X18X__
PB2424PP	16	22.40 x 23.50	569 x 597	ASE24X24X__	AHE14X14X__

Type 1

T1FLO VENTED ENCLOSURE WITH FAN, TYPE 1



BULLETIN: A90P1

INDUSTRY STANDARD

UL 508A Listed; Type 1; File No. E61997
cUL Listed per CSA C22.2 No. 94;
Type 1; File No. E61997

NEMA/EEMAC Type 1
IEC 60529, IP20

Catalog Number	Size H x W x D in. (mm)	Suggested HP	Solid Panel	Perforated Panel
T1F80LP	28.00 x 24.00 x 12.75 (711 x 610 x 324)	3	A24P24	A24P24PP
T1F130LP	34.00 x 24.00 x 12.75 (864 x 610 x 324)	Up to 20	A30P24	A30P24PP
T1F200LP	40.00 x 24.00 x 12.75 (1016 x 610 x 324)	40	A36P24	A36P24PP
T1F350LP	54.00 x 30.00 x 12.75 (1372 x 762 x 324)	Up to 75	A48P30	—

Type 1

HINGED-COVER, TYPE 1



BULLETIN: A90P1

Reading Catalog Numbers

AHE 10 X 8 X 6
H W D

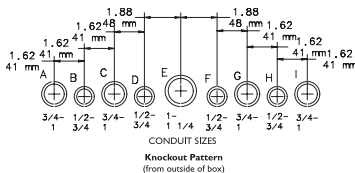
INDUSTRY STANDARD

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



Catalog Number	Knockout Pattern H Sides	Knockout Pattern W Sides
AHE6X4X4	B-C-D	B-C
AHE6X6X4	B-C-D	B-C-D
AHE8X6X4	F-G-H-I	B-C-D
AHE8X8X4	F-G-H-I	F-G-H-I
AHE10X8X4	F-G-H-I	F-G-H-I
AHE10X10X4	F-G-H-I	C-D-E-F-G
AHE12X8X4	C-D-E-F-G	F-G-H-I
AHE12X10X4	C-D-E-F-G	C-D-E-F-G
AHE12X12X4	C-D-E-F-G	C-D-E-F-G
AHE16X12X4	B-C-D-E-F-G-H	C-D-E-F-G
AHE18X12X4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
AHE6X6X6	B-C-D	B-C-D
AHE8X8X6	F-G-H-I	F-G-H-I

Type 1

Catalog Number	Knockout Pattern H Sides	Knockout Pattern W Sides
AHE10X8X6	F-G-H-I	F-G-H-I
AHE10X10X6	F-G-H-I	C-D-E-F-G
AHE12X10X6	C-D-E-F-G	C-D-E-F-G
AHE12X12X6	C-D-E-F-G	C-D-E-F-G
AHE16X12X6	B-C-D-E-F-G-H	C-D-E-F-G
AHE16X16X6	B-C-D-E-F-G-H	B-C-D-E-F-G-H
AHE18X12X6	A-B-C-D-E-F-G-H-I	C-D-E-F-G
AHE18X18X6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
AHE24X18X6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
AHE24X24X6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
AHE30X24X6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
AHE36X24X6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
AHE36X24X8	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I

Type 1

SMALL, TYPE 1



BULLETIN: A1SM

Reading Catalog Numbers

A	10	N	10	4
	H		W	D

INDUSTRY STANDARD

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

Catalog Number	Panel ^a	Perforated Panel ^a
A6N64	A6N6P	A6N6PP
A8N64	A8N6P	A8N6PP
A8N84	A8N8P	A8N8PP
A10N84	A10N8P	A10N8PP
A10N104	A10N10P	A10N10PP
A12N104	A12N10P	A12N10PP
A12N124	A12N12P	A12N12PP
A14N124	A14N12P	A14N12PP
A8N66	A8N6P	A8N6PP
A8N86	A8N8P	A8N8PP

Catalog Number	Panel ^a	Perforated Panel ^a
A10N86	A10N8P	A10N8PP
A10N106	A10N10P	A10N10PP
A12N106	A12N10P	A12N10PP
A12N126	A12N12P	A12N12PP
A14N126	A14N12P	A14N12PP
A16N126	A16N12P	A16N12PP
A20N126	A20N12P	A20N12PP
A12N128	A12N12P	A12N12PP
A14N128	A14N12P	A14N12PP

^aPurchase panels separately

Type 1

MEDIUM, TYPE 1



BULLETIN: A1M

Reading Catalog Numbers

A	16	N	12	ALP	A = 6.62 in.
	H		W	D	B = 8.62 in.
					C = 10.62 in.
					D = 12.62 in.

INDUSTRY STANDARD

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

Catalog Number	Panel ^a	Perforated Panel ^a
A16N12ALP	A16N12MP	A16N12MPP
A16N16ALP	A16N16MP	A16N16MPP
A16N20ALP	A16N20MP	A16N20MPP
A20N16ALP	A20N16MP	A20N16MPP
A20N20ALP	A20N20MP	A20N20MPP
A24N16ALP	A24N16MP	A24N16MPP
A24N20ALP	A24N20MP	A24N20MPP
A24N24ALP	A24N24MP	A24N24MPP*
A30N24ALP	A30N24MP	A30N24MPP*
A36N24ALP	A36N24MP	A36N24MPP*
A36N30ALP	A36N30MP	A36N30MPP*
A16N12BLP	A16N12MP	A16N12MPP
A20N12BLP	A20N12MP	A20N12MPP
A20N16BLP	A20N16MP	A20N16MPP
A20N20BLP	A20N20MP	A20N20MPP

Catalog Number	Panel ^a	Perforated Panel ^a
A24N20BLP	A24N20MP	A24N20MPP
A24N24BLP	A24N24MP	A24N24MPP*
A30N20BLP	A30N20MP	A30N20MPP*
A30N24BLP	A30N24MP	A30N24MPP*
A30N30BLP	A30N30MP	A30N30MPP*
A36N24BLP	A36N24MP	A36N24MPP*
A36N30BLP	A36N30MP	A36N30MPP*
A18N18CLP	A18N18MP	A18N18MPP
A24N20CLP	A24N20MP	A24N20MPP
A30N24CLP	A30N24MP	A30N24MPP
A24N24DLP	A24N24MP	A24N24MPP*
A30N24DLP	A30N24MP	A30N24MPP*
A36N30DLP	A36N30MP	A36N30MPP*

^aPurchase panels separately

*Flanged on all four sides

Type 1

LARGE, TYPE 1



BULLETIN: A1L

Reading Catalog Numbers

A	42	N	30	09
	H		W	D

INDUSTRY STANDARD

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

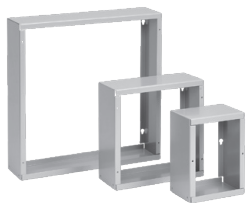
Catalog Number	Panel*
A42N3009	A42P30
A42N3609	A42P36
A48N3609	A48P36
A48N3611	A48P36
A42N3013	A42P30
A42N3613	A42P36
A48N3613	A48P36
A48N3617	A48P36

*Purchase panels separately. Optional aluminum panels are available for most sizes.

Purchase enclosure Mounting Bracket Kit accessory (AMFLN1) separately.

Type 1

SCREW-COVER PULL BOX EXTENDER, TYPE 1



BULLETIN: A90P1

Reading Catalog Numbers

A 6 6 4 **SUG** SU = Painted
H W D G = Galvanized

INDUSTRY STANDARD

UL 50, 50E Listed; Type 1; File No. E27525

cUL Listed per CSA C22.2 No 40; Type 1; File No. E27525

NEMA /EEMAC Type 1

IEC 60529, IP30

Catalog Number	Finish
A664SU	Painted
A664SUG	Galvanized
A864SU	Painted
A864SUG	Galvanized
A884SU	Painted
A884SUG	Galvanized
A1084SU	Galvanized
A1084SUG	Galvanized
A10104SU	Painted
A10104SUG	Galvanized
A1264SU	Painted
A1264SUG	Galvanized
A1284SU	Painted
A1284SUG	Galvanized
A12104SU	Painted
A12104SUG	Galvanized
A12124SU	Painted
A12124SUG	Galvanized
A16124SU	Painted
A16124SUG	Galvanized

Catalog Number	Finish
A16164SU	Painted
A16164SUG	Galvanized
A18124SU	Painted
A18124SUG	Galvanized
A18184SU	Painted
A18184SUG	Galvanized
A24124SU	Painted
A24124SUG	Galvanized
A24184SU	Painted
A24184SUG	Galvanized
A24244SU	Painted
A24244SUG	Galvanized
A30244SU	Painted
A30244SUG	Galvanized
A30304SU	Painted
A30304SUG	Galvanized
A36244SU	Painted
A36244SUG	Galvanized
A36364SU	Painted
A36364SUG	Galvanized

Type 3, 3R, 4, 4X

WEATHERFLO WITH FAN, TYPE 3R



BULLETIN: A3RD

INDUSTRY STANDARDS

UL 508A Listed; Type 3R; File Number E61997

cUL Listed per CSA C22.2 No 94; Type 3R; File Number E61997

NEMA/EEMAC Type 3R

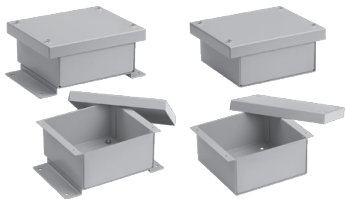
IEC 60529, IP32

Catalog Number	Enclosure Size H x W x D in. (mm)	Panel ^a	System CFM
WF3LP	29.00 x 24.00 x 12.00 (737 x 610 x 305)	A24P24	75
WF10LP	35.00 x 24.00 x 12.00 (889 x 610 x 305)	A30P24	160
WF25LP	41.00 x 24.00 x 12.00 (1041 x 610 x 305)	A36P24	160
WF40LP	47.00 x 24.00 x 14.00 (1194 x 610 x 356)	A42P24	200
WF75LP	55.00 x 36.00 x 16.00 (1397 x 914 x 406)	A48P36	400
WF100LP	67.00 x 36.00 x 16.00 (1702 x 914 x 706)	A60P36	500

^aPurchase panels separately

Type 3, 3R, 4, 4X

HORIZONTAL-MOUNT, TYPE 3R



Reading Catalog Numbers

A	12	R	12	6
	H		W	D

BULLETIN: A90RH

Catalog Number

A8R84HM

A10R104HM

A12R126HM

A24R206HM

INDUSTRY STANDARDS

Maintains Type 3R rating when mounted horizontally. Maintains Type 1 rating when mounted vertically.

