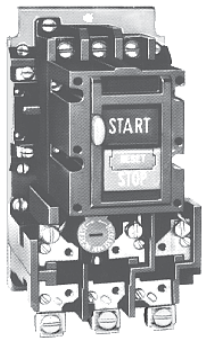


MS Series, Single-Phase Starters



Type B100, Single- and Three-Phase Starters



Types B230, B330 Switches

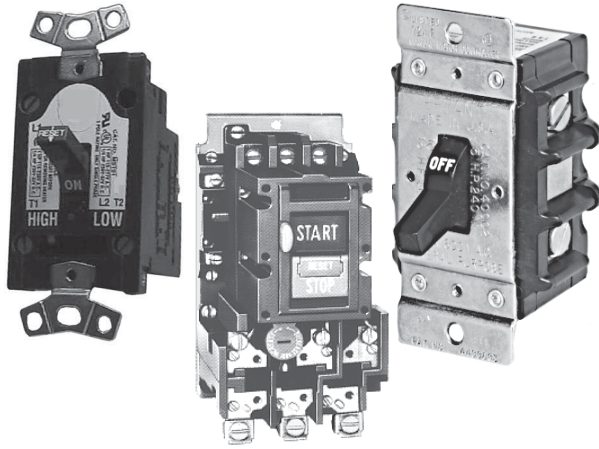


## 29.1 Starters and Switches

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MS Series, Single-Phase Starters .....	V5-T29-6
Type B100, Single- and Three-Phase Starters .....	V5-T29-10
Type 9441, Reversing Drum Switches .....	V5-T29-15

#### Starters and Switches

29



#### Product Overview

Eaton offers the most complete line of manual motor starters in the industry. Product offering includes manual motor starters and switches that cover single as well as three-phase motor applications.

#### Application Description

**MS Motor Starter** is a compact, versatile unit featuring heavy sliding contacts as well as “quick-make” and “quick-break” mechanism.

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Type B100, Single- and Three-Phase Starters . . . . .	<b>V5-T29-10</b>
Type 9441, Reversing Drum Switches . . . . .	<b>V5-T29-15</b>

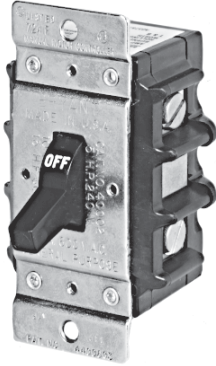
#### B100 Manual Motor Starters

can be used in single-phase applications rated 3 hp at 240 Vac or 2 hp at 230 Vdc. The starter can also be rated for three-phase applications up to 10 hp at 600 Vac.

#### B230 and B330 Manual Motor Switches

are available in two- or three-pole configurations rated at 30A.

Types B230, B330 Switches



**Types B230, B330, Switches**

**Product Description**

Manual Motor Switches are available in two- or three-pole configurations rated at 30A.

Optional NEMA 1 aluminum enclosure is supplied with a padlock guard for locking in the OFF or STOP position.

**Application Description**

Manual Motor Switches provide manual control of single- and three-phase motors where overload protection is not required or provided separately. Applications include:

- Fans
- Blowers
- Pumps
- Wood working equipment
- Machine tools

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Wiring Diagrams .....	<b>V5-T29-4</b>
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Type 9441, Reversing Drum Switches .....	<b>V5-T29-15</b>

**Features**

- Compact size
- Easy installation
- Simple operation
- Padlockable NEMA 1 enclosure available

**Standards and Certifications**

- UL File No. E146654, Category NLRV
- CSA File No. LR710828, Class 3211-05



**Instructional Leaflet**

Pub25371

# 29.1

## NEMA Manual Starters

### Starters and Switches




#### Product Selection

##### When Ordering Specify

- Catalog number of manual motor switch

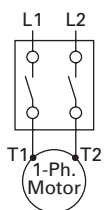
29

#### Manual Motor Switches without Overload

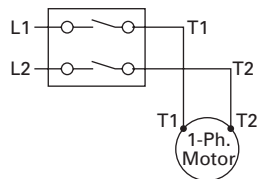
	Maximum Horsepower Ratings				Open	NEMA 1 Enclosed
	120V	240V	480V	600V		
<b>Two-Pole B230AN</b>	<b>Two-Pole—Manual Motor Switches</b>					
	2	5	—	—	B230AN	B230AG
<b>Two-Pole NEMA 1 Enclosure B230BG</b>	2	5	10	15	B230BND	B230BG
						
<b>Three-Pole B330AN</b>	<b>Three-Pole—Manual Motor Switches</b>					
	3	7-1/2	15	20	B330AND	B330AG

