

PROTECTING YOUR ADVANTAGE

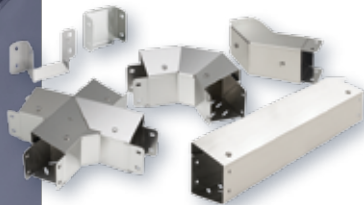
*Hoffman*<sup>®</sup>



# CONTRACTOR POCKET Reference



Volume 4



**Pentair**  
Technical Products

Enclosures • Wireway • Trough



## Information at your fingertips

hoffmanonline.com

The comprehensive Hoffman brand Web site not only offers the industry's largest line of enclosures and accessories, but is also the most complete information resource for enclosure education and specification:

- ▶ Complete online catalog featuring over 10,000 standard products
- ▶ Product selection and configuration tools
- ▶ Component, 2D and 3D drawing downloads
- ▶ Technical resources, specification sheets, instructions and more
- ▶ Thermal management, chemical resistance and hazardous location data





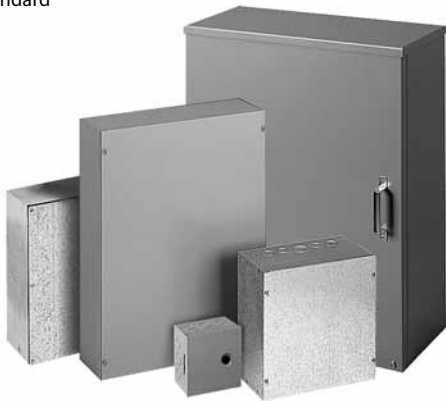
## The Hoffman Brand Provides Equipment Protection Solutions for a Wide Variety of Industries

Pentair Technical Products' Hoffman brand is recognized as an industry leader providing a broad range of standard, modified and engineered enclosure solutions, and extensive technical expertise.




### The Commercial Construction Market

#### Off-the-Shelf Innovation Saves Commercial and HVAC Contractors Time and Money

Pentair Technical Products has what you need for every application—Hoffman junction boxes, weatherproof outdoor enclosures, basic panel enclosures, wireway and trough. New product introductions include additional current transformer cabinets, drive cabinets, cable supports and accessories, and wire mesh cable tray products. Rely on Hoffman for innovative, feature-rich standard products that save you time and money.



## Product Selection Quick Reference

				
	<b>Small Enclosures</b>	<b>Medium Enclosures</b>	<b>Large Enclosures</b>	<b>Wireway and Trough</b>
<b>TYPE 1</b>	2-12, 14-16	17, 34	18	40-51, 54, 56-59
<b>TYPE 3R</b>	19-29	30, 32, 38	36	52, 55, 60

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# Screw-Cover Pull Boxes, Type 1

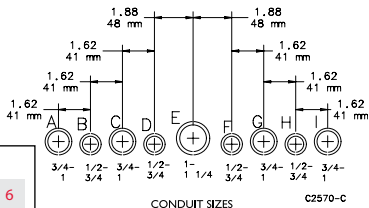


## Industry Standards

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



CONDUIT SIZES

**Knockout Pattern**  
 (from outside of box)

### Reading Catalog Numbers

E = Painted

G = Galvanized

ASE 10 X 8 X 6

H W D

## With Knockouts

Catalog Number	Number of Cover Screws	Knockout Pattern along "H" Sides	Knockout Pattern along "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
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

# Screw-Cover Pull Boxes, Type 1

## With Knockouts (Cont.)

Catalog Number	Number of Cover Screws	Knockout Pattern along "H" Sides	Knockout Pattern along "W" Sides
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

## Screw-Cover Pull Boxes, Type 1

### With Knockouts (Cont.)

Catalog Number	Number of Cover Screws	Knockout Pattern along "H" Sides	Knockout Pattern along "W" Sides
ASE8X8X6	4	F-G-H-I	F-G-H-I
ASG8X8X6	4	F-G-H-I	F-G-H-I
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



# Screw-Cover Pull Boxes, Type 1

## With Knockouts (Cont.)

Catalog Number	Number of Cover Screws	Knockout Pattern along "H" Sides	Knockout Pattern along "W" Sides
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
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
ASE4X4X3NK	2
ASG4X4X3NK	2
ASE6X6X3NK	2
ASG6X6X3NK	2
ASE8X6X3NK	2

Catalog Number	Number of Cover Screws
ASG8X6X3NK	2
ASE16X14X3NK	4
ASE20X14X3NK	4
ASE4X4X4NK	2
ASG4X4X4NK	2

## Screw-Cover Pull Boxes, Type 1

### Without Knockouts (Cont.)

Catalog Number	Number of Cover Screws
ASE6X4X4NK	2
ASG6X4X4NK	2
ASE6X6X4NK	2
ASG6X6X4NK	2
ASE8X6X4NK	2
ASG8X6X4NK	2
ASE8X8X4NK	4
ASG8X8X4NK	4
ASE10X6X4NK	4
ASG10X6X4NK	4
ASE10X8X4NK	4
ASG10X8X4NK	4
ASE10X10X4NK	4
ASG10X10X4NK	4
ASE12X6X4NK	4
ASG12X6X4NK	4
ASE12X8X4NK	4
ASG12X8X4NK	4
ASE12X10X4NK	4
ASG12X10X4NK	4
ASE12X12X4NK	4
ASG12X12X4NK	4
ASE15X15X4NK	4
ASG15X15X4NK	4
ASE16X12X4NK	4
ASG16X12X4NK	4
ASE18X12X4NK	4
ASG18X12X4NK	4
ASE18X15X4NK	4

Catalog Number	Number of Cover Screws
ASE18X18X4NK	4
ASG18X18X4NK	4
ASE24X12X4NK	4
ASE24X18X4NK	4
ASG24X18X4NK	4
ASE24X24X4NK	4
ASG24X24X4NK	4
ASE30X24X4NK	6
ASE30X30X4NK	8
ASE6X6X6NK	2
ASG6X6X6NK	2
ASE8X6X6NK	2
ASG8X6X6NK	2
ASE8X8X6NK	4
ASG8X8X6NK	4
ASE10X8X6NK	4
ASG10X8X6NK	4
ASE10X10X6NK	4
ASG10X10X6NK	4
ASE12X6X6NK	4
ASE12X8X6NK	4
ASG12X8X6NK	4
ASE12X10X6NK	4
ASG12X10X6NK	4
ASE12X12X6NK	4
ASG12X12X6NK	4
ASE16X12X6NK	4
ASG16X12X6NK	4
ASE16X16X6NK	4

# Screw-Cover Pull Boxes, Type 1

## Without Knockouts (Cont.)

Catalog Number	Number of Cover Screws
ASG16X16X6NK	4
ASE18X12X6NK	4
ASG18X12X6NK	4
ASE18X18X6NK	4
ASG18X18X6NK	4
ASE24X12X6NK	4
ASG24X12X6NK	4
ASE24X18X6NK	4
ASG24X18X6NK	4
ASE24X20X6NK	4
ASG24X20X6NK	4
ASE24X24X6NK	4
ASG24X24X6NK	4
ASE30X24X6NK	6
ASG30X24X6NK	6
ASE30X30X6NK	8
ASG30X30X6NK	8
ASE36X24X6NK	6
ASG36X24X6NK	6
ASE36X30X6NK	8
ASE36X36X6NK	8
ASG36X36X6NK	8
ASE8X8X8NK	4
ASG8X8X8NK	4
ASE10X10X8NK	4
ASG10X10X8NK	4
ASE12X10X8NK	4
ASE12X12X8NK	4
ASG12X12X8NK	4

