

Across the line • Combination • Reduced voltage

# Starters

**ABB** Starters  
Across the line  
Combination  
Reduced voltage

3





## General information

### Field modification kits

#### A Starters

#### Start-Stop pushbutton kit – dual element

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Starter size	Catalog number	List price
A9 – A750	CBKSSK	<b>\$ 38</b>

For field installation on NEMA 1 enclosures. Kit includes **one dual element pushbutton** and hardware.

#### Start-Stop pushbutton kit

Starter size	Catalog number	List price
A9 – A750	CBK4SSK4	<b>\$ 48</b>

For field installation on all enclosures. Kit includes **two momentary pushbuttons** and hardware. ①

#### Fwd-Rev-Stop pushbutton kit

Starter size	Catalog number	List price
A9 – A750	CBKFRK-4	<b>\$ 120</b>

For field installation on all enclosures. Kit includes three momentary pushbuttons and hardware. ①

#### 2 Position selector switch kit

Starter size	Catalog number	List price
A9 – A750	CBKSL2K-4	<b>\$ 90</b>

For field installation on all enclosures. Labels for ON-OFF are included. Kits include mounting hardware. ①

#### 3 Position selector switch kit

Starter size	Catalog number	List price
A9 – A750	CBKSL3K-4	<b>\$ 90</b>

For field installation on all enclosures. Labels for HAND-OFF-AUTO are included. Kits include mounting hardware. ①

#### Pilot light kits

Starter size	Voltage	Catalog number	List price
A9 – A750	120	CBKPLK-41	<b>\$ 90</b>
	240	CBKPLK-42	
	480V	CBKPLK-44	

For field installation on all enclosures. ①

#### Reset button kits

Starter size	Catalog number	List price
A9 – A750	KPR3-104B	<b>\$ 14</b>

For field installation on all enclosures. ①

① For use with UL Type 3R, 4, 4X, 12 & 13.

# General information

## Factory modifications

Starters  
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### Control cover accessories – A9-A750

Description	Control suffix ①	List price adder
		NEMA 1 3R 4, 4X & 12
Start-stop pushbutton	A	\$ 72
Fwd-rev-stop pushbutton	B	360
2 position selector switch (Std. ON-OFF)	C	72
3 position selector switch (Std. HAND-OFF-AUTO)	D	72
Pilot light, Red, RUN (Std.)	E	135
Pilot light, Green, RUN	R	135
Pilot light suffix + V= Neon bulb	V	–
Pilot light suffix + X= LED bulb	X	–
Start-stop pushbutton & pilot light	F	207
Fwd-rev-stop pushbutton & pilot light	G	496
2 position selector switch & pilot light	H	207
3 position selector switch & pilot light	J	207
Fast-slow-stop pushbuttons	K	360
Fast-slow-stop pushbuttons & pilot light	L	495
Fast-slow-off-auto selector switch	M	150
Emergency stop	P	100
F suffix + 1NO & 1NC auxiliary contact	T	237
J suffix + 1NO & 1NC auxiliary contact	U	237
Pushbutton (standard START)	Y	36

### Special modifications

Contact configuration	Suffix code ①	List price adder
<b>Contactor</b>		
Coil surge suppressor	S	\$ 75
<b>Auxiliary relays</b>		
Type N control relay (4 pole)	CR	225
<b>Electronic timer</b>		
1.5 – 30, On Delay	TN30	300
5 – 100, On Delay	TN100	300
1.5 – 30, Off Delay	TF30	300
5 – 100, Off Delay	TF100	300
<b>Phase failure phase reversal with over and undervoltage relays</b>		
Ground fault protection	PFPR	525
	GFP	2250
<b>For multi-speed controllers</b>		
Compelling relay	CPR	600
Accelerating relay	ACR	600
Decelerating relay	DCR	600
<b>Meters &amp; metering</b>		
Current transformer	CT	375
Ammeter (including C.T.)	AM	705
Ammeter & ammeter switch	AMS	1800
Voltmeter	VM	1200
Voltmeter & voltmeter switch	VMS	1800
Elapsed time meter	ETM	375
Operation counter	OC	560
Wattmeter	WM	3650
<b>Miscellaneous</b>		
Lightning arrester	LA	320
Space heater, 100W with thermostat	SH	600