UL 50, 50E Listed; Type 3R;

File No. E27525

cUL Listed per CSA C22.2 No 94;

Type 3R; File No. E27525

NEMA/EEMAC Type 3R

IEC 60529, IP32

Type 3, 3R, 4, 4X

TYPE 3, 3R, 4, 4X SCREW-COVER, TYPE 3R



Reading Catalog Numbers

A 12 R 10 4
H W D

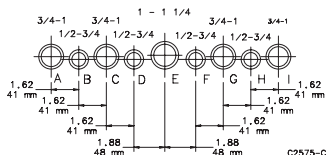
BULLETIN: A90S3

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27525
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E27525

NEMA/EEMAC Type 3R

IEC 60529, IP32



Catalog Number	Body Style	Knockout Pattern
A4R44	A	B-C
A6R44	A	B-C
A12R44	A	B-C
A6R64	A	B-C-D
A8R64	A	B-C-D
A8R84	A	F-G-H-I
A10R84	A	F-G-H-I
A12R84	A	F-G-H-I
A10R104	A	C-D-E-F-G
A12R104	A	C-D-E-F-G
A12R124	A	C-D-E-F-G
A18R124	A	C-D-E-F-G
A18R184	B	A-B-C-D-E-F-G-H-I
A6R66	A	B-C-D
A8R86	A	F-G-H-I
A10R86	A	F-G-H-I
A10R106	A	C-D-E-F-G
A12R86	A	F-G-H-I

Type 3, 3R, 4, 4X

Catalog Number	Body Style	Knockout Pattern
A12R106	A	C-D-E-F-G
A12R126	A	C-D-E-F-G
A15R126	A	C-D-E-F-G
A16R126	A	C-D-E-F-G
A18R126	A	C-D-E-F-G
A18R186	B	A-B-C-D-E-F-G-H-I
A24R126	B	C-D-E-F-G
A24R186	B	A-B-C-D-E-F-G-H-I
A24R246	B	A-B-C-D-E-F-G-H-I
A8R88	A	F-G-H-I
A12R128	A	C-D-E-F-G
A15R128	A	C-D-E-F-G
A18R128	A	C-D-E-F-G
A24R168	B	C-D-E-F-G
A18R188	B	A-B-C-D-E-F-G-H-I
A24R188	B	A-B-C-D-E-F-G-H-I
A24R208	B	A-B-C-D-E-F-G-H-I
A24R248	C	A-B-C-D-E-F-G-H-I
A30R248	C	A-B-C-D-E-F-G-H-I
A48R368	C	A-B-C-D-E-F-G-H-I
A18R1810	B	A-B-C-D-E-F-G-H-I
A24R1810	B	A-B-C-D-E-F-G-H-I
A24R2410	C	A-B-C-D-E-F-G-H-I
A30R2410	C	A-B-C-D-E-F-G-H-I
A24R2412	C	A-B-C-D-E-F-G-H-I
A30R3012	C	A-B-C-D-E-F-G-H-I
A36R3012	C	A-B-C-D-E-F-G-H-I
A36R3612	C	A-B-C-D-E-F-G-H-I
A30R3016	C	A-B-C-D-E-F-G-H-I
A48R3616	C	A-B-C-D-E-F-G-H-I

Type 3, 3R, 4, 4X

SCREW-COVER WITHOUT KNOCKOUTS, TYPE 3R



Reading Catalog Numbers

A 12 R 12 4 NK

H W D

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27525
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E27525

NEMA/EEMAC Type 3R

IEC 60529, IP32

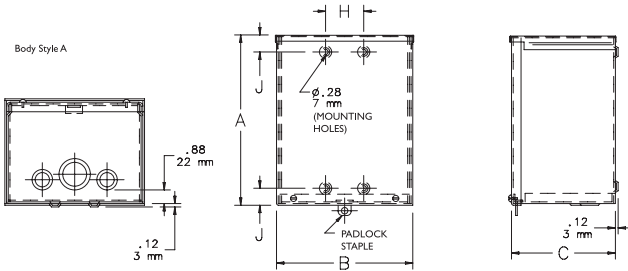
BULLETIN: A90S3

Catalog Number	Body Style
A4R44NK	A
A6R64NK	A
A8R64NK	A
A8R84NK	A
A10R84NK	A
A12R84NK	A
A10R104NK	A
A12R104NK	A
A12R124NK	A
A18R184NK	B
A6R66NK	A
A18R66NK	A
A8R86NK	A
A10R86NK	A
A10R106NK	A
A12R106NK	A
A12R126NK	A
A15R126NK	A
A16R126NK	A
A18R126NK	A
A18R186NK	B
A24R186NK	B
A24R246NK	B

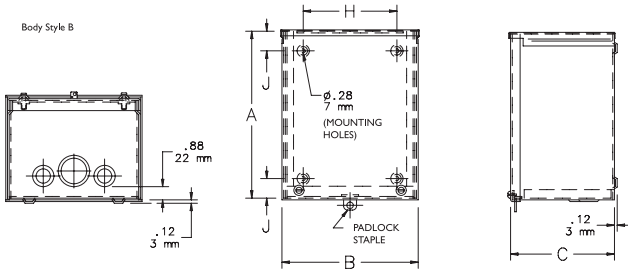
Catalog Number	Body Style
A8R88NK	A
A24R88NK	A
A12R128NK	A
A15R128NK	A
A18R128NK	A
A18R188NK	B
A24R188NK	B
A24R208NK	B
A24R248NK	C
A30R248NK	C
A48R368NK	C
A24R2410NK	C
A24R2412NK	C
A30R3012NK	C
A36R3012NK	C
A36R3612NK	C
A30R3016NK	C
A48R3616NK	C

Type 3, 3R, 4, 4X

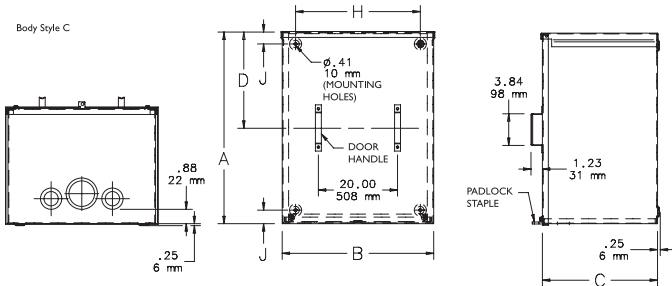
Body Style A



Body Style B



Body Style C



Type 3, 3R, 4, 4X

SCREW-COVER GALVANIZED, TYPE 3R



INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27525
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E27525

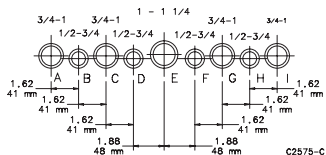
NEMA/EEMAC Type 3R

IEC 60529, IP32

Reading Catalog Numbers

A 12 R 12 4 GV
H W D

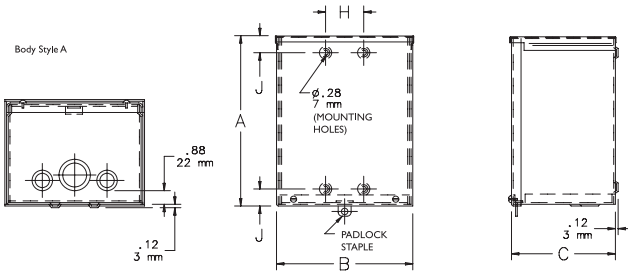
BULLETIN: A90G3



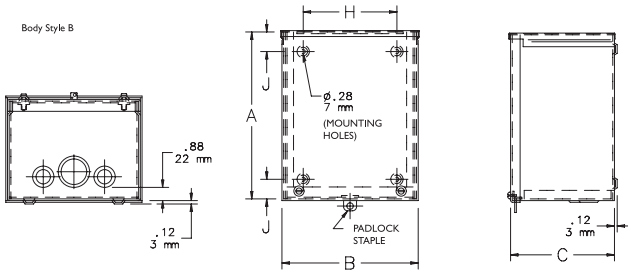
Catalog Number	Body Style	Knockout Pattern
A4R44GV	A	B-C
A6R64GV	A	B-C
A8R84GV	A	B-C-D
A10R104GV	A	C-D-E-F-G
A12R124GV	A	C-D-E-F-G
A6R66GV	A	B-C-D
A8R86GV	A	F-G-H-I
A10R106GV	A	C-D-E-F-G
A12R126GV	A	C-D-E-F-G
A18R186GV	B	A-B-C-D-E-F-G-H-I
A8R88GV	A	F-G-H-I
A8R88GVNK	A	—
A10R108GVNK	A	—
A12R128GV	A	C-D-E-F-G
A24R248GV	C	A-B-C-D-E-F-G-H-I
A24R2410GV	C	A-B-C-D-E-F-G-H-I

Type 3, 3R, 4, 4X

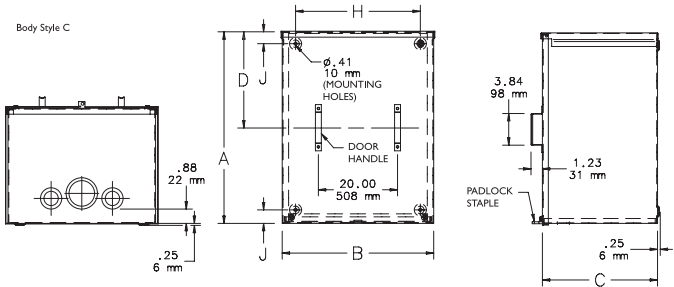
Body Style A



Body Style B



Body Style C



Type 3, 3R, 4, 4X

SCREW-COVER GASKETED, TYPE 3



Reading Catalog Numbers

A 6 6 4 GSC
H W D

BULLETIN: A90GS

INDUSTRY STANDARDS

UL 508A Listed; Type 3, 12;
File No. E61997
cUL Listed per CSA C22.2 No 94;
Type 3, 12; File No. E61997

NEMA/EEMAC Type 3 and 12 (except for
mounting provisions)

CSA, File 42184: Type 4 and 12

IEC 60529, IP66

Catalog Number

A664GSC
A864GSC
A884GSC
A1084GSC
A10104GSC
A12124GSC
A666GSC
A886GSC
A10106GSC
A12106GSC
A12126GSC
A16126GSC
A16166GSC
A18186GSC
A20166GSC
A24246GSC
A888GSC
A10108GSC

Catalog Number

A12128GSC
A16168GSC
A20208GSC
A24208GSC
A24248GSC
A30248GSC
A242410GSC
A121212GSC
A161612GSC
A202012GSC
A242412GSC
A303012GSC
A363612GSC

Type 3, 3R, 4, 4X

HINGED-COVER SMALL, TYPE 3R



Reading Catalog Numbers

A	6	R	6	4	HCR
H		W		D	

BULLETIN: A3SM

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27567
cUL Listed per CSA C22.2 No 94;
Type 3R File No. E27567

NEMA/EEMAC Type 3R
IEC 60529, IP32

Catalog Number	Panel ^a	Perforated Panel ^a
A6R44HCR	A6N4P	—
A6R64HCR	A6N6P	A6N6PP
A8R64HCR	A8N6P	A8N6PP
A8R86HCR	A8N8P	A8N8PP
A10R86HCR	A10N8P	A10N8PP
A12R106HCR	A12N10P	A12N10PP
A12R126HCR	A12N12P	A12N12PP
A12R1210HCR	A12N12P	A12N12PP

^aPurchase panels separately

Type 3, 3R, 4, 4X

HINGED-COVER MEDIUM, TYPE 3R



Reading Catalog Numbers

A	16	R	12	6	HCR
	H		W	D	

BULLETIN: A3M

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27567
cUL Listed per CSA C22.2 No 94;
Type 3R File No. E27567

NEMA/EEMAC Type 3R

IEC 60529, IP32

Catalog Number	Panel ^a	Perforated Panel ^a
A16R126HCR	A16P12	A16P12PP
A16R166HCR	A16P16	A16P16PP
A18R186HCR	A18P18	A18P18PP
A20R166HCR	A20P16	A20P16PP
A20R208HCR	A20P20	A20P20PP
A24R208HCR	A24P20	A24P20PP
A24R248HCR	A24P24	A24P24PP*
A30R248HCR	A30P24	A30P24PP*
A30R308HCR	A30P30	A30P30PP*
A18R1810HCR	A18P18	A18P18PP
A24R2410HCR	A24P24	A24P24PP*
A30R2410HCR	A30P24	A30P24PP*
A36R3610HCR	A36P36	A36P36PP*
A30R3012HCR	A30P30	A30P30PP*

Catalog Number	Panel ^a	Perforated Panel ^a
A36R2412HCR	A36P24	A36P24PP*
A36R3012HCR	A36P30	A36P30PP*
A36R3612HCR	A36P36	A36P36PP*
A42R3012HCR	A42P30	—
A42R3612HCR	A42P36	—
A48R3612HCR	A48P36	—
A60R3612HCR	A60P36	—
A30R3016HCR	A30P30	A30P30PP*
A48R3616HCR	A48P36	—