Catalog Number	Number of Cover Screws
ASE16X12X8NK	4
ASE18X12X8NK	4
ASG18X12X8NK	4
ASE18X18X8NK	4
ASG18X18X8NK	4
ASE24X12X8NK	4
ASG24X12X8NK	4
ASE24X18X8NK	4
ASG24X18X8NK	4
ASE24X20X8NK	4
ASG24X20X8NK	4
ASE24X24X8NK	4
ASG24X24X8NK	4
ASE30X24X8NK	6
ASG30X24X8NK	6
ASE30X30X8NK	8
ASG30X30X8NK	6
ASE36X24X8NK	6
ASG36X24X8NK	6
ASE36X36X8NK	8
ASG36X36X8NK	8
ASE12X12X10NK	4
ASG12X12X10NK	4
ASE18X12X10NK	4
ASE18X18X10NK	4
ASG18X18X10NK	4
ASE24X12X10NK	4
ASE24X18X10NK	4
ASE24X24X10NK	4

Subject to change without notice

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## Screw-Cover Pull Box, Type 1, Accessories

### Without Knockouts (Cont.)

Catalog Number	Number of Cover Screws
ASG24X24X10NK	4
ASE30X24X10NK	6
ASE30X30X10NK	8
ASG30X30X10NK	8
ASE36X24X10NK	6
ASG36X24X10NK	6
ASE36X36X10NK	8
ASG36X36X10NK	8
ASE12X12X12NK	4
ASG12X12X12NK	4
ASE24X12X12NK	4
ASG24X12X12NK	4
ASE18X18X12NK	4
ASG18X18X12NK	4
ASE24X18X12NK	4
ASE24X24X12NK	4

Catalog Number	Number of Cover Screws
ASG24X24X12NK	4
ASE30X24X12NK	6
ASE30X30X12NK	8
ASG30X30X12NK	8
ASE36X24X12NK	6
ASG36X24X12NK	6
ASE36X36X12NK	8
ASG36X36X12NK	8
ASE48X48X12NK	12
ASG48X48X12NK	12
ASE30X30X16NK	8
ASE36X36X16NK	8
ASG36X36X16NK	8
ASE48X48X16NK	12
ASG48X48X16NK	12

## Screw-Cover Pull Box, Type 1, Accessories

### Flush-Mount Door Frames



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

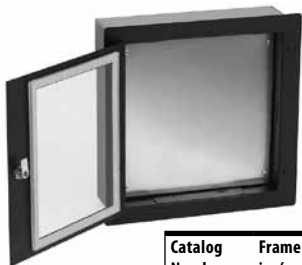
### Flush Covers



Catalog Number	Fits Box Size H x W in. (mm)
<b>AFE6X6</b>	6.00 x 6.00 (152 x 152)
<b>AFE8X6</b>	8.00 x 6.00 (203 x 152)
<b>AFE8X8</b>	8.00 x 8.00 (203 x 203)
<b>AFE10X8</b>	10.00 x 8.00 (254 x 203)
<b>AFE12X8</b>	12.00 x 8.00 (305 x 203)
<b>AFE10X10</b>	10.00 x 10.00 (254 x 254)
<b>AFE12X12</b>	12.00 x 12.00 (305 x 305)
<b>AFE18X12</b>	18.00 x 12.00 (457 x 305)
<b>AFE18X18</b>	18.00 x 18.00 (457 x 457)
<b>AFE24X18</b>	24.00 x 18.00 (610 x 457)
<b>AFE24X24</b>	24.00 x 24.00 (610 x 610)

## Screw-Cover Pull Box, Type 1, Accessories

### Type 1 Locking Window Pull Box Accessory



Catalog Number	Frame Size H x W in. (mm)	Dead Front Panel Size H x W 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)

# Locking Integrated Perforated Panel Enclosure, Type 1



1

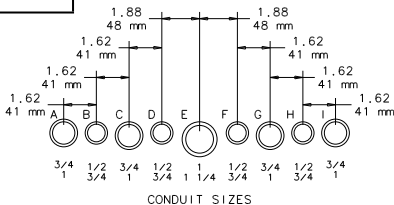
## Industry Standards

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

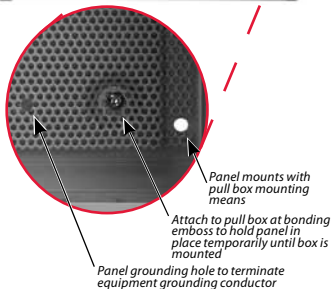
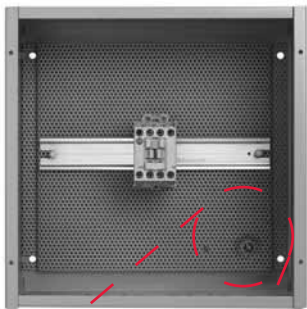
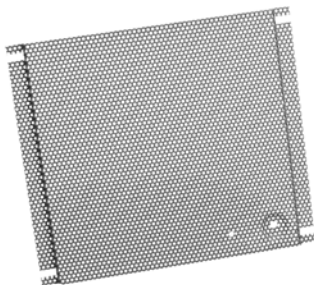
**A 12 12 6 T1 PP**  
 H W D



Knockout Pattern  
 (from outside of box)

Catalog Number	Panel Size D x E in. (mm)	Mounting Holes G x H in. (mm)	Knockout Pattern A-Sides	Knockout Pattern B-Sides
<b>A12126T1PP</b>	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
<b>A16126T1PP</b>	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
<b>A2016AT1PP</b>	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
<b>A2420AT1PP</b>	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
<b>A3624AT1PP</b>	32.00 x 22.50 (813 x 572)	33.50 x 16.75 (851 x 425)	—	—
<b>A3630AT1PP</b>	32.00 x 31.50 (813 x 800)	33.50 x 22.75 (851 x 578)	—	—

## Type 1 Pull Box Perforated Panel



Catalog Number	Panel Gauge	Panel Size D x E (in.)	Panel Size D x E (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__

PB1818PP and PB2424PP have flange on all four sides.



