*Advantage is a trademark of Cutler-Hammer Inc.

# 2C Motor Starters

## Application and Selection Quick Selector Chart

### Application:

Line starters are housed in enclosures suitable for specific environments, and are used for:

- across-the-line starting of motors
- motor running protection
- undervoltage protection
- remote or manual starting and stopping

### Selection:

Considerations for selection of proper enclosure:

- The environment of the enclosure location in accordance with NEC/CEC and NEMA/EEMAC requirements
- The characteristics of the starter to be enclosed
- See ''Quick-Selector'' below for guidance

### Options:

Many options are available on:

- material and finishes where special atmospheric conditions prevail
- special features for specific applications.

See individual listings for available options, many of which are available in kit form for field addition to existing units.

### Quick Selector Chart

**Enclosures for Starters**

| Enclosures | NEC/CEC – Hazardous Area Compliance | NEMA/ EEMAC Enclosure Type | Starter Type | NEMA/EEMAC Size Starters Single Speed Non-reversing | Motor Phase and Type | Manufacturers Equipment Enclosed – Starter | Cover Type |
|---|---|---|---|---|---|---|---|
| **MC** | None | 3,4,12 | Manual | | Single-AC | Cutler-Hammer | Gasketed |
| **EPC** | Cl. I, Div. 1 & 2, Groups C,D<br>Cl. II, Div. 1, Groups E,F,G<br>Cl. II, Div. 2, Groups F,G<br>Cl. III | 3,4,7CD, 9EFG,12 | Magnetic | 0-2 | Poly-AC | Allen-Bradley<br>Cutler-Hammer<br>G.E.<br>Square D | Threaded |
| **EBMS** | Cl. I, Div. 1 & 2, Groups B,C,D<br>Cl. II, Div. 1, Groups E,F,G<br>Cl. II, Div. 2, Groups F,G<br>Cl. III | 3,4,7BCD, 9EFG,12 | Magnetic | 0-5 | Poly-AC | Allen-Bradley<br>G.E.<br>Square D<br>Cutler-Hammer | Bolted/ Ground Joint/ Gasketed |
| **EMN** | Cl. I, Div. 1 & 2, Groups C,D<br>Cl. II, Div. 1, Groups E,F,G<br>Cl. II, Div. 2, Groups F,G<br>Cl. III | 3, 7CD, 9EFG,12 | Manual | 0-1P | Single and Poly-AC | Allen-Bradley<br>Cutler-Hammer<br>G.E.<br>Square D | Bolted/ Ground Joint |
| **EDS, EDSC‡** | Cl. I, Div. 1 & 2, Groups B*,C,D<br>Cl. II, Div. 1, Groups E,F,G<br>Cl. II, Div. 2, Groups F,G<br>Cl. III | 3,7CD, 9EFG,12 | Manual | | DC and Single AC | Allen-Bradley<br>G.E.<br>Cutler-Hammer | Bolted/ Ground Joint |
| **EFD** | Cl. I, Div. 1 & 2, Groups B,C,D<br>Cl. II, Div. 1, Groups E,F,G<br>Cl. II, Div. 2, Groups F,G<br>Cl. III | 3,7BCD, 9EFG,12 | Manual | | DC and Single and Poly-AC | G.E.<br>Square D | Bolted/ Ground Joint |

‡ Factory sealed units listed on pages 440 and 441.

* Check listings for Group B suitability.

# EBMS Magnetic Line Starters and Enclosures

| | |
|---|---|
| Cl. I, Div. 1 & 2, Groups B,C,D | Explosionproof |
| Cl. II, Div. 1, Groups E,F,G | Dust-Ignitionproof |
| Cl. II, Div. 2, Groups F,G | Raintight |
| Cl. III | Wet Locations |
| NEMA 3,3R,4‡,7BCD,9EFG,12 | Watertight |



## Application:

Spectrum EBM™ hinged cover motor control enclosures are used:

- For general motor control – indoors or outdoors – in damp, wet, dirty, dusty hazardous locations, without the need for a protective shelter.
- In areas where frequent washdowns are necessary or where heavy rain or water spray is prevalent.
- For across-the-line starting, stopping, speed changing and reversing of polyphase AC induction motors.
- To provide motor overload and undervoltage protection.
- On switchracks or other assemblies where it's desired that motor control be centrally located.

## Features:

- Rugged, corrosion resistant, cast copper-free aluminum construction (less than 0.4 of 1%).
- Motor starter operating handle located through the right side wall of the body permits visual confirmation of correct component assembly and operation.
- Total compliance to the wiring end room requirements of the National Electrical Code® and Canadian Electrical Code.
- Semi-clamshell enclosure design, with an external flanged ground joint between body and cover makes interior components more accessible.
- Minimum enclosure-to-enclosure spacing with little interference between the opened cover and an adjacent enclosure.
- Copper-free aluminum hinges allow the cover to swing well out of the way.
- Stainless steel, quick release, captive, hex head cover bolts. Stainless steel springs provide clear indication cover bolts are fully retracted from body.
- Versatile, internal operating mechanisms allow for field adjustment to accommodate popular manufacturers' starters.
- Simple, straightforward installation of starter on pre-drilled mounting plate within enclosure. Mounting plate also field removable.

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.

- Neoprene cover gasket permanently attached to the cover seals out moisture.
- Bodies have top and bottom drilled and tapped entrances for power conduits plus one at the bottom for control conduit. Removable reducers are supplied as standard, to accommodate smaller size conduits. All conduit entrances are plugged.
- Tap-on mounting feet.
- Optional EMPS control devices may be added to enclosure cover.
- Steel bracket for lifting larger enclosures during installation supplied as standard.

## Certifications & Compliances:

- NEC/CEC:
  - Class I, Division 1 & 2, Groups B,C,D
  - Class II, Division 1, Groups E,F,G
  - Class II, Division 2, Groups F,G
  - Class III
- UL Standards: UL1203 – Hazardous (classified) Locations
- NEMA: 3,3R,4‡,7BCD,9EFG,12
- CSA Standard: C22.2 No. 30

## Standard Materials:

- Body and cover – copper-free aluminum
- Operating handle – copper-free aluminum
- Operating shaft and bushing – stainless steel
- Interior parts – sheet steel, electrogalvanized
- Cover bolts, washers and retractile springs – stainless steel

## Electrical Rating Range:

- Motor starters – NEMA/EEMAC sizes 0-5





*Spectrum EBM motor control enclosures accommodate popular makes of starters.*

# 2C EBMS Magnetic Line Starters and Enclosures

| | |
|---|---|
| Cl. I, Div. 1 & 2, Groups B,C,D | Explosionproof |
| Cl. II, Div. 1, Groups E,F,G | Dust-Ignitionproof |
| Cl. II, Div. 2, Groups F,G | Raintight |
| Cl. III | Wet Locations |
| NEMA 3,3R,4‡,7BCD,9EFG,12 | Watertight |

## Options

The following options are available from the factory by adding suffix to catalog number. Suffixes are added alphanumerically.

**Catalog Number System Example**

EBMS1FB-(A)-W6413-(B)

(A) Options in this position are additions to the enclosures and should be listed alphanumerically.

(B) Options in this position are modifications to the motor starter and should be listed alphanumerically.

| Description | Suffix to be added to Cat. No. | Position in Cat. No. |
|---|---|---|
| ● Less Overload Relays (lighting contactor) | CL | A |
| ● Less overload relays (motor contactor) | CM | A |
| ● Control Circuit Transformer, 100VA for NEMA/EEMAC sizes 0-2, 600/480/240-120, 50/60 Hertz, with provision for fusing both primary leads and one secondary lead (fuses not included) | FTPS100 | A |
| ● Control Circuit Transformer, 200VA for NEMA/EEMAC size 3, 600/480/240-120, 50/60 Hertz, with provision for fusing both primary leads and one secondary lead (fuses not included) | FTPS200 | A |
| ● Control Circuit Transformer, 300VA for NEMA/EEMAC size 4, 5 600/480/240-120, 50/60 Hertz, with provision for fusing both primary leads and one secondary lead (fuses not included) | FTPS300 | A |
| ● Pilot Light, 120VAC, Red Jewel, w/blank indicating plate | J1 ① | A |
| ● Pilot Light, 120VAC, Green Jewel, w/blank indicating plate | J3 ① | A |
| ● Less Heaters in Starter Overload Relay | 0 | B |
| ● Start-Stop Pushbuttons (requires 2 spaces) | PB23 ①‡ | A |
| ● On-Off Selector Switch | RR2 ①‡ | A |
| ● Hand-Off-Auto Selector Switch | RR3 ①‡ | A |
| ● Space Heater, 120 Volt, 25 Watts | R11 | A |
| ● Space Heater, 240 Volt, 25 Watts | R22 | A |
| ● Space Heater, 480 Volt, 25 Watts | R44 | A |
| ● Automatic Reset Overload Relay | S1 | A |
| ● Std. Drain, Class I, B,C&D; Class II, EF&G; Class III | S756‡ | A |
| ● Std. Breather & Drain, Class I, B,C&D; Class II, EF&G; Class III | S756V‡ | A |
| ● Side Conduit Entrances (check factory for application) | S366 | A |
| ● Back Conduit Entrances (check factory for application) | S367 | A |
| ● External Epoxy Finish | S752 | A |
| ● Internal and External Epoxy Finish | S753 | A |
| ● Additional control contacts, N.O. or N.C. – for single speed, non-reversing starters only (number limited by design of starter. Details on specific makes and sizes on request.) | | |
| Aux. Contacts on starter 1 N.O. & 1 N.C. | S781 | B |
| Aux. Contacts on starter 2 N.O. & 2 N.C. | S782 | B |
| Aux. Contacts on starter 3 N.O. & 3 N.C. | S783 | B |
| 12 Point Term. Block – 30 Amp, 300V | S786 | A |
| ● General Purpose Control Relay, 4 Pole N.O., contacts rated 10A @ 600V, coil 120VAC, 50-60 Hz | S787* | A |

① When specifying non-standard markings on any one of the following options with Spectrum EBM™ Motor Controls (J1, J3, PB23, RR2, RR3) it is necessary to order DSL Legend Plates for identification and marking of the device(s) being used. See page 329 for DSL Legend Plate listings.