^aPurchase panels separately

*Flanged on all four sides

Type 3, 3R, 4, 4X

HINGED-COVER LIFT-OFF, TYPE 3R



Reading Catalog Numbers

A 16 R 12 6 HCLO
H W D

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27567
cUL Listed per CSA C22.2 No 94;
Type 3R File No. E27567

NEMA/EEMAC Type 3R
CSA, File 42184: Type 3R
IEC 60529, IP32

BULLETIN: A3LO

Catalog Number	Panel ^a	Panel Mounting Kit ^b	Mounting Bracket Kit ^b
A8R64HCLO	A6P6	APMK3RLO16	AMFK3RLO16
A8R86HCLO	A8P6	APMK3RLO16	AMFK3RLO16
A10R86HCLO	A8P8	APMK3RLO16	APMK3RLO16
A12R106HCLO	A10P10	APMK3RLO16	AMFK3RLO16
A12R126HCLO	A12P10	APMK3RLO16	AMFK3RLO16
A16R126HCLO	A14P12	APMK3RLO16	AMFK3RLO16
A16R166HCLO	A16P16	APMK3RLO14	AMFK3RLO14
A20R166HCLO	A20P16	APMK3RLO14	AMFK3RLO14
A20R208HCLO	A20P20	APMK3RLO14	AMFK3RLO14
A24R208HCLO	A24P20	APMK3RLO14	AMFK3RLO14
A24R248HCLO	A24P24	APMK3RLO14	AMFK3RLO14
A30R248HCLO	A30P24	APMK3RLO14	AMFK3RLO14

^aPurchase panels separately

^bOrder Panel Mounting Kit and Mounting Bracket Kit separately
(A Panel Mounting Kit must be ordered to install panel.)

Type 3, 3R, 4, 4X

WEATHERPRO OUTDOOR PAD-MOUNT, TYPE 3R



Reading Catalog Numbers

A	60	R	28	18	FSLP
	H		W	D	

BULLETIN: A3M

INDUSTRY STANDARDS

UL 508A Listed; Type 3R;
File No. E61997
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E61997

NEMA/EEMAC Type 3R

IEC 60529, IP32

Catalog Number	Panel
A60R2518FSLP	A49P21N
A60R2524FSLP	A49P21N
A72R2518FSLP	A61P21N
A60R3618FSLP	A49P32N
A72R3618FSLP	A61P32N
A72R3624FSLP	A61P32N

Purchase panels separately

Type 3, 3R, 4, 4X

WEATHERPRO OUTDOOR PAD-MOUNT, TYPE 3R



Reading Catalog Numbers

A	60	R	52	18	FSLP
H		W		D	

BULLETIN: A3LO

INDUSTRY STANDARDS

UL 508A Listed; Type 3R;
File No. E61997
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E61997

NEMA/EEMAC Type 3R

IEC 60529, IP32

Catalog Number	Panel
A60R5218FSLP	A49P48N
A60R5224FSLP	A49P48N
A60R7224FSLP	A49P68N
A72R7218FSLP	A61P68N
A72R7224FSLP	A61P68N

Purchase panels separately

Type 3, 3R, 4, 4X

SCREW-COVER, TYPE 4X



BULLETIN: A90S4

Reading Catalog Numbers

ASE 4X 4X 4 SSNK
H W D

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3, 3R, 4, 4X, 12; File No. E27525; cUL Listed per CSA C22.2 No. 40 and No. 94.2; Type 3, 3R, 4, 4X, 12

IEC 60529, IP66

Catalog Number

ASE6X6X4SSNK
ASE6X6X6SSNK
ASE8X6FSSNK
ASE8X8X4SSNK
ASE8X8X6SSNK
ASE10X8X4SSNK
ASE10X8X6SSNK
ASE10X10X4SSNK
ASE10X10X6SSNK
ASE12X8X4SSNK
ASE12X10X4SSNK
ASE12X12X4SSNK
ASE12X12X6SSNK
ASE12X12X8SSNK
ASE16X12X4SSNK
ASE16X16X6SSNK
ASE18X12X4SSNK

Catalog Number

ASE18X12X6SSNK
ASE18X18X4SSNK
ASE18X18X6SSNK
ASE18X18X8SSNK
ASE24X24X10SSNK
ASE24X24X12SSNK
ASE24X24X6SSNK
ASE24X24X8SSNK
ASE30X30X10SSNK
ASE30X30X12SSNK
ASE30X30X6SSNK
ASE30X30X8SSNK
ASE36X36X6SSNK
ASE36X36X8SSNK
ASE36X36X12SSNK
ASE48X48X12SSNK

Telephone Cabinets

TELEPHONE CABINET, 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

IEC 60529, IP30

Reading Catalog Numbers

ATC 12 12 4 S S = Surface
H W D F = Flush

BULLETIN: T90

Catalog Number	Mounted
ATC10104S	Surface
ATC10104F	Flush
ATC12124S	Surface
ATC12124F	Flush
ATC18124S	Surface
ATC18124F	Flush
ATC18184S	Surface
ATC18184F	Flush
ATC24184S	Surface
ATC24184F	Flush
ATC24244S	Surface
ATC24244F	Flush
ATC30244S	Surface
ATC30244F	Flush
ATC30304S	Surface
ATC36244S	Surface

Telephone Cabinets

Catalog Number	Mounted
ATC36244F	Flush
ATC36364S	Surface
ATC36364F	Flush
ATC12126S	Surface
ATC12126F	Flush
ATC18126S	Surface
ATC18126F	Flush
ATC18186S	Surface
ATC18186F	Flush
ATC24186S	Surface
ATC24186F	Flush
ATC24246S	Surface
ATC24246F	Flush
ATC30246F	Flush
ATC30306S	Surface
ATC30306F	Flush
ATC36246S	Surface
ATC36246F	Flush
ATC36306S	Surface
ATC36306F	Flush
ATC36366S	Surface
ATC36366F	Flush
ATC36308S	Surface
ATC36308F	Flush

Telephone Cabinets

T3-BOX TELEPHONE CABINET, TYPE 3R



INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R;
File No. E27567
UL 497 / 1863 Listed; File No. E230874
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E27567

NEMA Type 3R

IEC 60529 IP32

Reading Catalog Numbers

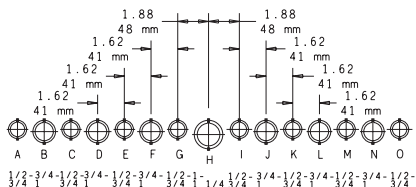
ATC	12	R	14	5
	H		W	D

BULLETIN: T90R3

Catalog Number	Door	Knockout Pattern
ATC12R145	Single	G-H-I
ATC36R366	Single	C-D-E-F-G-H-I-J-K-L-M
ATC26R248	Single	E-F-G-H-I-J-K
ATC36R248	Single	E-F-G-H-I-J-K
ATC36R308	Single	D-E-F-G-H-I-J-K-L
ATC36R369	Single	C-D-E-F-G-H-I-J-K-L-M
ATC42R369	Double	C-D-E-F-G-H-I-J-K-L-M
ATC48R369	Double	C-D-E-F-G-H-I-J-K-L-M
ATC48R489	Double	A-B-C-D-E-F-G-H-I-J-K-L-M-N-O
ATC36R3612	Single	C-D-E-F-G-H-I-J-K-L-M

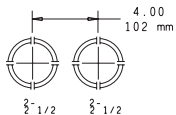
3/4-inch-thick plywood panel included.

Telephone Cabinets

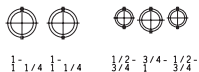


CONDUIT SIZES ALL EXCEPT ATC12R145

Knockout Pattern
(from outside of box)



CONDUIT SIZES
EXCEPT ATC12R145



CONDUIT SIZES
ATC12R145

87788681

Terminal Boxes

TERMINAL BOX, TYPE 3R



BULLETIN: S90B3

INDUSTRY STANDARDS

UL 1773 Listed; Type 3R;
File No. E256098
UL 50, 50E Listed; Type 3R;
File No. E27525
cUL Listed per CSA C22.2 No 94;
Type 3R; File No. E27525

NEMA/EEMAC Type 3R

IEC 60529, IP32

Catalog Number	Size H x W x D in. (mm)	Volts	Amps	Number of Bars
TB3R101	18.00 x 10.75 x 4.50 (457 x 273 x 114)	120/240	100	3
TB3R103	18.00 x 10.75 x 4.50 (457 x 273 x 114)	600	100	4
TB3R103240	18.00 x 10.75 x 4.50 (457 x 273 x 114)	120/240	100	4
TB3R201	23.00 x 14.00 x 4.50 (584 x 356 x 114)	120/240	200	3
TB3R203	23.00 x 14.00 x 4.50 (584 x 356 x 114)	600	200	4
TB3R203240	23.00 x 14.00 x 4.50 (584 x 356 x 114)	120/240	200	4
TB3R401	27.00 x 20.50 x 6.00 (686 x 521 x 152)	120/240	400	3
TB3R403	27.00 x 20.50 x 6.00 (686 x 521 x 152)	600	400	4

INTERCHANGEABLE BOLT-ON HUB

Terminal boxes

TERMINAL BOX, TYPE 3R, ACCESSORIES



BULLETIN: S90B3

Catalog Number	Fits Conduit Size (in.)	Fits Conduit Size (mm)
TBHUB10	1	25
TBHUB12	1.25	32
TBHUB15	1.5	38
TBHUB20	2	51
TBHUB25	2.5	64

LUG ASSEMBLY



BULLETIN: S90B3

Catalog Number	Wire Range
TBL100	(6) #14-2/0
TBL200	(6) #6-350 MCM
TBL400	(6) #4-600 MCM

Lay-In Wireways and Wiring Troughs

LAY-IN GALVANIZED WIREWAY, NEMA TYPE 1



BULLETIN: F40G

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524
cUL Listed per CSA C22.2 No. 26;
File No. E27524

NEMA/EEMAC: Type 1

IEC 60529, IP30

Description	2.50 x 2.50 in. 64 x 64 mm	4.00 x 4.00 in. 102 x 102 mm
12.00-in. (305-mm) Straight Section with knockouts	—	F44T112GVWK
12.00-in. (305-mm) Straight Section without knockouts	F22T112GV	F44T112GV
18.00-in. (455-mm) Straight Section with knockouts	—	—
18.00-in. (455-mm) Straight Section without knockouts	—	F44T118GV
24.00-in. (610-mm) Straight Section with knockouts	F22T124GVWK	F44T124GVWK
24.00-in. (610-mm) Straight Section without knockouts	F22T124GV	F44T124GV
36.00-in. (914-mm) Straight Section with knockouts	F22T136GVWK	F44T136GVWK
36.00-in. (914-mm) Straight Section without knockouts	F22T136GVWK	F44T136GV
48.00-in. (1219-mm) Straight Section with knockouts	—	F44T148GVWK
48.00-in. (1219-mm) Straight Section without knockouts	F22T148GV	F44T148GV
60.00-in. (1524-mm) Straight Section with knockouts	F22T160GVWK	F44T160GVWK
60.00-in. (1524-mm) Straight Section without knockouts	F22T160GV	F44T160GV
72.00-in. (1829-mm) Straight Section with knockouts	—	F44T172GVWK
72.00-in. (1829-mm) Straight Section without knockouts	—	F44T172GV
120.00-in. (3048-mm) Straight Section with knockouts	F22T1120GVWK	F44T1120GVWK
120.00-in. (3048-mm) Straight Section without knockouts	F22T1120GV	F44T1120GV