### Control circuit transformer (standard VA) – A9 - A750 ②

Standard size with fused secondary			Coil suffix	Starter size	CCT VA	List price
Primary	Secondary	Hz				
				A9 – A40	45 ③	\$ 300
				A9 – A40	50	360
				A50 – A75	75	435
				A95 – A110	100	560
200/208V	110V	50/60	0	A145 – A185	150	720
220/240V	110/120V	50/60	7	A210 – A300	250	795
440/480V	110/120V	50/60	8	A400 – A460	150	720 ④
550/600V	110/120V	50/60	9	A580 – A750	250	795 ④

Control circuit transformers do include two primary fuses and one secondary fuse.

① Add this suffix to the last digit of the catalog number.

② Consult factory if additional VA is required.

③ Does not include primary fusing.

④ A400 - A750 utilizes the AF wide range coil with a lower coil consumption than A210 - A300.

### Additional auxiliary contact blocks — A9 – A750

Contact configuration	Suffix code ①	A9 – A110 list price adder	A145 – A750 list price adder
1 N.O.	10	\$ 20	–
1 N.C.	01	20	–
2 N.O.	20	30	–
1 N.O. & 1 N.C.	11	30	\$ 30
2 N.C.	02	30	–
4 N.O.	40	60	–
3 N.O. & 1 N.C.	31	60	–
2 N.O. & 2 N.C.	22	60	60
1 N.O. & 3 N.C.	13	60	–
4 N.C.	04	60	–
3 N.O. & 3 N.C.	33	90	90

### Reduced voltage & multi-speed starters — price adders

Starter size	Non-fusible switch price adder	Fusible switch price adder	MCCB or MCP price adder
A9	\$ 990	\$ 1008	\$ 1287
A12	990	1008	1287
A16	990	1008	1287
A26	990	1008	1287
A30	990	1224	1350
A40	990	1224	1350
A50	1152	1224	1350
A63	1230	1350	1785
A75	1494	1602	1809
A95 – A110	2310	2565	2982
A145	3042	3366	4158
A185	3300	3735	4533
A210	3450	3825	6000
A260	3744	4068	6849
A300	4200	6000	8750
A400	6600	9450	9030
A460	8200	11,100	9475
A580	8400	11,800	10,200
A750	9000	12,450	12,900

### Hazardous location enclosure accessories, NEMA 7 & 9

Item	Catalog ① Suffix No.	List price
3R Breather/drain	A	\$ 80
Start PB green	B	180
Stop PB red	C	180
St/St dual PB	D	360
Em. Stop mush momentary	E	220
Em. Stop mush maintained	F	460
Black PB N.O. auxiliary	G	180
Black PB N.C. auxiliary	H	180
Pilot light	J	180
Illuminated PB	K	460
Push-to-test pilot light	L	450
Potentiometer	M	460
2-Pos Selector Maintained	N	260
2-Pos Selector spring L to R	P	280
2-Pos Selector spring R to L	Q	280
3-Pos Selector sw. main.	R	260
3-Pos Selector spring L to R	S	280
3-Pos Selector spring R to L	T	280
3-Pos Selector spring to C	U	280
2-Pos Selector key operated	V	450
3-Pos Selector key operated	W	450



# General information

## Catalog number explanation

**3 Starter size** A110 SR F 1 - 84 C 6 D 4 L A

**Starter type**

- S - Non-reversing
- SR - Reversing
- SS - Single phase, non-reversing
- ST - Multi-speed, 2 speed 1 winding, 2 speed 2 winding
- SA - Autotransformer
- SG - Wye-delta open transition
- SY - Wye-delta closed transition
- SH - Part winding

**Combination type**

- N - Non-fusible disconnect
- F - Fusible disconnect
- B - Thermal magnetic or electronic trip type circuit breaker
- M - Motor Circuit Protection (MCP)