* Use this option with NEMA/EEMAC Size 0 or 1 starters necessitates a larger enclosure. Use ''B'' size enclosure.

**Example:**

| | Enclosure Cat. No. | Enclosure for S787 |
|---|---|---|
| W/O Starter | EBMSF<u>A</u> | EBMSF<u>B</u> |

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.

# EBMS Magnetic Line Starters and Enclosures

## Single-Speed Non-Reversing 3-Pole 60 hertz, 600 VAC Maximum

| | |
|---|---|
| Cl. I, Div. 1 & 2, Groups B,C,D | Explosionproof |
| Cl. II, Div. 1, Groups E,F,G | Dust-Ignitionproof |
| Cl. II, Div. 2, Groups F,G | Raintight |
| Cl. III | Wet Locations |
| NEMA 3,3R,4 ‡,7BCD,9EFG,12 | Watertight |



## Ordering Information:

● To order an enclosure complete with motor starter, insert the manufacturer's symbol in the designated position (see ‡) of the catalog number. Symbols are shown in the footnotes.
● Also specify HP, voltage, frequency, RPM, type and full load ampere rating of motor – or specify ampere rating of heaters.

♦ ♦ Motor starters are furnished with three heaters when heater ratings are fully specified.
● Enclosures without starters may be ordered. Select from the listings below. For catalog numbers of manufacturers motor starters that can be accommodated see Section 6C of this catalog.

*EBMS Series starter enclosures are available with magnetic line starters. NEMA sizes 0-5.*

### EBMS Series Enclosures for Magnetic Line Starters Single Speed Non-Reversing

| Motor Starter | | | Enclosure | |
|---|---|---|---|---|
| Max. HP Poly-phase | Volts | NEMA Size | Without Starter Cat. No. | With Starter Cat. No. ♦ ♦ |
| 2 | 120 | 0 | EBMSFA | EBMS0FA-*613 |
| 3 | 120 | 1 | EBMSFA | EBMS1FA-*613 |
| 3 | 240 | 0 | EBMSFA | EBMS0FA-*623 |
| 5 | 480 | 0 | EBMSFA | EBMS0FA-*643 |
| 5 | 600 | 0 | EBMSFA | EBMS0FA-*663 |
| 7½ | 120 | 2 | EBMSFB | EBMS2FB-*613 |
| 7½ | 240 | 1 | EBMSFA | EBMS1FA-*623 |
| 10 | 480 | 1 | EBMSFA | EBMS1FA-*643 |
| 10 | 600 | 1 | EBMSFA | EBMS1FA-*663 |
| 15 | 120 | 3 | EBMSFH | EBMS3FH-*613 |
| 15 | 240 | 2 | EBMSFB | EBMS2FB-*623 |
| 25 | 480 | 2 | EBMSFB | EBMS2FB-*643 |
| 25 | 600 | 2 | EBMSFB | EBMS2FB-*663 |
| 30 | 240 | 3 | EBMSFH | EBMS3FH-*623 |
| 50 | 480 | 3 | EBMSFH | EBMS3FH-*643 |
| 50 | 600 | 3 | EBMSFH | EBMS3FH-*663 |
| 50 | 240 | 4 | EBMSFH | EBMS4FH-*623 |
| 100 | 480 | 4 | EBMSFH | EBMS4FH-*643 |
| 100 | 600 | 4 | EBMSFH | EBMS4FH-*663 |
| 100 | 240 | 5 | EBMSFL | EBMS5FL-*623 |
| 200 | 480 | 5 | EBMSFL | EBMS5FL-*643 |
| 200 | 600 | 5 | EBMSFL | EBMS5FL-*663 |

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.

* Motor starters:

| Manufacturer | Symbol |
|---|---|
| Allen Bradley | AB |
| Square D | D |
| General Electric | G |
| Cutler-Hammer | W |



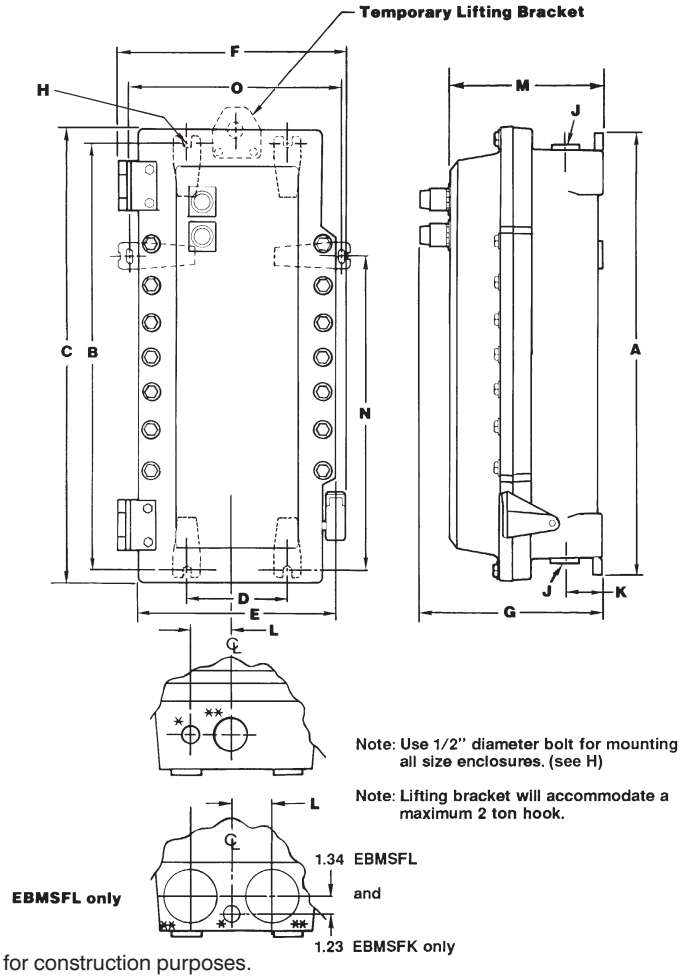
# EBMS Magnetic Line Starters and Enclosures

## Dimensions

| | |
|---|---|
| Cl. I, Div. 1 & 2, Groups B,C,D | Explosionproof |
| Cl. II, Div. 1, Groups E,F,G | Dust-Ignitionproof |
| Cl. II, Div. 2, Groups F,G | Raintight |
| Cl. III | Wet Locations |
| NEMA 3,3R,4‡,7BCD,9EFG,12 | Watertight |



### Single-Speed Non-Reversing Sizes 0, 1, 2, 3, 4 and 5 Starters




Dimensions are approximate, not for construction purposes.

| | Enclosure Only Cat. No. | Enclosure Size Symbol | A | B | C | D | E | F | G | **J Conduit Entry Trade Size D&T♦ | **J Conduit Entry Trade Size w/RE | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size 0,1 FVNR Starter§ | EBMSFA | A | 18.25 | 17.25 | 19.00 | 6.00 | 12.63 | 14.38 | 12.13 | 2″ | 1.5″ | 3.25 | 3.13 | 10.25 | — | — |
| Size 2 FVNR Starter | EBMSFB | B | 25.75 | 24.75 | 26.50 | 6.00 | 12.63 | 14.38 | 12.13 | 2″ | 1.5″ | 3.25 | 3.13 | 10.25 | — | — |
| Size 3,4 FVNR | EBMSFD*** | D | 28.25 | 27.25 | 29.00 | 6.00 | 12.63 | 14.06 | 12.13 | 3″ | 2.5″ | 3.25 | 3.13 | 10.25 | — | — |
| Starter | EBMSFH | H | 37.50 | 36.50 | 38.25 | 6.00 | 14.25 | 16.00 | 13.54 | 3″ | 2.5″ | 3.25 | 3.94 | 11.66 | — | — |
| Size 5 FVNR | EBMSFK*** | K | 43.12 | 41.50 | 42.25 | 12.00 | 17.25 | 19.88 | 11.00 | (2) 3″ | (2) 2.5″ | 3.25 | 3.00 | 10.78 | — | — |
| Starter | EBMSFL | L | 53.25 | 51.50 | 52.88 | 12.00 | 17.50 | 20.18 | 15.00 | (2) 4″ | (2) 3.5″ | 4.00 | 3.50 | 13.03 | 41.50 | 18.00 |

§ Use EBMSFB enclosure when S787 option is ordered with size 0 or 1 starter.

