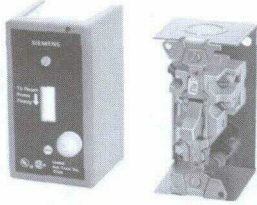


## Fractional HP Starters with Melting Alloy Overload, Class SMF



Class SMF Motor Starter

### Ordering Information

- ▶ Heater Elements see page 31.
- ▶ Accessories see page 34.
- ▶ Dimensions see pages 35–36.
- ▶ Wiring Diagrams see page 29.
- ▶ Application Data see page 29.

### Horsepower Ratings

| Volts   | Maximum Horsepower |        |        |
|---------|--------------------|--------|--------|
|         | AC Single Phase    |        | DC     |
|         | 1 Pole             | 2 Pole | 2 Pole |
| 115–230 | 1                  | 1      | ¾      |
| 277     | 1                  | 1      | —      |

### Basic Starter—Class SMF, Single Phase

| Type of Operator | No. of Poles | Features                           | General Purpose Flush Mounting (Open with Flush Plate) |                |                   |                |                                      |                | NEMA Type 1 General Purpose Enclosure Surface Mounting |                   |                 |                     | NEMA Type 3R, 4 and 12 Watertight, Dust-tight Enclosure |                     | NEMA Type 4 Watertight, Dust-tight Metallic Enclosure |          | NEMA Type 7 & 9 Class I Groups B, C, D & Class II Groups E, F, G Enclosures |          |            |          |
|------------------|--------------|------------------------------------|--------------------------------------------------------|----------------|-------------------|----------------|--------------------------------------|----------------|--------------------------------------------------------|-------------------|-----------------|---------------------|---------------------------------------------------------|---------------------|-------------------------------------------------------|----------|-----------------------------------------------------------------------------|----------|------------|----------|
|                  |              |                                    | Open Type                                              |                | Gray Flush Plate  |                | Standard Stainless Steel Flush Plate |                | Jumbo Stainless Steel Flush Plate                      |                   | Standard        |                     | Oversized                                               |                     | Catalog No                                            | Price \$ | Catalog No                                                                  | Price \$ | Catalog No | Price \$ |
|                  |              |                                    | Catalog No                                             | Price \$       | Catalog No        | Price \$       | Catalog No                           | Price \$       | Catalog No                                             | Price \$          | Catalog No      | Price \$            | Catalog No                                              | Price \$            |                                                       |          |                                                                             |          |            |          |
| Toggle           | 1            | Standard—<br>With Red Pilot Light— | SMFF01<br>SMFF01P                                      | 38.50<br>62.00 | SMFFF1<br>SMFFF1P | 42.50<br>65.00 | SMFFS1<br>SMFFS1P                    | 45.00<br>69.00 | —<br>—                                                 | SMFFG1<br>SMFFG1P | 46.00<br>81.00  | SMFFGJ1<br>SMFFGJ1P | 54.00<br>77.00                                          | SMFFWN1<br>SMFFWN1P | 162.00<br>169.00                                      | —<br>—   | —<br>—                                                                      | —<br>—   | —<br>—     |          |
|                  | 2            | Standard—<br>With Red Pilot Light— | SMFF02<br>SMFF02P                                      | 46.00<br>69.00 | SMFFF2<br>SMFFF2P | 50.00<br>73.00 | SMFFS2<br>SMFFS2P                    | 54.00<br>77.00 | —<br>—                                                 | SMFFG2<br>SMFFG2P | 54.00<br>89.00  | SMFFGJ2<br>SMFFGJ2P | 62.00<br>85.00                                          | SMFFWN2<br>SMFFWN2P | 223.00<br>231.00                                      | —<br>—   | —<br>—                                                                      | —<br>—   | —<br>—     |          |
| Key              | 1            | Standard—<br>With Red Pilot Light— | SMFF03<br>SMFF03P                                      | 54.00<br>77.00 | SMFFF3<br>SMFFF3P | 58.00<br>81.00 | SMFFS3<br>SMFFS3P                    | 62.00<br>NM    | —<br>—                                                 | SMFFG3<br>SMFFG3P | 62.00<br>85.00  | SMFFGJ3<br>SMFFGJ3P | 69.00<br>92.00                                          | SMFFWN3<br>SMFFWN3P | 177.00<br>185.00                                      | —<br>—   | —<br>—                                                                      | —<br>—   | —<br>—     |          |
|                  | 2            | Standard—<br>With Red Pilot Light— | SMFF04<br>SMFF04P                                      | 62.00<br>85.00 | SMFFF4<br>SMFFF4P | 65.00<br>89.00 | SMFFS4<br>SMFFS4P                    | 69.00<br>92.00 | —<br>—                                                 | SMFFG4<br>SMFFG4P | 69.00<br>104.00 | SMFFGJ4<br>SMFFGJ4P | 77.00<br>100.00                                         | SMFFWN4<br>SMFFWN4P | 239.00<br>247.00                                      | —<br>—   | —<br>—                                                                      | —<br>—   | —<br>—     |          |