**Enclosure**

- 1 - UL Type 1
- 2 - UL Type 12
- 3 - UL Type 3R
- 4 - UL Type 4
- X - UL Type 4X stainless steel
- P - Plastic

7 - UL Type 7 & 9  
Class I, Group C, D, Div 1 & 2  
Class II, Groups E, F & G, Div 1 & 2  
Class III  
74 - Hazardous Type 4

**Coil voltage/CCT**

**Coil voltage selection – A9 - A300** ①

Hz	Cntr type	Volts															
		12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	A		81	83	84	84		34	36	80	42		86	86	51	53	55
50	A		81	83	84					80			85	86			55

For other voltages, see page 1.26.

**Coil voltage selection – A400 - A750**

Hz	Cntr type	Volts			
		24 - 60	48 - 130	100 - 250	250 - 500
60	AF	68	69	70	71
50	AF	68	69	70	71
DC	AF	68	69	70	71

**Control transformer voltage selection chart**

Hz	Type	Volts			
		208/120	230 – 240/120	460 – 480/120	575 – 600/120
50/60	A/AF	0	7	8	9

For other voltages, consult factory.

**Accessories**  
See Factory modifications, page 3.3.

**Horsepower**

A - 10	N - 200
B - 15	P - 250
C - 20	R - 300
D - 25	S - 350
E - 30	T - 400
F - 40	U - 500
G - 50	V - 600
H - 60	W - 700
J - 75	X - 800
K - 100	Y - 900
L - 125	Z - 1000
M - 150	

**Line voltage**

- 1 - 200 – 208V
- 2 - 230 – 240V
- 3 - 380 – 415V
- 4 - 460 – 480V
- 6 - 575 – 600V

**Fuse clip**

- 6A- 30A, 600V, Class J
- 6B- 60A, 600V, Class J
- 6C- 100A, 600V, Class J
- 6D- 200A, 600V, Class J
- 6E- 400A, 600V, Class J
- 6F- 600A, 600V, Class J
- 6G- 800A, 600V, Class L
- 6H- 1200A, 600V, Class L

**Circuit breaker amp rating (600V)**

6D-15	6M-70	6W - 225	6E - 700
6E-20	6N - 80	6X - 250	6F - 800
6F-25	6P-90	6Y - 300	6G - 900
6G-30	6R-100	6Z - 350	6H - 1000
6H-35	6S-125	6A - 400	6J - 1200
6J-40	6T-150	6B - 450	
6K-50	6U-175	6C - 500	
6L-60	6V-200	6D - 600	

**Circuit breaker amp rating (200V – 480V)**

4D-15	4M-70	4W - 225	4E - 700
4E-20	4N - 80	4X - 250	4F - 800
4F-25	4P-90	4Y - 300	4G - 900
4G-30	4R-100	4Z - 350	4H - 1000
4H-35	4S-125	4A - 400	4J - 1200
4J-40	4T-150	4B - 450	
4K-50	4U-175	4C - 500	
4L-60	4V-200	4D - 600	

**MCP amp rating (600V)**

6A - 3	6E - 50	6J - 400	6N-1200
6B - 5	6F - 100	6K - 600	
6C - 10	6G - 150	6L - 800	
6D - 25	6H - 250	6M - 1000	

**MCP amp rating (200V – 480V)**

4A - 3	4E - 50	4J - 400	4N - 1200
4B - 5	4F - 100	4K - 600	
4C - 10	4G - 150	4L - 800	
4D - 25	4H - 250	4M - 1000	

① For AF50 - AF300 starters, consult factory.