## T1FLO® Vented Enclosure with Fan, Type 1



### Industry Standards

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	AxBxC in. (mm)	Suggested HP	Solid Panel	Perforated Panel
<b>T1F80LP</b>	28.00 x 24.00 x 12.75 (711 x 610 x 324)	3	<b>A24P24</b>	<b>A24P24PP</b>
<b>T1F130LP</b>	34.00 x 24.00 x 12.75 (864 x 610 x 324)	Up to 20	<b>A30P24</b>	<b>A30P24PP</b>
<b>T1F200LP</b>	40.00 x 24.00 x 12.75 (1016 x 610 x 324)	40	<b>A36P24</b>	<b>A36P24PP</b>
<b>T1F350LP</b>	54.00 x 30.00 x 12.75 (1372 x 762 x 324)	Up to 75	<b>A48P30</b>	—

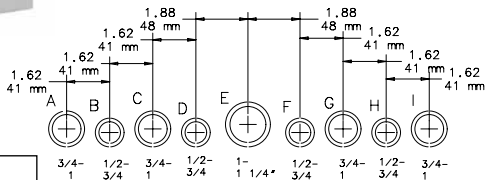
## Hinged-Cover Cutout Boxes



### 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



### Reading Catalog Numbers

AHE 10 X 8 X 6  
 H W D

CONDUIT SIZES

Knockout Pattern  
 (from outside of box)

### Hinged-Cover, Type 1

Catalog Number	Knockout Pattern along "H" Sides	Knockout Pattern along "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

## Hinged-Cover Cutout Boxes

### Hinged-Cover, Type 1 (Cont.)

Catalog Number	Knockout Pattern along "H" Sides	Knockout Pattern along "W" Sides
AHE6X6X6	B-C-D	B-C-D
AHE8X8X6	F-G-H-I	F-G-H-I
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

## Hinged-Cover, 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

#### Reading Catalog Numbers

A	10	N	10	4
	H		W	D

### Small, Type 1

Catalog Number	Panel <sup>a</sup>	Perforated Panel <sup>a</sup>
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 <sup>a</sup>	Perforated Panel <sup>a</sup>
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

<sup>a</sup>Purchase panels separately.

## Hinged-Cover, 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

#### 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.

## Medium, Type 1

Catalog Number	Panel Catalog <sup>a</sup>	Perforated Panel <sup>a</sup>
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

Catalog Number	Panel Catalog <sup>a</sup>	Perforated Panel <sup>a</sup>
A20N20BLP	A20N20MP	A20N20MPP
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*

<sup>a</sup>Purchase panels separately.

\*Flanged on all four sides.

## Hinged-Cover, 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

### Large, Type 1

Catalog Number	Panel <sup>a</sup>
A42N3009	A42P30
A42N3609	A42P36
A48N3609	A48P36
A48N3611	A48P36
A42N3013	A42P30
A42N3613	A42P36
A48N3613	A48P36
A48N3617	A48P36

#### Reading Catalog Numbers

A	42	N	30	09
	H		W	D

<sup>a</sup>Purchase panels separately. Optional aluminum panels are available for most sizes.

Purchase enclosure Mounting Bracket Kit accessory (AMFLN1) separately.

## WEATHERFLO® with Fan, Type 3R


**2**

### Industry Standards

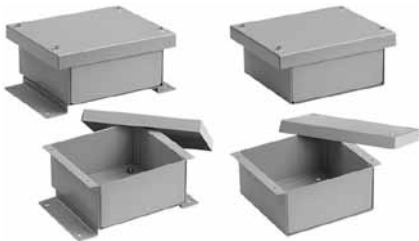
UL 508A Listed; Type 3R; File Number E61997  
 cUL Listed per CSA C22.2 No 94; Type 3R; File Number E61997

NEMA/EEMAC Type 3R  
 IEC 60529, IP32

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

<sup>a</sup>Purchase panels separately.

## Horizontal-Mount, Type 3R



### Reading Catalog Numbers

A	12	R	12	6
	H		W	D

### 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



## Screw-Cover, Type 3R



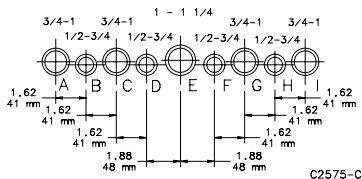
Reading Catalog Numbers

A	12	R	10	4
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



### With Knockouts

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

## Screw-Cover, Type 3R

### With Knockouts (Cont.)

Catalog Number	Body Style	Knockout Pattern
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
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

## Screw-Cover, Type 3R

### With Knockouts (Cont.)

Catalog Number	Body Style	Knockout Pattern
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

## Screw-Cover, 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	NK
	H		W		D

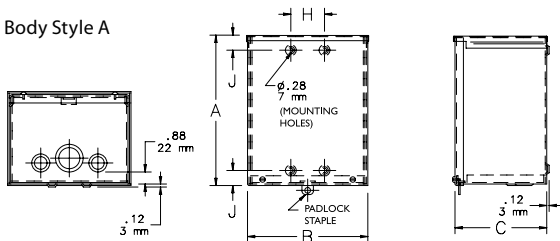
### Without Knockouts

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

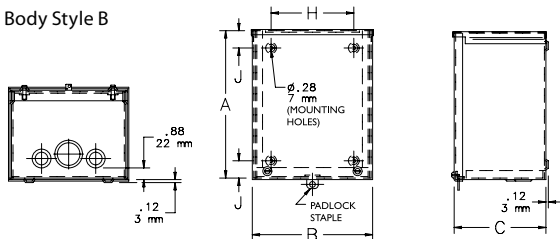
Catalog Number	Body Style
A18R186NK	B
A24R186NK	B
A24R246NK	B
A8R88NK	A
A24R88NK	A
A12R128NK	A
A15R128NK	A
A18R128NK	A
A18R188NK	B
A24R188NK	B
A24R208NK	B
A24R248NK	C
A30R248NK	C
A48R368NK	C
A24R2410NK	C
A24R2412NK	C
A30R3012NK	C
A36R3012NK	C
A36R3612NK	C
A30R3016NK	C
A48R3616NK	C

## Screw-Cover, Type 3R

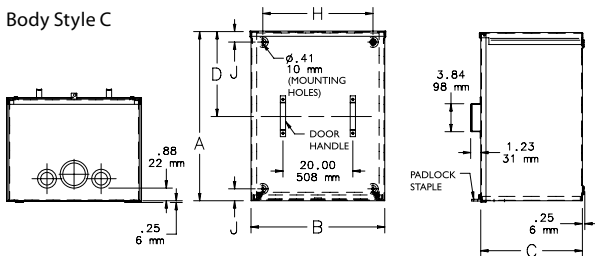
Body Style A



Body Style B



Body Style C



## Screw-Cover Galvanized, Type 3R



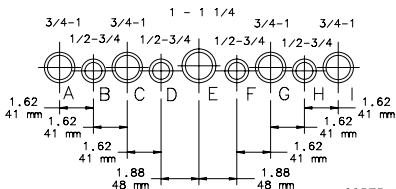
### Industry Standards

UL50, 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

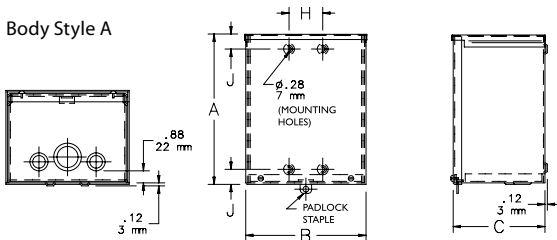


C2575-C

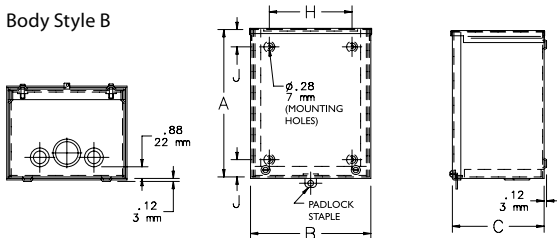
Catalog Number	Body Style	Knockout Pattern
A4R44GV	A	B-C
A6R64GV	A	B-C
A8R84GV	A	B-C-D
A10R104GV	A	C-D-E-F-G
A12R124GV	A	C-D-E-F-G
A6R66GV	A	B-C-D
A8R86GV	A	F-G-H-I
A10R106GV	A	C-D-E-F-G
A12R126GV	A	C-D-E-F-G
A18R186GV	B	A-B-C-D-E-F-G-H-I
A8R88GV	A	F-G-H-I
A8R88GVNK	A	—
A10R108GVNK	A	—
A12R128GV	A	C-D-E-F-G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