### Starter With Handle Guard Lock Off—Class SMF, Single Phase

|        |   |                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|---|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Toggle | 1 | Standard—             | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
|        |   | With Red Pilot Light— | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
|        | 2 | Standard—             | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
|        |   | With Red Pilot Light— | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

Order basic starter plus separate handle guard kit.

|         |       |          |       |   |   |                      |        |                      |        |
|---------|-------|----------|-------|---|---|----------------------|--------|----------------------|--------|
| SMFFG5  | 54.00 | SMFFGJ5  | 62.00 | — | — | SMFFW1 <sup>①</sup>  | 173.00 | SMFFR1 <sup>①</sup>  | 189.00 |
| SMFFG5P | 77.00 | SMFFGJ5P | 85.00 | — | — | SMFFW1P <sup>①</sup> | 235.00 | SMFFR1H <sup>①</sup> | 204.00 |
| —       | —     | —        | —     | — | — | SMFFW1PH             | 189.00 | SMFFR2 <sup>①</sup>  | 196.00 |
| —       | —     | —        | —     | — | — | SMFFW2 <sup>①</sup>  | 181.00 | SMFFR2H <sup>①</sup> | 212.00 |
| SMFFG6  | 62.00 | SMFFGJ6  | 69.00 | — | — | SMFFW2P <sup>①</sup> | 243.00 | —                    | —      |
| SMFFG6P | 87.00 | SMFFGJ6P | 92.00 | — | — | SMFFW2H              | 196.00 | —                    | —      |
| —       | —     | —        | —     | — | — | FW2PH                | 258.00 | —                    | —      |

### Duplex Units—Class SMF, Single Phase

| Type of Operator | Number of Poles | Features | General Purpose Flush Mounting (Open with Flush Plate) |          |                                                         |          | NEMA Type 1 General Purpose Enclosure Surface Mounting |          | Replacement Starters |          |
|------------------|-----------------|----------|--------------------------------------------------------|----------|---------------------------------------------------------|----------|--------------------------------------------------------|----------|----------------------|----------|
|                  |                 |          | Gray Flush Plate For Wall or Cavity Mounting           |          | Stainless Steel Flush Plate For Wall or Cavity Mounting |          | Catalog No                                             | Price \$ | Catalog No           | Price \$ |
|                  |                 |          | Catalog No                                             | Price \$ | Catalog No                                              | Price \$ |                                                        |          |                      |          |

### One Starter in Duplex Enclosure—Class SMF, Single Phase

|        |   |                                    |   |   |   |   |          |        |   |   |
|--------|---|------------------------------------|---|---|---|---|----------|--------|---|---|
| Toggle | 2 | Standard—<br>With Red Pilot Light— | — | — | — | — | SMFFG02  | 85.00  | — | — |
| Key    | 2 | With Red Pilot Light—              | — | — | — | — | SMFFG02P | 108.00 | — | — |
| —      | — | —                                  | — | — | — | — | SMFFG04P | 108.00 | — | — |