Lay-In Wireways and Wiring Troughs

6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F66T112GVWK	F88T112GVWK	—	—
F66T112GV	F88T112GV	F1010T112GV	F1212T112GV
—	—	—	—
F66T118GV	F88T118GV	—	—
F66T124GVWK	F88T124GVWK	—	—
F66T124GV	F88T124GV	F1010T124GV	F1212T124GV
F66T136GVWK	F88T136GVWK	—	—
F66T136GV	F88T136GV	F1010T136GV	F1212T136GV
F66T148GVWK	F88T148GVWK	—	—
F66T148GV	F88T148GV	F1010T148GV	F1212T148GV
F66T160GVWK	F88T160GVWK	—	—
F66T160GV	F88T160GV	F1010T160GV	F1212T160GV
F66T172GVWK	F88T172GVWK	—	—
F66T172GV	F88T172GV	F1010T172GV	—
F66T1120GVWK	F88T1120GVWK	—	—
F66T1120GV	F88T1120GV	F1010T1120GV	F1212T1120GV

Lay-In Wireways and Wiring Troughs

LAY-IN GALVANIZED WIREWAY, NEMA TYPE 1

BULLETIN: F40GF

Description	2.50 x 2.50 in. 64 x 64 mm	4.00 x 4.00 in. 102 x 102 mm
90° Elbow	F2290EGV	F4490EGV
90° Elbow Inside Opening	F2290EINGV	F4490EINGV
90° Elbow Outside Opening	F2290EOUTGV	F4490EOUTGV
45° Elbow	F2245EGV	F4445EGV
Telescope Fitting	F22GAGV	F44GAGV
Panel Adapter	F22GPAGV	F44GPAGV
Closure Plate with knockouts	F22GCPGV	F44GCPGV
Closure Plate without knockouts	F22GCPNKGV	F44GCPNKGV
Reducer	—	F44G22R
F1212G1010R		
Drop and Bracket Hanger	F22GDB	F44GDB
Support Hanger	F22GSHGV	F44GSHGV
Universal U-Connector	F22GUCGV	F44GUCGV

Lay-In Wireways and Wiring Troughs

6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F6690EGV	F8890EGV	F101090EGV	F121290EGV
F6690EINGV	F8890EINGV	F101090EINGV	F121290EINGV
F6690EOUTGV	F8890EOUTGV	F101090EOUTGV	F121290EOUTGV
F6645EGV	F8845EGV	F101045EGV	F121245EGV
F66GAGV	F88GAGV	F1010GAGV	F1212GAGV
F66GPAGV	F88GPAGV	F1010GPAGV	F1212GPAGV
F66GCPGV	F88GCPGV	—	F1212GCPGV
F66GCPNKGV	F88GCPNKGV	F1010GCPNKGV	F1212GCPNKGV
F66G44R	F88G66R	F1010G88R	F1212G88R
F66GDB	F88GDB	F1010GDB	F1212GDB
F66GSHGV	F88GSHGV	F1010GSHGV	F1212GSHGV
F66GUCGV	F88GUCGV	F1010GUCGV	F1212GUCGV

Lay-In Wireways and Wiring Troughs

LAY-IN PAINTED FLAT-COVER WIREWAY, NEMA TYPE 1



BULLETIN: F40FC

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524
cUL Listed per CSA C22.2 No. 26;
File No. E27524

NEMA/EEMAC: Type 1

IEC 60529

Description	2.50 x 2.50 in. 64 x 64 mm	3.00 x 3.00 in. 76 x 76 mm	4.00 x 4.00 in. 102 x 102 mm
12.00-in. (305-mm) Straight Section with knockouts	F22T112GVPWK	—	F44T112GVPWK
12.00-in. (305-mm) Straight Section without knockouts	F22T112GVP	—	F44T112GVP
18.00-in. (455-mm) Straight Section without knockouts	—	—	F44T118GVP
24.00-in. (610-mm) Straight Section with knockouts	F22T124GVPWK	—	F44T124GVPWK
24.00-in. (610-mm) Straight Section without knockouts	F22T124GVP	—	F44T124GVP
36.00-in. (914-mm) Straight Section with knockouts	F22T136GVPWK	—	F44T136GVPWK
36.00-in. (914-mm) Straight Section without knockouts	F22T136GVP	—	F44T136GVP
48.00-in. (1219-mm) Straight Section with knockouts	F22T148GVPWK	—	F44T148GVPWK
48.00-in. (1219-mm) Straight Section without knockouts	F22T148GVP	—	F44T148GVP
60.00-in. (1524-mm) Straight Section with knockouts	F22T160GVPWK	—	F44T160GVPWK
60.00-in. (1524-mm) Straight Section without knockouts	F22T160GVP	F33T160GVP	F44T160GVP
72.00-in. (1829-mm) Straight Section with knockouts	—	—	F44T172GVPWK
72.00-in. (1829-mm) Straight Section without knockouts	—	—	F44T172GVP
120.00-in. (3048-mm) Straight Section with knockouts	F22T1120GVPWK	—	F44T1120GVPWK

Lay-In Wireways and Wiring Troughs

6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F66T112GVPWK	F88T112GVPWK	—	F1212T112GVPWK
F66T112GVP	F88T112GVP	F1010T112GVP	F1212T112GVP
F66T118GVP	F88T118GVP	—	F1212T118GVPWK
F66T124GVPWK	F88T124GVPWK	—	F1212T124GVPWK
F66T124GVP	F88T124GVP	F1010T124GVP	F1212T124GVP
F66T136GVPWK	F88T136GVPWK	—	F1212T136GVPWK
F66T136GVP	F88T136GVP	F1010T136GVP	F1212T136GVP
F66T148GVPWK	F88T148GVPWK	—	F1212T148GVPWK
F66T148GVP	F88T148GVP	F1010T148GVP	F1212T148GVP
F66T160GVPWK	F88T160GVPWK	—	F1212T160GVPWK
F66T160GVP	F88T160GVP	F1010T160GVP	F1212T160GVP
F66T172GVPWK	—	—	—
F66T172GVP	F88T172GVP	F1010T172GVP	—
F66T1120GVPWK	F88T1120GVP	—	—

Lay-In Wireways and Wiring Troughs

LAY-IN PAINTED FLAT-COVER WIREWAY, NEMA TYPE 1

BULLETIN: F40PF

Description	2.50 x 2.50 in. 64 x 64 mm	3.00 x 3.00 in. 76 x 76 mm	4.00 x 4.00 in. 102 x 102 mm
120.00-in. (3048-mm) Straight Section without knockouts	F22T1120GVP	F33T1120GVP	F44T1120GVP
90° Flush Tee	F22GT	F33GT	F44GT
Sweep Tee	F22T	—	F44T
Cross Fitting	F22X	—	F44X
90° Sweep Elbow	F22G90SE	—	F44G90SE
90° Elbow-Tee-Cross	F22G90TX	F33G90TX	F44G90TX
90° Elbow	F22G90E	F33G90E	F44G90E
90° Elbow Outside Opening	F2290EOUT	—	F4490EOUT
90° Elbow Inside Opening	F2290EIN	—	F4490EIN
45° Elbow	F22G45E	F33G45E	F44G45E
Telescope Fitting	F22GAa	—	F44GAa
Open Adapter	F22GOA	—	F44GOA
Panel Adapter	F22GPA	F33GPA	F44GPA
Closure Plate with knockouts	F22GCP	—	F44GCP
Closure Plate without knockouts	F22GCPNK	F33GCPNK	F44GCPNK
Reducer	—	F33G22R	F44G22R F44G33R
Drop and Bracket Hanger	F22GDB	—	F44GDB
Support Hanger	F22GSH	—	F44GSH
Universal U-Connector	F22GUC	F33GUC	F44GUC
Barrier Kit, bolt-on Each barrier 60.00 in. (1524 mm)	—	F33BK60	F44BK60

Lay-In Wireways and Wiring Troughs

6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F66T1120GVP	F88T1120GVP	F1010T1120GVP	F1212T1120GVP
F66GT	F88GT	F1010GT	F1212GT
F66T	F88T	F1010T	F1212T
F66X	F88X	F1010X	F1212X
F66G90SE	F88G90SE	F1010G90SE	F1212G90SE
F66G90TX	F88G90TX	F1010G90TX	F1212G90TX
F66G90E	F88G90E	F1010G90E	F1212G90E
F6690EOUT	F8890EOUT	F101090EOUT	F121290EOUT
F6690EIN	F8890EIN	F101090EIN	F121290EIN
F66G45E	F88G45E	F1010G45E	F1212G45E
F66GAa	F88GAa	F1010GAa	F1212GAa
F66GOA	F88GOA	F1010GOA	F1212GOA
F66GPA	F88GPA	F1010GPA	F1212GPA
F66GCP	F88GCP	F1010GCP	F1212GCP
F66GCPNK	F88GCPNK	F1010GCPNK	F1212GCPNK
F66G44R	F88G66R	F1010G88R	F1212G1010R F1212G88R
F66GDB	F88GDB	F1010GDB	F1212GDB
F66GSH	F88GSH	F1010GSH	F1212GSH
F66GUC	F88GUC	F1010GUC	F1212GUC
F66BK60	F88BK60	—	—

Lay-In Wireways and Wiring Troughs

LAY-IN HINGED-COVER WIREWAY, NEMA TYPE 1



BULLETIN: F40

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524
cUL Listed per CSA C22.2 No. 26;
File No. E27524

NEMA/EEMAC: Type 1

IEC 60529

Description	2.50 x 2.50 in. 64 x 64 mm	4.00 x 4.00 in. 102 x 102 mm	6.00 x 6.00 in. 152 x 152 mm
12.00-in. (305-mm) Straight Section with knockouts	F22G12WK	F44G12WK	F66G12WK
12.00-in. (305-mm) Straight Section without knockouts	F22G12	F44G12	F66G12
18.00-in. (455-mm) Straight Section without knockouts	—	F44G18	F66G18
24.00-in. (610-mm) Straight Section with knockouts	F22G24WK	F44G24WK	F66G24WK
24.00-in. (610-mm) Straight Section without knockouts	F22G24	F44G24	F66G24
36.00-in. (914-mm) Straight Section with knockouts	F22G36WK	F44G36WK	F66G36WK
36.00-in. (914-mm) Straight Section without knockouts	F22G36	F44G36	F66G36
48.00-in. (1219-mm) Straight Section with knockouts	F22G48WK	F44G48WK	F66G48WK
48.00-in. (1219-mm) Straight Section without knockouts	F22G48	F44G48	F66G48
60.00-in. (1524-mm) Straight Section with knockouts	F22G60WK	F44G60WK	F66G60WK
60.00-in. (1524-mm) Straight Section without knockouts	F22G60	F44G60	F66G60
72.00-in. (1829-mm) Straight Section with knockouts	—	F44G72WK	F66G72WK
72.00-in. (1829-mm) Straight Section without knockouts	—	F44G72	F66G72
96.00-in. (2438-mm) Straight Section without knockouts	—	F44G96	F66G96

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Lay-In Wireways and Wiring Troughs

8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	Not Hinged 12.00 x 12.00 in. 305 x 305 mm	Hinged 12.00 x 12.00 in. 305 x 305 mm
—	—	—	—
F88G12	F1010G12	F1212G12	F1212G12H
F88G18	—	—	—
—	—	—	—
F88G24	F1010G24	F1212G24	F1212G24H
—	—	—	—
F88G36	F1010G36	F1212G36	F1212G36H
—	—	—	—
F88G48	F1010G48	F1212G48	F1212G48H
—	—	—	—
F88G60	F1010G60	F1212G60	F1212G60H
—	—	—	—
F88G72	F1010G72	F1212G72	F1212G72H
F88G96	F1010G96	F1212G96	—