## Screw-Cover Galvanized, Type 3R

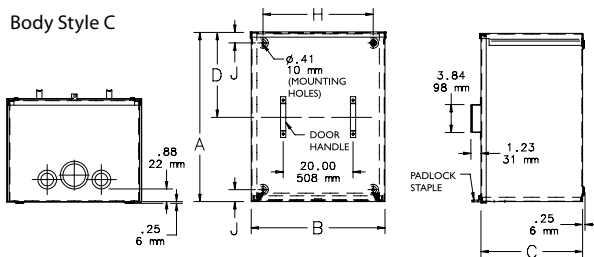
Body Style A



Body Style B



Body Style C



## Screw-Cover Gasketed, Type 3



### 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

#### Reading Catalog Numbers

A 6 6 4 GSC  
 H W D

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

Catalog Number
A888GSC
A10108GSC
A12128GSC
A16168GSC
A20208GSC
A24208GSC
A24248GSC
A30248GSC
A242410GSC
A121212GSC
A161612GSC
A202012GSC
A242412GSC
A303012GSC
A363612GSC



## Hinged-Cover Small , Type 3R



### 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

### Reading Catalog Numbers

A 6 R 6 4 HCR  
 H W D

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

<sup>a</sup>Purchase panels separately.

## Hinged-Cover Medium, Type 3R



### 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

#### Reading Catalog Numbers

A	16	R	12	6	HCR
H	W	D			

Catalog Number	Panel <sup>a</sup>	Perforated Panel <sup>a</sup>
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*

Catalog Number	Panel <sup>a</sup>	Perforated Panel <sup>a</sup>
A30R3012HCR	A30P30	A30P30PP*
A36R2412HCR	A36P24	A36P24PP*
A36R3012HCR	A36P30	A36P30PP*
A36R3612HCR	A36P36	A36P36PP*
A42R3012HCR	A42P30	—
A42R3612HCR	A42P36	—
A48R3612HCR	A48P36	—
A60R3612HCR	A60P36	—
A30R3016HCR	A30P30	A30P30PP*
A48R3616HCR	A48P36	—

<sup>a</sup>Purchase panels separately.

\*Flanged on all four sides.

## Hinged-Cover Lift-Off, Type 3R

### 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



#### Reading Catalog Numbers

A	16	R	12	6	HCL0
H	W	D			

Catalog Number	Panel <sup>a</sup>	Panel Mounting Kit <sup>b</sup>	Mounting Bracket Kit <sup>b</sup>
A8R64HCL0	A6P6	APMK3RL016	AMFK3RL016
A8R86HCL0	A8P6	APMK3RL016	AMFK3RL016
A10R86HCL0	A8P8	APMK3RL016	APMK3RL016
A12R106HCL0	A10P10	APMK3RL016	AMFK3RL016
A12R126HCL0	A12P10	APMK3RL016	AMFK3RL016
A16R126HCL0	A14P12	APMK3RL016	AMFK3RL016
A16R166HCL0	A16P16	APMK3RL014	AMFK3RL014
A20R166HCL0	A20P16	APMK3RL014	AMFK3RL014
A20R208HCL0	A20P20	APMK3RL014	AMFK3RL014
A24R208HCL0	A24P20	APMK3RL014	AMFK3RL014
A24R248HCL0	A24P24	APMK3RL014	AMFK3RL014
A30R248HCL0	A30P24	APMK3RL014	AMFK3RL014

<sup>a</sup>Purchase panels separately.

<sup>b</sup>Order Panel Mounting Kit and Mounting Bracket Kit separately.  
 (A Panel Mounting Kit must be ordered to install panel.)

## WEATHERPRO® Outdoor Pad-Mount, Type 3R



### 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

#### Reading Catalog Numbers

A 60 R 28 18 FSLP  
 H W D

### Single-Door

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

Purchase panels separately.

## WEATHERPRO® Outdoor Pad-Mount, Type 3R



### 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

### Reading Catalog Numbers

A 60 R 52 18 FSLP  
 H W D

### Two-Door

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

Purchase panels separately.

## 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

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

Catalog Number	Mounted
ATC30244S	Surface
ATC30244F	Flush
ATC30304S	Surface
ATC36244S	Surface
ATC36244F	Flush
ATC36364S	Surface
ATC36364F	Flush
ATC12126S	Surface
ATC12126F	Flush
ATC18126S	Surface
ATC18126F	Flush
ATC18186S	Surface

*3/4-inch-thick plywood panel included.*

# Telephone Cabinet, Type 1

## Reading Catalog Numbers

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

Catalog Number	Mounted
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

## 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

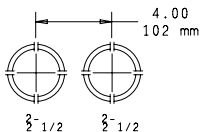
ATC	12	R	14	5
	H		W	D

Catalog Number	Door	Conduit 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

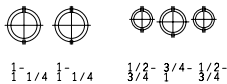
*3/4-inch-thick plywood panel included.*



# T3-Box Telephone Cabinet, Type 3R

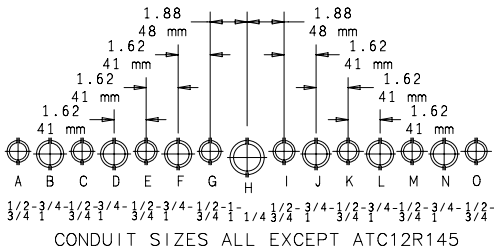


CONDUIT SIZES  
EXCEPT ATC12R145



CONDUIT SIZES  
ATC12R145

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## Terminal Box, Type 3R



### 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	A x B x C in. (mm)	Volts	Amps	Number of Bars
<b>TB3R101</b>	18.00 x 10.75 x 4.50 (457 x 273 x 114)	120/240	100	3
<b>TB3R103</b>	18.00 x 10.75 x 4.50 (457 x 273 x 114)	600	100	4
<b>TB3R103240</b>	18.00 x 10.75 x 4.50 (457 x 273 x 114)	120/240	100	4
<b>TB3R201</b>	23.00 x 14.00 x 4.50 (584 x 356 x 114)	120/240	200	3
<b>TB3R203</b>	23.00 x 14.00 x 4.50 (584 x 356 x 114)	600	200	4
<b>TB3R203240</b>	23.00 x 14.00 x 4.50 (584 x 356 x 114)	120/240	200	4
<b>TB3R401</b>	27.00 x 20.50 x 6.00 (686 x 521 x 152)	120/240	400	3
<b>TB3R403</b>	27.00 x 20.50 x 6.00 (686 x 521 x 152)	600	400	4