### Two Starters In Duplex Enclosure—Class SMF, Single Phase<sup>②</sup>

|        |               |                                            |           |        |          |        |           |        |   |   |
|--------|---------------|--------------------------------------------|-----------|--------|----------|--------|-----------|--------|---|---|
| Toggle | 2 Per Starter | Standard—<br>With Red Pilot Light on Each— | SMFFF222  | 123.00 | —        | —      | SMFFG222  | 131.00 | — | — |
| Key    | 2 Per Starter | With Red Pilot Light on Each—              | SMFFF222P | 208.00 | SMFFS22P | 216.00 | SMFFG222P | 216.00 | — | — |
| —      | —             | —                                          | SMFFF44P  | 239.00 | SMFFS44P | 247.00 | SMFFG44P  | 247.00 | — | — |

### Starter And "Auto-Off-Hand" SPDT Selector Switch (AC Only)—Class SMF, Single Phase

|        |   |                                    |          |        |          |        |          |        |   |   |
|--------|---|------------------------------------|----------|--------|----------|--------|----------|--------|---|---|
| Toggle | 1 | Standard—<br>With Red Pilot Light— | SMFFF71  | 112.00 | —        | —      | SMFFG71  | 119.00 | — | — |
|        | 2 | Standard—<br>With Red Pilot Light— | SMFFF71P | 135.00 | SMFFS71P | 143.00 | SMFFG71P | 143.00 | — | — |
| Key    | 2 | Standard—<br>With Red Pilot Light— | SMFFF72  | 119.00 | —        | —      | SMFFG72  | 127.00 | — | — |
|        | 2 | With Red Pilot Light—              | SMFFF72P | 143.00 | SMFFS72P | 150.00 | SMFFG72P | 150.00 | — | — |
| —      | — | With Red Pilot Light—              | SMFFF74P | 158.00 | SMFFS74P | 166.00 | SMFFG74P | 166.00 | — | — |

### Two Speed Starters (AC Only)—Class SMF, Single Phase<sup>②</sup>

|        |   |                                                                  |                     |                  |           |        |                     |                  |          |       |
|--------|---|------------------------------------------------------------------|---------------------|------------------|-----------|--------|---------------------|------------------|----------|-------|
| Toggle | 1 | With Mechanical Interlock: Standard—<br>With 2 Red Pilot Lights— | SMFFF11<br>SMFFF11P | 162.00<br>247.00 | —         | —      | SMFFG11<br>SMFFG11P | 169.00<br>254.00 | SMFFO1T  | 46.00 |
|        | 2 | With HIGH-OFF-LOW Selector Switch:<br>With 2 Red Pilot Lights—   | —                   | —                | SMFFS101P | 254.00 | —                   | —                | SMFFO1PT | 69.00 |
|        | 2 | With Mechanical Interlock: Standard—<br>With 2 Red Pilot Lights— | SMFFF22<br>SMFFF22P | 177.00<br>262.00 | —         | —      | SMFFG22<br>SMFFG22P | 185.00<br>270.00 | SMFFO2T  | 54.00 |
|        | 2 | With HIGH-OFF-LOW Selector Switch:<br>With 2 Red Pilot Lights—   | —                   | —                | SMFFS202P | 270.00 | —                   | —                | SMFFO2PT | 77.00 |

①Furnished with (1) ¾" pipe tap in bottom (reversible for top feed).

②Two heater elements required.



## North American Approvals

### INSTALLATION CONSIDERATIONS

The control products described in this catalog have been designed, tested and manufactured in accordance with a wide variety of standards including but not limited to those issued by UL, CSA, NEMA and IEC. These standards typically apply to the control product as a component and not the installation or use of the product. It is the responsibility of the end user of the control product to make sure each installation complies with all of the applicable safety requirements, laws, regulations, codes and standards (some examples of which are the N.E.C., the C.E.C.

and OSHA regulations). Note that local authorities may impose further jurisdiction over each installation. When in doubt, consult with the local inspection authorities.

Unless otherwise specified, the control products described in this catalog are designed to operate under "usual service conditions" as defined in NEMA Standards Publication—Part ICS 1-108. Open type devices are intended for installation in enclosures that provide environmental protection as needed for the specific application. See pages 14 and 15 for definitions of the various enclosure types.

### PERFORMANCE DATA

Where given in this catalog, performance data should only be used as a guide to determine the suitability of the product for an application. The data may be the result of accelerated testing or elevated stress levels under controlled conditions. The user must take care in correlating this data to actual application or service conditions.