Lay-In Wireways and Wiring Troughs

LAY-IN HINGED-COVER WIREWAY, NEMA TYPE 1

BULLETIN: F40PF

Description	2.50 x 2.50 in. 64 x 64 mm	4.00 x 4.00 in. 102 x 102 mm	6.00 x 6.00 in. 152 x 152 mm
120.00-in. (3048-mm) Straight Section with knockouts	F22G120WK	F44G120WK	F66G120WK
120.00-in. (3048-mm) Straight Section without knockouts	F22G120	F44G120	F66G120
90° Flush Tee	F22GT	F44GT	F66GT
Sweep Tee	F22T	F44T	F66T
Cross Fitting	F22X	F44X	F66X
90° Sweep Elbow	F22G90SE	F44G90SE	F66G90SE
90° Elbow-Tee-Cross	F22G90TX	F44G90TX	F66G90TX
90° Elbow	F22G90E	F44G90E	F66G90E
90° Elbow Outside Opening	F2290EOUT	F4490EOUT	F6690EOUT
90° Elbow Inside Opening	F2290EIN	F4490EIN	F6690EIN
45° Elbow	F22G45E	F44G45E	F66G45E
Telescope Fitting	F22GAa	F44GAa	F66GAa
Open Adapter	F22GOA	F44GOA	F66GOA
Panel Adapter	F22GPA	F44GPA	F66GPA
Closure Plate without knockouts	F22GCPNK	F44GCPNK	F66GCPNK
Closure Plate with knockouts	F22GCP	F44GCP	F66GCP
Reducer	—	F44G22R	F66G44R
Drop and Bracket Hanger	F22GDB	F44GDB	F66GDB
Support Hanger	F22GSH	F44GSH	F66GSH
Universal U-Connector	F22GUC	F44GUC	F66GUC
Barrier Kit, bolt-on Each barrier 60.00 in. (1524 mm)	—	F44BK60	F66BK60

Lay-In Wireways and Wiring Troughs

8.00 x 8.00 in. 203 x 203 mm	10.00 x 10.00 in. 254 x 254 mm	Not Hinged 12.00 x 12.00 in. 305 x 305 mm	Hinged 12.00 x 12.00 in. 305 x 305 mm
—	—	—	—
F88G120	F1010G120	F1212G120	F1212G120H
F88GT	F1010GT	F1212GT	F1212GT
F88T	F1010T	F1212T	F1212T
F88X	F1010X	F1212X	F1212X
F88G90SE	F1010G90SE	F1212G90SE	F1212G90SE
F88G90TX	F1010G90TX	F1212G90TX	F1212G90TX
F88G90E	F1010G90E	F1212G90E	F1212G90E
F8890EOUT	F101090EOUT	F121290EOUT	F121290EOUT
F8890EIN	F101090EIN	F121290EIN	F121290EIN
F88G45E	F1010G45E	F1212G45E	F1212G45E
F88GAa	F1010GAa	F1212GAa	F1212GAa
F88GOA	F1010GOA	F1212GOA	F1212GOA
F88GPA	F1010GPA	F1212GPA	F1212GPA
F88GCPNK	F1010GCPNK	F1212GCPNK	F1212GCPNK
F88GCP	F1010GCP	F1212GCP	F1212GCP
F88G66R	F1010G88R	F1212G88R F1212G1010R	F1212G88R F1212G1010R
F88GDB	F1010GDB	F1212GDB	F1212GDB
F88GSH	F1010GSH	F1212GSH	F1212GSH
F88GUC	F1010GUC	F1212GUC	F1212GUC
F88BK60	—	—	—

Lay-In Wireways and Wiring Troughs

LAY-IN WIREWAY, NEMA TYPE 3R



INDUSTRY STANDARDS

UL 870 Listed; File No. E27524;
Raintight

NEMA/EEMAC Type 3R
CSA File No. 42184, Type 3R
IEC 60529, IP32

BULLETIN: F30G

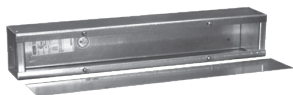
Description	4.00 x 4.00 in. 102 x 102 mm	6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm
12.00-in. (305-mm) Male Straight Section	F44T3R12	F66T3R12	F88T3R12
60.00-in. (1524-mm) Male Straight Section	F44T3R60	F66T3R60	F88T3R60
120.00-in. (3048-mm) Male Straight Section	F44T3R120	F66T3R120	F88T3R120

Description	4.00 x 4.00 in. 102 x 102 mm	6.00 x 6.00 in. 152 x 152 mm	8.00 x 8.00 in. 203 x 203 mm
90° Flush Tee	F44T3RT	F66T3RT	F88T3RT
30° Sweep Elbow	F44T3R30SE	F66T3R30SE	F88T3R30SE
90° Elbow-Tee-Cross	F44T3RTX	F66T3RTX	F88T3RTX
90° Elbow	F44T3R90E	F66T3R90E	F88T3R90E
Panel Adapter	F44T3RPA	F66T3RPA	F88T3RPA
Closure Plate	F44T3RCP	F66T3RCP	F88T3RCP
Reducer	—	F66T3R44R	F88T3R66R
Drop and Bracket Hanger	F44T3RDH	F66T3RDH	F88T3RDH
Wall Hanger	F44T3RWH	F66T3RWH	F88T3RWH
Universal U-Connector	F44T3RUC	F66T3RUC	F88T3RUC

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Lay-In Wireways and Wiring Troughs

WIRING TROUGH, NEMA TYPE 1



Reading Catalog Numbers

A 4 4 12 T1T

H W L

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524
cUL CSA C22.2 No. 26 Listed;
File No. E27524

NEMA/EEMAC: Type 1

IEC 60529, IP30

BULLETIN: F40T1

Catalog Number

A4412T1T

A4424T1T

A4436T1T

A4448T1T

A4460T1T

A4472T1T

A4496T1T

A6612T1T

A6624T1T

A6636T1T

A6648T1T

A6660T1T

A6672T1T

A6696T1T

A8824T1T

A8836T1T

Catalog Number

A8848T1T

A8860T1T

A8872T1T

A8896T1T

A101048T1T

A121224T1T

A121236T1T

A121248T1T

A121260T1T

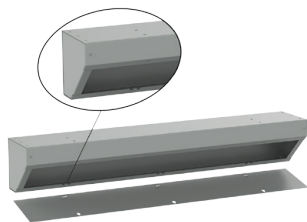
A121272T1T

A121296T1T

A1212120T1T

Lay-In Wireways and Wiring Troughs

ANGLED WIRING TROUGH, NEMA TYPE 1



BULLETIN: F40AT

Reading Catalog Numbers

AT 6 6 12
H W L

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524
cUL CSA C22.2 No. 26 Listed;
File No. E27524

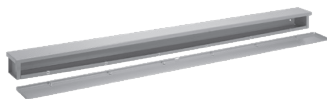
NEMA/EEMAC: Type 1

IEC 60529, IP30

Catalog Number	Max Conduit Size (in.)	Max Conduit Size (mm)	Gauge	No. of Cover Screws
AT6612	1.25	32	16	1
AT6618	1.25	32	16	2
AT6624	1.25	32	16	2
AT6636	1.25	32	16	3
AT6648	1.25	32	16	4
AT6660	1.25	32	16	5
AT6672	1.25	32	16	6
AT8824	2.00	51	16	2
AT8836	2.00	51	16	3
AT8848	2.00	51	16	4
AT8860	2.00	51	16	5
AT8872	2.00	51	16	6
AT101024	3.00	76	16	2
AT101036	3.00	76	16	3
AT101048	3.00	76	16	4
AT121224	3.00	76	14	2
AT121236	3.00	76	14	3
AT121248	3.00	76	14	4
AT121260	3.00	76	14	5
AT121272	3.00	76	14	6

Lay-In Wireways and Wiring Troughs

WIRING TROUGH, NEMA TYPE 3R



Reading Catalog Numbers

A	4	4	12	RT
H	W	L		

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524; Raintight
cUL CSA C22.2 No. 26 Listed;
File No. E27524; Raintight

NEMA/EEMAC Type 3R

IEC 60529, IP32

BULLETIN: F40PT

Catalog Number

A4412RT

A4418RT

A4424RT

A4436RT

A4448RT

A4460RT

A4472RT

A6612RT

A6618RT

A6624RT

A6636RT

A6648RT

A6660RT

A6672RT

A8812RT

A8824RT

A8836RT

A8848RT

A8860RT

A8872RT

A8896RT

A88116RT

A101024RT

A101036RT

Catalog Number

A101048RT

A101060RT

A101096RT

A101072RT

A1010116RT

A121224RT

A121236RT

A121248RT

A121260RT

A121272RT

A121284RT

A121296RT

A1212116RT

A141448RT

A141472RT

A141484RT

A141496RT

A1414116RT

Lay-In Wireways and Wiring Troughs

ECONOTROUGH, NEMA TYPE 3R



Reading Catalog Numbers

F	4	4	12	RTGV
H	W	L		

BULLETIN: F40GT

INDUSTRY STANDARDS

UL 870 Listed; File No. E27524; Raintight
cUL CSA C22.2 No. 26 Listed;
File No. E27524; Raintight

NEMA/EEMAC Type 3R

IEC 60529, IP32

Catalog Number

F4412RTGV

F4424RTGV

F4436RTGV

F4448RTGV

F4460RTGV

F4472RTGV

F6612RTGV

F6618RTGV

F6624RTGV

F6636RTGV

F6648RTGV

F6660RTGV

F6672RTGV

F8812RTGV

F8824RTGV

F8836RTGV

F8848RTGV

F8860RTGV

F8872RTGV

F8896RTGV

F88116RTGV

F101024RTGV

Catalog Number

F101036RTGV

F101048RTGV

F101060RTGV

F101072RTGV

F101096RTGV

F1010116RTGV

F121224RTGV

F121236RTGV

F121248RTGV

F121260RTGV

F121272RTGV

F121284RTGV

F121296RTGV

F1212116RTGV

F141448RTGV

F141472RTGV

F141496RTGV

F1414116RTGV

Lay-In Wireways and Wiring Troughs

SCREW COVER WIRING TROUGH, NEMA TYPE 4X



Reading Catalog Numbers

F 4 4 12 SCSS

H W L

BULLETIN: F24

INDUSTRY STANDARDS

UL 870, 50E Listed; Type 3R, 4, 4X, 12;
File No. E27524; cUL Listed per CSA
C22.2 No. 26 & No. 94.2; Type 3R, 4,
4X, 12

IEC 60529, IP66

Catalog Number

F4412SCSS

F4418SCSS

F4424SCSS

F6612SCSS

F6624SCSS

F6636SCSS

F6648SCSS

F8824SCSS

Catalog Number

F8836SCSS

F8848SCSS

F121224SCSS

F121236SCSS

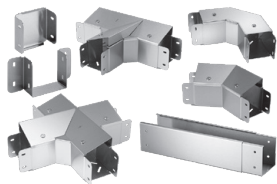
F121248SCSS

F121260SCSS

F121272SCSS

Lay-In Wireways and Wiring Troughs

CLEAN TRAY STAINLESS STEEL CABLE TRAY, TYPE 1



INDUSTRY STANDARDS

UL Classified; File No. E263414

This product is classified as to its suitability as an equipment grounding conductor only.