## Terminal Box, Type 3R, Accessories

### Interchangeable Bolt-On Hub



Catalog Number	Fits Conduit Size (in.)	Fits Conduit Size (mm)
TBHUB10	1.00	25
TBHUB12	1.25	32
TBHUB15	1.50	38
TBHUB20	2.00	51
TBHUB25	2.50	64

### Lug Assembly



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

# Lay-In Galvanized Wireway, NEMA Type 1

## 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 Galvanized Wireway, NEMA Type 1

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 Galvanized Wireway, NEMA Type 1

<b>Description</b>	<b>2.50 x 2.50 in. 64 x 64 mm</b>	<b>4.00 x 4.00 in. 102 x 102 mm</b>
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
Drop and Bracket Hanger	F22GDB	F44GDB
Support Hanger	F22GSHGV	F44GSHGV
Universal U-Connector	F22GUCGV	F44GUCGV

## Lay-In Galvanized Wireway, NEMA Type 1

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 F1212G1010R
F66GDB	F88GDB	F1010GDB	F1212GDB
F66GSHGV	F88GSHGV	F1010GSHGV	F1212GSHGV
F66GUCGV	F88GUCGV	F1010GUCGV	F1212GUCGV

# Lay-In Painted Flat-Cover Wireway, NEMA Type 1



## Industry Standards

UL 870 Listed; File No. E27524  
 cUL CSA C22.2 No. 26 Listed;  
 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
12.00-in. (305-mm) Straight Section with knockouts	<b>F22T112GVPWK</b>	—
12.00-in. (305-mm) Straight Section without knockouts	<b>F22T112GVP</b>	—
18.00-in. (455-mm) Straight Section without knockouts	—	—
24.00-in. (610-mm) Straight Section with knockouts	<b>F22T124GVPWK</b>	—
24.00-in. (610-mm) Straight Section without knockouts	<b>F22T124GVP</b>	—
36.00-in. (914-mm) Straight Section with knockouts	<b>F22T136GVPWK</b>	—
36.00-in. (914-mm) Straight Section without knockouts	<b>F22T136GVP</b>	—
48.00-in. (1219-mm) Straight Section with knockouts	<b>F22T148GVPWK</b>	—
48.00-in. (1219-mm) Straight Section without knockouts	<b>F22T148GVP</b>	—
60.00-in. (1524-mm) Straight Section with knockouts	<b>F22T160GVPWK</b>	—
60.00-in. (1524-mm) Straight Section without knockouts	<b>F22T160GVP</b>	<b>F33T160GVP</b>
72.00-in. (1829-mm) Straight Section with knockouts	—	—
72.00-in. (1829-mm) Straight Section without knockouts	—	—
120.00-in. (3048-mm) Straight Section with knockouts	<b>F22T1120GVPWK</b>	—
120.00-in. (3048-mm) Straight Section without knockouts	<b>F22T1120GVP</b>	<b>F33T1120GVP</b>



## Lay-In Painted Flat-Cover Wireway, NEMA Type 1

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	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F44T112GVPWK	F66T112GVPWK	F88T112GVPWK	—	F1212T112GVPWK
F44T112GVP	F66T112GVP	F88T112GVP	F1010T112GVP	F1212T112GVP
F44T118GVP	F66T118GVP	F88T118GVP	—	F1212T118GVPWK
F44T124GVPWK	F66T124GVPWK	F88T124GVPWK	—	F1212T124GVPWK
F44T124GVP	F66T124GVP	F88T124GVP	F1010T124GVP	F1212T124GVP
F44T136GVPWK	F66T136GVPWK	F88T136GVPWK	—	F1212T136GVPWK
F44T136GVP	F66T136GVP	F88T136GVP	F1010T136GVP	F1212T136GVP
F44T148GVPWK	F66T148GVPWK	F88T148GVPWK	—	F1212T148GVPWK
F44T148GVP	F66T148GVP	F88T148GVP	F1010T148GVP	F1212T148GVP
F44T160GVPWK	F66T160GVPWK	F88T160GVPWK	—	F1212T160GVPWK
F44T160GVP	F66T160GVP	F88T160GVP	F1010T160GVP	F1212T160GVP
F44T172GVPWK	F66T172GVPWK	—	—	—
F44T172GVP	F66T172GVP	F88T172GVP	F1010T172GVP	—
F44T1120GVPWK	F66T1120GVPWK	F88T1120GVP	—	—
F44T1120GVP	F66T1120GVP	F88T1120GVP	F1010T1120GVP	F1212T1120GVP

## Lay-In Painted Flat-Cover Wireway, NEMA Type 1

<b>Description</b>	<b>2.50 x 2.50 in. 64 x 64 mm</b>	<b>3.00 x 3.00 in. 76 x 76 mm</b>
90° Flush Tee	F22GT	F33GT
Sweep Tee	F22T	—
Cross Fitting	F22X	—
90° Sweep Elbow	F22G90SE	—
90° Elbow-Tee-Cross	F22G90TX	F33G90TX
90° Elbow	F22G90E	F33G90E
90° Elbow Outside Opening	F2290EOUT	—
90° Elbow Inside Opening	F2290EIN	—
45° Elbow	F22G45E	F33G45E
Telescope Fitting	F22GAA	—
Open Adapter	F22GOA	—
Panel Adapter	F22GPA	F33GPA
Closure Plate with knockouts	F22GCP	—
Closure Plate without knockouts	F22GCPNK	F33GCPNK
Reducer	—	F33G22R
Drop and Bracket Hanger	F22GDB	—
Support Hanger	F22GSH	—
Universal U-Connector	F22GUC	F33GUC
Barrier Kit, bolt-on Each barrier 60.00 in. (1524 mm)	—	F33BK60

## Lay-In Painted Flat-Cover Wireway, NEMA Type 1

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	10.00 x 10.00 in. 254 x 254 mm	12.00 x 12.00 in. 305 x 305 mm
F44GT	F66GT	F88GT	F1010GT	F1212GT
F44T	F66T	F88T	F1010T	F1212T
F44X	F66X	F88X	F1010X	F1212X
F44G90SE	F66G90SE	F88G90SE	F1010G90SE	F1212G90SE
F44G90TX	F66G90TX	F88G90TX	F1010G90TX	F1212G90TX
F44G90E	F66G90E	F88G90E	F1010G90E	F1212G90E
F4490EOUT	F6690EOUT	F8890EOUT	F101090EOUT	F121290EOUT
F4490EIN	F6690EIN	F8890EIN	F101090EIN	F121290EIN
F44G45E	F66G45E	F88G45E	F1010G45E	F1212G45E
F44GAA	F66GAA	F88GAA	F1010GAA	F1212GAA
F44GOA	F66GOA	F88GOA	F1010GOA	F1212GOA
F44GPA	F66GPA	F88GPA	F1010GPA	F1212GPA
F44GCP	F66GCP	F88GCP	F1010GCP	F1212GCP
F44GCPNK	F66GCPNK	F88GCPNK	F1010GCPNK	F1212GCPNK
F44G22R	F66G44R	F88G66R	F1010G88R	F1212G88R
F44G33R				F1212G1010R
F44GDB	F66GDB	F88GDB	F1010GDB	F1212GDB
F44GSH	F66GSH	F88GSH	F1010GSH	F1212GSH
F44GUC	F66GUC	F88GUC	F1010GUC	F1212GUC
F44BK60	F66BK60	F88BK60	—	—