* 1″ Drilled & Tapped conduit entry for control conductors supplied with PLG plug (top & bottom)

** Conduit entrance for power conductors (top and bottom). (All conduit entrances supplied with RE reducer and PLG plug.)

*** For Cutler-Hammer W200 Advantage® starters.

♦ Drilled & Tapped.

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.

# Spectrum™ EBM Enclosures

## Supplied with Cutler-Hammer Advantage™ Starters

Cl. I, Div. 1 & 2, Groups B,C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,3R,4‡,7BCD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations
Watertight

## Application:

Spectrum EBM-E series of hinged cover motor control enclosures are used:
- for general motor control – indoors and outdoors – in damp, wet, dirty, dusty hazardous locations without the need for a protective shelter.
- in areas where frequent washdowns are necessary or where heavy rain or water spray is prevalent.
- for across-the-line starting and stopping of polyphase ac induction motors.
- to provide motor overload and undervoltage protection.
- on switchracks or other assemblies where it's desired that motor control be centrally located.

## Features:

- Total compliance to the wiring end room requirements of the National Electrical Code® 1993.
- Solid state electronic Cutler-Hammer Advantage™ starter.
- Smaller enclosures required than for conventional starter applications.
- Elimination of heater elements, contact chatter, and welding due to low voltage supply.
- Precise overcurrent protection and constant coil power.
- Same performance and labor-saving benefits from the versatile Spectrum EBM Enclosure product line.
- Universal mounting plates and hardware for all major manufacturers' components.
- Mercury switch electronic overload reset.
- Optional EMPS control devices may be added to enclosure cover.

## Standard Materials:

- Body and cover – copper-free aluminum
- Operating handle – copper-free aluminum
- Operating shafts and bushings – stainless steel
- Interior parts – sheet steel, electrogalvanized
- Cover bolts, washers, and rectractile springs – stainless steel

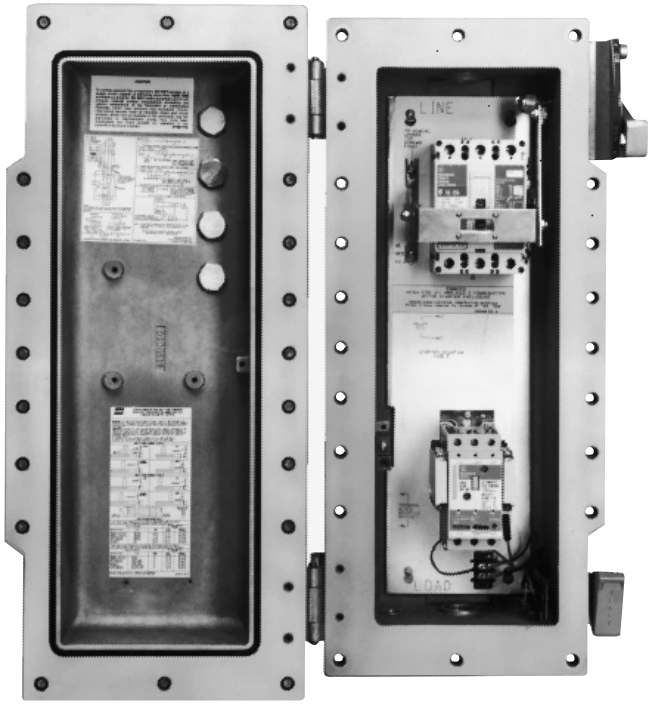
## Electrical Rating Ranges:

- Motor starters – NEMA sizes 1-5

## Certifications and Compliances:

- NEC/CEC:
  Class I, Division 1 & 2, Groups B,C,D
  Class II, Division 1, Groups E,F,G,
  Class II, Division 2, Groups F,G
  Class III
- UL Standards: UL1203 – Hazardous (classified) locations
- CSA Standard: C22.2 No. 30
- NEMA: 3, 3R, 4 ‡, 7BCD, 9EFG, 12

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.




*Spectrum EBM-E Series Combination Line Starter with Advantage Starter shown. Circuit breakers not provided in EBMS series.*

## Options: (Starter only)

See page 344 for options for the EBM enclosures supplied with Cutler-Hammer Advantage starters. The following suffixes cannot be ordered with this style equipment: 0, S1.



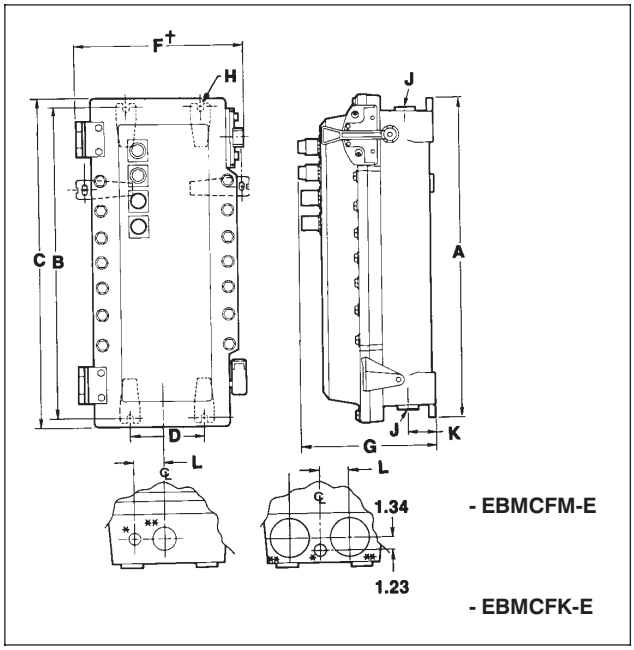
  

# 2C Spectrum™ EBM Enclosures

## Supplied with Cutler-Hammer Advantage™ Starters

Cl. I, Div. 1 & 2, Groups B,C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,3R,4‡,7BCD,9EFG,12

## Dimensions (inches):




Dimensions are approximate, not for construction purposes.

## Ordering Information – Starters

- To order an enclosure, determine the electrical requirements of the system and locate the corresponding catalog number from the chart below.
- Enclosures can be ordered without starters, universal mounting plates with templates will still be provided.

**EBM ''E'' Series Enclosures for Cutler-Hammer Advantage Starters Single Speed, Non-Reversing**

| Motor Starter | | | Enclosure | |
|---|---|---|---|---|
| Max. HP Poly-phase | Volts | NEMA Size | Without Starter Cat. #‡ | With Starter Cat. # |
| 7½ | 240 | 1 | EBMSFA-E | EBMS1FA-W6213-E |
| 10 | 480 | 1 | EBMSFA-E | EBMS1FA-W6413-E |
| 10 | 600 | 1 | EBMSFA-E | EBMS1FA-W6613-E |
| 15 | 240 | 2 | EBMSFA-E | EBMS2FA-W6213-E |
| 25 | 480 | 2 | EBMSFA-E | EBMS2FA-W6413-E |
| 25 | 600 | 2 | EBMSFA-E | EBMS2FA-W6613-E |
| 30 | 240 | 3 | EBMSFD-E | EBMS3FD-W6213-E |
| 50 | 240 | 4 | EBMSFD-E | EBMS4FD-W6213-E |
| 50 | 480 | 3 | EBMSFD-E | EBMS3FD-W6413-E |
| 50 | 600 | 3 | EBMSFD-E | EBMS3FD-W6613-E |
| 100 | 240 | 5 | EBMSFK-E | EBMS5FK-W6213-E |
| 100 | 480 | 4 | EBMSFD-E | EBMS4FD-W6413-E |
| 100 | 600 | 4 | EBMSFD-E | EBMS4FD-W6613-E |
| 200 | 480 | 5 | EBMSFK-E | EBMS5FK-W6413-E |
| 200 | 600 | 5 | EBMSFK-E | EBMS5FK-W6613-E |

‡ Note: ''Enclosures only'' are supplied with necessary operators, linkages, and mercury switch electronic overload resets.

**DIMENSIONS (inches)**

| Enclosure Only Cat. No. | Dimensions A | B | C | D | F | G | **J Conduit Entry Trade Size D&T♦ | w/RE | K | L |
|---|---|---|---|---|---|---|---|---|---|---|
| EBMSFA-E | 18.25 | 17.25 | 19.40 | 6.00 | 14.78 | 12.13 | 2″ | 1.5″ | 3.25 | 3.13 |
| EBMSFD-E | 28.25 | 27.25 | 29.40 | 6.00 | 14.46 | 12.13 | 3″ | 2.5″ | 3.25 | 3.13 |
| EBMSFK-E | 43.12 | 41.50 | 42.65 | 12.00 | 20.58 | 15.00 | (2) 3″ | (2) 2.5″ | 2.50 | 3.00 |

''H'' – Use ½″ diameter bolts for all enclosures listed above.

* 1'' Drilled & Tapped conduit entry for control conductors supplied with PLG plug (top & bottom).

** Conduit entrance for power conductors (top & bottom). (All conduit entrances supplied with RE reducer and PLG plug.)

♦ Drilled & Tapped.