### UL and CSA—File Numbers and Guide Card Numbers

Most control equipment listed in this catalog is designed, manufactured and tested in accordance with the relevant UL and CSA standards as listed in the table below.

| Siemens Brand Devices Description                | ☐ Guide No | ☐ File No            | Ⓛ Guide No | Ⓛ File No        | UL Guide No | UL File No |
|--------------------------------------------------|------------|----------------------|------------|------------------|-------------|------------|
| Control Relays<br>3TH2<br>3TH3<br>3TH8           | Class 3211 | LR 12730<br>LR 50487 | NKCR       | E 44653          | NKCR2       | E 44653    |
| AC contactors, DC contactors                     | Class 3211 | LR 12730             | NLDX       | E 31519          | NLDX2       | E 31519    |
| Reversing Starters                               | Class 3211 | LR 38590             | NLDX       | E 32529          | —           | —          |
| Overload relays                                  | Class 3211 | LR 12730             | NKCR       | E 44653          | NKCR2       | E 44653    |
| Terminal blocks                                  | Class 3211 | LR 50181             | —          | —                | XCFR2       | E 80027    |
| Manual Motor Controller 3VU                      | Class 3211 | LR 50487             | NLVR       | E 47705          | —           | —          |
| Starters, Combination Starters                   | Class 3211 | LR 38590             | NLDX       | E 32529          | —           | —          |
| Push buttons                                     | Class 3211 | LR 12730             | NCXR       | E 44653, E 47512 | —           | —          |
| Lighting and Heating Contactors                  | Class 3231 | LR 38590             | NRNT       | E 60310          | —           | —          |
| Mechanical Limit Switches<br>International Style | Class 3211 | LR 50487             | NKCR       | E 44653          | NKCR2       | E 44653    |
| North American Style                             | Class 3211 | LR 68551             | NKCR       | E 47512          | —           | —          |
| Fast Bus Components/Kits                         | —          | —                    | NMTR       | E 155959         | NMTR2       | E 160776   |
| Modular Motor Controllers Type E                 | —          | —                    | NKJH       | E 156943         | —           | —          |
| Modular Motor Controllers—Group Installation     | Class 3211 | LR 50487             | NLRV       | E 47705          | —           | —          |
| US Series Starter                                | Class 3211 | LR 38590             | NLDX       | E 32529          | —           | —          |
| Fraction Hp Starters, SMF, MMS                   | —          | —                    | —          | —                | NLRV2       | E 80332    |
| Sirius 3RT Contactors                            | Class 3211 | LR 12730             | NLDX       | E 31519          | NLDX2       | —          |
| Sirius 3RV MSP—Group Installation                | Class 3211 | LR 12730             | NLRV       | E 47705          | —           | —          |
| Type E                                           | —          | —                    | NKJH       | E 156943         | —           | —          |
| Sirius 3RU Overload                              | Class 3211 | LR 12730             | NKCR       | E 44653          | NKCR2       | E 44653    |
| Sirius 3RH Relays                                | Class 3211 | LR 12730, LR50487    | NKCR       | E 44653          | NKCR2       | E 44653    |
| Sirius 3RP Timers                                | Class 3211 | LR 12730             | NKCR       | E 44653          | —           | —          |
| Miniature Circuit Breakers—5SX                   | Class 3211 | LR 93659             | —          | —                | NKCR2       | E 116386   |
| Manual Motor Controllers—3LD                     | Class 3211 | LR 19188             | NLRV       | E 47705          | —           | —          |
| Sirius 3RA Combination Starters                  | —          | —                    | NKJH       | E 156943         | —           | —          |
| Sirius 3RA Reversing Contactors                  | Class 3211 | LR 38590             | NLDX       | E 31519          | —           | —          |
| Sirius 3RA Fastbus Combo Starters                | —          | —                    | NKJH       | E 156943         | —           | —          |
| Sirius 3RB Solid State Overloads                 | Class 3211 | LR 6535              | NKCR       | E 22655          | —           | —          |

