

# Pump Control Panels

## Class 87, 88

### General

#### Features

- Fully Gasketed NEMA 3R Rainproof Enclosures
- 100,000 Amp Interrupting Capacity with Class R Fuses
- Heavy Duty NEMA Starters
- Solid State or Ambient Compensated Bimetal Overload Relays
- Heavy Duty Disconnect Handle
- Available in Reduced Voltage Versions
- Bold Pilot Legend on Front
- Generous Accessory Space
- Copper Grounding Lug For Three #6 Wires
- UL Listed for Outdoor Use and Service Equipment File #E185287



#### Application

Heavy duty pump control panels are designed to withstand the most demanding environments. Typical applications include irrigation, agriculture, petrochemical, wastewater treatment and wherever motor control is challenged by harsh elements.

Rugged pump control panels utilized cold forming "tox" process. They are more rainproof, sleet and ice resistant than in the past.

Installation is easy. Panels are factory wired to provide flexible control and protect against short circuits and overloads. Ample space is provided for field modifications and installation of accessories.

The pump control panels feature a full sized removable auxiliary panel for the mounting of accessories. The fusible version features fuse clips for full sized RK5 or compact class J fuses and accessory mounting space for the most commonly used accessories.

Class 87 pump panels become jockey pump panels with the addition of a pressure switch. The jockey pump's primary function is to maintain water pressure at a preset level and thus compensate for possible shortage of water in the pumping system. When the water pressure drops below the preset level, the pressure switch energizes the starter which in turn activates the jockey pump. The water pressure is then brought back up to the desired level. This insures the maintenance of proper water pressure at all times.

#### Features

Specified by Fortune 500 companies, Siemens NEMA starters offer prolonged service under severe duty conditions. NEMA rated, these starters utilize large silver cadmium oxide contacts and wide copper heat sinks to ensure rapid heat dissipation and maximum electrical life.

#### ESP200 solid state overload relay

Refer to the section on Class 48 overload relays for features and benefits. Pump panels are factory set at trip Class 10.

#### The ambient compensated bimetal overload relays

are designed to parallel thermal characteristics of typical pump motors. They prevent nuisance trips that may result from operation of the control in a higher ambient temperature than that at the pump. These relays are trip-free, tamperproof and can be set to reset automatically or manually.

#### HOA and Start Pushbutton

Every pump panel comes with an HOA and a start pushbutton.

#### Half Size Starters

Siemens motor matched starters feature all the rugged performance characteristics of our NEMA rated starter sizes, but are fractionally sized to more closely match your exact motor rating. As a result, significant economic savings are made possible without sacrificing the reliability you expect from a heavy duty starter.

These additional starter sizes have the reserve capacity to handle occasional plugging and jogging without de-rating the device.

Siemens motor matched can save hundreds, even thousands of dollars per project.

Siemens motor matched starters comply with NEMA, UL and CSA standards.

Panels are predrilled for easy repositioning of the fuse trailer block to accommodate 250 and 600 volt fuses and full sized RK or compact J fuses. Circuit breakers are also available.

### Heavy Duty Fusible Disconnect Switch

The disconnect switch has the following advantages:

- Visible blades for the highest level of safety
- Double Break Switching Action to reduce arcing, increase lifetime and eliminate the "electric hinge"
- Oversized lugs are standard
- Line side shield to help guard personnel from contact with live parts

### Motor Circuit Protector

The motor circuit protector provides fast, accurate fault clearing that will minimize damage to the motor and control apparatus and protect branch circuit conductors. Continuous current ratings and adjustable trip ranges meet NEC requirements for full load and locked rotor currents. The adjustable instantaneous trip point can be set precisely to assure fault protection and eliminate nuisance tripping.

### Removable Door

Enclosure door may be lifted off to make wiring easier.

### Mounting Flanges

Convenient flanges at top and bottom of the enclosure provide easy mounting. They fit pole or flat surfaces using keyhole slots.

