

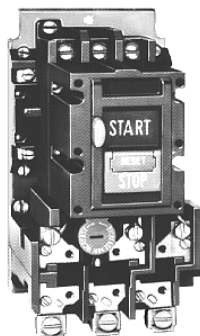
MS Series, Single-Phase Starters



## 3.1 Starters and Switches

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Type B100, Single- and Three-Phase Starters



Types B230, B330 Switches



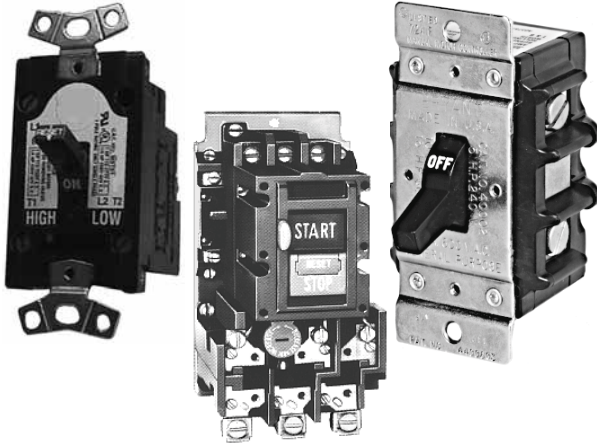
# 3.1

## NEMA Manual Starters

### Starters and Switches

#### Starters and Switches

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#### 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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#### 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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#### 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

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## NEMA Manual Starters

### Starters and Switches




#### Product Selection

##### When Ordering Specify

- Catalog number of manual motor switch

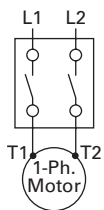
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#### Manual Motor Switches without Overload

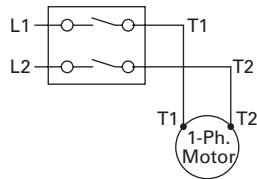
|   | Maximum Horsepower Ratings              |       |      |      | Open           | NEMA 1 Enclosed |
|---|---|-------|------|------|----------------|-----------------|
|   | 120V                                    | 240V  | 480V | 600V |                |                 |
| <b>Two-Pole B230AN</b>  | <b>Two-Pole—Manual Motor Switches</b>   |       |      |      |                |                 |
|    | 2                                       | 5     | —    | —    | <b>B230AN</b>  | <b>B230AG</b>   |
| <b>Two-Pole NEMA 1 Enclosure B230BG</b>   | 2                                       | 5     | 10   | 15   | <b>B230BND</b> | <b>B230BGD</b>  |
|   |   |       |      |      |                |                 |
| <b>Three-Pole B330AN</b>  | <b>Three-Pole—Manual Motor Switches</b> |       |      |      |                |                 |
|  | 3                                       | 7-1/2 | 15   | 20   | <b>B330AND</b> | <b>B330AGD</b>  |

#### Wiring Diagrams

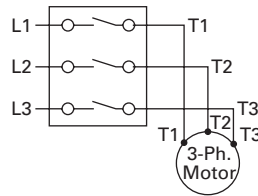
##### B230AN



##### B230BN



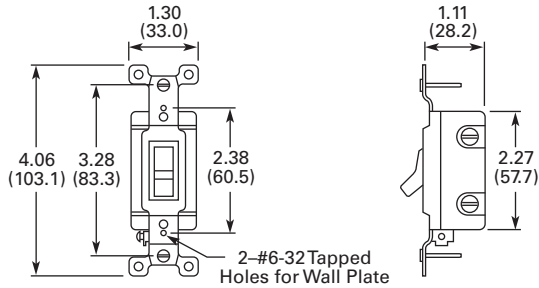
##### B330AN



**Dimensions**

Approximate Dimensions in Inches (mm)