## Lay-In Hinged-Cover Wireway, NEMA Type 1



### 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

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	F22G12WK	F44G12WK
12.00-in. (305-mm) Straight Section without knockouts	F22G12	F44G12
18.00-in. (455-mm) Straight Section without knockouts	—	F44G18
24.00-in. (610-mm) Straight Section with knockouts	F22G24WK	F44G24WK
24.00-in. (610-mm) Straight Section without knockouts	F22G24	F44G24
36.00-in. (914-mm) Straight Section with knockouts	F22G36WK	F44G36WK
36.00-in. (914-mm) Straight Section without knockouts	F22G36	F44G36
48.00-in. (1219-mm) Straight Section with knockouts	F22G48WK	F44G48WK
48.00-in. (1219-mm) Straight Section without knockouts	F22G48	F44G48
60.00-in. (1524-mm) Straight Section with knockouts	F22G60WK	F44G60WK
60.00-in. (1524-mm) Straight Section without knockouts	F22G60	F44G60
72.00-in. (1829-mm) Straight Section with knockouts	—	F44G72WK
72.00-in. (1829-mm) Straight Section without knockouts	—	F44G72
96.00-in. (2438-mm) Straight Section without knockouts	—	F44G96
120.00-in. (3048-mm) Straight Section with knockouts	F22G120WK	F44G120WK
120.00-in. (3048-mm) Straight Section without knockouts	F22G120	F44G120

## Lay-In Hinged-Cover Wireway, NEMA Type 1

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	Not Hinged 12.00 x 12.00 in. 305 x 305 mm	Hinged 12.00 x 12.00 in. 305 x 305 mm
F66G12WK	—	—	—	—
F66G12	F88G12	F1010G12	F1212G12	F1212G12H
F66G18	F88G18	—	—	—
F66G24WK	—	—	—	—
F66G24	F88G24	F1010G24	F1212G24	F1212G24H
F66G36WK	—	—	—	—
F66G36	F88G36	F1010G36	F1212G36	F1212G36H
F66G48WK	—	—	—	—
F66G48	F88G48	F1010G48	F1212G48	F1212G48H
F66G60WK	—	—	—	—
F66G60	F88G60	F1010G60	F1212G60	F1212G60H
F66G72WK	—	—	—	—
F66G72	F88G72	F1010G72	F1212G72	F1212G72H
F66G96	F88G96	F1010G96	F1212G96	—
F66G120WK	—	—	—	—
F66G120	F88G120	F1010G120	F1212G120	F1212G120H

## Lay-In Hinged-Cover Wireway, NEMA Type 1

<b>Description</b>	<b>2.50 x 2.50 in. 64 x 64 mm</b>	<b>4.00 x 4.00 in. 102 x 102 mm</b>
90° Flush Tee	F22GT	F44GT
Sweep Tee	F22T	F44T
Cross Fitting	F22X	F44X
90° Sweep Elbow	F22G90SE	F44G90SE
90° Elbow-Tee-Cross	F22G90TX	F44G90TX
90° Elbow	F22G90E	F44G90E
90° Elbow Outside Opening	F2290EOUT	F4490EOUT
90° Elbow Inside Opening	F2290EIN	F4490EIN
45° Elbow	F22G45E	F44G45E
Telescope Fitting	F22GAA	F44GAA
Open Adapter	F22G0A	F44G0A
Panel Adapter	F22GPA	F44GPA
Closure Plate without knockouts	F22GCPNK	F44GCPNK
Closure Plate with knockouts	F22GCP	F44GCP
Reducer	—	F44G22R
Drop and Bracket Hanger	F22GDB	F44GDB
Support Hanger	F22GSH	F44GSH
Universal U-Connector	F22GUC	F44GUC
Barrier Kit, bolt-on Each barrier 60.00 in. (1524 mm)	—	F44BK60

## Lay-In Hinged-Cover Wireway, NEMA Type 1

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	Not Hinged 12.00 x 12.00 in. 305 x 305 mm	Hinged 12.00 x 12.00 in. 305 x 305 mm
F66GT	F88GT	F1010GT	F1212GT	F1212GT
F66T	F88T	F1010T	F1212T	F1212T
F66X	F88X	F1010X	F1212X	F1212X
F66G90SE	F88G90SE	F1010G90SE	F1212G90SE	F1212G90SE
F66G90TX	F88G90TX	F1010G90TX	F1212G90TX	F1212G90TX
F66G90E	F88G90E	F1010G90E	F1212G90E	F1212G90E
F6690EOUT	F8890EOUT	F101090EOUT	F121290EOUT	F121290EOUT
F6690EIN	F8890EIN	F101090EIN	F121290EIN	F121290EIN
F66G45E	F88G45E	F1010G45E	F1212G45E	F1212G45E
F66GAA	F88GAA	F1010GAA	F1212GAA	F1212GAA
F66GOA	F88GOA	F1010GOA	F1212GOA	F1212GOA
F66GPA	F88GPA	F1010GPA	F1212GPA	F1212GPA
F66GCPNK	F88GCPNK	F1010GCPNK	F1212GCPNK	F1212GCPNK
F66GCP	F88GCP	F1010GCP	F1212GCP	F1212GCP
F66G44R	F88G66R	F1010G88R	F1212G88R F1212G1010R	F1212G88R F1212G1010R
F66GDB	F88GDB	F1010GDB	F1212GDB	F1212GDB
F66GSH	F88GSH	F1010GSH	F1212GSH	F1212GSH
F66GUC	F88GUC	F1010GUC	F1212GUC	F1212GUC
F66BK60	F88BK60	—	—	—

## 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

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



## Lay-In Wireway, NEMA Type 3R

	4.00 x 4.00 in.	6.00 x 6.00 in.	8.00 x 8.00 in.
<b>Description</b>	<b>102 x 102 mm</b>	<b>152 x 152 mm</b>	<b>203 x 203 mm</b>
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

## 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

Catalog Number
A4412T1T
A4424T1T
A4436T1T
A4448T1T
A4460T1T
A4472T1T
A4496T1T
A6612T1T
A6624T1T
A6636T1T
A6648T1T
A6660T1T
A6672T1T
A6696T1T

Catalog Number
A8824T1T
A8836T1T
A8848T1T
A8860T1T
A8872T1T
A8896T1T
A101048T1T
A121224T1T
A121236T1T
A121248T1T
A121260T1T
A121272T1T
A121296T1T
A1212120T1T