### Quarter Turn Latches

Quarter turns are utilized to secure the door.

### Wind Catches

A wind catch is provided to prevent the door from slamming shut (or open) due to high wind conditions.

### Safety Disconnect Handle

Up to three padlocks can be used to lock the disconnect in the OFF position. Maintenance work can be performed without hazard to personnel.

### External Reset

The overload relay may be quickly reset by means of a button on the front of the enclosure.

### Bold Pilot Legend

Provides positive indication of the selector switch position for use to stop the pump motor.

### Ground Lugs

Insures proper connecting of ground wires and lightning arresters.

### UL Listed

Assures proper construction throughout control panel.

### Reduced Voltage

Available in part winding, wye delta and auto transformer types, these controls may be necessary where the power company limits the amount of current drawn from its lines, or where starting torque must be reduced.

### Fully gasketed NEMA 3/12 weather-proof enclosures are supplied with Class 88 reduced voltage starters.

**Part Winding Starters** apply starting current in timed steps to minimize voltage fluctuations.

**Auto Transformer Starters** maintain a closed circuit during transition and eliminate voltage or current surges. They draw less current than part winding starters and are well suited for starting motors over 20 Hp.

**Wye Delta starters** and motors are used in areas where the power supply is inadequate to supply full starting current without objectionable voltage drop or for applications where low starting torque is required. Centrifugal pumps and similar apparatus requiring a low starting torque are typical applications. Both ends of all three windings of the wye delta motor are brought out so that they may be accessible for reconnecting from wye to delta.

### Auxiliary Equipment

**Pilot Lights** are easily installed on the enclosure. Oil Tight and Heavy Duty, they meet NEMA A600 requirements.

**Lightning Arresters** protect the control panel from lightning induced surges.

**Undervoltage and Phase Sensing Relays** protect the pump against low voltage, voltage imbalance, loss of phase and phase reversal.

**Anti-Backspin Timers** prevent the motor from starting during motor/shaft backspin.

### The TOX Box

Siemens uses the TOX process to manufacture the enclosures for the pump panels.

Advantages of the TOX process:

- Joints are 50-70% stronger
- Since the TOX process compresses the metal at the joint, it does not leave the high stresses in the metal
- Increased corrosion resistance. The protective layer on the metal is not damaged in the process, but instead flows with the material


### Class 87 NEMA Vacuum Starter Pump Control Panels

The Siemens vacuum starter pump controllers are designed for the harshest environments. Typical environments include chemical, petrochemical, waste water treatment and mining. Contaminations present in these severe environments are detrimental to conventional air-break contacts decreasing their life expectancy and reliability. The Siemens vacuum starter pump controllers are well suited for these environments because the contacts are contained in hermetically sealed contact tubes. This prevents contamination in the atmosphere from affecting the operation of the contacts. Additionally, neither arcs nor arcing gases are produced which dramatically increases the electrical endurance of the contacts.

# Pump Control Panels

## Standard Pump Panel with Solid State Overload, Class 87

### Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 9/104.</li> <li>▶ Factory Modifications see page 9/119.</li> <li>▶ Dimensions see page 9/169.</li> <li>▶ Wiring Diagrams see page 9/187.</li> <li>▶ Replacement Parts see page 9/131.</li> <li>▶ Sizes 1-4 will be supplied standard with a 240/480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> <li>▶ Sizes 5 &amp; 6 will be supplied standard with a 480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24</td><td>J</td></tr> <tr><td>120</td><td>F</td></tr> <tr><td>110-120/220-240</td><td>A<sup>ⓐ</sup></td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>220-240/440-480</td><td>C<sup>ⓑ</sup></td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>550-600</td><td>E</td></tr> </tbody> </table>	60Hz Voltage	Letter	24	J	120	F	110-120/220-240	A <sup>ⓐ</sup>	200-208	D	220-240	G	220-240/440-480	C <sup>ⓑ</sup>	277	L	440-480	H	550-600	E
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### Fusible Disconnect