NEMA/EEMAC Type 1

BULLETIN: F23

Description	2.00 x 2.00 in. 51 x 51 mm	4.00 x 4.00 in. 102 x 102 mm
10-ft. Straight Section, Standard Cover	CT22120SS	CT33120SS
10-ft. Straight Section, Perforated	CT22P120SS	CT33P120SS
10-ft. Straight Section, 20° Sloped Cover	—	CTS33120SS
10-ft. Straight Section, Perforated 20° Sloped Cover	—	CTS33P120SS
Divider Straight Section	—	CT33DSS
Telescopic Straight Section (18.74 in. to 30.61 in.)	CT22TSS	CT33TSS
Divider, Telescopic Straight Section	—	CT33TDPSS
90-Degree Elbows, Front Cover	CT22EFC90SS	CT33EFC90SS
90-Degree Elbows, Front Cover without Tabs	CT22EFCNT90SS	CT33EFCNT90SS
90-Degree Elbows, Inside Cover	CT22EIC90SS	CT33EIC90SS
90-Degree Elbows, Outside Cover	CT22EOC90SS	CT33EOC90SS
90-Degree Elbows, Front Cover Perforated	CT22PEFC90SS	CT33PEFC90SS
90-Degree Elbows, Front Cover Sloped Inward	—	CTS33EFC90SS
90-Degree Elbows, Front Cover Sloped Inward Perforated	—	CTS33PEFC90SS
90-Degree Elbows, Perforated without Tabs	CT22PEFCNT90SS	CT33PEFCNT90SS
90-Degree Elbows, Front Cover Sloped Inward without Tabs	—	—
90-Degree Elbows, Front Cover Sloped Outward with Tabs	—	—
90-Degree Elbows, Front Cover Sloped Outward without Tabs	—	—
90-Degree Elbows, Inside Cover Sloped	—	—
90-Degree Elbows, Outside Cover Sloped	—	—
45-Degree Elbows, Front Cover	CT22EFC45SS	CT33EFC45SS
45-Degree Elbows, Inside Cover	CT22EIC45SS	CT33EIC45SS

Lay-In Wireways and Wiring Troughs

4.00 x 4.00 in. 102 x 102 mm	4.00 x 6.00 in. 102 x 152 mm	6.00 x 6.00 in. 152 x 152 mm
CT44120SS	CT46120SS	CT66120SS
CT44P120SS	CT46P120SS	CT66P120SS
CTS44120SS	CTS46120SS	CTS66120SS
CTS44P120SS	CTS46P120SS	CTS66P120SS
CT44DSS	–	CT66DSS
CT44TSS	CT46TSS	CT66TSS
CT44TDS PSS	–	CT66TDS PSS
CT44EFC90SS	CT46EFC90SS	CT66EFC90SS
CT44EFCNT90SS	CT46EFCNT90SS	CT66EFCNT90SS
CT44EIC90SS	CT46EIC90SS	CT66EIC90SS
CT44EOC90SS	CT46EOC90SS	CT66EOC90SS
CT44PEFC90SS	CT46PEFC90SS	CT66PEFC90SS
CTS44EFC90SS	CTS46EFC90SS	CTS66EFC90SS
CTS44PEFC90SS	CTS46PEFC90SS	CTS66PEFC90SS
CT44PEFCNT90SS	CT46PEFCNT90SS	CT66PEFCNT90SS
CTS44EFCNT90SS	CTS46EFCNT90SS	CTS66EFCNT90SS
CTS44EFC090SS	CTS46EFC090SS	CTS66EFC090SS
CTS44EFCNT090SS	CTS46EFCNT090SS	CTS66EFCNT090SS
CT44EFC45SS	CT46EFC45SS	CT66EFC45SS
CT44EIC45SS	CT46EIC45SS	CT66EIC45SS

Lay-In Wireways and Wiring Troughs

CLEAN TRAY STAINLESS STEEL CABLE TRAY, TYPE 1

BULLETIN: F23

Description	2.00 x 2.00 in. 51 x 51 mm	4.00 x 4.00 in. 102 x 102 mm
45-Degree Elbows, Outside Cover	CT22EOC45SS	CT33EOC45SS
45-Degree Elbows, Front Cover Perforated	CT22PEFC45SS	CT33PEFC45SS
45-Degree Elbows, Front Cover Sloped	—	-EFC45SS
45-Degree Elbows, Front Cover Sloped Perforated	—	CTS33PEFC45SS
45-Degree Elbows, Front Cover Sloped Outward	—	—
45-Degree Elbows, Inside Cover Sloped	—	—
45-Degree Elbows, Outside Cover Sloped	—	—
Variable-Angle Elbow Fitting	CT22VSS	CT33VSS
90-Degree Tee, Front Cover	CT22TFCSS	CT33TFCSS
90-Degree Tee, Inside Cover	—	CT33TICSS
90-Degree Tee, Outside Cover	CT22TOCSS	CT33TOCSS
90-Degree Tee, Front Cover Perforated	CT22PTFCSS	CT33PTFCSS
90-Degree Tee, Front Cover Sloped	—	CTS33TFCSS
90-Degree Tee, Front Cover Sloped Perforated	—	CTS33PTFCSS
90-Degree Tee, Front Cover Sloped Outward	—	—
90-Degree Tee, Inside Cover Sloped	—	—
90-Degree Tee, Outside Cover Sloped	—	—
Divider 90-Degree Tee, Front Cover	—	CT33DTFCSS
Divider 90-Degree Tee, Inside Cover	—	CT33DTICSS
Divider 90-Degree Tee, Outside Cover	—	CT33DTOCSS
Divider 90-Degree Elbow, Front Cover	—	CT33DEFC90SS
Divider 90-Degree Elbow, Inside Cover	—	CT33DEIC90SS
Divider 90-Degree Elbow, Outside Cover	—	CT33DEOC90SS
Divider 45-Degree Elbow, Front Cover	—	CT33DEFC45SS
Divider 45-Degree Elbow, Inside Cover	—	CT33DEIC45SS
Divider 45-Degree Elbow, Outside Cover	—	CT33DEOC45SS

Lay-In Wireways and Wiring Troughs

4.00 x 4.00 in. 102 x 102 mm	4.00 x 6.00 in. 102 x 152 mm	6.00 x 6.00 in. 152 x 152 mm
CT44EOC45SS	CT46EOC45SS	CT66EOC45SS
CT44PEFC45SS	CT46PEFC45SS	CT66PEFC45SS
CTS44EFC45SS	CTS46EFC45SS	CTS66EFC45SS
CTS44PEFC45SS	CTS46PEFC45SS	CTS66PEFC45SS
CTS44EFCO45SS	CTS46EFCO45SS	CTS66EFCO45SS
CTS44EIC45SS	CTS46EIC45SS	CTS66EIC45SS
CTS44EOC45SS	CTS46EOC45SS	CTS66EOC45SS
CT44VSS	CT46VSS	CT66VSS
CT44TFCSS	CT46TFCSS	CT66TFCSS
CT44TICSS	CT46TICSS	CT66TICSS
CT44TOCSS	CT46TOCSS	CT66TOCSS
CT44PTFCSS	CT46PTFCSS	CT66PTFCSS
CTS44TFCSS	CTS46TFCSS	CTS66TFCSS
CTS44PTFCSS	CTS46PTFCSS	CTS66PTFCSS
CTS44TFCOSS	CTS46TFCOSS	CTS66TFCOSS
CTS44TICSS	CTS46TICSS	CTS66TICSS
CTS44TOCSS	CTS46TOCSS	CTS66TOCSS
CT44DTFCSS	CT46DTFCSS	CT66DTFCSS
CT44DTICSS	—	CT66DTICSS
CT44DTCOSS	CT46DTCOSS	CT66DTCOSS
CT44DEFC90SS	CT46DEFC90SS	CT66DEFC90SS
CT44DEIC90SS	—	CT66DEIC90SS
CT44DEOC90SS	—	CT66DEOC90SS
CT44DEFC45SS	CT46DEFC45SS	CT66DEFC45SS
CT44DEIC45SS	—	CT66DEIC45SS
CT44DEOC45SS	—	CT66DEOC45SS

Technical Information

INDUSTRY STANDARDS

COMPARISON OF SPECIFIC NON-HAZARDOUS APPLICATIONS IN OUTDOOR LOCATIONS

Provides a Degree of Protection Against the Following Environmental Conditions	Type of Enclosure					
	3	3R ^a	3RX ^a	4	4X	6
Incidental contact with the enclosed equipment	•	•	•	•	•	•
Rain, snow and sleet ^b	•	•	•	•	•	•
Sleet ^c						
Windblown dust	•			•	•	•
Hose-down				•	•	•
Corrosive agents			•		•	
Occasional temporary submersion						•

^a These enclosures may be ventilated.

^b External operating mechanisms are not required to be operable when enclosure is ice covered.

^c External operating mechanisms are operable when enclosure is ice covered.

COMPARISON OF SPECIFIC NON-HAZARDOUS APPLICATIONS IN INDOOR LOCATIONS

Provides a Degree of the Following Protection Against	Type of Enclosure						
	1 ^a	4	4X	6	12	12K	13
Incidental contact with the enclosed equipment	•	•	•	•	•	•	•
Falling dirt	•	•	•	•	•	•	•
Falling liquids and light splashing		•	•	•	•	•	•
Dust, lint, fibers and flyings ^b		•	•	•	•	•	•
Hose-down and splashing water		•	•	•			
Oil and coolant seepage					•	•	•
Oil or coolant spraying and splashing							•
Corrosive agents			•				
Occasional temporary submersion				•			

^a These enclosures may be ventilated. However, Type 1 may not provide protection against small particles of falling dirt when ventilation is provided in the enclosure top. Consult HOFFMAN for more information.

^b These fibers and flyings are non-hazardous materials and are not considered Class II type ignitable

Technical Information

fibers or combustible flyings. For Class III type ignitable fibers or combustible flyings see the National Electrical Code Section 505.

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CROSS-REFERENCE (APPROXIMATE) NEMA, UL, CSA VS. IEC ENCLOSURE TYPE

Enclosure Rating	IP20	IP22	IP55	IP64	IP65	IP66	IP67
Type 1	•						
Type 3				•			
Type 3R, 3RX		•					
Type 4						•	
Type 4X						•	
Type 6							•
Type 12, 12K			•				
Type 13					•		

IEC 60529 has no equivalents to NEMA enclosure Types 7, 8, 9, 10 or 11.

• Indicates compliance.

NEMA, UL and CSA are standard-writing organizations commonly recognized in North America. Their ratings are based on similar application descriptions and expected performance. UL and CSA both require enclosure testing by qualified evaluators in their certified labs. They also send site inspectors to make sure a manufacturer adheres to prescribed manufacturing methods and material specifications. NEMA, on the other hand, does not require independent testing and leaves compliance completely up to the manufacturer.

Technical Information

NEMA, UL AND CSA RATINGS NON-HAZARDOUS LOCATIONS

Enclosure Type	NEMA ^a	UL ^b	CSA ^c
Indoor	Type 1 Enclosures are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment or locations where unusual service conditions do not exist.	Indoor use primarily to provide protection against contact with the enclosed equipment and against a limited amount of falling dirt.	General purpose enclosure. Protects against accidental contact with live parts.
Indoor	Type 12 Enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping noncorrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water and external condensation of noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; dripping and light splashing of non-corrosive liquids; not provided with knockouts.
Indoor	Type 12K Enclosures with knockouts are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping noncorrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water and external condensation of noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; dripping and light splashing of noncorrosive liquids; not provided with knockouts.
Indoor	Type 13 Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.	Indoor use to provide a degree of protection against lint, dust seepage, external condensation and spraying of water, oil and noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; seepage and spraying of non-corrosive liquids, including oils and coolants.

Technical Information

Enclosure Type		NEMA ^a	UL ^b	CSA ^c
Outdoor	Type 3	Enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against windblown dust and windblown rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow and windblown dust; undamaged by the external formation of ice on the enclosure.
Outdoor	Type 3R	Enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against falling rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain and snow; undamaged by the external formation of ice on the enclosure.
Outdoor	Type 3RX	Enclosures are intended for outdoor use primarily to provide a degree of protection against corrosion, falling rain and sleet; undamaged by the formation of ice on the enclosure.	Not specifically defined.	Not specifically defined.
Outdoor	Type 4	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water and hose directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.