‡ Enclosure not suitable for NEMA 4 with cover mounted operators. Breather and drain entries must be plugged for NEMA 4 rating.

# EPC Magnetic Line Starters and Enclosures

Cl. I, Div. 1 & 2, Groups C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,4,7CD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations
Watertight

## Application:

EPC magnetic line starters and enclosures are used:
- for across-the-line starting of polyphase ac induction motors
- in locations, made hazardous, due to the presence of flammable vapors, gases or highly combustible dusts
- in damp, wet or corrosive locations
- indoors or outdoors at petroleum refineries, chemical and petrochemical plants and other process industry facilities where similar hazards exist
- to provide motor running protection, undervoltage protection, and remote starting and stopping

## Features:

- Quick-opening covers – less than two turns to remove or install
- Three section design for ease of installation
- Water-shedding construction with female threads on top cover, male threads on bottom cover, and top cover skirted
- Specially located stops and locks ensure adequate thread engagement and prevent overtightening
- Separate replaceable mounting bracket attached to the rear of the body provides three-point suspension for quick installation and leveling – one keyhole slot at top and two open slots at bottom
- Bodies have two taper tapped conduit hubs with integral bushings on the top, and two more directly below
- Universal mounting plate and reset mechanism will accommodate any of the motor starters in catalog listing
- When interior mounting plate is removed, line and load conductors are easily pulled into the wiring chamber. The interior assembly with starter attached is then replaced, final connections made, and covers assembled
- Furnished with third overload relay as standard

## Standard Materials:

- Bodies and covers – copper-free aluminum
- Reset handle – copper-free aluminum
- Reset shaft – stainless steel
- Interior parts – stainless steel

## Standard Finishes:

- Copper-free aluminum – natural
- Stainless steel – natural
- Sheet steel – electrogalvanized with chromate finish

## Electrical Rating Ranges:

- Starter Sizes 0 to 2 inclusive

* Application limited by starter or contactor design – consult factory

† Required for pilot lights on other than 120 volt control circuits. One required for each lamp

‡ Not suitable for NEMA 4

## Certifications & Compliances:

- NEC/CEC:
  - Class I, Division 1 & 2, Groups C,D
  - Class II, Division 1, Groups E,F,G
  - Class II, Division 2, Groups F,G
  - Cl. III
- NEMA/EEMAC: 3, 4, 7CD, 9EFG, 12
- UL Standard: 698
- CSA Standard: C22.2 No. 30

## Options:

- The following special options are available from factory by adding suffix to Cat. No. and many are available in kit form for field addition to existing units:

See page 352 for listing of kits



| Description | Suffix to be Added to Encl. Cat. # |
|---|---|
| Control circuit transformer 600/480/240-120 volts, 50 or 60 hertz (Sizes 0 and 1 – 50VA, 100VA, Size 2 – 100VA-200VA) | |
| Fusible – Secondary | FT |
| Primary and secondary | FTPS |
| Automatic reset overload relay | S1 |
| Less overload relays (lighting contactor) | CL |
| Less overload relays (motor contactor) | CM |
| Auxiliary Contacts:* | |
| 1NO/1NC | S781 |
| 2NO/2NC | S782 |
| 3NO/3NC | S783 |
| Pilot light holes drilled, tapped and plugged for future addition of pilot lights – one hole | S541 |
| two holes | S542 |
| Side bosses drilled and tapped same size as standard hubs | S366 |
| Back boss drilled and tapped same size as standard hubs | S367 |
| Standard Breather (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S219 |
| Standard Drain (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S198 |
| Standard Breather and Drain (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S198V |
| Universal Breather-Drain (Cl. I, Groups C,D; Cl. II, Groups F,G) | S454‡ |
| (2) Universal-Breather Drains (Cl. I, Groups C,D; Cl. II, Groups F,G) | S454V‡ |

| Pushbuttons (heavy duty): | |
|---|---|
| START-STOP | PB3‡ |
| Selector switches (standard duty): | |
| ON-OFF | RR2‡ |
| HAND-OFF-AUTO | RR3‡ |
| Pilot lights: | |
| Red, 120 volt | J1 |
| Green, 120 volt | J3 |

| Pilot light transformers: | |
|---|---|
| 240 volt† | T2 |
| 480 volt† | T4 |
| 600 volt† | T5 |
| Space heaters: | |
| 120 volt | R11 |
| 240 volt | R22 |
| 480 volt | R44 |

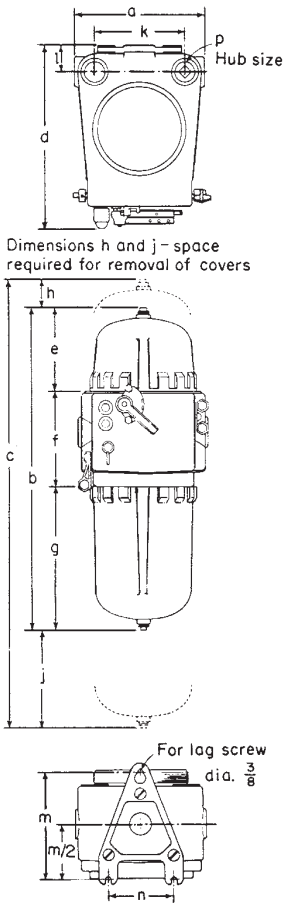
## Dimensions (inches)*

### Single-Speed Non-Reversing Sizes 0, 1, and 2 Starters

| Cat. # | | 97-FT |
|---|---|---|
| EPC | 97 | 97-FTPS |
| Int. Dia. | 7″ | 7″ |
| | Dimensions | Dimensions ♦ |
| a | 10 5/8 | 10 5/8 |
| b | 19 13/16 | 24 13/16 |
| c | 25 13/16 | 37 13/16 |
| d | 14 11/16 | 14 11/16 |
| e | 6 3/4 | 11 3/4 |
| f | 7 11/16 | 7 11/16 |
| g | 5 3/8 | 5 3/8 |
| h | 2 | 9 |
| j | 4 | 4 |
| k | 7 3/8 | 7 3/8 |
| l | 2 1/16 | 2 1/16 |
| m | 9 3/8 | 9 3/8 |
| n | 5 1/4 | 5 1/4 |
| p | 1 1/4 | 1 1/4 |

♦ For units with Control Circuit Transformer (suffix FT or FTPS)

**7″ 9″ Internal diameter**




* Dimensions are approximate, not for construction

# EPC Magnetic Line Starters and Enclosures

## Single-Speed Non-Reversing 3-Pole 60 hertz, 600VAC Maximum

Cl. I, Div. 1 & 2, Groups C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,4,7CD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations
Watertight



## Ordering Information:

To order an enclosure complete with starter, insert the manufacturer's symbol in the designated position of the catalog number. Symbols are shown in the footnote at the bottom of this page. Specify hp, voltage, frequency, rpm, type and full load ampere rating of motor – or specify ampere rating of heaters. ♦ ♦ Starters are furnished with three heaters when heater ratings are fully specified.

Enclosures only can be ordered. Select from listings. For starters that can be accommodated see Table 1 in Section 6C.

Detailed information on starter and heater selection is given in Section 6C.

| Motor Starter | | | Enclosure | | | |
|---|---|---|---|---|---|---|
| Max. HP Polyphase | Volts | NEMA/EEMAC Size | Hub Size | Int. Dia. | Without Starter Cat. # | With Starter Cat. # ♦ ♦ |
| 2 | 120 | 0 | 1¼ | 7 | EPC97 | EPC970-†613 |
| 3 | 120 | 1 | 1¼ | 7 | EPC97 | EPC971-†613 |
| 3 | 240 | 0 | 1¼ | 7 | EPC97 | EPC970-†623 |
| 5 | 480 | 0 | 1¼ | 7 | EPC97 | EPC970-†643 |
| 5 | 600 | 0 | 1¼ | 7 | EPC97 | EPC970-†653 |
| 7½ | 240 | 1 | 1¼ | 7 | EPC97 | EPC971-†623 |
| 10 | 480 | 1 | 1¼ | 7 | EPC97 | EPC971-†643 |
| 10 | 600 | 1 | 1¼ | 7 | EPC97 | EPC971-†653 |

**† Motor Starters:**

| Manufacturer | Symbol |
|---|---|
| Allen-Bradley | AB |
| General Electric | G |
| Square D | D |
| Cutler-Hammer | W |

## Pushbutton Station and Selector Switch Kits

EPC magnetic line starter and EPC combination line starter enclosures are provided as standard with switch operating shaft holes drilled, tapped and plugged. Pushbutton stations and selector switches can be assembled in these enclosures in the field, using kits listed below.