#### Wiring Diagrams

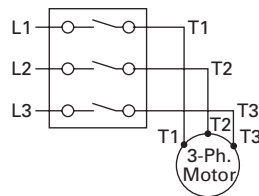
##### B230AN



##### B230BN



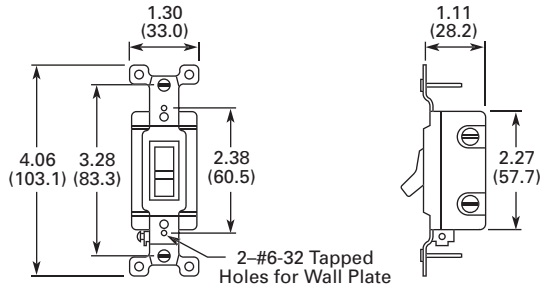
##### B330AN



**Dimensions**

Approximate Dimensions in Inches (mm)

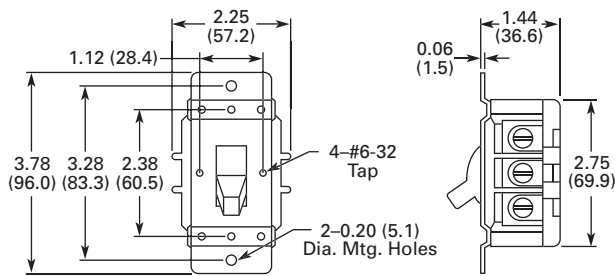
**B230AN**



**Approximate Shipping Weight**

4 oz. (0.11 kg)

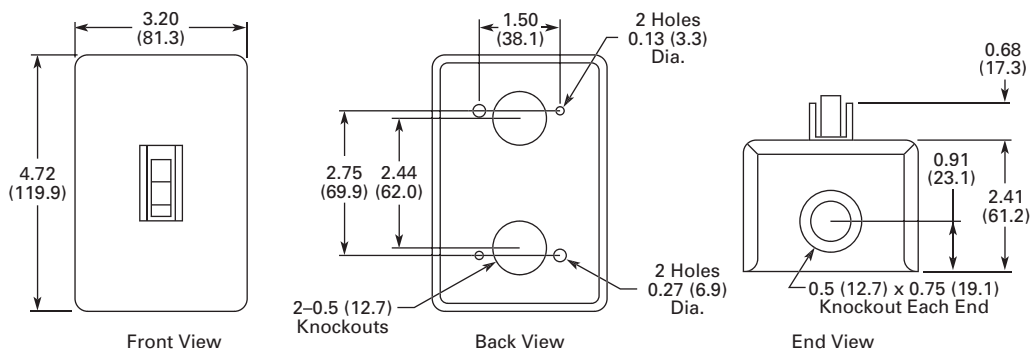
**B230BN and B330AN**



**Approximate Shipping Weight**

6 oz. (0.17 kg)

**B230AG, B230BG, B330AG**



**Approximate Shipping Weight**

14 oz. (0.40 kg)

**MS Series, Single-Phase Starters**



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Accessories . . . . .	<b>V5-T29-9</b>
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Type 9441, Reversing Drum Switches . . . . .	<b>V5-T29-15</b>

**MS Series, Single-Phase Starters**

**Product Description**

- The MS Motor Starter is a compact, versatile unit featuring heavy sliding contacts as well as “quick-make” and “quick-break” mechanism
- Standard with large pressure type terminals, straight-through wiring and a trip-free handle mechanism
- The “plug-in” heater element is keyed to ensure proper positioning and an adjustable knob allows a setting of plus or minus ten percent of the nominal heater rating

**Application Description**

The MS Manual Motor Starter provides manual control and overload protection to single-phase motors. By utilizing the interchangeable heater elements, the starter can protect motors ranging from 0.40A up to 16.0A. Ideal for HVAC applications.

**Features**

- Compact size
- Trip-free handle mechanism
- Keyed heater elements to ensure proper installation
- Starters available with red pilot light
- The operating handle of the enclosed units can be locked in the OFF position
- Enclosures are offered in NEMA 1, 3, 4 and 5
- Hazardous locations cast aluminum enclosures are available rated for Type 7, Class I, Group D (vapors) and Type 9, Class II, Groups E, F and G (dust)

**Standards and Certifications**

- UL File No. E19222, Category NLRV
- CSA File No. LR39402-6, Class 3211-05



**Instructional Leaflet**  
IL12987G

**Product Selection**

**When Ordering Specify**

- Catalog number of manual motor starter
- Heater pack selection
- Any required accessories
- Heater coil selection according to the motor full load current requirements

**MS Series Starters**

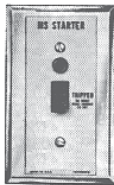
**MS Series, Single-Phase Starters**



**Open Type**

Number of Poles	Horsepower	Voltage	Catalog Number ①
1	1	120/240V, 277 Vac	<b>MST01</b>
	1/4	120/240 Vdc	<b>MST01</b>
	1/4	32 Vdc	<b>MST01</b>
2	1	120/240V, 277 Vac	<b>MST02</b>
	1	120/240 Vdc	<b>MST02</b>
	1/4	32 Vdc	<b>MST02</b>

**Switch and Pilot Light Mounted on Flush Plate**



**Flush Plate (No Enclosure Included)**

Number of Poles	Flush Plate Type	Voltage	Catalog Number ①
1	General purpose	Switch only	<b>MST01FN</b>
		Switch with pilot light	<b>MST02FN1P</b>
1	Stainless steel	Switch only	<b>MST01DN</b>
		Switch with pilot light	<b>MST01DN1P</b>
2		Switch only	<b>MST02DN</b>
		Switch with pilot light	<b>MST02DN1P</b>

**Note**

① Does not include heater. Select heater from tables on **Page V5-T29-8**.