| Furnas Brand Devices Class                 | ☐ Guide No | ☐ File No | Ⓛ Guide No | Ⓛ File No | UL Guide No | UL File No |
|--------------------------------------------|------------|-----------|------------|-----------|-------------|------------|
| 11, 12—Manual Switches                     | Class 3211 | LR 6535   | NLRV       | E 10590   | NLRV2       | E 10590    |
| 14, 22, 30, 40, 43—Starters and Contactors | Class 3211 | LR 6535   | NLDX       | E 14900   | NLDX2       | E 14900    |
| 17, 18, 25, 26, 32—Combination Starters    | Class 3211 | LR 6535   | NKJH       | E 185287  | —           | —          |
| 36, 37—Reduced Voltage Starters            | Class 3211 | LR 6535   | NLDX       | E 14900   | NLDX2       | E 14900    |
| 83, 84, 85, 87, 88—Pump Control Panels     | Class 3211 | LR 6535   | NKJH       | E 185287  | —           | —          |
| 50—Standard Duty Pilot Devices             | Class 3211 | LR 6535   | NKCR       | E 22655   | —           | —          |
| 51—Hazardous Location Pilot Devices        | Class 3218 | LR 23889  | NOIV       | E 39935   | —           | —          |
| 52—30 mm Pilot Devices                     | Class 3211 | LR 6535   | NKCR       | E 22655   | NKCR2       | E 22655    |
| 16, 41, 42, 45—Definite Purpose Controls   | Class 3211 | LR 6535   | —          | —         | NLDX2       | E 14900    |
| 46, 47—Relays                              | Class 3211 | LR 6535   | NKCR       | E 22655   | NKCR2       | E 22655    |
| 48, 948, 958—Overload Relays               | Class 3211 | LR 6535   | NKCR       | E 22655   | NKCR2       | E 22655    |
| 49—Field Kits                              | Class 3211 | ELR 535   | NLDX       | E 14900   | NLDX2       | E 14900    |
| Class 56—Fast Switch                       | Class 3211 | LR 6535   | NLRV       | E 10590   | —           | —          |
| Class 53—Master Switch                     | Class 3211 | LR 6535   | NKCR       | E 22655   | —           | —          |
| Class 69—Pressure Switch                   | Class 3211 | LR 6535   | NKPZ       | E 14861   | NKPZ2       | E 14861    |



## IEC Enclosure Description

### Comparison of NEMA Enclosures

This table summarizes the information provided on the previous page.

| Provides a Degree of Protection Against the Following Environmental Conditions | 1 | 3R | 4 | 4X | 12 | 13 |
|--------------------------------------------------------------------------------|---|----|---|----|----|----|
| Incidental contact with the enclosed equipment                                 | × | ×  | × | ×  | ×  | ×  |
| Rain, snow, and sleet                                                          | — | ×  | × | ×  | —  | —  |
| Windblown dust                                                                 | — | —  | × | ×  | —  | —  |
| Falling dirt                                                                   | × | —  | × | ×  | ×  | ×  |
| Falling liquids and light splashing                                            | — | —  | × | ×  | ×  | ×  |
| Circulating dust, lint, fibers, and flyings                                    | — | —  | × | ×  | ×  | ×  |
| Settling airborne dust, lint, fibers, and flyings                              | — | —  | × | ×  | ×  | ×  |
| Hosedown and splashing water                                                   | — | —  | × | ×  | —  | —  |
| Oil and coolant seepage                                                        | — | —  | — | —  | ×  | ×  |
| Oil or coolant spraying and splashing                                          | — | —  | — | —  | —  | ×  |
| Corrosive agents                                                               | — | —  | — | ×  | —  | —  |

### IEC Environmental Enclosure Ratings for Global Applications

IEC enclosures use a two digit numbering system to define the degree of protection they provide. The first digit specifies the degree of protection against incidental contact and penetration of solid objects. The second digit specifies the level of protection against the ingress of water.