Max Hp				NEMA Size	Half Size	Overload		Disc. Amp Range	Fuse Clip Amp / Volts	Catalog Number	List Price \$
200 Volts	230 Volts	460 Volts	575 Volts			Amp Range	Frame Size				
—	—	1	1	1	—	0.75-3.4 <sup>ⓐ</sup>	A	30	30A/600V	87DUB6FC	
—	—	5	5	1	—	3-12	A1	30	30A/600V	87DUC6FC	
—	—	10	10	1	—	5.5-22	A1	30	30A/600V	87DUD6FC	
—	—	10	10	1	—	5.5-22	A1	60	60A/600V	87DUD60C	
—	—	15	15	—	1½	10-40	A1	30	30A/600V	87EUE6FC	
—	—	15	15	—	1½	10-40	A1	60	60A/600V	87EUE60C	
—	—	25	25	2	—	13-52	B	60	60A/600V	87FUF6FC	
—	—	25	25	2	—	13-52	B	100	100A/600V	87FUF60C	
—	—	30	30	—	2½	25-100	B	60	60A/600V	87GUG6FC	
—	—	30	30	—	2½	25-100	B	100	100A/600V	87GUG60C	
—	—	50	50	3	—	25-100	B	100	100A/600V	87HUG6FC	
—	—	50	50	3	—	25-100	B	200	200A/600V	87HUG60C	
—	—	75	75	—	3½	50-200	B	200	200A/600V	87IUH6FC	
—	—	100	100	4	—	50-200	B	200	200A/600V	87JUH6FC	
—	—	200	200	5	—	55-250	—	400	400A/600V	87LPU6FH	
—	—	250	—	6	—	160-630	—	600	600A/600V	87MSW6FH	
2	2	—	—	1	—	3-12	A1	30	30A/250V	87DUC6LC	
3	3	—	—	1	—	5.5-22	A1	30	30A/250V	87DUD6LC	
7½	7½	—	—	1	—	10-40	A1	30	30A/250V	87DUE6LC	
7½	7½	—	—	1	—	10-40	A1	60	60A/250V	87DUE6PC	
10	10	—	—	—	1½	10-40	A1	60	60A/250V	87EUE6LC	
10	15	—	—	2	—	13-52	B	60	60A/250V	87FUF6LC	
10	15	—	—	2	—	13-52	B	100	100A/250V	87FUF6PC	
15	20	—	—	—	2½	25-100	B	60	60A/250V	87GUG6LC	
15	20	—	—	—	2½	25-100	B	100	100A/250V	87GUG6PC	
20	30	—	—	3	—	25-100	B	100	100A/250V	87HUG6LC	
25	30	—	—	3	—	25-100	B	200	200A/250V	87HUG6PC	
30	40	—	—	—	3½	50-200	B	200	200A/250V	87IUH6LC	
40	50	—	—	4	—	50-200	B	200	200A/250V	87JUH6LC	
75	100	—	—	5	—	55-250	—	400	400A/250V	87LPU6LG	

### Circuit Breaker

Max Hp				NEMA Size	Half Size	Overload		Motor Circuit Interrupter ETI Amps	Catalog Number	List Price \$
200 Volts	230 Volts	460 Volts	575 Volts			Amp Range	Frame Size			
½	½	1	1	1	—	0.75-3.4 <sup>ⓐ</sup>	A	3	87DUB6MC	
2	2	5	5	1	—	3-12	A1	10	87DUC6MC	
3	3	10	10	1	—	5.5-22	A1	25	87DUD6MC	
7½	7½	10	—	1	—	10-40	A1	30	87DUE6MC	
—	—	15	15	—	1½	10-40	A1	40	87EUE6MC	
10	15	25	25	2	—	13-52	B	50	87FUF6MC	
15	20	30	30	—	2½	25-100	B	100	87GUG6MC	
25	30	50	50	3	—	25-100	B	100	87HUG6MC	
30	40	75	75	—	3½	50-200	B	125	87IUH6MC	
40	50	100	100	4	—	50-200	B	150	87JUH6MC	
50	75	150	200	5	—	55-250	—	250	87LPT6MH	
75	100	200	200	5	—	55-250	—	400	87LPU6MH	
100	125	250	300	6	—	160-630	—	400	87MSW6MH	
150	200	400	400	6	—	160-630	—	600	87MSX6MH	