#### Enclosed Types

Switch and Pilot Light Mounted in Type 1 Enclosure



Number of Poles	Enclosure Type	Voltage	Catalog Number ①
1	General purpose Type 1	Switch only	<b>MST01SN</b>
		Switch with pilot light	<b>MST01SN1P</b>
2		Switch only	<b>MST02SN</b>
		Switch with pilot light	<b>MST02SN1P</b>

Waterproof Type 3, 4 and 5



1	Waterproof Type 3, 4 and 5	Through hub	<b>MST01AH</b>
2		Through hub	<b>MST02AH</b>

Hazardous Location Type 7D, 9E, 9F and 9G



1	Hazardous location ②	Through hub	<b>MST01EH</b>
2	Types 7D, 9E, 9F and 9G	Through hub	<b>MST02EH</b>

Typical Heater



Heater Element Installation



#### Heater Selection for MS Starters

Motor Full Load Current	Catalog Number	Motor Full Load Current	Catalog Number	Motor Full Load Current	Catalog Number	Motor Full Load Current	Catalog Number
0.4–0.43	<b>MSH-5A</b>	1.04–1.15	<b>MSH1-3A</b>	2.72–2.95	<b>MSH3-4A</b>	7.04–7.74	<b>MSH8-8A</b>
0.44–0.48	<b>MSH-55A</b>	1.16–1.27	<b>MSH1-45A</b>	2.96–3.27	<b>MSH3-7A</b>	7.75–8.46	<b>MSH9-7A</b>
0.49–0.53	<b>MSH-61A</b>	1.28–1.35	<b>MSH1-6A</b>	3.28–3.59	<b>MSH4-1A</b>	8.47–9.35	<b>MSH10-6A</b>
0.54–0.58	<b>MSH-67A</b>	1.36–1.51	<b>MSH1-7A</b>	3.60–3.99	<b>MSH4-5A</b>	9.36–10.30	<b>MSH11-7A</b>
0.59–0.64	<b>MSH-74A</b>	1.52–1.67	<b>MSH1-9A</b>	4.00–4.39	<b>MSH5-0A</b>	10.31–11.35	<b>MSH12-9A</b>
0.65–0.71	<b>MSH-81A</b>	1.68–1.83	<b>MSH2-1A</b>	4.40–4.79	<b>MSH5-5A</b>	11.36–12.47	<b>MSH14-2A</b>
0.72–0.78	<b>MSH-89A</b>	1.84–1.99	<b>MSH2-3A</b>	4.80–5.26	<b>MSH6-0A</b>	12.48–13.67	<b>MSH15-6A</b>
0.79–0.87	<b>MSH-98A</b>	2.00–2.23	<b>MSH2-5A</b>	5.27–5.83	<b>MSH6-6A</b>	13.68–15.12	<b>MSH17-1A</b>
0.88–0.95	<b>MSH1-1A</b>	2.24–2.47	<b>MSH2-8A</b>	5.84–6.39	<b>MSH7-3A</b>	15.13–16.00	<b>MSH18-6A</b>
0.96–1.03	<b>MSH1-2A</b>	2.48–2.71	<b>MSH3-1A</b>	6.40–7.03	<b>MSH8-0A</b>	—	—

#### Notes

- ① Does not include heater. Select heater from table above.
- ② Type 7D = Type 7, Class I, Group D; Type 9E, 9F and 9G = Type 9, Class II, Groups E, F and G.



Accessories

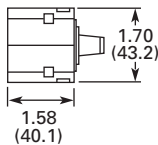
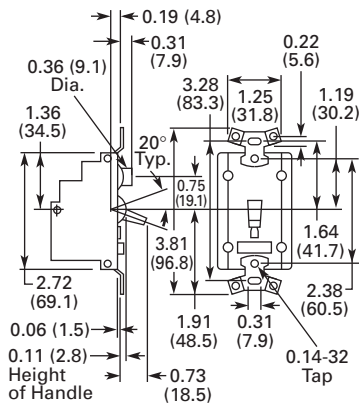
MS Accessories

Description	Catalog Number
Pilot light kit (NEMA 1 enclosure and flush plates)	MSPT
Box, 1 unit (NEMA 1 enclosure)	MS1BN
Cover, 1 unit (NEMA 1 enclosure)	MS1CN
Flush plate, 1 unit (steel)	MS1FN
Flush plate, 1 unit (stainless steel)	MS1DN
Handle guard (padlockable for NEMA 1 enclosure and flush plates)	MSLG