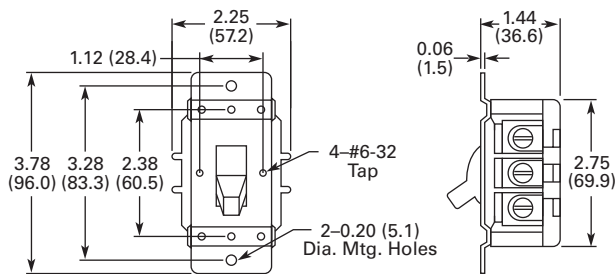
**B230AN**



**Approximate Shipping Weight**

4 oz. (0.11 kg)

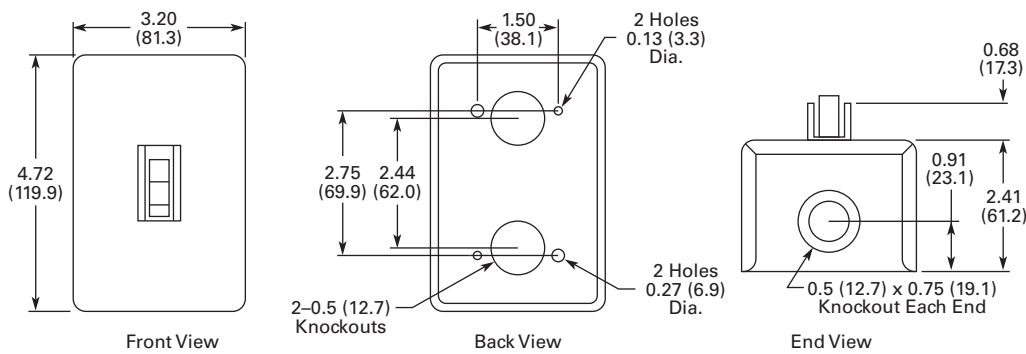
**B230BN and B330AN**



**Approximate Shipping Weight**

6 oz. (0.17 kg)

**B230AG, B230BG, B330AG**



**Approximate Shipping Weight**

14 oz. (0.40 kg)

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## NEMA Manual Starters

### Starters and Switches

#### MS Series, Single-Phase Starters

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#### 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

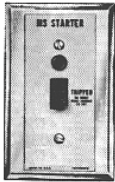
##### MS Series, Single-Phase Starters



#### Open Type

| Number of Poles | Horsepower | Voltage           | Catalog Number <sup>①</sup> |
|-----------------|------------|-------------------|-----------------------------|
| 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 <sup>①</sup> |
|-----------------|------------------|-------------------------|-----------------------------|
| 1               | General purpose  | Switch only             | <b>MST01FN</b>              |
| 2               |                  | 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

<sup>①</sup> Does not include heater. Select heater from tables on [Page V5-T3-8](#).

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## NEMA Manual Starters

### Starters and Switches

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#### 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

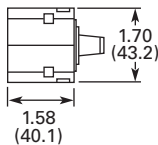
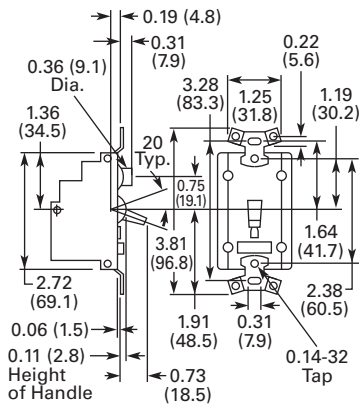
#### MS Accessories

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

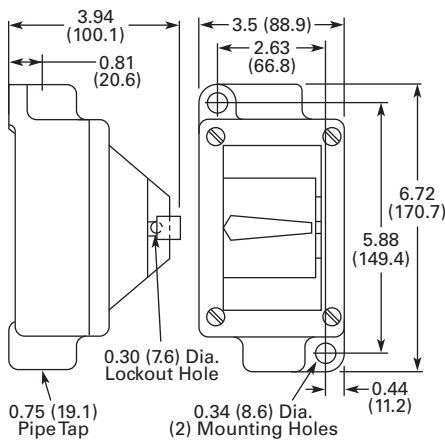
### Dimensions

Approximate Dimensions in Inches (mm)