Technical Information

Enclosure Type	NEMA ^a	UL ^b	CSA ^c
Outdoor Type 4X	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure; resists corrosion.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.
Outdoor Type 6	Enclosures are intended for use indoors or outdoors where occasional submersion is encountered; limited depth; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection against entry of water during temporary submersion at a limited depth; undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against the entry of water during temporary submersion at a limited depth. Undamaged by the external formation of ice on the enclosure; resists corrosion.

^a This material is reproduced with permission from NEMA. The preceding descriptions, however, are not intended to be complete representations of National Electrical Manufacturers Association standards for enclosures nor those of the Electrical and Electronic Manufacturers Association of Canada.

^b This material is reproduced with permission from Underwriters Laboratories Inc. Enclosures for Electrical Equipment, UL 50, and Industrial Control Panels, UL 508A.

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Technical Information

ENCLOSURE TYPE RATING VS. IP RATING

Electrical enclosures are rated by Type (NEMA 250 / UL 50, 50E), and/or IP rating (IEC 60529) based upon the degree of protection provided. Type ratings and IP ratings have only the following in common:

1. A degree of protection for persons from hazardous components inside the enclosure
2. A degree of protection for equipment inside the enclosure from ingress of solid foreign objects, including dust
3. A degree of protection for equipment inside the enclosure from ingress of water

NEMA 250 and UL 50 and 50E Type rating documentation defines additional requirements that a Type-rated enclosure must meet. These include:

- Mechanical impact on enclosure walls
- Gasket aging and oil resistance
- Corrosion resistance
- Door and cover latching requirements
- Sheet metal gauge construction requirements (UL 50 only)

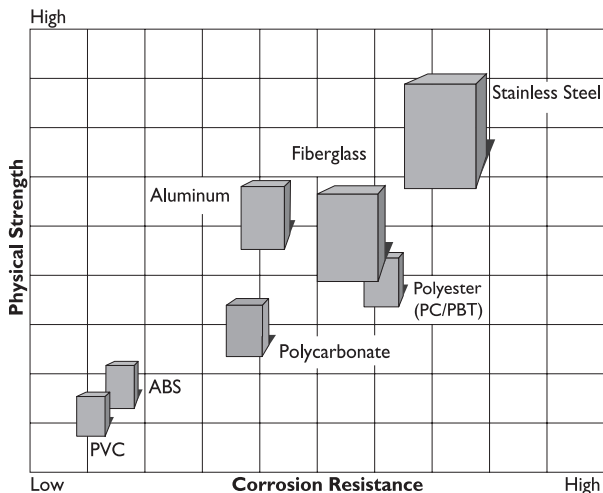
Electrical enclosures that carry only an IP rating have not been designed or tested to the additional Type-rating requirements. For this reason, and because the tests and evaluations for other characteristics are not identical, the IP ratings cannot be exactly equated with NEMA enclosure Types.

Electrical enclosures manufactured by HOFFMAN are tested for and carry both Type and IP ratings.

Technical Information

SPECIFYING ENCLOSURE MATERIALS

While some enclosure materials offer exceptional corrosion resistance, they may not provide the physical strength required to support internal components. This graph plots primary enclosure materials on a grid of physical strength and corrosion resistance.



Technical Information

GLOSSARY

Terms Specifying Non-Hazardous Environmental Conditions

Corrosion-Resistant - Constructed to provide a degree of protection against exposure to corrosive agents such as salt spray. Type 3RX and 4X enclosures meet this requirement.

Damp Locations - Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. Examples of damp locations include partially protected areas under canopies, marquees, roofed open porches and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns and some cold-storage warehouses. See the indoor enclosure types and select a type rating that fits the specific application.

Dust-tight - Constructed so that circulating or airborne dust will not enter the enclosure under specified test conditions. Type 3, 4, 4X, 12, 12K and 13 enclosures meet this requirement.

Drip-tight - Constructed so that falling moisture or dirt does not enter the enclosure under specified test conditions. Type 3, 4, 4X, 12, 12K and 13 enclosures meet this requirement.

Indoor - Not to be exposed to weather. Type 1, 12, 12K and 13 enclosures meet this requirement.

Oil-Resistant - Constructed so that oil will not interfere with successful operation of equipment. Type 12 and 13 enclosures meet this requirement.

Oil-tight - Constructed so that oil will not enter the enclosure under specified test conditions. Type 13 enclosures meet this requirement.

Outdoor - Constructed or protected so that exposure to the weather will not interfere with successful operation of equipment. Type 3, 3R, 4, 4X and 6 enclosures meet this requirement. These ratings can also be used indoors.

Technical Information

Rainproof - Constructed, protected or treated to prevent beating rain from interfering with the successful operation of the apparatus or result in wetting of live parts and wiring within the enclosure under specified test conditions. Type 3R and 3RX enclosures meet this requirement.

Rain-tight - Constructed or protected so that exposure to beating rain will not result in water entering the enclosure under specified test conditions. Type 3, 4, 4X and 6 enclosures meet this requirement.

Water-tight - Constructed so that moisture will not enter the enclosure when it is subjected to a stream of water under specified test conditions. Type 4, 4X and 6 enclosures meet this requirement.

Weatherproof - Constructed or protected so that exposure to the weather will not interfere with successful operation of the equipment. Rainproof, raintight or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust or temperature extremes, are not a factor.

Wet Locations - Installations underground or in concrete slabs or masonry in direct contact with the earth; in locations subject to saturation with water or other liquids, such as vehicle washing areas; and in unprotected locations exposed to weather. Use weatherproof enclosures with a type rating that fits the specific application.

THERMAL MANAGEMENT

CRITICAL PARAMETERS (UPPER TEMPERATURE LIMITS)

Enclosure Heat Load Calculations

Drive heat:

$$W_D = ([HP \times 745.7 \text{ Watts/HP}] / E_M) \times (I - E_P) \text{ Watts}$$

Total heat:

Estimate an additional 25%^a for wire connections and other components.

$$W_T = W_D \times 1.25^a \text{ Watts}$$

Required airflow:

$$CFM = (W_T \times 3.16) / (T_{int} - T_{amb}) \text{ Ft}^3 / \text{Min.}$$

^a This is an estimated factor. Further investigation is necessary to obtain actual total heat dissipated in enclosure.

Technical Information

Variable Descriptions	Variables	Typical Values
Maximum ambient temperature	T_{amb}	104 F
Maximum internal temperature	T_{int}	122 F
Typical temperature rise	$(T_{int} - T_{amb})$	15 F
Full-load drive power	hp	
Motor efficiency ^b	E_M	.80-.96
Drive efficiency ^b	E_D	.96-.98
Drive heat loss	W_D	
Total heat loss	W_T	
Required airflow	CFM	

^b Use full-load efficiency. Motor and drive efficiency will vary based on HP and voltage.

SAMPLE VALUES

Drive Horsepower (hp)	Typical Full Load Rating - Motor Efficiency	Typical Full Load Rating - Drive Efficiency	Drive Heat Loss W_D (Watts)	Additional Heat Loss W_a (Watts)	Total Heat Loss W_T (Watts)	Airflow when $T_{int} - T_{amb} = 15\text{ F}$ (CFM)
3	.86	.97	78	20	98	21
10	.90	.97	249	62	311	65
25	.91	.97	615	154	768	162
40	.92	.98	648	162	811	171
75	.93	.98	1203	301	1503	317
100	.94	.98	1587	397	1983	418

^a Additional Heat Loss - This is an estimated factor. Further investigation is necessary to obtain actual total heat dissipated in enclosure.

Technical Information

ELECTRICAL REFERENCE

OHM'S LAW

The relationship between voltage, current and resistance in an electrical circuit where:

I = current (amps)

V = E = volts (electromotive force or potential difference)

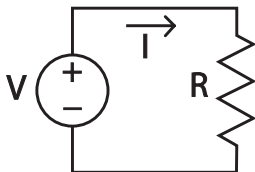
R = resistance (ohms)

In mathematical terms:

$$I = E \div R$$

$$E = I \times R$$

$$R = E \div I$$



$$\text{Amps} = \sqrt{\frac{\text{Watts}}{\text{Ohms}}} = \frac{\text{Watts}}{\text{Volts}} = \frac{\text{Volts}}{\text{Ohms}}$$

$$I = \sqrt{\frac{P}{R}} = \frac{P}{E} = \frac{E}{R}$$

$$\text{Watts} = \frac{\text{Volts}^2}{\text{Ohms}} = \text{Volts} \times \text{Amps} = \text{Amps}^2 \times \text{Ohms}$$

$$P = \frac{E^2}{R} = E \times I = I^2 \times R$$

$$\text{Volts} = \sqrt{\text{Watts} \times \text{Ohms}} = \text{Amps} \times \text{Ohms} = \frac{\text{Watts}}{\text{Amps}}$$

$$E = \sqrt{P \times R} = I \times R = \frac{P}{I}$$

Technical Information

$$\begin{aligned} \text{Ohms} &= \frac{\text{Volts}^2}{\text{Watts}} = \frac{\text{Watts}}{\text{Amps}^2} = \frac{\text{Volts}}{\text{Amps}} \\ R &= \frac{E^2}{P} = \frac{P}{I^2} = \frac{E}{I} \end{aligned}$$

SERIES CIRCUITS

$$\text{Total Volts} = E_T = E_1 + E_2 + E_3$$

$$\text{Total Amps} = I_T = I_1 = I_2 = I_3$$

$$\text{Total Ohms} = R_T = R_1 + R_2 + R_3$$

PARALLEL CIRCUITS

If total current and total voltage are unknown, use this formula:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

The total resistance of several matching resistors (same resistance in each one) connected in parallel equals the resistance of one resistor divided by the number of resistors:

$$R_T = \frac{R}{N}$$

R_T is the total resistance, R is the resistance of one resistor and N is the number of resistors.

COMMON ELECTRICAL DISTRIBUTION

120/240 Volt Single-Phase Three-Wire System

120/240 Volt Three-Phase Four-Wire System (Delta High Leg)

120/208 Volt Three-Phase Four-Wire System (WYE Connected)

277/480 Volt Three-Phase Four-Wire System (WYE Connected)

Technical Information

ELECTRICAL FORMULAS

Horsepower (HP)	
DC	$E \times I \times \% \text{ Efficiency}$ 746
Single Phase AC	$E \times I \times \% \text{ Efficiency} \times \text{PF}$ 746
2 Phase-4 Wire AC	$E \times I \times \% \text{ Efficiency} \times \text{PF} \times 2$ 746
3 Phase AC	$E \times I \times \% \text{ Efficiency} \times \text{PF} \times 1.73$ 746

Kilowatts (KW)	
DC	$E \times I$ 1000
Single Phase AC	$E \times I \times \text{PF}$ 1000
2 Phase-4 Wire AC	$E \times I \times \text{PF} \times 2$ 1000
3 Phase AC	$E \times I \times \text{PF} \times 1.73$ 1000

Kilovolt Amps (KVA)	
DC	—
Single Phase AC	$E \times I$ 1000
2 Phase-4 Wire AC	$E \times I \times 2$ 1000
3 Phase AC	$E \times I \times 1.73$ 1000

Amps when HP is known	
DC	$\text{HP} \times 746$ $E \times \% \text{ Efficiency}$
Single Phase AC	$\text{HP} \times 746$ $E \times \% \text{ Efficiency} \times \text{PF}$
2 Phase-4 Wire AC	$\text{HP} \times 746$ $E \times \% \text{ Efficiency} \times \text{PF} \times 2$
3 Phase AC	$\text{HP} \times 746$ $E \times \% \text{ Efficiency} \times \text{PF} \times 1.73$

Amps when KW is known	
DC	$\text{KW} \times 1000$ E
Single Phase AC	$\text{KW} \times 1000$ $E \times \text{PF}$
2 Phase-4 Wire AC	$\text{KW} \times 1000$ $E \times \text{PF} \times 2$
3 Phase AC	$\text{KW} \times 1000$ $E \times \text{PF} \times 1.73$

Amps when KVA is known	
DC	—
Single Phase AC	$\text{KVA} \times 1000$ E
2 Phase-4 Wire AC	$\text{KVA} \times 1000$ $E \times 2$
3 Phase AC	$\text{KVA} \times 1000$ $E \times 1.73$

E = Volts

I = Amps

W = Watts

% Efficiency = [Output (Watts)] / [Input (Watts)]

PF = Power Factor

Technical Information

CAPACITANCE (C)

$$C = \frac{Q}{E} = \frac{\text{Coulombs}}{\text{Volts}}$$

C is capacitance in farads, Q is the quantity of stored electrical charge in coulombs and E is the difference in potential in volts.