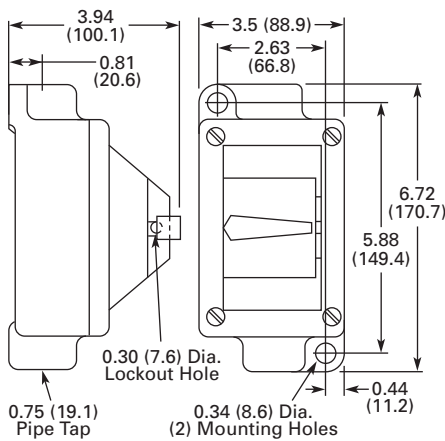
Dimensions

Approximate Dimensions in Inches (mm)

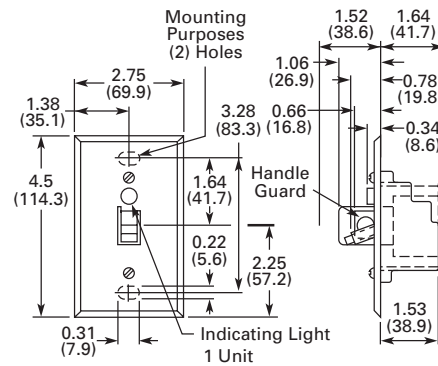
MS Motor Starter Toggle Operated Open Units



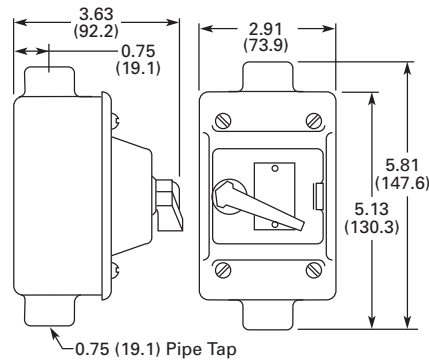
Hazardous Location (Cast Aluminum)



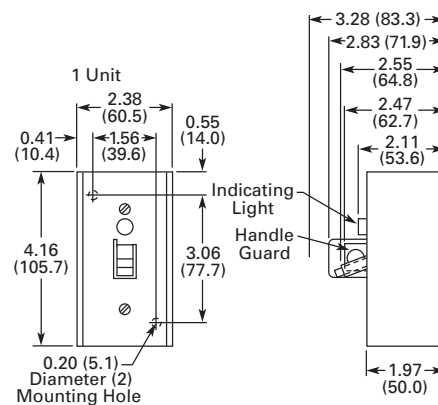
Flush Plates



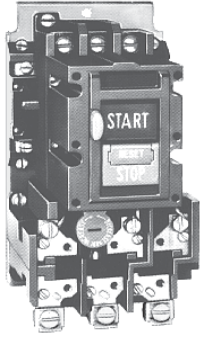
Watertight (Cast Aluminum)



Type 1 Enclosure (Boxes and Covers)



Type B100, Single- and Three-Phase Starters



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Type 9441, Reversing Drum Switches . . . . .	<b>V5-T29-15</b>

### Type B100, Single- and Three-Phase Starters

#### Product Description

The B100 Manual Motor Starters can be used in single-phase applications rated 3 hp at 240 Vac or 2 hp at 230 Vdc. The starter can also be rated for three-phase applications up to 10 hp at 600 Vac.

There are two methods of operation for the B100 Manual Starter. It can be ordered with a toggle switch operator or a START/STOP pushbutton operator.

#### Application Description

The B100 family of Manual Motor Starters provides manual control, as well as overload protection, to both single-phase and three-phase motors. The starter protects motors up to 38.9A single-phase and 26.8A three-phase with the appropriate heater selection.

#### Features

- Includes three-pole bimetallic overload relay
- Straight-through wiring
- Field mounted auxiliary contacts
- Available in NEMA 1, 4, 7, 9 and 12 enclosures with toggle operation (NEMA 1 enclosure for pushbutton operator)
- Standard with a lockout device to lock motor in the OFF position

#### Standards and Certifications

- UL File No. E19222, Category NLRV
- CSA File No. LR39402-6, Class 3211-05 (Open Starters)
- CSA File No. LR54517-1, Class 3211-05 (Closed Starters)



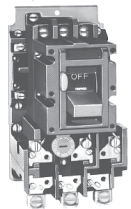
**Instructional Leaflet**  
IL14890

**Product Selection**

**When Ordering Specify**

- Catalog number of Starter with application modifications
- Heater pack selection— a three-phase starter requires three heaters, and a single-phase starter requires two heaters
- Any required accessories