## 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

Catalog Number
A4412RT
A4418RT
A4424RT
A4436RT
A4448RT
A4460RT
A4472RT
A6612RT
A6618RT
A6624RT
A6636RT
A6648RT
A6660RT
A6672RT
A8812RT
A8824RT
A8836RT
A8848RT
A8860RT
A8872RT
A8896RT

Catalog Number
A88116RT
A101024RT
A101036RT
A101048RT
A101060RT
A101096RT
A101072RT
A1010116RT
A121224RT
A121236RT
A121248RT
A121260RT
A121272RT
A121284RT
A121296RT
A1212116RT
A141448RT
A141472RT
A141484RT
A141496RT
A1414116RT

# 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



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	—	CT533120SS
10-ft. Straight Section, Perforated 20° Sloped Cover	—	CT533P120SS
Divider Straight Section	—	CT33D5S
Telescopic Straight Section (18.74 in. to 30.61 in.)	CT22T5S	CT33T5S
Divider, Telescopic Straight Section	—	CT33TDSP5S
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	CT22E0C90SS	CT33E0C90SS
90-Degree Elbows, Front Cover Perforated	CT22PEFC90SS	CT33PEFC90SS
90-Degree Elbows, Front Cover Sloped Inward	—	CT533EFC90SS
90-Degree Elbows, Front Cover Sloped Inward Perforated	—	CT533PEFC90SS
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

## CLEAN TRAY® Stainless Steel Cable Tray, Type 1

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
CT44TDSPSS	—	CT66TDSPSS
CT44EFC90SS	CT46EFC90SS	CT66EFC90SS
CT44EFCNT90SS	CT46EFCNT90SS	CT66EFCNT90SS
CT44EIC90SS	CT46EIC90SS	CT66EIC90SS
CT44E0C90SS	CT46E0C90SS	CT66E0C90SS
CT44PEFC90SS	CT46PEFC90SS	CT66PEFC90SS
CTS44EFC90SS	CTS46EFC90SS	CTS66EFC90SS
CTS44PEFC90SS	CTS46PEFC90SS	CTS66PEFC90SS
CT44EFCNT90SS	CT46EFCNT90SS	CT66EFCNT90SS
CTS44EFCNT90SS	CTS46EFCNT90SS	CTS66EFCNT90SS
CTS44EFC090SS	CTS46EFC090SS	CTS66EFC090SS
CTS44EFC090SS	CTS46EFC090SS	CTS66EFC090SS
CT44EFC45SS	CT46EFC45SS	CT66EFC45SS
CT44EIC45SS	CT46EIC45SS	CT66EIC45SS

Subject to change without notice

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## CLEAN TRAY® Stainless Steel Cable Tray, Type 1

<b>Description</b>	<b>2.00 x 2.00 in. 51 x 51 mm</b>	<b>4.00 x 4.00 in. 102 x 102 mm</b>
45-Degree Elbows, Outside Cover	CT22E0C45SS	CT33E0C45SS
45-Degree Elbows, Front Cover Perforated	CT22PEFC45SS	CT33PEFC45SS
45-Degree Elbows, Front Cover Sloped	—	CTS33EFC45SS
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	CT22V5S	CT33V5S
90-Degree Tee, Front Cover	CT22TFCSS	CT33TFCSS
90-Degree Tee, Inside Cover	—	CT33TICSS
90-Degree Tee, Outside Cover	CT22T0CSS	CT33T0CSS
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	—	CT33DT0CSS
Divider 90-Degree Elbow, Front Cover	—	CT33DEFC90SS
Divider 90-Degree Elbow, Inside Cover	—	CT33DEIC90SS
Divider 90-Degree Elbow, Outside Cover	—	CT33DE0C90SS
Divider 45-Degree Elbow, Front Cover	—	CT33DEFC45SS
Divider 45-Degree Elbow, Inside Cover	—	CT33DEIC45SS
Divider 45-Degree Elbow, Outside Cover	—	CT33DE0C45SS

## CLEAN TRAY® Stainless Steel Cable Tray, Type 1

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
CT44E0C45SS	CT46E0C45SS	CT66E0C45SS
CT44PEFC45SS	CT46PEFC45SS	CT66PEFC45SS
CTS44EFC45SS	CTS46EFC45SS	CTS66EFC45SS
CTS44PEFC45SS	CTS46PEFC45SS	CTS66PEFC45SS
CTS44EFC045SS	CTS46EFC045SS	CTS66EFC045SS
CTS44EIC45SS	CTS46EIC45SS	CTS66EIC45SS
CTS44E0C45SS	CTS46E0C45SS	CTS66E0C45SS
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
CT44DE0C90SS	—	CT66DE0C90SS
CT44DEFC45SS	CT46DEFC45SS	CT66DEFC45SS
CT44DEIC45SS	—	CT66DEIC45SS
CT44DE0C45SS	—	CT66DE0C45SS

## EconoTrough, NEMA Type 3R



### Reading Catalog Numbers

F	4	4	12	RTGV
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, IP 32

### Catalog Number

F4412RTGV

F4424RTGV

F4436RTGV

F4448RTGV

F4460RTGV

F4472RTGV

F6612RTGV

F6618RTGV

F6624RTGV

F6636RTGV

F6648RTGV

F6660RTGV

F6672RTGV

F8812RTGV

F8824RTGV

F8836RTGV

F8848RTGV

F8860RTGV

F8872RTGV

F8896RTGV

F88116RTGV

### Catalog Number

F101024RTGV

F101036RTGV

F101048RTGV

F101060RTGV

F101072RTGV

F101096RTGV

F1010116RTGV

F121224RTGV

F121236RTGV

F121248RTGV

F121260RTGV

F121272RTGV

F121284RTGV

F121296RTGV

F1212116RTGV

F141448RTGV

F141472RTGV

F141496RTGV

F1414116RTGV



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## 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 <sup>a</sup>	3RX <sup>a</sup>	4	4X	6
Incidental contact with the enclosed equipment	.	.	.	.	.	.
Rain, snow and sleet <sup>b</sup>	.	.	.	.	.	.
Sleet <sup>c</sup>						
Windblown dust	.			.	.	.
Hose-down				.	.	.
Corrosive agents			.		.	
Occasional temporary submersion						.

<sup>a</sup> These enclosures may be ventilated.

<sup>b</sup> External operating mechanisms are not required to be operable when enclosure is ice covered.

<sup>c</sup> External operating mechanisms are operable when enclosure is ice covered.

### in Indoor Locations

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

<sup>a</sup> 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.

<sup>b</sup> These fibers and flyings are non-hazardous materials and are not considered Class II type ignitable fibers or combustible flyings. For Class III type ignitable fibers or combustible flyings see the National Electrical Code Section 505.

*The preceding tables are reproduced by permission of the National Electrical Manufacturers Association from NEMA Standards Publication 250 "Enclosures for Electrical Equipment (1000 Volts Maximum)".*

## Industry Standards (Cont.)

### 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.

## NEMA, UL and CSA Ratings Non-Hazardous Locations

## Industry Standards (Cont.)

Enclosure Type	NEMA	UL	CSA
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.
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 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.