Note: All starter sizes carry one maximum Hp rating (per the National Electric Code).

ⓐ Not available on Size 5 and larger.

ⓑ For an overload amp range of 0.25-1A, change the 5th character from a 'B' to an 'A'.

ⓒ A version with coil code A is also stocked via Controls Express.

# Pump Control Panels

## Pump Panel with Ambient Compensated Bimetal Overload, Class 87

Selection

Ordering Information	Coil Table	
<ul style="list-style-type: none"> <li>▶ Heater elements for bimetal overloads see page 9/124 (3-Required).</li> <li>▶ Field Modification Kits see page 9/104.</li> <li>▶ Factory Modifications see page 9/119.</li> <li>▶ Dimensions see page 9/169.</li> <li>▶ Wiring Diagrams see page 9/187.</li> <li>▶ Replacement Parts see page 9/131.</li> <li>▶ Sizes 1-4 will be supplied standard with a 230/480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> <li>▶ Sizes 5 &amp; 6 will be supplied standard with a 480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> </ul>	60Hz Voltage	Letter
	24 120 110-120/220-240 200-208 220-240 220-240/440-480 277 440-480 550-600	J F A <sup>Ⓞ</sup> D G C <sup>Ⓞ</sup> L H E

### Fusible Disconnect

Max HP				NEMA Size	Half Size	Disc Amp Rating	Fuse Clip Amps/Volts	Catalog Number	List Price \$
200V	230V	460V	575V						
—	—	10	10	1	—	30	30A/600V	87DAE6FC	
—	—	10	10	1	—	60	60A/600V	87DAE60C	
—	—	15	15	—	1¼	30	30A/600V	87EAF6FC	
—	—	15	15	—	1¼	60	60A/600V	87EAF60C	
—	—	25	25	2	—	60	60A/600V	87FAJ6FC	
—	—	25	25	2	—	100	100A/600V	87FAJ60C	
—	—	30	30	—	2½	60	60A/600V	87GAK6FC	
—	—	30	30	—	2½	100	100A/600V	87GAK60C	
—	—	50	50	3	—	100	100A/600V	87HAN6FC	
—	—	50	50	3	—	200	200A/600V	87HAN60C	
—	—	75	75	—	3½	200	200A/600V	87IAP6FC	
—	—	100	100	4	—	200	200A/600V	87JAR6FC	
7½	7½	—	—	1	—	30	30A/250V	87DAE6LC	
7½	7½	—	—	1	—	60	60A/250V	87DAE6PC	
10	10	—	—	—	1¼	60	60A/250V	87EAG6LC	
10	15	—	—	2	—	60	60A/250V	87FAJ6LC	
10	15	—	—	2	—	100	100A/250V	87FAJ6PC	
15	20	—	—	—	2½	100	100A/250V	87GAL6LC	
25	30	—	—	3	—	100	100A/250V	87HAN6LC	
25	30	—	—	3	—	200	200A/250V	87HAN6PC	
30	40	—	—	—	3½	200	200A/250V	87IAP6LC	
40	50	—	—	4	—	200	200A/250V	87JAR6LC	