**Toggle Operated**



Type 1 Enclosure



**Toggle and Pushbutton Operated Starters**

NEMA Size	Enclosed				
	Open Type Toggle Handle Catalog Number ④	NEMA 1 General Purpose Catalog Number ④	NEMA 4 Watertight, Stainless Steel ① Catalog Number ④	NEMA 7D, 9E, 9F and 9G for Hazardous Locations ②③ Catalog Number ④	NEMA 12 Dust-Tight Catalog Number ④
<b>Type B100 Non-Reversing Two-Pole (For Single-Phase Motors and DC)</b>					
M-0	B100M0B	B100S0B	B100W0B	B100U0B	B100J0B
M-1	B100M1B	B100S1B	B100W1B	B100U1B	B100J1B
<b>Type B100 Non-Reversing Three-Pole (For Polyphase Motors) ⑤</b>					
M-0	B100M0C	B100S0C	B100W0C	B100U0C	B100J0C
M-1	B100M1C	B100S1C	B100W1C	B100U1C	B100J1C

**Heater Selection—Single-Phase Enclosed Starters ⑥**

Motor Full Load Current	Maximum Fuse Amps	Catalog Number	Motor Full Load Current	Maximum Fuse Amps	Catalog Number	Motor Full Load Current	Maximum Fuse Amps	Catalog Number
0.28–0.29	1	FH03	1.90–2.10	7	FH22	9.59–10.40	35	FH40
0.30–0.33	1	FH04	2.11–2.32	8	FH23	10.41–11.30	35	FH41
0.34–0.36	1	FH05	2.33–2.54	8	FH24	11.40–12.20	40	FH42
0.37–0.40	1	FH06	2.55–2.79	9	FH25	12.30–13.50	45	FH43
0.41–0.45	1	FH07	2.80–3.07	10	FH26	13.60–14.90	50	FH44
0.46–0.50	1	FH08	3.08–3.36	10	FH27	15.00–16.00	50	FH45
0.51–0.56	1	FH09	3.37–3.68	10	FH28	16.10–17.10	60	FH46
0.57–0.63	2	FH10	3.69–4.03	10	FH29	17.20–18.30	60	FH47
0.64–0.70	2	FH11	4.04–4.40	15	FH30	18.40–19.70	70	FH48
0.71–0.78	2	FH12	4.41–4.81	15	FH31	19.80–21.20	70	FH49
0.79–0.86	2	FH13	4.82–5.26	15	FH32	21.30–22.80	80	FH50
0.87–0.95	3	FH14	5.27–5.74	15	FH33	22.90–24.50	88	FH51
0.96–1.04	3	FH15	5.75–6.26	20	FH34	24.60–26.40	90	FH52
1.05–1.14	3	FH16	6.27–6.83	20	FH35	26.50–28.50	90	FH53
1.15–1.25	4	FH17	6.84–7.45	25	FH36	28.60–30.80	100	FH54
1.26–1.39	4	FH18	7.46–8.11	25	FH37	30.90–33.30	110	FH55
1.40–1.54	5	FH19	8.12–8.81	30	FH38	33.40–36.00	125	FH56
1.55–1.71	5	FH20	8.82–9.58	30	FH39	36.10–38.90	125	FH57
1.72–1.89	6	FH21	—	—	—	—	—	—

**Notes**

- ① One 1 in chrome hub supplied on each end.
- ② NEMA 7D = NEMA 7, Class I, Group D. NEMA 9E, 9F and 9G = NEMA 9, Class II, Groups E, F and G.
- ③ Tapped for 1 in conduit on each end.
- ④ Starter does not include heaters. Select catalog numbers of heaters from table on Page V5-T29-12.
- ⑤ Single-phase starters require two overload heaters.

Heater Selection—Three-Phase Enclosed Starters <sup>②</sup>

Motor Full Load Current	Maximum Fuse Amps	Catalog Number	Motor Full Load Current	Maximum Fuse Amps	Catalog Number	Motor Full Load Current	Maximum Fuse Amps	Catalog Number
0.25–0.26	1	FH03	1.51–1.66	5	FH21	7.12–7.73	25	FH38
0.27–0.29	1	FH04	1.67–1.84	6	FH22	7.74–8.40	25	FH39
0.30–0.32	1	FH05	1.85–2.03	7	FH23	8.41–9.12	30	FH40
0.33–0.35	1	FH06	2.04–2.23	7	FH24	9.13–9.89	35	FH41
0.36–0.39	1	FH07	2.24–2.45	8	FH25	9.90–10.70	35	FH42
0.40–0.44	1	FH08	2.46–2.69	9	FH26	10.80–11.80	40	FH43
0.45–0.49	1	FH09	2.70–2.95	10	FH27	11.90–13.00	45	FH44
0.50–0.55	1	FH10	2.96–3.23	10	FH28	13.10–14.00	50	FH45
0.56–0.61	2	FH11	3.24–3.53	10	FH29	14.10–15.00	50	FH46
0.62–0.68	2	FH12	3.54–3.85	10	FH30	15.10–16.10	50	FH47
0.69–0.75	2	FH13	3.86–4.22	10	FH31	16.20–17.30	60	FH48
0.78–0.83	2	FH14	4.23–4.61	15	FH32	17.40–18.60	60	FH49
0.84–0.91	3	FH15	4.62–5.03	15	FH33	18.70–20.00	70	FH50
0.92–1.00	3	FH16	5.04–5.49	15	FH34	20.10–21.50	70	FH51
1.01–1.10	3	FH17	5.50–5.99	20	FH35	21.60–23.20	80	FH52
1.11–1.22	4	FH18	6.00–6.53	20	FH36	23.30–25.00	80	FH53
1.23–1.3	4	FH19	6.54–7.11	25	FH37	25.10–26.80	90	FH54
1.36–1.50	5	FH20	—	—	—	—	—	—