# General information

## Motor data ①



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### Ampere ratings of 3 phase, AC induction motors

Horse power	110 – 120V			200 – 208V			220 – 240V			380 – 415V		440 – 480V			550 – 600V		
	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase	Single phase	Three phase	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase
1/10	3.0	—	—	1.65	—	—	1.5	—	—	1.0	—	—	—	—	—	—	—
1/8	3.8	—	—	2.1	—	—	1.9	—	—	1.2	—	—	—	—	—	—	—
1/6	4.4	—	—	2.4	—	—	2.2	—	—	1.4	—	—	—	—	—	—	—
1/4	5.8	—	—	3.2	—	—	2.9	—	—	1.8	—	—	—	—	—	—	—
1/3	7.2	—	—	4.0	—	—	3.6	—	—	2.3	—	—	—	—	—	—	—
1/2	9.8	4.0	4.4	5.4	2.2	2.4	4.9	2.0	2.2	3.2	1.3	2.5	1.0	1.1	2.0	0.8	0.9
3/4	13.8	4.8	6.4	7.6	2.6	3.5	6.9	2.4	3.2	4.5	1.8	3.5	1.2	1.6	2.8	1.0	1.3
1	16.0	6.4	8.4	8.8	3.6	4.6	8.0	3.2	4.2	5.1	2.3	4.0	1.6	2.1	3.2	1.3	1.7
1 1/2	20.0	9.0	12.0	11.0	5.0	6.6	10.0	4.5	6.0	6.4	3.3	5.0	2.3	3.0	4.0	1.8	2.4
2	24.0	11.8	13.6	13.2	6.5	7.5	12.0	5.9	6.8	7.7	4.3	6.0	3.0	3.4	4.8	2.4	2.7
3	34.0	16.6	19.2	18.7	9.2	10.6	17.0	8.3	9.6	10.9	6.1	8.5	4.2	4.8	6.8	3.3	3.9
5	56.0	26.4	30.4	30.8	14.5	16.8	28.0	13.2	15.2	17.9	9.7	14.0	6.6	7.6	11.2	5.3	6.1
7 1/2	80.0	38.0	44.0	44.0	21.0	24.2	40.0	19.0	22.0	27.0	14.0	21.0	9.0	11.0	16.0	8.0	9.0
10	100.0	48.0	56.0	55.0	26.4	30.8	50.0	24.0	28.0	33.0	18.0	26.0	12.0	14.0	20.0	10.0	11.0
15	135.0	72.0	84.0	75.0	39.6	46.2	68.0	36.0	42.0	44.0	27.0	34.0	18.0	21.0	27.0	14.0	17.0
20	—	94.0	108.0	96.8	52.0	60.0	88.0	47.0	54.0	56.0	34.0	44.0	23.0	27.0	35.0	19.0	22.0
25	—	118.0	136.0	121.0	65.0	75.0	110.0	59.0	68.0	70.0	44.0	55.0	29.0	34.0	44.0	24.0	27.0
30	—	138.0	160.0	150.0	76.0	88.0	136.0	69.0	80.0	87.0	51.0	68.0	35.0	40.0	54.0	28.0	32.0
40	—	180.0	208.0	194.0	100.0	115.0	176.0	90.0	104.0	112.0	66.0	88.0	45.0	52.0	70.0	36.0	41.0
50	—	226.0	260.0	238.0	125.0	143.0	216.0	113.0	130.0	139.0	83.0	108.0	56.0	65.0	86.0	45.0	52.0
60	—	—	—	—	147.0	160.0	—	133.0	154.0	—	103.0	—	67.0	77.0	—	53.0	62.0
75	—	—	—	—	183.0	212.0	—	166.0	192.0	—	128.0	—	83.0	96.0	—	66.0	77.0
100	—	—	—	—	240.0	273.0	—	218.0	248.0	—	165.0	—	109.0	124.0	—	87.0	99.0
125	—	—	—	—	—	344.0	—	—	312.0	—	208.0	—	135.0	156.0	—	108.0	125.0
150	—	—	—	—	—	396.0	—	—	360.0	—	240.0	—	156.0	180.0	—	125.0	144.0
200	—	—	—	—	—	528.0	—	—	480.0	—	320.0	—	208.0	240.0	—	167.0	192.0
250	—	—	—	—	—	663.0	—	—	602.0	—	403.0	—	—	302.0	—	—	242.0
300	—	—	—	—	—	—	—	—	—	—	482.0	—	—	361.0	—	—	289.0
350	—	—	—	—	—	—	—	—	—	—	560.0	—	—	414.0	—	—	336.0
400	—	—	—	—	—	—	—	—	—	—	636.0	—	—	477.0	—	—	382.0
500	—	—	—	—	—	—	—	—	—	—	786.0	—	—	590.0	—	—	472.0

① The above values of full-load currents are typical for motors running at speeds normal for belted motors and motors with normal torque characteristics. Whenever possible, use the actual motor nameplate full-load current when selecting motor control products.