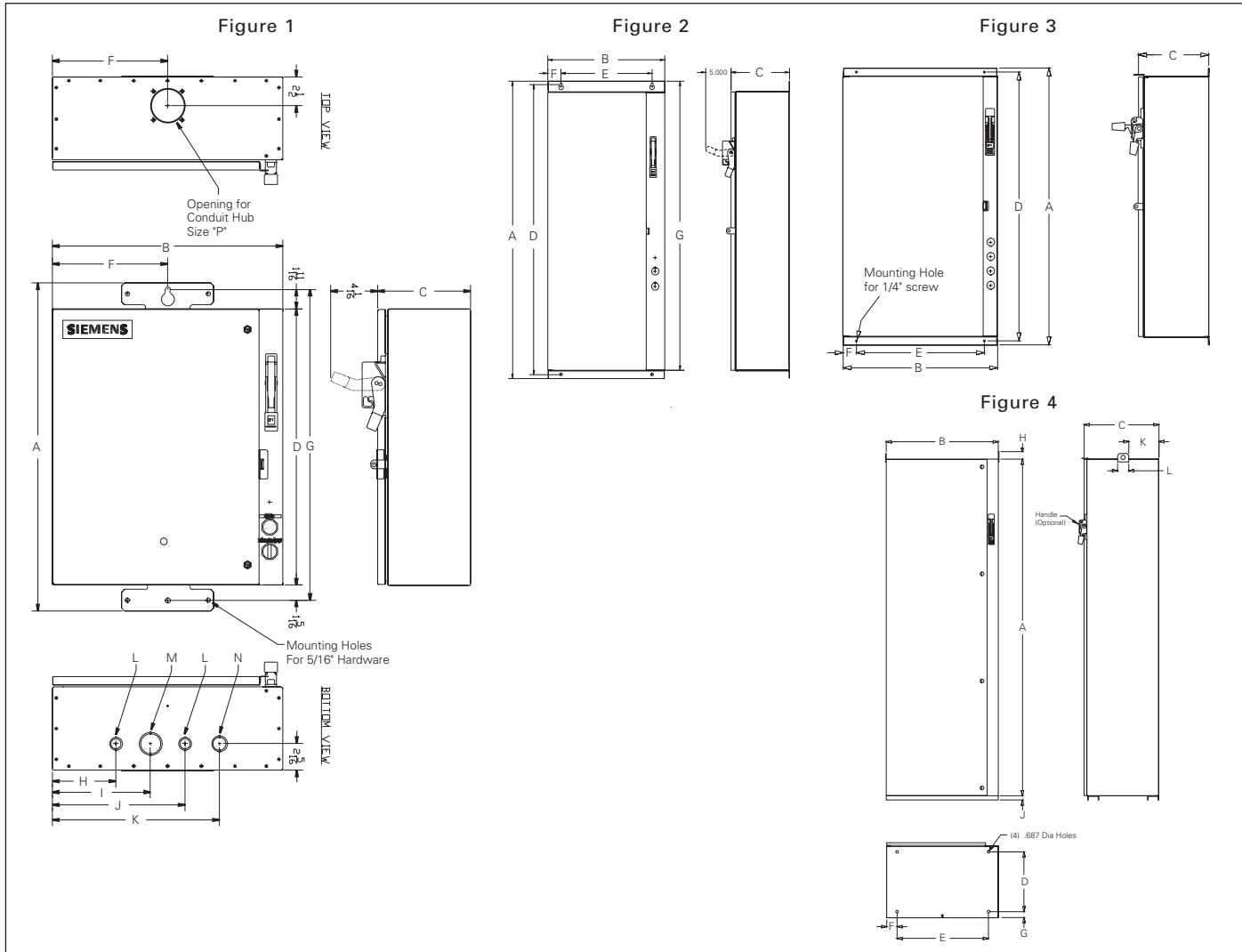
### Circuit Breaker

Max HP				NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Catalog Number	List Price \$
200V	230V	460V	575V					
½	½	1	1	1	—	3	87DAA6MC	
1	1	3	3	1	—	10	87DAB6MC	
3	3	7½	7½	1	—	25	87DAD6MC	
7½	7½	10	10	1	—	30	87DAE6MC	
7½	7½	15	15	—	1¼	40	87EAF6MC	
10	10	—	—	—	1¼	50	87EAG6MC	
—	—	15	20	2	—	40	87FAH6MC	
10	15	25	25	2	—	50	87FAJ6MC	
—	—	30	30	—	2½	50	87GAK6MC	
15	20	—	—	—	2½	100	87GAL6MC	
25	30	50	50	3	—	100	87HAN6MC	
30	40	75	75	—	3½	125	87IAP6MC	
40	50	100	100	4	—	150	87JAR6MC	

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

Ⓞ Not available on Size 5 or above.

#### Outline Drawings



#### Class 87 Standard and Vacuum Starter Pump Panel

Size	Figure	A	B	C	D	E	F	G	H	I	J	K	Conduit Knockout			Hub
													L	M	N	P
1 - 2½	1	28½	20	8 <sup>1</sup> / <sub>16</sub>	24	—	10	27	5 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>2</sub>	14 <sup>1</sup> / <sub>2</sub>	1/2 x 3/4	1¼ x 1	¾ x 1	1½
3 - 4	1	40½	24	8 <sup>3</sup> / <sub>32</sub>	36	—	12	39	8 <sup>7</sup> / <sub>16</sub>	11 <sup>15</sup> / <sub>16</sub>	15 <sup>7</sup> / <sub>16</sub>	—	1 <sup>3</sup> / <sub>32</sub> x 2 <sup>15</sup> / <sub>32</sub>	7/8 x 1 <sup>1</sup> / <sub>8</sub>	—	2 <sup>1</sup> / <sub>2</sub>
5	2	72 <sup>5</sup> / <sub>32</sub>	20	11	71	16	2 <sup>1</sup> / <sub>8</sub>	70 <sup>29</sup> / <sub>32</sub>	—	—	—	—	—	—	—	—