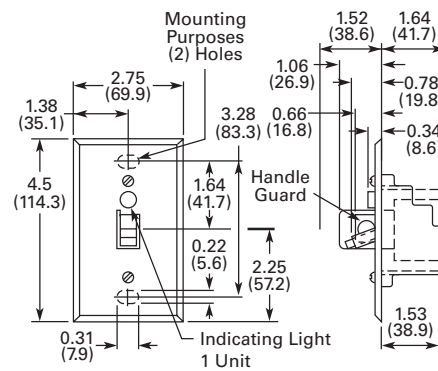
#### MS Motor Starter Toggle Operated Open Units



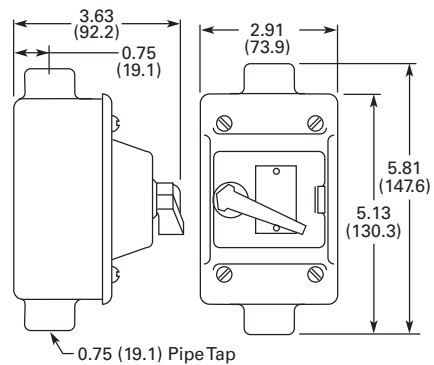
#### Hazardous Location (Cast Aluminum)



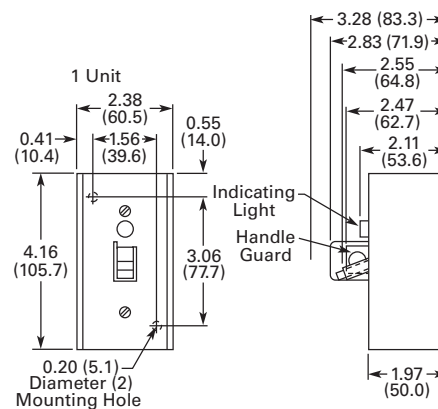
#### Flush Plates



#### Watertight (Cast Aluminum)



#### Type 1 Enclosure (Boxes and Covers)



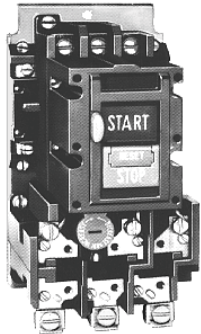
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## NEMA Manual Starters

### Starters and Switches

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Type B100, Single- and Three-Phase Starters



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

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

**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-T3-12**.
- 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                               | <b>B1A</b>     |
| 1NC elect. auxiliary                               | <b>B1B</b>     |
| Red pilot light 120/60 (NEMA 1 enclosure only)     | <b>LK-21</b>   |
| Red pilot light 208-240/6 (NEMA 1 enclosure only)  | <b>LK-22</b>   |
| Red pilot light 480-600/60 (NEMA 1 enclosure only) | <b>LK-26</b>   |

## Options

## Modifications

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

## 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**

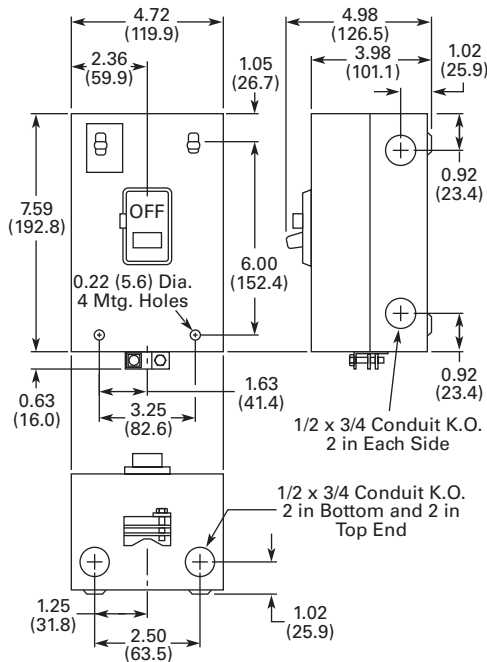
**Type B100 Starters**

| NEMA Size                      | Maximum hp for AC Ratings <sup>①</sup> |             |             | 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          | —                         | —       |