Applies to 7″, 9″, 11″ EPC

| Description | Cat. # |
|---|---|
| START-STOP pushbutton station assembly | EPC-PB3-KIT |
| Replacement pushbutton station only for EPC-PB3-KIT | 16320-N |
| ON-OFF selector switch assembly (2 position) | EPC-RR2-KIT |
| Replacement switch only for EPC-RR2-KIT | ESWP126 |
| HAND-OFF-AUTO selector switch assembly (3 position) | EPC-RR3-KIT |
| Replacement switch only for EPC-RR3-KIT | ESWP126 |

## Pilot Light Kits

When EPC magnetic line starter and EPC combination line starter enclosures have been ordered with pilot light holes drilled, tapped and plugged (Cat. No. suffix S541 and S542), pilot lights can be assembled in the field, using kits listed below.

| Description | Applies to | Cat. # |
|---|---|---|
| Pilot light assembly less transformer | 7″, 9″, 11″ EPC | EMP015-J†-KIT |
| Pilot light assemblies with transformer and transformer mounting strap (for single pilot light) suffix S541 | 7″ EPC only<br>9″ EPC only<br>11″ EPC only | EPC87-J†-T†-KIT<br>EPC892-J†-T†-KIT<br>EPC813-J†-T†-KIT |
| 2 pilot light assemblies with 2 transformers and transformer mounting strap (for double pilot light) suffix S542 | 7″ EPC only<br>9″ EPC only<br>11″ EPC only | EPC87-J†-J†-T†-KIT<br>EPC892-J†-J†-T†-KIT<br>EPC813-J†-J†-T†-KIT |
| Replacement pilot light transformer only (240V primary) | All units | 15129-A |
| Replacement pilot light transformer only (480V primary) | All units | 15130-A |
| Replacement pilot light transformer only (600V primary) | All units | 15131-A |

† Insert color symbol from table below and add primary voltage symbol (T2 for 240, T4 for 480 or T5 for 600 volts). Example: EPC87-J†-J†-T†-KIT with red and green pilot lights for 480 volts is EPC-J1-J3-T4-KIT.

| Color | Symbol | Color | Symbol |
|---|---|---|---|
| Red | J1 | Clear | J10 |
| Green | J3 | Blue | J11 |
| Amber | J6 | | |

# EMN Manual Line Starters and Enclosures

## 600VAC Maximum

Cl. I, Div. 1 & 2, Groups C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,7CD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations

## Application:

EMN manual line starters and enclosures are used:

- for manual across-the-line starting of single and polyphase ac motors
- to provide motor running protection and manual starting and stopping
- in locations made hazardous due to the presence of flammable vapors, gases, or high combustible dusts
- for installation in petroleum refineries, chemical and petrochemical plants, and other process industry facilities
- in damp, wet, or corrosive locations

## Features:

- Compact, rectangular enclosure makes optimum use of internal space
- Operating handle may be padlocked in either ''ON'' or ''OFF'' position
- Compact design allows installation in area where space is limited
- Furnished with drilled and tapped conduit openings
- Polyphase manual starters are furnished with third overload relay as standard

## Standard Materials:

- Bodies, covers and toggle operator – copper-free aluminum
- Operating shaft – stainless steel
- Internal operating bail – sheet steel or aluminum

## Standard Finishes:

- Copper-free aluminum – natural
- Stainless steel – natural
- Sheet steel – electrogalvanized with chromate finish

## Electrical Rating Ranges:

- Starter sizes 0, 1, 1P

## Certifications & Compliances:

- NEC/CEC:
  - Class I, Division 1 & 2, Groups C,D
  - Class II, Division 1, Groups E,F,G
  - Class II, Division 2, Groups F,G
  - Class III
- NEMA/EEMAC: 3, 7CD, 9EFG, 12
- UL Standard: 698
- CSA Standard: C22.2 No. 14

## Options:

- The following special options are available from factory by adding suffix to Cat. #:

| Description | Suffix to be Added to Encl. Cat. # |
|---|---|
| Standard Breather (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S219 |
| Standard Drain (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S198 |
| Standard Breather and Drain (Cl. I, Groups C,D; Cl. II, Groups E,F,G; Cl. III) | S198V |
| Universal Breather-Drain (Cl. I, Groups C,D; Cl. II, Groups F,G) | S454 |
| (2) Universal Breather-Drains (Cl. I, Groups C,D; Cl. II, Groups F,G) | S454V |

## Ordering Information:

Specify hp, voltage, frequency, number of phases, rpm, type and full load ampere rating of motor – or specify ampere rating of heaters.

Two pole starters require one heater; three pole starters have three heaters. See page 446 for starter and heater selection. For starter Cat. No. refer to Table 3 in Section 6C.

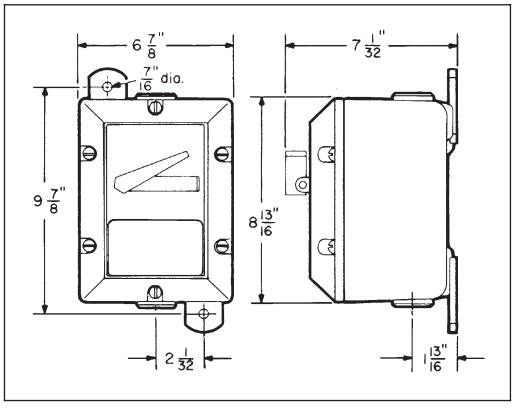
**Motor Starter**

| NEMA Size | Poles (Phase) | Max. AC HP Ratings 115V | 208/240V | 480/600V | Enclosure With Starter Cat. # |
|---|---|---|---|---|---|
| M-0 | 2 (1PH) | 1 | 2 | | EMN24-W20 |
| M-1 | 2 (1PH) | 2 | 3 | | EMN24-W21 |
| M-1P | 2 (1PH) | 3 | 5 | | EMN24-W21P |
| M-0 | 3 (3PH) | 2 | 3 | 5 | EMN24-W30 |
| M-1 | 3 (1PH) | 2 | 3 | | EMN24-W31 |
| | 3 (3PH) | 3 | 7½ | 10 | |

**Enclosure Without Starter**

| Starter Manufacturer | Enclosure Cat. #§ |
|---|---|
| Cutler-Hammer | EMN24 |

## Dimensions* (inches)




§ Enclosures are furnished with two 1¼" drilled and tapped openings with 1¼" to 1" reducers.

* Dimensions are approximate, not for construction purposes.

# 2C EFD Manual Motor Starting Switches and Enclosures

Cl. I, Div. 1 & 2, Groups B*,C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,7B*CD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations

## Application:

EFD manual motor starting and stopping switch enclosures are used:
- for manual starting of small ac or dc motors
- in locations, made hazardous, due to the presence of flammable vapors, gases or highly combustible dusts
- for installation at petroleum refineries, chemical and petrochemical plants and in other process industry facilities where similar hazards exist

## Features:

- Enclosure is small and compact
- Accurately ground flange on both body and cover for flame-tight joint
- Switch can be padlocked in either ''ON'' or ''OFF'' positions
- Dead end (EFD) or through feed (EFDC) hubs in ¾″ to 1″ size

## Standard Materials:

- Bodies and covers – *Feraloy*® iron alloy
- Operating handle – type 6/6 nylon
- Operating shaft – stainless steel

## Standard Finishes:

- *Feraloy* iron alloy – electrogalvanized and aluminum acrylic paint
- Type 6/6 nylon – natural (black)
- Stainless steel – natural

## Certifications and Compliances:

- NEC/CEC:
  Class I, Division 1 & 2, Groups B*,C,D
  Class II, Division 1, Groups E,F,G
  Class II, Division 2, Groups F,G
  Class III
- NEMA: 3, 7B*CD, 9EFG, 12
- UL Standard: 698
- CSA Standard: C22.2 No. 30

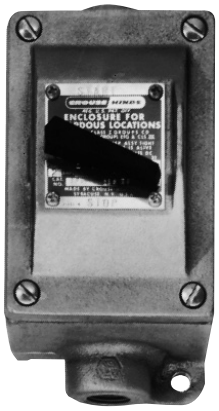
## Options:

- The following special options are available from factory by adding suffix to Cat. No.:

| Description | Suffix to be Added to Encl. Cat. # |
|---|---|
| For use in Group B Hazardous areas. . . . | GB* |

* Add GB suffix. Seals must be installed within 1-1/2″ of each conduit opening for Group B usage.