6	2	79 <sup>1</sup> / <sub>8</sub>	22	12 <sup>15</sup> / <sub>16</sub>	78	18	2 <sup>1</sup> / <sub>8</sub>	77 <sup>7</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
4 (Vac)	2	55 <sup>3</sup> / <sub>32</sub>	24 <sup>3</sup> / <sub>8</sub>	9 <sup>22</sup> / <sub>32</sub>	54 <sup>26</sup> / <sub>32</sub>	20 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	54 <sup>23</sup> / <sub>32</sub>	26 <sup>3</sup> / <sub>16</sub>	—	5	27 <sup>14</sup> / <sub>32</sub>	—	—	—	—

#### Class 88 Reduced Voltage Pump Panels

RVAT Size	Part Winding & Wye Delta		Figure	A	B	C	D	E	F	H	I	J	K	L
	Fusible Disconnect	Circuit Breaker												
2-2½	1-2	1-2½	3	43 <sup>5</sup> / <sub>16</sub>	24 <sup>5</sup> / <sub>32</sub>	11	42 <sup>11</sup> / <sub>32</sub>	20	2 <sup>1</sup> / <sub>16</sub>	—	—	—	—	—
3-3½	2½-3½	3-3½	3	55 <sup>5</sup> / <sub>16</sub>	28 <sup>9</sup> / <sub>32</sub>	11	54 <sup>11</sup> / <sub>32</sub>	24	2 <sup>1</sup> / <sub>8</sub>	—	—	—	—	—
4	4	4	3	74 <sup>21</sup> / <sub>32</sub>	28 <sup>9</sup> / <sub>32</sub>	11	73 <sup>13</sup> / <sub>32</sub>	24	2 <sup>1</sup> / <sub>8</sub>	—	—	—	—	—
5, 6	5, 6	5, 6	4	90	30	20	16	24 <sup>7</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>	1 ½	—	1 ⅛	8 <sup>1</sup> / <sub>16</sub>	3

**Note:** Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.