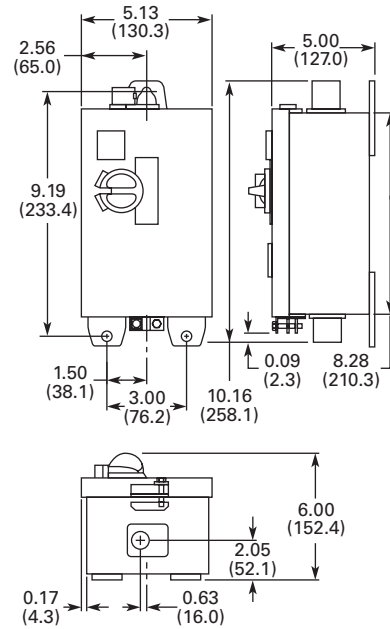
**Dimensions**

Approximate Dimensions in Inches (mm)

**Type 1 Enclosed**



**Type 4 Enclosed**



**Note**

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

# 3.1

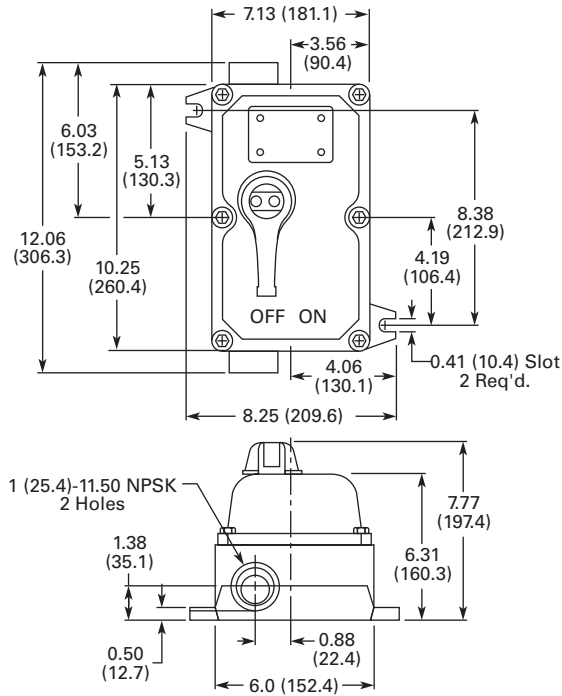
## NEMA Manual Starters

### Starters and Switches

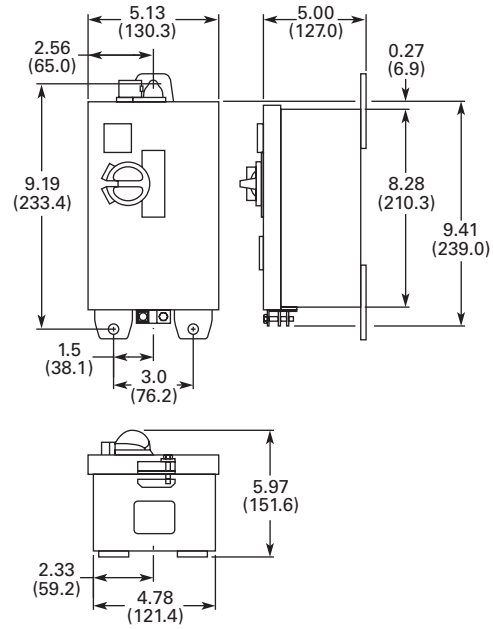
Approximate Dimensions in Inches (mm)