## Accessories

## Type B100 Starters

Description	Catalog Number
<b>Field Mounting Kits</b>	
1NO elect. auxiliary	B1A
1NC elect. auxiliary	B1B
Red pilot light 120/60 (NEMA 1 enclosure only)	LK-21
Red pilot light 208-240/6 (NEMA 1 enclosure only)	LK-22
Red pilot light 480-600/60 (NEMA 1 enclosure only)	LK-26
<b>For Types 4 and 12 Enclosures Only</b>	
Red pilot light 120V	LK-41
Red pilot light 240V	LK-42

## Options

## Modifications

Description	Catalog Number Suffix <sup>③</sup>
Pushbutton operator (open and NEMA 1 only)	A
Without lockoff (open only)	X

## Notes

- ① Single-phase starters require two overload heaters.
- ② Three-phase starters require three overload heaters.
- ③ Add suffix letter to starter catalog number Example: B100MOCA.

FH Series heaters are for Type B100 manual motor starters. Heater element selection is based on motor nameplate's listed full load amperes. Trip rating of this series of elements is 125% of minimum motor full load amperes listed for the element. When motor and overload relay are in the same ambient and the service factor of the motor is 1.15 to 1.25, select heaters from the heater selection table. If the service factor is 1.0 or less (including zero), or a maximum of 115% protection is desired, select a heater one size smaller than indicated for the amperage range required.

Technical Data and Specifications

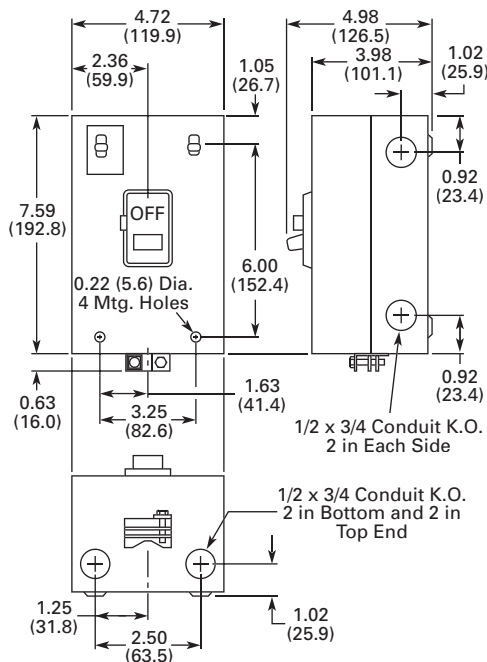
Type B100 Starters

NEMA Size	Maximum hp for AC Ratings ①			Maximum hp for DC Ratings	
	120 Vac	208–240 Vac	480–600 Vac	115 Vdc	230 Vdc
<b>Two-Pole, Single-Phase</b>					
M-0	1	2	—	1	1-1/2
M-1	2	3	—	1-1/2	2
<b>Three-Pole, Three-Phase</b>					
M-0	2	3	5	—	—
M-1	3	7-1/2	10	—	—

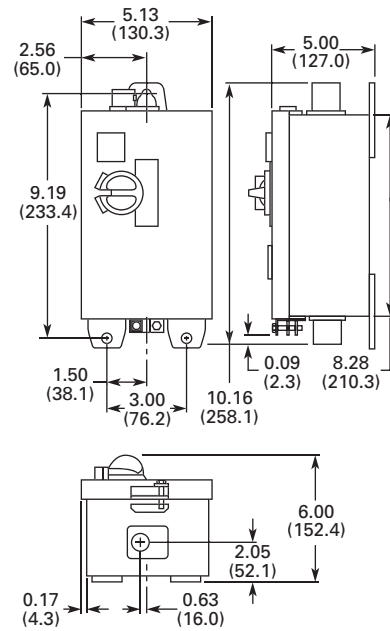
Dimensions

Approximate Dimensions in Inches (mm)

Type 1 Enclosed



Type 4 Enclosed



Note

① Ratings up to 3 hp, three-phase are suitable for group fusing.