**EFD dead end**



**EFDC through feed**

### Without Overload Protection With Switches

| Poles | Cat. # | Switch Ratings Amps | | HP | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| 2 | Square D Class 2510 Type KO-1 | 250VAC<br>30 | 600VAC<br>20 | 115VAC<br>1 | 230VAC<br>2 | 460-575VAC<br>3 |
| 3 | GE-TC2368S | 30A., 240VAC, 7-1/2 hp<br>20A., 600VAC, 15 hp | | | | |

### Dead end

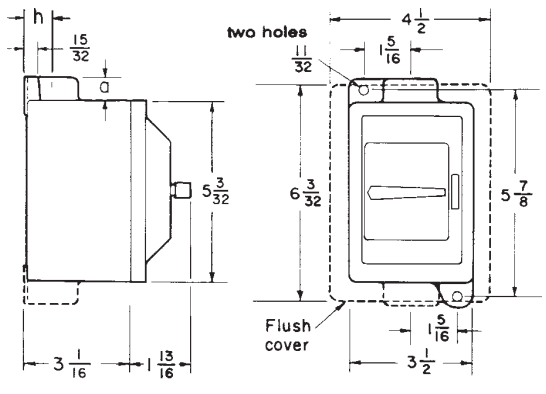
| Poles | Hub Size | With Switch Cat. # |
|---|---|---|
| 2 | ¾ | EFD218-T8 |
| | 1 | EFD318-T8 |
| 3 | ¾ | EFD2419 |
| | 1 | EFD3419 |

### Through feed

| Poles | Hub Size | With Switch Cat. # |
|---|---|---|
| 2 | ¾ | EFDC218-T8 |
| | 1 | EFDC318-T8 |
| 3 | ¾ | EFDC2419 |
| | 1 | EFDC3419 |

## Dimensions (inches)

Dimensions are approximate, not for construction purposes




| Hub Size | Dim. "h" | Dim. "a" |
|---|---|---|
| 3/4 | 7/8 | 13/16 |
| 1 | 1 | 15/16 |

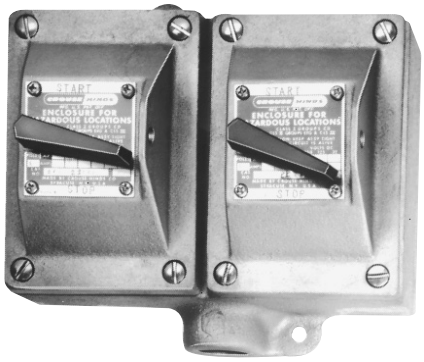
# EDS Factory Sealed Manual Motor Starting Switches and Enclosures

Cl. I, Div. 1 & 2, Groups B*,C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,7B*CD,9EFG

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations



EDSC2199



EDS2299

## Standard Finishes:

*Feraloy* iron alloy – electrogalvanized and aluminum acrylic paint
- Copper-free aluminum – natural
- Type 6/6 nylon – black
- Stainless steel – natural

## Certifications and Compliances:

- NEC/CEC:
  Class I, Division 1 & 2, Groups B*,C,D
  Class II, Division 1, Groups E,F,G
  Class II, Division 2, Groups F,G
  Class III
- NEMA/EEMAC: 3,7B*CD,9EFG
- UL Standard: 894, 698
- CSA Standard: C22.2 No. 30

## Application:

Factory sealed enclosures are installed in a rigid metallic conduit system for surface mounting adjacent to or remote from equipment being controlled and are used:
- to prevent arcing of enclosed device from causing ignition of a specific hazardous atmosphere or atmospheres external to the enclosure
- in industrial areas such as chemical plants, oil and gas refineries, paint and varnish manufacturing plants, gasoline bulk loading terminals, grain elevators, grain processing industries, coal processing or handling areas, or metal handling or finishing areas where atmosphere may contain hazardous gases and/or dust
- in non-hazardous areas where sturdy, durable enclosures are required
- in conjunction with magnetic starters or contactors for remote control of motors

Manual motor starting switch enclosures are used:
- for manual starting of small ac or dc motors
- to provide manual starting and stopping and, in the case of units with heaters, motor running protection

## Features:

Factory sealed devices have many distinct advantages:
- reduce installation problems
- eliminate external seals
- lower installation costs
- improve safety
- mounting lugs and taper tapped hubs with integral bushings
- large machine screws for fastening covers to bodies
- lockout hole for padlock having ¼″ hasp is provided
- close tolerances in machining of wide, mating flanges and journalled shafts and bearings produce flametightness of enclosure joints
- dead end (EDS) or through feed (EDSC) hubs – ¾″ or 1″ sizes

## Options:

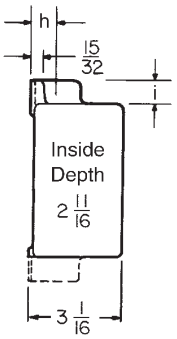
| Description | Suffix to be Added to Cat. # |
|---|---|
| For use in Group B hazardous areas. | GB* |
| Bodies and covers (single and two gang units) – copper-free aluminum. | SA |

## Standard Materials:

- Bodies – *Feraloy*® iron alloy (U.S.); copper-free aluminum (Canada).
- Shafts & bushings – stainless steel
- Sealing enclosures – copper-free aluminum

## Dimensions (inches)

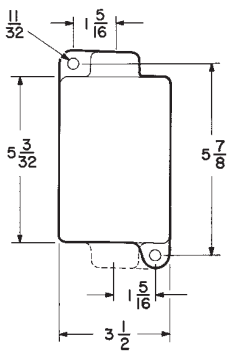
Dimensions are approximate, not for construction purposes.



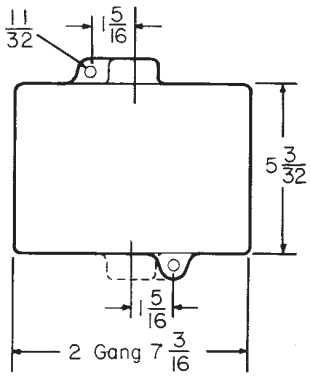

| Side View | Hub Size | Dim. "h" | Dim. "i" |
|---|---|---|---|
| ¾ | ⅞ | 13/16 | |
| 1 | 1 | 15/16 | |

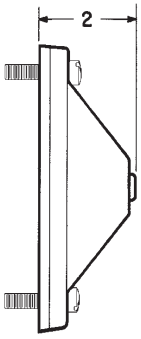
### Front View

**Single gang**




**Two gang**




Surface covers have same length and width as single & 2 gang bodies.

* Seals must be installed within 1½″ of each conduit opening in Division 1

# 2C EDS Factory Sealed Manual Motor Starting Switches and Enclosures

Cl. I, Div. 1 & 2, Groups B*,C,D
Cl. II, Div. 1, Groups E,F,G
Cl. II, Div. 2, Groups F,G
Cl. III
NEMA 3,7B*CD,9EFG,12

Explosionproof
Dust-Ignitionproof
Raintight
Wet Locations

## With Allen-Bradley Bulletin 600 Switches

**Maximum HP Ratings**

| Poles | 115-230 Volts AC | 115-230 Volts DC | Cat. # |
|---|---|---|---|
| 1 | 1 hp | | A-B BUL 600 TOX4 |
| 2 | 1 hp | ¾ hp | A-B BUL 600 TOX5 |

### Single Gang

| Poles | Hub Size | Dead end Cat. # | Through feed Cat. # |
|---|---|---|---|
| 1 | ¾ | EDS2199† | EDSC2199† |
| | 1 | EDS3199† | EDSC3199† |
| 2 | ¾ | EDS21100† | EDSC21100† |
| | 1 | EDS31100† | EDSC31100† |

### Two Gang

| | | | |
|---|---|---|---|
| 1 | ¾ | EDS2299† | EDSC2299† |
| | 1 | EDS3299† | EDSC3299† |
| 2 | ¾ | EDS22100† | EDSC22100† |
| | 1 | EDS32100† | EDSC32100† |

## With General Electric Switches

**Maximum HP Ratings**

| Poles | 115-230 Volts AC | 115 Volts DC | 230 Volts DC | Cat. # |
|---|---|---|---|---|
| 1 | 1 hp | 1 hp | ¼ hp | GE-CR101-Y |
| 2 | 1 hp | 1 hp | 1 hp | GE-CR101-H |

### Single Gang

| Poles | Hub Size | Dead end Cat. # | Through feed Cat. # |
|---|---|---|---|
| 1 | ¾ | EDS21093† | EDSC21093† |
| | 1 | EDS31093† | EDSC31093† |
| 2 | ¾ | EDS21094† | EDSC21094† |
| | 1 | EDS31094† | EDSC31094† |

### Two Gang

| | | | |
|---|---|---|---|
| 1 | ¾ | EDS22093† | EDSC22093† |
| | 1 | EDS32093† | EDSC32093† |
| 2 | ¾ | EDS22094† | EDSC22094† |
| | 1 | EDS32094† | EDSC32094† |

These heaters are for motors rated 40°C continuously. For motors rated 50°C or 55°C, multiply full load motor current by 0.9 and use this value to select heaters. Symbol 0 (zero) must be used to indicate heater omitted.

## Heater Table (Allen-Bradley)

| Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number | Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number |
|---|---|---|---|
| 0.17 | P1 | 2.92 | P22 |
| 0.21 | P2 | 3.09 | P23 |
| 0.25 | P3 | 3.32 | P24 |
| 0.32 | P4 | 3.77 | P25 |
| 0.39 | P5 | 4.16 | P26 |
| 0.46 | P6 | 4.51 | P27 |
| 0.57 | P7 | 4.93 | P28 |
| 0.71 | P8 | 5.43 | P29 |
| 0.79 | P9 | 6.03 | P30 |
| 0.87 | P10 | 6.83 | P31 |
| 0.98 | P11 | 7.72 | P32 |
| 1.08 | P12 | 8.24 | P33 |
| 1.19 | P13 | 8.9 | P34 |
| 1.30 | P14 | 9.6 | P35 |
| 1.43 | P15 | 10.8 | P36 |
| 1.58 | P16 | 12.0 | P37 |
| 1.75 | P17 | 13.5 | P38 |
| 1.88 | P18 | 15.2 | P39 |
| 2.13 | P19 | | |
| 2.40 | P20 | | |
| 2.58 | P21 | | |

## Heater Table (General Electric)

| Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number | Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number |
|---|---|---|---|
| .48 | G2 | 3.01 | G22 |
| .53 | G3 | 3.27 | G23 |
| .58 | G4 | 3.56 | G24 |
| .65 | G5 | 3.88 | G25 |
| .71 | G6 | 4.22 | G26 |
| .78 | G7 | 4.60 | G27 |
| .86 | G8 | 5.00 | G28 |
| .95 | G9 | 5.43 | G29 |
| 1.04 | G10 | 5.90 | G30 |
| 1.14 | G11 | 6.41 | G31 |
| 1.25 | G12 | 6.98 | G32 |
| 1.37 | G13 | 7.60 | G33 |
| 1.49 | G14 | 8.25 | G34 |
| 1.63 | G15 | 8.95 | G35 |
| 1.78 | G16 | 9.75 | G36 |
| 1.95 | G17 | 10.6 | G37 |
| 2.13 | G18 | 11.4 | G38 |
| 2.32 | G19 | 12.5 | G39 |
| 2.53 | G20 | 13.6 | G40 |
| 2.76 | G21 | 14.8 | G41 |
| | | 16.0 | G42 |

† Includes one interchangeable heater. Select heater from the table below individual listings and use symbol number as second section of the Cat. No. Example: EDS2199-P5. Insert symbol 0 (zero) to omit heater.