## General information

### Standard thermal overload relays

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A9



A50

#### Standard – Thermal, Type TA, Class 10 & Electronic, Type E, Class 10, 20 & 30

For contactor	Setting range A	Suffix code for all other starters	Suffix code for NEMA starters	Catalog number
A/AE9 – A/AE40 BC9 – BC30	0.1 – 0.16	A		TA25DU0.16
	0.16 – 0.25	B		TA25DU0.25
	0.25 – 0.4	C		TA25DU0.4
	0.4 – 0.63	D		TA25DU0.63
	0.63 – 1.0	E		TA25DU1.0
	1.0 – 1.4	F		TA25DU1.4
	1.3 – 1.8	G		TA25DU1.8
	1.7 – 2.4	H		TA25DU2.4
	2.2 – 3.1	J		TA25DU3.1
	2.8 – 4.0	K		TA25DU4.0
	3.5 – 5.0	L		TA25DU5.0
	4.5 – 6.5	M		TA25DU6.5
	6.0 – 8.5	N		TA25DU8.5
	7.5 – 11	P		TA25DU11
A/AE30 – A/AE40	18 – 25	A		TA42DU25
	22 – 32	B		TA42DU32
	29 – 42	C		TA42DU42
A/AE/AF50 – A/AE/AF75	18 – 25	A		TA75DU25
	22 – 32	B		TA75DU32
	29 – 42	C		TA75DU42
	36 – 52	D		TA75DU52
	45 – 63	E		TA75DU63
	60 – 80	F		TA75DU80
A/AE/AF95 – A/AE/AF110	29 – 42	C		TA80DU42
	36 – 52	D		TA80DU52
	45 – 63	E		TA80DU63
	60 – 80	F		TA80DU80
	65 – 90	A		TA110DU90
	80 – 110	B		TA110DU110
A/AF145 – A/AF185	65 – 90	A	R	TA200DU90
	80 – 110	B	R	TA200DU110
	100 – 135	C	T	TA200DU135
	110 – 150	D	T	TA200DU150
	130 – 175	E	T	TA200DU175
	150 – 200	F	T	TA200DU200
A/AF210 – A/AF300	130 – 185	A		TA450DU185 ①
	165 – 235	B		TA450DU235
	220 – 310	C		TA450DU310
A/AF400 – A/AF460	170 – 500	E5		E500DU500 ②
A/AF580 – A/AF750	270 – 800	E8		E800DU800 ②

① TA450 overloads require mounting kits for installation.