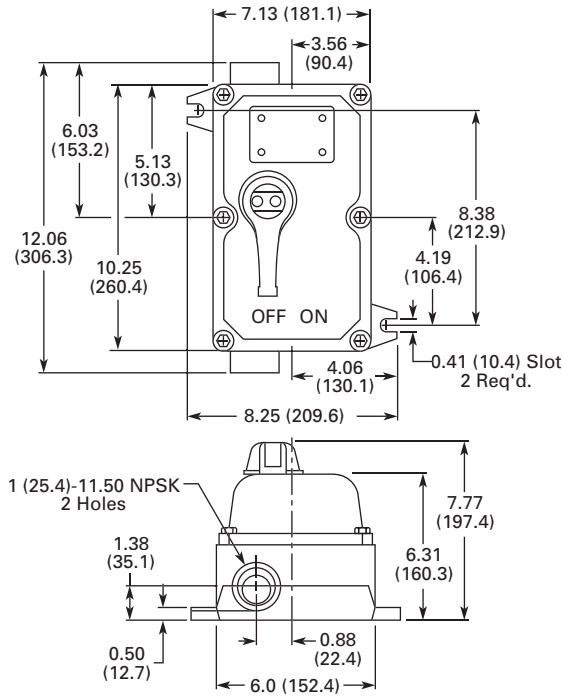
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## NEMA Manual Starters

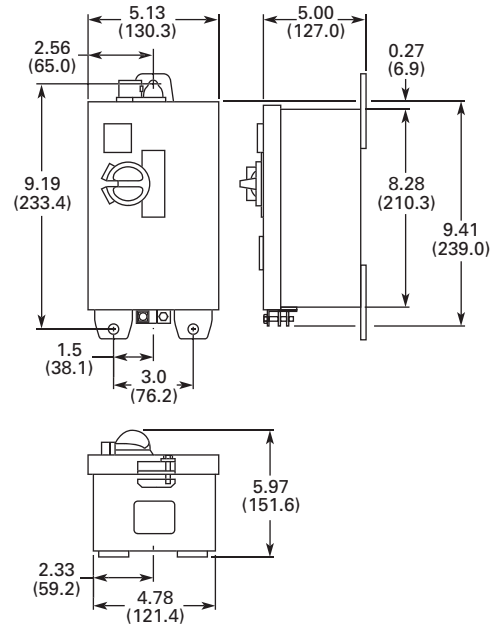
### Starters and Switches

Approximate Dimensions in Inches (mm)

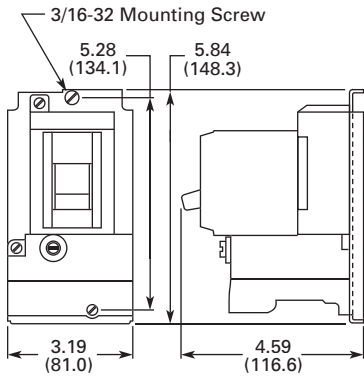
#### Type 7 and 9 Enclosed



#### Type 12 Enclosed



#### Open, Non-Reversing Starter



Type 9441, Reversing Drum Switches



**Contents**

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MS Series, Single-Phase Starters . . . . .	V5-T29-6
Type B100, Single- and Three-Phase Starters . . . . .	V5-T29-10
Type 9441, Reversing Drum Switches	
Product Selection . . . . .	V5-T29-16
Wiring Diagrams . . . . .	V5-T29-17
Dimensions . . . . .	V5-T29-17

**Type 9441, Reversing Drum Switches**

**Application Description**

These drum switches are designed primarily for use with single-phase and squirrel cage, single-speed reversible motors which may be connected directly across-the-line. Typical applications would be hoists and machine tools.

**Features**

- Compact size
- Front mounting—easily installed
- Terminals front accessible—slanted 45° for extra convenience
- Captive pressure clamps on terminal screws back off with screw—no prying with screwdriver necessary
- Choice of operators
  - Large
  - Lever
  - Knob
- Orientation of operator independent of legend—360° positioning in 22-1/2° increments—pointer remains oriented to legend
- Field convertible from maintained to momentary operation
- Replaceable, large volume, silver plated contacts
- Oiltight machine cavity or surface mounting types
- Modern attractive appearance

**Operation**

All of the operators may be rotated 360° in 22-1/2° increments without losing the indication of the drum position. A red-lined pointer is permanently orientated to the legend markings and clearly indicates the selected drum function regardless of the selected setting for the operator. This enables the user to “offset” the operator to afford the most comfortable operating position. This is accomplished simply by loosening and retightening one screw.

**Standards and Certifications**

- UL File No. E37316, Category NLRV
- CSA Guide No. 184-N-13.13A, Class 3211



#### Product Selection

##### When Ordering Specify

- Catalog number

Type DB1 Flush Mount Standard Lever



Type DB and DD Surface Mounting Standard Lever



Type DB1 Flush Mount Knob Operator



Type DB and DD Surface Mounting Knob Operator



#### Reversing Drum Type without Overload Relay

##### Maximum Horsepower

Three-Phase		Single-Phase		DC		Size	Type of Operation	Surface Mounting General Purpose—NEMA 1		Flush or Cavity Mounting (Oiltight Mounting on Sizes DB and DD)	
200–230V	380–575V	115V	230V	115V	230V			Lever Operator	Knob	Lever Operator	Knob
Three-Pole											
2	2	1-1/2	2	1	1	DB 1	Maintained ①	9441H268	9441H269	9441H274	9441H275
							Maintained and Momentary ②	9441H271	9441H272	9441H276	9441H277
3	5	1-1/2	2	1	1	DB 2	Maintained ①	9441H353	9441H354	9441H347	9441H348
							Maintained and Momentary ②	9441H356	9441H357	9441H349	9441H350
5	7-1/2	1-1/2	3	2	3	DD 1	Maintained ①	9441H284	9441H285	9441H388	9441H287
7-1/2	10	2	5	2	3	DD 2	Maintained ①	9441H361	9441H363	9441H362	9441H364