3

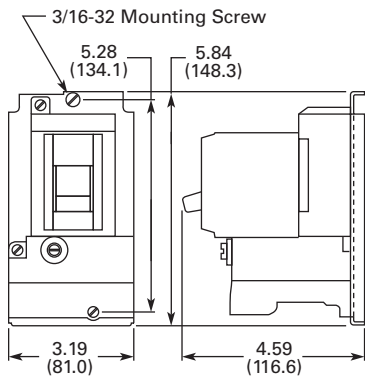
#### Type 7 and 9 Enclosed



#### Type 12 Enclosed



#### Open, Non-Reversing Starter



Type 9441, Reversing Drum Switches



**Contents**

| <i>Description</i>                                    | <i>Page</i> |
|---|-------------|
| Types B230, B330, Switches . . . . .                  | V5-T3-3     |
| MS Series, Single-Phase Starters . . . . .            | V5-T3-6     |
| Type B100, Single- and Three-Phase Starters . . . . . | V5-T3-10    |
| Type 9441, Reversing Drum Switches                    |             |
| Product Selection . . . . .                           | V5-T3-16    |
| Wiring Diagrams . . . . .                             | V5-T3-17    |
| Dimensions . . . . .                                  | V5-T3-17    |

**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



# 3.1

## NEMA Manual Starters

### Starters and Switches

#### Product Selection

##### When Ordering Specify

- Catalog number

3

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

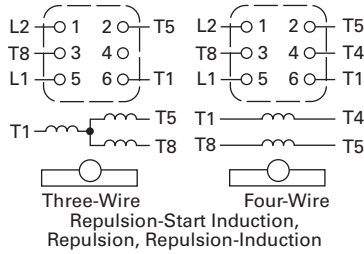
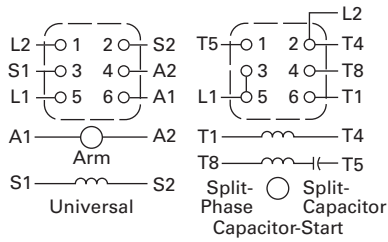
| Three-Phase<br>200–230V | 380–575V | Single-Phase |      | DC   |      | Size | Type of<br>Operation          | Surface Mounting<br>General Purpose—NEMA 1 |          | Flush or Cavity Mounting<br>(Oiltight Mounting<br>on Sizes DB and DD) |          |
|-------------------------|----------|--------------|------|------|------|------|------------------------------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

##### Notes

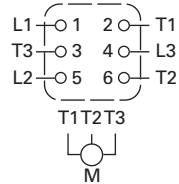
- ① These devices are field convertible from maintained both positions to momentary both positions.
- ② These devices are field convertible from maintained FORWARD and momentary REVERSE to momentary FORWARD and maintained REVERSE.

Wiring Diagrams

Single-Phase Motors

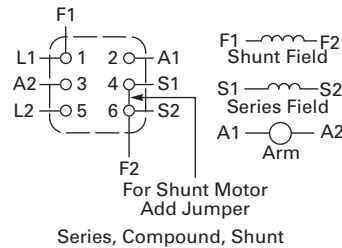


Polyphase Motors



Three-Phase Three-Wire

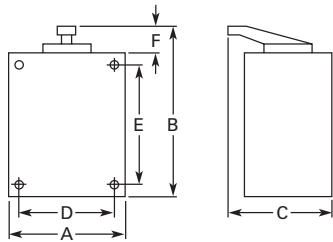
DC Motors



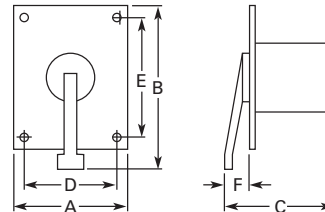
Dimensions

Approximate Dimensions in Inches (mm)

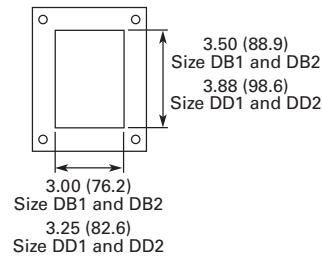
Surface Mounting



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)                |