## General information

### Electronic overload relays

Starters



A145

#### Optional – Electronic, Type E, Class 10, 20 & 30

For contactor	Setting range	Suffix code	Catalog number ①	List price adder
<b>E16DU – Tripping Class 10</b> A/AE9 – A/AE16	0.1 – 0.32	A1	E16DU0.32-10	<b>\$ 33</b>
	0.3 – 1.0	B1	E16DU1.0-10	
	0.9 – 2.7	C1	E16DU2.7-10	
	2.0 – 6.3	D1	E16DU6.3-10	
	5.7 – 18.9	E1	E16DU18.9-10	
<b>E16DU – Tripping Class 20</b> A/AE9 – A/AE16	0.1 – 0.32	A2	E16DU0.32-20	<b>33</b>
	0.3 – 1.0	B2	E16DU1.0-20	
	0.9 – 2.7	C2	E16DU2.7-20	
	2.0 – 6.3	D2	E16DU6.3-20	
	5.7 – 18.9	E2	E16DU18.9-20	
<b>E16DU – Tripping Class 30</b> A/AE9 – A/AE16	0.1 – 0.32	A3	E16DU0.32-30	<b>33</b>
	0.3 – 1.0	B3	E16DU1.0-30	
	0.9 – 2.7	C3	E16DU2.7-30	
	2.0 – 6.3	D3	E16DU6.3-30	
	5.7 – 18.9	E3	E16DU18.9-30	
<b>E200DU – Tripping Class 10, 20 &amp; 30</b> A/AF145 – A/AF185 A/AF210 – A/AF300 AF400 – AF460 AF580 – AF750	65 – 200	E2	E200DU200	<b>325</b>
	105 – 320	E3	E320DU320	<b>287</b>
	170 – 500	E5	E500DU500	<b>865</b>
	270 – 800	E8	E800DU800	<b>950</b>

① Not suitable for single-phase motors and direct current (DC) motors.



## General information Enclosures

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Type enclosure	For use with	Dimensions H x W x D (inches)	Catalog number	List price
IP65	A9 – A16 Contactors & starters, blank cover	7 x 3.5 x 5.2	EKA16S-0	<b>\$ 75</b>
	A9 – A16 Contactors & starters, start & stop/reset		EKA16S-A	<b>90</b>
	A9 – A16 Contactors & starters, reset only		EKA16S-R	<b>90</b>
NEMA 1 Lift off cover	A9 – A26 Contactors, non-reversing & reversing starters A30 – A75 Contactors, non-reversing & reversing starters	11.5 x 7 x 6 13 x 9 x 7	EK-N1A9A26 EK-N1A30A75	<b>113</b> <b>188</b>
	A9 – A40 Non-reversing starters + CCT A9 – A40 Reversing contactors A9 – A40 Reversing starters	10 x 8 x 6	EK-11H	<b>160</b>
NEMA 1 Indoor metal hinged cover	A50 – A75 Contactors A50 – A75 Non-reversing starters + CCT A50 – A75 Reversing starters	14 x 12 x 8	EK-12	<b>205</b>
	A95 – A110 Contactors A95 – A110 Non-reversing starters + CCT	24 x 12 x 8	EK-13	<b>405</b>
NEMA 1, 3R 4, 4X & 12 Plastic	A9 – A40 Contactors A9 – A40 Non-reversing starters + CCT A9 – A40 Reversing starters	10 x 8 x 7	EK-W	<b>160</b>
	A50 – A75 Contactors A50 – A75 Non-reversing starters + CCT A50 – A75 Reversing starters	12 x 10 x 7	EK-W2	<b>220</b>
NEMA 12 Indoor metal dusttight	A9 – A40 Contactors A9 – A40 Non-reversing starters A9 – A40 Reversing contactors A9 – A40 Reversing starters	10 x 8 x 6	EK-24	<b>180</b>
	A50 – A75 Contactors + CCT A50 – A75 Non-reversing starters + CCT A50 – A75 Reversing starters	14 x 12 x 8	EK-22	<b>270</b>
NEMA 3R Outdoor metal	A9 – A40 Contactors + CCT A9 – A40 Non-reversing starters + CCT A9 – A40 Reversing contactors A9 – A40 Reversing starters	10 x 8 x 6	EK-31	<b>225</b>
	A50 – A75 Contactors + CCT A50 – A75 Non-reversing starters + CCT A50 – A75 Reversing contactors A50 – A75 Reversing starters A95 – A110 Contactors + CCT A110 Non-reversing starters + CCTA95 – A110 Contactors + CCT A110 Non-reversing starters + CCT	14 x 12 x 8	EK-32	<b>435</b>

NOTE : (1) All enclosures come standard with reset button and predrilled back panel.



# General information

## Enclosure rating definitions

### Introduction

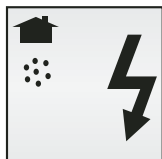
An enclosure is a surrounding case constructed to provide a degree of protection to personnel against accidental contact with the enclosed equipment and to provide a degree of protection to the enclosed equipment against specified environmental conditions.