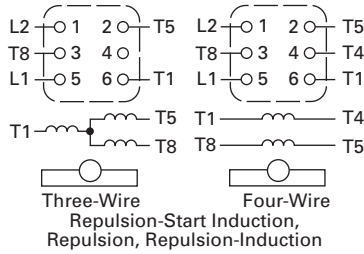
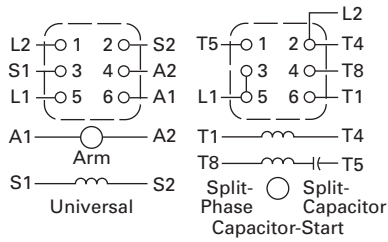
##### Notes

- ① These devices are field convertible from maintained both positions to momentary both positions.
- ② These devices are field convertible from maintained FORWARD and momentary REVERSE to momentary FORWARD and maintained REVERSE.

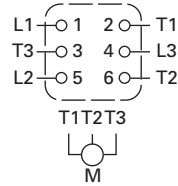


Wiring Diagrams

Single-Phase Motors

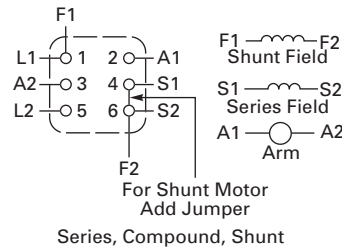


Polyphase Motors



Three-Phase Three-Wire

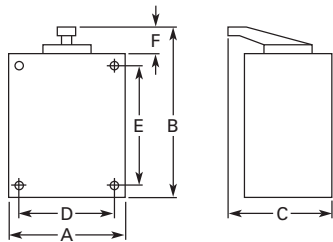
DC Motors



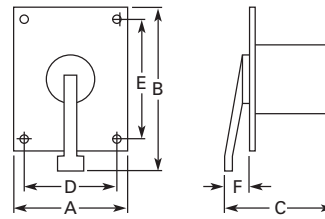
Dimensions

Approximate Dimensions in Inches (mm)

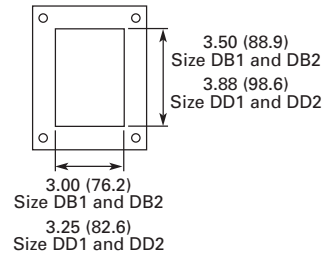
Surface Mounting



Cavity Mounting



Panel Cutout Cavity Mounting



Dimensions and Shipping Weights

Size	Type of Operator	Wide A	High B	Deep C	Mounting D	Mounting E	Lever F	Shipping Weight Lbs (kg)
<b>Surface Mounting</b>								
DB1 and DB2	Lever	2.50 (63.5)	5.88 (149.4)	4.38 (111.3)	2.00 (50.8)	2.25 (57.2)	1.88 (47.8)	3.0 (1.4)
	Knob	2.50 (63.5)	5.38 (136.7)	3.00 (76.2)	2.00 (50.8)	2.25 (57.2)	1.38 (35.1)	3.0 (1.4)
DD1 and DD2	Lever	3.38 (85.9)	6.88 (174.8)	4.75 (120.7)	2.63 (66.8)	2.75 (69.9)	2.00 (50.8)	4.0 (1.8)
	Knob	3.38 (85.9)	6.25 (158.8)	3.63 (92.2)	2.63 (66.8)	2.75 (69.9)	1.38 (35.1)	4.0 (1.8)
<b>Cavity Mounting</b>								
DB1 and DB2	Lever	4.00 (101.6)	4.75 (120.7)	5.00 (127.0)	3.50 (88.9)	4.00 (101.6)	1.88 (47.8)	3.0 (1.4)
	Knob	4.00 (101.6)	4.50 (114.3)	4.50 (114.3)	3.50 (88.9)	4.00 (101.6)	1.38 (35.1)	3.0 (1.4)
DD1 and DD2	Lever	4.50 (114.3)	5.75 (146.1)	5.25 (133.4)	4.00 (101.6)	4.50 (114.3)	2.00 (50.8)	4.0 (1.8)
	Knob	4.50 (114.3)	5.13 (130.3)	4.63 (117.6)	4.00 (101.6)	4.50 (114.3)	1.38 (35.1)	4.0 (1.8)

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## NEMA Manual Starters

Starters and Switches