* Add GB suffix. Seals must be installed within 1½" of each conduit opening for Group B usage.

## With Cutler-Hammer Switches

**Maximum HP Ratings**

| Poles | 120-240 Volts AC | 32 Volts DC | 120 Volts DC | 240 Volts DC | Cat. # |
|---|---|---|---|---|---|
| 1 | 1 hp | ¼ hp | ¼ hp | ¼ hp | WEST-MST01 |
| 2 | 1 hp | ¼ hp | 1 hp | 1 hp | WEST-MST02 |

### Single Gang

| Poles | Hub Size | Dead end Cat. # | Through feed Cat. # |
|---|---|---|---|
| 1 | ¾ | EDS21101† | EDSC21101† |
| | 1 | EDS31101† | EDSC31101† |
| 2 | ¾ | EDS21102† | EDSC21102† |
| | 1 | EDS31102† | EDSC31102† |

### Two Gang

| | | | |
|---|---|---|---|
| 1 | ¾ | EDS22101† | EDSC22101† |
| | 1 | EDS32101† | EDSC32101† |
| 2 | ¾ | EDS22102† | EDSC22102† |
| | 1 | EDS32102† | EDSC32102† |

These heaters are for motors rated 40°C continuously. For motors rated 50°C or 55°C, multiply full load motor current by 0.9 and use this value to select heaters. Symbol 0 (zero) must be used to indicate heater omitted.

### Heater Table (Cutler-Hammer)

| Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number | Max. Motor Full-Load Amps | Crouse-Hinds Symbol Number |
|---|---|---|---|
| .43 | W 1 | 2.95 | W21 |
| .48 | W 2 | 3.27 | W22 |
| .53 | W 3 | 3.59 | W23 |
| .58 | W 4 | 3.99 | W24 |
| .64 | W 5 | 4.39 | W25 |
| .71 | W 6 | 4.79 | W26 |
| .78 | W 7 | 5.26 | W27 |
| .87 | W 8 | 5.83 | W28 |
| .95 | W 9 | 6.39 | W29 |
| 1.03 | W10 | 7.03 | W30 |
| 1.15 | W11 | 7.74 | W31 |
| 1.27 | W12 | 8.46 | W32 |
| 1.35 | W13 | 9.35 | W33 |
| 1.51 | W14 | 10.30 | W34 |
| 1.67 | W15 | 11.35 | W35 |
| 1.83 | W16 | 12.47 | W36 |
| 1.99 | W17 | 13.67 | W37 |
| 2.23 | W18 | 15.12 | W38 |
| 2.47 | W19 | 16.00 | W39 |
| 2.71 | W20 | | |

† Includes one interchangeable heater. Select heater from the table below individual listings and use symbol number as second section of the Cat. No. Example: EDS21101-W5. Insert symbol 0 (zero) to omit heater.

* Add GB suffix. Seals must be installed within 1½″ of each conduit opening for Group B usage.

# 2C Explosion Protected Manual Motor Starters

## 25 Amp, 690 VAC Non-Metallic Enclosure

UL/cUL Listed Class I, Division 2, Groups A, B, C, D
Class I, Zones 1 and 2, AEx de HB + $H_2$, T5, T6
Class II, Division 1, Groups E, F, G (cUL)

CENELEC - PTB 99, ATEX 1162 CERTIFIED
EEx de IIC, T6, Zones 1 and 2 EEx de IIC, T6 Zones 21 and 22
IP66, NEMA 4X



## Application

Explosion protected manual motor starters are used in a metallic conduit or cable system for surface mounting to protect motors against overload and phase failure.

## Features

- Explosion protected factory sealed circuit breaker and manual motor starter
- Innovative break-line in cover allows full wiring access, making installation quick and easy.
- Switch handle provides clear indication of switch position
- Lockable handle meets OSHA lockout/ tagout requirements, provision for 3 padlocks
- Large rotary handle provides easy gripping with gloved hands
- Captive cover screws

## Certifications & Compliances

- UL/cUL Listed
- Class I, Division 2, Groups A, B, C, D
- Class I, Zones 1 and 2, Ex de IIB+$H_2$, T6
- Class II, Division 1, Groups E, F, G (cUL)
- CENELEC - PTB 99-ATEX 1162
- EEx de IIC, T6, Zones 1 and 2.
- IP 66, NEMA 4X

## Standard Materials

Enclosure - Fiberglass-reinforced polyester
- Nonmetallic, corrosion resistant
- Increased safety Ex-e protection
- Impact Resistant
- NEMA 4X, IP 66 Protection
- Enclorure meets UL 94-VO
- UV rated

Enclosure Gasket - Silicon
Handle - Impact-resistant thermoplastic
Cover Screws - Stainless steel
Conduit Entries: Zinc Myers Hubs
Brass Mounting plate - Ground continuity

| Technical Data | |
|---|---|
| **Type of Protection** | **(A)Ex ed IIC T5, T6** |
| **Rated Voltage** | **Up to 690 VAC** |
| **Rated Current** | **Up to 25 A** |
| **Rated Current, aux. contact** | **2 A** |
| **Short Circuit** | **See table on next page** |
| **Under voltage trip** | **Tripping at 15% - 75% V-rated<br>Switching - on when V> 80% V-rated** |
| **Connection Terminals** | **Up to 10mm²** |
| **Connection terminals, aux. contact** | **2 × 2.5 mm²** |
| **Conduit or Cable entries** | **2 × ¾″ Myers hubs** |
| **Weight** | **5.5 lbs./ 2.5 Kg.** |

# Explosion Protected Manual Motor Starters

## 25 Amp, 690 VAC Non-Metallic Enclosures

UL/cUL Listed Class I, Division 2, Groups A, B, C, D
Class I, Zones 1 and 2, AEx de HB + $H_2$, T5, T6
Class II, Division 1, Groups E, F, G (cUL)

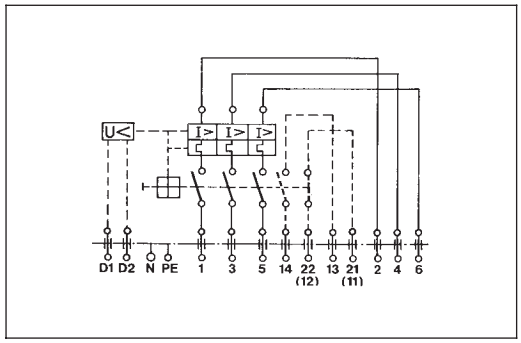
CENELEC - PTB 99, ATEX 1162 CERTIFIED
EEx de IIC, T6, Zones 1 and 2 EEx de IIC, T6 Zones 21 and 22
IP66, NEMA 4X



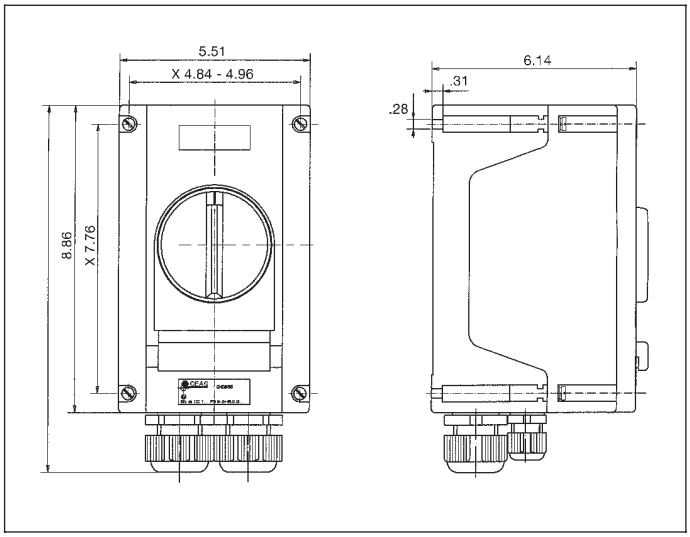
## Short Circuit Protection

| Setting Range | 230 VAC AIC | 400 VAC AIC | 500 VAC AIC | 690 VAC AIC |
|---|---|---|---|---|
| 0.1 A - 1.6 A | Short-circuit proof. No back-up fuse required | | | |
| 1.6 A - 2.5 A | | | | 40 |
| 2.5 A - 4.0 A | | | 40 | 10 |
| 4.0 A - 6.3 A | | | 30 | 3 |
| 6.3 A - 9.0 A | | | 30 | 3 |
| 9.0 A - 12.5 A | | 50 | 20 | 3 |
| 12.5 A - 16.0 A | | 50 | 20 | 3 |
| 16.0 A - 20.0 A | | 50 | 20 | 2 |
| 20.0 A - 25.0 A | 50 | 50 | 20 | 2 |