A brief description of the more common types of enclosures used by the electrical industry relating to their environmental capabilities follows.

Refer to NEMA Standards Publication for more information regarding applications, features and design tests.

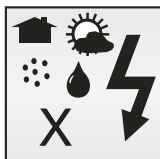
Individual NEMA product Standards Publications or third party certification standards may contain additional requirements for product testing and performance.

### Definitions pertaining to nonhazardous locations



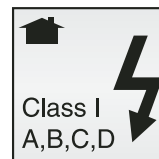
Type 1

Enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling dirt. (NEMA Standard 7-15-1991.)



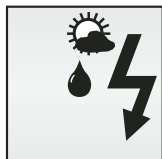
Type 4X

Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water and damage from external ice formation. (NEMA Standard 1-10-1979)



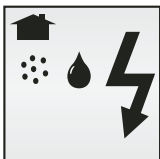
Type 7

Enclosures are intended for indoor use in locations classified as Class I, Groups A, B, C, or D, as defined in the National Electrical Code. (NEMA Standard 7-15-1991.)



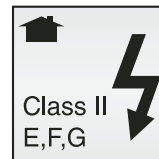
Type 3R

Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet and damage from external ice formation. (NEMA Standard 7-15-1991.)



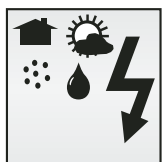
Type 12

Enclosures are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids. (NEMA Standard 7-15-1991.)



Type 9

Enclosures are intended for indoor use in locations classified as Class II, Groups E, F, or G, as defined in the National Electrical Code. (NEMA Standard 7-15-1991.)



Type 4

Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and damage from external ice formation. (NEMA Standard 1-10-1979.)



Type 13

Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant. (NEMA Standard 1-10-1979.)

Legend

- Indoors
- Outdoors
- Water
- Dirt/dust
- Corrosion



## General information

### IP Environmental ratings

### IP ratings

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indicate the degree of protection against dust, liquids and impacts. The IP degrees of protection are defined by the French standard NFC 20-010. To rate a device's degrees of protection, the letters IP are followed by up to three numbers. These numbers are defined as follows:

first number protection against solid objects	second number protection against liquids	third number protection against mechanical impacts
<p><b>IP 0</b>  no protection</p>	<p><b>IP 0</b>  no protection</p>	<p><b>IP 0</b>  no protection</p>
<p><b>1</b>  protected against solid objects over 50mm (e.g. accidental touch by hands.)</p>	<p><b>1</b>  protected against vertically falling rain or condensation</p>	<p><b>1</b>  impact 0.225 joule 150g falling from 15cm</p>
<p><b>2</b>  protected against solid objects over 12mm (e.g. fingers)</p>	<p><b>2</b>  protected against direct sprays of water up to 15° from vertical</p>	<p><b>2</b>  impact 0.375 joule 250g falling from 15cm</p>
<p><b>3</b>  protected against solid objects over 2.5mm (tools &amp; wires)</p>	<p><b>3</b>  protected against sprays to 60° from vertical</p>	<p><b>3</b>  impact 0.50 joule 250g falling from 20cm</p>
<p><b>4</b>  protected against solid objects over 1mm (small tools &amp; small wires)</p>	<p><b>4</b>  protected against water sprayed from all directions</p>	<p><b>5</b>  impact 2.00 joule 500g falling from 40cm</p>
<p><b>5</b>  protected against dust (no harmful deposit)</p>	<p><b>5</b>  protected against low pressure jets of water from all directions</p>	<p><b>7</b>  impact 6.00 joule 1.5kg falling from 40cm</p>
<p><b>6</b>  totally protected against dust</p>	<p><b>6</b>  protected from strong jets of water (e.g. for use on ship decks)</p>	<p><b>9</b>  impact 20.00 joule 5 kg falling from 40cm</p>
	<p><b>7</b>  protected against the effects of immersion between 15cm and 1m</p>	