## Industry Standards (Cont.)

Enclosure Type	NEMA	UL	CSA
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.
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.

See footnotes on page 66

## Industry Standards (Cont.)

<sup>a</sup> 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.

<sup>b</sup> 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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## 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.

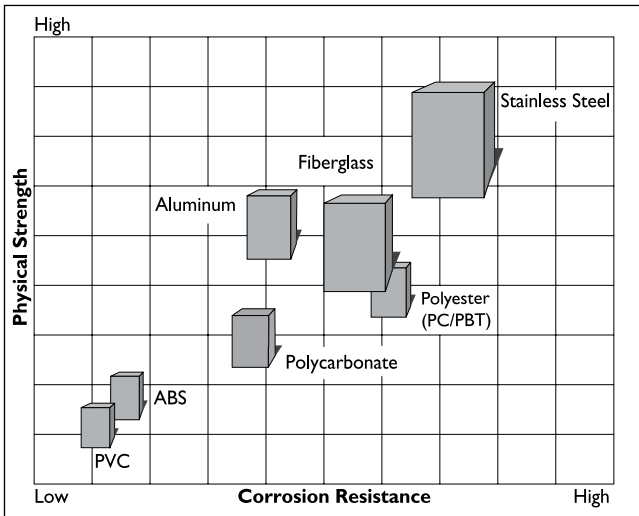
**Electrical enclosures manufactured by Hoffman are tested for and carry both Type and IP ratings.**

## Industry Standards (Cont.)

### 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.

### Strength/Corrosion Resistance of Enclosure Materials



## Industry Standards (Cont.)

### 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.



## Industry Standards (Cont.)

**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:

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

##### Total heat:

Estimate an additional 25%<sup>a</sup> for wire connections and other components.

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

##### Required airflow:

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

<sup>a</sup> This is an estimated factor. Further investigation is necessary to obtain actual total heat dissipated in enclosure.

## Thermal Management (Cont.)

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 <sup>b</sup>	$E_M$	.80-.96
Drive efficiency <sup>b</sup>	$E_D$	.96-.98
Drive heat loss	$W_D$	
Total heat loss	$W_T$	
Required airflow	CFM	

<sup>b</sup> 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 <sup>a</sup> (Watts)	Total Heat Loss $W_T$ (Watts)	Airflow when $T_{int} - T_{amb}$ = 15 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

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

## Electrical Reference

### Ohm's Law

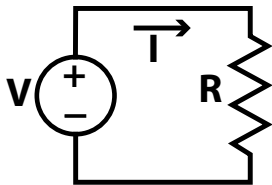
The relationship between voltage, current and resistance in an electrical circuit where:

I = current (amps)

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

R = resistance (ohms)

P = power (Watts)



In mathematical terms:

$$I = E \div R$$

$$E = I \times R$$

$$R = E \div I$$

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

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

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

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

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

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

## Electrical Reference (Cont.)

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

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

### 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:

$$R_T = \frac{R}{N} \quad \text{where } R_T \text{ is total resistance, } R \text{ is the resistance of one resistor and } N \text{ is the number of resistors}$$

### 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)

## Electrical Reference (Cont.)

### Electrical Formulas

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

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

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

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

	<b>Kilovolt Amps (KVA)</b>
DC	—
Single Phase AC	$\frac{E \times I}{1000}$
2 Phase-4 Wire AC	$\frac{E \times I \times 2}{1000}$
3 Phase AC	$\frac{E \times I \times 1.73}{1000}$

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

Where  
 E = Volts  
 I = Amps  
 W = Watts

% Efficiency =  $\frac{\text{Output (Watts)}}{\text{Input (Watts)}}$   
 PF = Power Factor

## Electrical Reference (Cont.)

### Capacitance (C)

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

Where 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:

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

## Electrical Reference (Cont.)

### Impedance

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

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

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

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

Where:

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:

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

Where:

F = frequency (in Hertz)

L = inductance (in Henry)

#### Capacitive reactance:

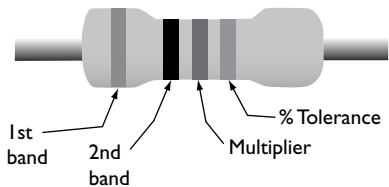
$$X_C = \frac{1}{2 \times 3.1416 \times F \times C} \quad \text{where } C = \text{conductance (in Farads)}$$



## Electrical Reference (Cont.)

### 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	1,000	
Yellow	4	4	10,000	
Green	5	5	100,000	
Blue	6	6	1,000,000	
Violet	7	7	10,000,000	
Gray	8	8	100,000,000	
White	9	9	1,000,000,000	
Gold			0.1	± 5%
Silver			0.01	± 10%
No Band				± 20%



## Electrical Reference (Cont.)

### 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.

## Electrical Reference (Cont.)

### 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.

## Measurement

### Gauge Equivalents

Gauge Number	Nominal Thickness in inches	Nominal Thickness in millimeters
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 <sup>2</sup>	6.45 centimeters <sup>2</sup>
1 foot <sup>2</sup> = 144 inches <sup>2</sup>	929.03 centimeters <sup>2</sup>
9 feet <sup>2</sup> = 1 yard <sup>2</sup> = 1296 inches <sup>2</sup>	8361.3 centimeters <sup>2</sup> = 0.83613 meters <sup>2</sup>
640 acres = 1 mile <sup>2</sup>	2.59 kilometers <sup>2</sup>
1 ft. <sup>3</sup> = 1,728 inches <sup>3</sup>	33.98 meters <sup>3</sup>
1 yard <sup>3</sup> = 27 ft. <sup>3</sup>	.76 meters <sup>3</sup>
2 pints = 1 quart = .5 gallon	.94 liter
16 oz. = 1 lb.	453.59 grams = .454 kg
2,000 lb. = 1 ton	1016 kg

## Measurement (Cont.)

### 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

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

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

## Measurement

### Decimal / Fraction / mm Equivalents

Decimal	Fraction				mm		
.0156				1/64	.396		
.0313			1/32	2/64	.795		
.0469				3/64	1.191		
.0625		1/16	2/32	4/64	1.588		
.0781				5/64	1.984		
.0938			3/32	6/64	2.383		
.1094				7/64	2.779		
.1250	1/8	2/16	4/32	8/64	3.175		
.1406				9/64	3.571		
.1562			5/32	10/64	3.768		
.1719				11/64	4.366		
.1875		3/16	6/32	12/64	4.763		
.2031				13/64	5.159		
.2188			7/32	14/64	5.558		
.2344				15/64	5.954		
.2500	1/4	2/8	4/16	8/32	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	2/4	4/8	8/16	16/32	32/64	12.700

## Measurement (Cont.)

### Decimal / Fraction / mm Equivalent (Cont.)

Decimal	Fraction				mm		
.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		
.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	64/64	25.400



## Notes



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Go to **hoffmanonline.com** to locate your local Hoffman sales office and speak with a representative who can match you with a local distributor.

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OR

Country:

### 3 SUBMIT QUESTIONS VIA OUR ONLINE FORM

Enter your questions or comments at **hoffmanonline.com**, and we will respond as quickly as possible.

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Cat-00014 D