## Wiring Diagram




## Dimensions (Inches)




## Ordering Information:

| Setting Range or rated current | Catalog Number |
|---|---|
| 0.1 - 0.16 A | GHG 635 1101 L0101 |
| 0.16 - 0.25 A | GHG 635 1101 L0102 |
| 0.25 - 0.40 A | GHG 635 1101 L0103 |
| 0.40 - 0.63 A | GHG 635 1101 L0104 |
| 0.63 - 1.0 A | GHG 635 1101 L0105 |
| 1.0 - 1.6 A | GHG 635 1101 L0106 |
| 1.6 - 2.5 A | GHG 635 1101 L0107 |
| 2.5 - 4.0 A | GHG 635 1101 L0108 |
| 4.0 - 6.3 A | GHG 635 1101 L0109 |
| 6.3 - 9.0 A | GHG 635 1101 L0110 |
| 9.0 - 12.5 A | GHG 635 1101 L0111 |
| 12.5 - 16 A | GHG 635 1101 L0112 |
| 16 - 20 A | GHG 635 1101 L0113 |
| 20 - 25 A | GHG 635 1101 L0114 |

### Accessory Options

1 = without aux. contact
2 = with aux contact 1 NO + 1 NC

# 2C MC Manual Motor Starting Switches and Enclosures

NEMA 3,4,12
Raintight
Wet Locations

## Application:

MC manual motor starting switches and enclosures are used:
- for manual starting of small ac and dc motors of one horsepower or less (see page 361 for ratings)
- in damp, wet or corrosive locations such as dairies, meat packing plants, chemical plants and outdoor locations
- to provide motor running protection and manual starting and stopping

## Features:

- Enclosure is compact and gasketed to meet NEMA/EEMAC 4 requirements for watertightness
- Switch can be padlocked in either the ''ON'' or ''OFF'' positions
- Provided with dead end (MC) or through-feed (MCC) hubs – ½″ and ¾″ sizes – with mounting feet

## Standard Materials:

- Body and cover – *Feraloy*® iron alloy
- Operating handle – copper-free aluminum
- Operating shaft – stainless steel

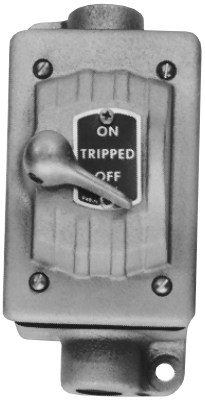
## Standard Finishes:

- *Feraloy* – electrogalvanized and aluminum acrylic paint
- Copper-free aluminum – natural
- Stainless steel – natural

## Certifications and Compliances:

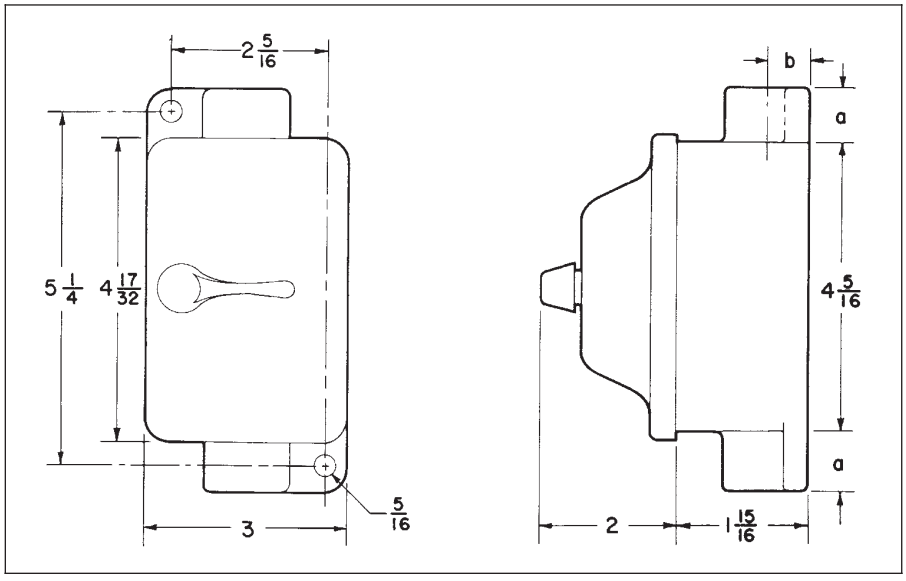
- NEMA/EEMAC: 3, 4, 12
- UL Standard: 508
- CSA Standard: C22.2 No. 14


**MC dead end**




**MCC through feed**

## Dimensions (inches)*




| Hub Size | ½ | ¾ |
|---|---|---|
| a | ⅞ | ⅞ |
| b | ⅝ | ¾ |

* Dimensions are approximate, not for construction purposes.

## MC Manual Motor Starting Switches

| Manufacturer | Poles | Cat. # |
|---|---|---|
| Cutler-Hammer | 1 | MST01 |
| Cutler-Hammer | 2 | MST02 |

## Maximum Horsepower Ratings

| Volts | 1-Pole | 2-Pole |
|---|---|---|
| 120/240 AC | 1 | 1 |
| 32 DC | ¼ | ¼ |
| 120/240 DC | | 1 |
| 240 DC | ¼ | |

## MC
### Single Gang (Dead End)

| | | Enclosure | |
|---|---|---|---|
| Poles | Hub Size | With Switch Cat. # | Without Switch Cat. # |
| 1 | ½ | MC1211† | MC1212B |
| 1 | ¾ | MC2211† | MC2212B |
| 2 | ½ | MC1212† | MC1212B |
| 2 | ¾ | MC2212† | MC2212B |

## MCC
### Single Gang (through feed)

| | | Enclosure | |
|---|---|---|---|
| Poles | Hub Size | With Switch Cat. # | Without Switch Cat. # |
| 1 | ½ | MCC1211† | MCC1212B |
| 1 | ¾ | MCC2211† | MCC2212B |
| 2 | ½ | MCC1212† | MCC1212B |
| 2 | ¾ | MCC2212† | MCC2212B |

These heaters are for motors rated 40°C continuously. For motors rated 50°C or 55°C, multiply full load motor current by 0.9 and use this value to select heaters. Symbol 0 (zero) may be used to indicate heater omitted.

### Heater Table

| Full Load Motor Current | Heater Rating | Cooper Crouse-Hinds Symbol Number |
|---|---|---|
| .40— .43 | .50 | W1 |
| .44— .48 | .55 | W2 |
| .49— .53 | .61 | W3 |
| .54— .58 | .67 | W4 |
| .59— .64 | .74 | W5 |
| .65— .71 | .81 | W6 |
| .72— .78 | .89 | W7 |
| .79— .87 | .98 | W8 |
| .88— .95 | 1.10 | W9 |
| .96— 1.03 | 1.20 | W10 |
| 1.04— 1.15 | 1.30 | W11 |
| 1.16— 1.27 | 1.45 | W12 |
| 1.28— 1.35 | 1.60 | W13 |
| 1.36— 1.51 | 1.70 | W14 |
| 1.52— 1.67 | 1.90 | W15 |
| 1.68— 1.83 | 2.10 | W16 |
| 1.84— 1.99 | 2.30 | W17 |
| 2.00— 2.23 | 2.50 | W18 |
| 2.24— 2.47 | 2.80 | W19 |
| 2.48— 2.71 | 3.10 | W20 |
| 2.72— 2.95 | 3.40 | W21 |
| 2.96— 3.27 | 3.70 | W22 |
| 3.28— 3.59 | 4.10 | W23 |
| 3.60— 3.99 | 4.50 | W24 |
| 4.00— 4.39 | 5.00 | W25 |
| 4.40— 4.79 | 5.50 | W26 |
| 4.80— 5.26 | 6.00 | W27 |
| 5.27— 5.83 | 6.60 | W28 |
| 5.84— 6.39 | 7.30 | W29 |
| 6.40— 7.03 | 8.00 | W30 |
| 7.04— 7.74 | 8.80 | W31 |
| 7.75— 8.46 | 9.70 | W32 |
| 8.47— 9.35 | 10.60 | W33 |
| 9.36—10.30 | 11.70 | W34 |
| 10.31—11.35 | 12.90 | W35 |
| 11.36—12.47 | 14.20 | W36 |
| 12.48—1.367 | 15.60 | W37 |
| 13.68—15.12 | 17.10 | W38 |
| 15.13—16.00 | 18.60 | W39 |

† Includes one interchangeable heater. Select heater from table above and use symbol number as second section of the Cat. No.
Example: MC1211-W5