Therefore, stored electric charge can be calculated using the formula:

$$Q = CV$$

The difference in potential or voltage of the capacitor can be calculated using the formula:

$$E = Q/C$$

The total capacitance in a circuit containing capacitors in parallel:

$$C_T = C_1 + C_2 + C_3 \dots$$

The total capacitance in a circuit containing capacitors in series:

$$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots$$

Technical Information

IMPEDANCE

The impedance (Z) is the combination of resistance and reactance in an alternating current circuit.

$$Z = \frac{E}{I}$$

$$Z = \sqrt{R^2 + X^2}$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

Z = impedance (in ohms)

R = resistance (in ohms)

E = volts

I = amps

X = reactance (in ohms)

X_L = inductive reactance (in ohms)

X_C = capacitive reactance (in ohms)

REACTANCE

Reactance (X) is a component of impedance caused by inductance and capacitance to an alternating current in a given circuit.

INDUCTIVE REACTANCE:

$$X_L = 2 \times 3.1416 \times F \times L$$

F = frequency (in Hertz)

L = inductance (in Henry)

CAPACITIVE REACTANCE:

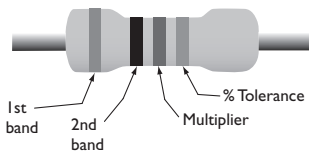
$$X_C = [1] / [2 \times 3.1416 \times F \times C]$$

C = Conductance (in Farads)

Technical Information

RESISTOR COLOR CODE

Band Color	1st Band	2nd Band	Multiplier	% Tolerance
Black	0	0	1	
Brown	1	1	10	
Red	2	2	100	
Orange	3	3	1000	
Yellow	4	4	10000	
Green	5	5	100000	
Blue	6	6	1000000	
Violet	7	7	10000000	
Gray	8	8	100000000	
White	9	9	1000000000	
Gold			0.1	± 5%
Silver			0.01	± 10%
No Band				± 20%



Technical Information

FULL-LOAD CURRENT (AMPS) FOR DC MOTORS

Motors running at base speed.

HP	90 V	120 V	180 V	240 V	500 V	550 V
1/4	4	3.1	2	1.6	-	-
1/3	5.2	4.1	2.6	2	-	-
1/2	6.8	5.4	3.4	2.7	-	-
3/4	9.6	7.6	4.8	3.8	-	-
1	12.2	9.5	6.1	4.7	-	-
1 1/2	-	13.2	8.3	6.6	-	-
2	-	17	10.8	8.5	-	-
3	-	25	16	12.2	-	-
5	-	40	27	20	-	-
7 1/2	-	58	-	29	13.6	12.2
10	-	76	-	38	18	16
15	-	-	-	55	27	24
20	-	-	-	72	34	31
25	-	-	-	89	43	38
30	-	-	-	106	51	46
40	-	-	-	140	67	61
50	-	-	-	173	83	75
60	-	-	-	206	99	90
75	-	-	-	255	123	111
100	-	-	-	341	164	148
125	-	-	-	425	205	185
150	-	-	-	506	246	222
200	-	-	-	675	330	294

Table based on 2008 National Electrical Code.

Technical Information

FULL-LOAD CURRENT (AMPS) FOR SINGLE-PHASE AC MOTORS

HP	115 V	200 V	208 V	230 V
1/6	4.4	2.5	2.4	2.2
1/4	5.8	3.3	3.2	2.9
1/3	7.2	4.1	4	3.6
1/2	9.8	5.6	5.4	4.9
3/4	13.8	7.9	7.6	6.9
1	16	9.2	8.8	8
1 1/2	20	11.5	11	10
2	24	13.8	13.2	12
3	34	19.6	18.7	17
5	56	32.2	30.8	28
7 1/2	80	46	44	40
10	100	57.5	55	50

Amps listed are for voltage ranges of 110-120 and 220-240.

GLOSSARY OF ELECTRICAL TERMS

Capacitance - a measure of the amount of electric charge stored (or separated) for a given electric potential.

Impedance - the generalization of the concept of resistance from DC to AC. It is a way to represent how much current will flow with a specified (AC) voltage across the impedance. If there is one volt AC across an impedance that lets one ampere of AC current flow, the impedance is defined by the AC version of Ohm's law and is one ohm.

Potential - the potential energy per unit of charge associated with a static (time-invariant) electric field, also called the electrostatic potential, typically measured in volts.

Power Factor - the power factor of an AC electric power system is defined as the ratio of the real power to the apparent power, and is a number between 0 and 1.

Reactance - the imaginary part of impedance caused by the presence of inductors or capacitors in the circuit.

Technical Information

MEASUREMENT

GAUGE EQUIVALENTS

Gauge Number	Nominal Thickness (in.)	Nominal Thickness (mm)
7 Gauge	0.179	4.547
8 Gauge	0.164	4.166
9 Gauge	0.150	3.810
10 Gauge	0.134	3.404
11 Gauge	0.120	3.048
12 Gauge	0.105	2.667
13 Gauge	0.090	2.286
14 Gauge	0.075	1.905
15 Gauge	0.067	1.702
16 Gauge	0.060	1.524
17 Gauge	0.054	1.372
18 Gauge	0.048	1.219
19 Gauge	0.042	1.067
20 Gauge	0.036	0.914
21 Gauge	0.033	0.838
22 Gauge	0.030	0.762

ENGLISH-TO-METRIC CONVERSIONS

English	Metric
1 inch	2.54 centimeters = 25.4 millimeters
12 inches = 1 foot	30.48 centimeters = 304.8 millimeters
3 feet = 1 yard	.914 meters = 91.44 centimeters
1 inch ²	6.45 centimeters ²
1 foot ² = 144 inches ²	929.03 centimeters ²
9 feet ² = 1 yard ² = 1296 inches ²	8361.3 centimeters ² = 0.83613 meters ²
640 acres = 1 mile ²	2.59 kilometers ²
1 ft. ³ = 1728 inches ³	33.98 meters ³
1 yard ³ = 27 ft. ³	.76 meters ³
2 pints = 1 quart = .5 gallon	.94 liter
16 oz. = 1 lb.	453.59 grams = .454 kg
2 000 lb. = 1 ton	1016 kg

Technical Information

CELCIUS-TO-FAHRENHEIT CONVERSIONS

°C	°F	°C	°F	°C	°F	°C	°F
0	32						
1	33.8	26	78.8	51	123.8	76	168.8
2	35.6	27	80.6	52	125.6	77	170.6
3	37.4	28	82.4	53	127.4	78	172.4
4	39.2	29	84.2	54	129.2	79	174.2
5	41	30	86	55	131	80	176
6	42.8	31	87.8	56	132.8	81	177.8
7	44.6	32	89.6	57	134.6	82	179.6
8	46.4	33	91.4	58	136.4	83	181.4
9	48.2	34	93.2	59	138.2	84	183.2
10	50	35	95	60	140	85	185
11	51.8	36	96.8	61	141.8	86	186.8
12	53.6	37	98.6	62	143.6	87	188.6
13	55.4	38	100.4	63	145.4	88	190.4
14	57.2	39	102.2	64	147.2	89	192.2
15	59	40	104	65	149	90	194
16	60.8	41	105.8	66	150.8	91	195.8
17	62.6	42	107.6	67	152.6	92	197.6
18	64.4	43	109.4	68	154.4	93	199.4
19	66.2	44	111.2	69	156.2	94	201.2
20	68	45	113	70	158	95	203
21	69.8	46	114.8	71	159.8	96	204.8
22	71.6	47	116.6	72	161.6	97	206.6
23	73.4	48	118.4	73	163.4	98	208.4
24	75.2	49	120.2	74	165.2	99	210.2
25	77	50	122	75	167	100	212

$$^{\circ}\text{C} = 5/9 \times (^{\circ}\text{F} - 32)$$

$$^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$$

Technical Information

DECIMAL / FRACTION / MM EQUIVALENTS

Decimal	Fraction			mm				
.0156				1/64	.396			
.0313				2/64	.795			
.0469				3/64	1.191			
.0625		1/16		4/64	1.588			
.0781				5/64	1.984			
.0938				6/64	2.383			
.1094				7/64	2.779			
.1250		1/8		8/64	3.175			
.1406				9/64	3.571			
.1562				10/64	3.768			
.1719				11/64	4.366			
.1875			3/16	6/32	4.763			
.2031				13/64	5.159			
.2188				7/32	5.558			
.2344				15/64	5.954			
.2500		1/4	2/8	4/16	8/32	16/64	6.350	
.2656					17/64	6.746		
.2812					9/32	18/64	7.143	
.2969					19/64	7.541		
.3125				5/16	10/32	20/64	7.938	
.3281					21/64	8.334		
.3438					11/32	22/64	8.733	
.3594					23/64	9.129		
.3750			3/8	6/16	12/32	24/64	9.525	
.3906					25/64	9.921		
.4062					13/32	26/64	10.317	
.4219					27/64	10.716		
.4375				7/16	14/32	28/64	11.112	
.4531					29/64	11.509		
.4688					15/32	30/64	11.908	
.4844					31/64	12.304		
.5000		1/2	4/8	4/8	8/16	16/32	32/64	12.700
.5156					33/64	13.096		
.5312					17/32	34/64	13.492	
.5469					35/64	13.891		
.5625				9/16	18/32	36/64	14.288	

Technical Information

DECIMAL / FRACTION / MM EQUIVALENTS (CONT.)

Decimal	Fraction					mm
.5781					37/64	14.684
.5938				19/32	38/64	15.083
.6094					39/64	15.479
.6250	5/8		10/16	20/32	40/64	15.875
.6406					41/64	16.271
.6562				21/32	42/64	16.667
.6719					43/64	17.066
.6876			11/16	22/32	44/64	17.465
.7031					45/64	17.859
.7188				23/32	46/64	18.258
.7344					47/64	18.654
.7500	3/4	6/8	12/16	24/32	48/64	19.050
.7656					49/64	19.446
.7812				25/32	50/64	19.842
.7969					51/64	20.241
.8125			13/16	26/32	52/64	20.637
.8281					53/64	21.034
.8438				27/32	54/64	21.433
.8465					55/64	21.501
.8750	7/8		14/16	28/32	56/64	22.225
.8906					57/64	22.621
.9062				29/32	58/64	23.017
.9219					59/64	23.416
.9375			15/16	30/32	60/64	23.813
.9531					61/64	24.209
.9688				31/32	62/64	24.608
.9844					63/64	25.004
1.000	1	4/4	8/8	16/16	32/32	25.400

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