**Example:** An IP 65 enclosure is dust tight and protected against water jets. An IP66 enclosure is dust tight and protected against powerful water jets.

| First Numeral                                                                                                               | Second Numeral                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Protection of persons against access to hazardous parts and protection against penetration of solid foreign objects.</b> | <b>Protection against ingress of water under test conditions specified in IEC 529.</b> |
| 0 Non-protected                                                                                                             | 0 Non-protected                                                                        |
| 1 Back of hand; objects greater than 50 mm in diameter                                                                      | 1 Vertically falling drops of water                                                    |
| 2 Finger; objects greater than 12.5 mm in diameter                                                                          | 2 Vertically falling drops of water with enclosure tilted 15 degrees                   |
| 3 Tools or objects greater than 2.5 mm in diameter                                                                          | 3 Spraying water                                                                       |
| 4 Tools or objects greater than 1 mm in diameter                                                                            | 4 Splashing water                                                                      |
| 5 Dust-protected (Dust may enter but must not interfere with operation of the equipment or impair safety)                   | 5 Water jets                                                                           |
| 6 Dust tight (No dust observable inside enclosure at end of test)                                                           | 6 Powerful water jets                                                                  |
|                                                                                                                             | 7 Temporary submersion                                                                 |
|                                                                                                                             | 8 Continuous submersion                                                                |

### Conversion of NEMA Type Numbers to IEC Classification Designations

This table shows the IP classification designation to which NEMA enclosures may be applied. The table cannot be used to convert IEC designations to NEMA type numbers.

| NEMA Enclosure Type Number | IEC Enclosure Classification Designation |
|----------------------------|------------------------------------------|
| 1                          | IP10                                     |
| 3                          | IP54                                     |
| 3R                         | IP14                                     |
| 4 and 4X                   | IP56                                     |
| 6 and 6P                   | IP67                                     |
| 12                         | IP52                                     |
| 13                         | IP54                                     |

Application Data

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**2**  
 NEMA and HP  
 Rated Control



## Fractional HP Starters, Class SMF

### Class SMF

Class SMF fractional horsepower starters provide overload protection as well as manual on-off control for small horsepower motors in a variety of industrial and commercial applications. Available in one or two pole versions, these devices are suitable for use with AC single phase motors up to 1 HP.

Two pole starters can also be used with DC motors up to 3/4 HP. Typical applications include fans, conveyors, pumps, and small machine tools.

#### Continuous Current Rating

16 amperes.

#### Overload Trip Assembly

Motor protection is provided by a Class SMFH heater element which must be installed before the starter will operate.

#### Two Speed Starters

Two speed manual starters are designed for control of small single phase AC motors having separate windings for high and low speed operation. Two toggle operated starters are used, with overload protection included for each motor winding. Surface mounting devices, and those with a gray flush plate, utilize a mechanical interlock which allows direct control of the motor by means of the toggle operators.

#### Enclosures

Class SMF, NEMA Type 1 surface mounting enclosures are sheet steel with a thermo-plastic wrap-around cover for convenience in wiring. The NEMA Type 1 enclosure is also available in an oversized version which allows more wiring space. A zinc alloy die casting is used for NEMA Type 4 enclosures.

#### Pilot Lights

Red or green neon pilot light units are available factory installed in Class SMF, NEMA Type 1 surface and flush mounting and NEMA Type 4 enclosures or as a field modification kit for NEMA Type 1 enclosures and gray flush plates. (Red pilot light—standard. Green pilot light—add "G" to end of type number.)

#### Terminals

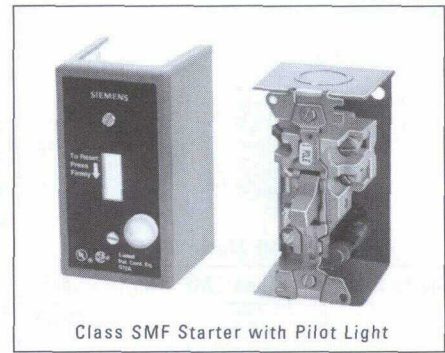
Binding head screw type terminals are suitable for #10 or smaller copper wire, and are accessible from the front. All terminals are clearly marked.

#### Mounting

Open types without a pilot light fit standard single gang switch boxes, and can be used with any cover plate having a standard toggle cutout. Single-unit flush mounting types, including those with pilot lights, are suitable for wall mounting in a standard switch box or for machine cavity mounting without a box.

#### Operation

Available with toggle handle or with removable key type operator to discourage unauthorized operation.



Class SMF Starter with Pilot Light

#### Emergency Off Actuator

A toggle operator extender is available for Class SMF, NEMA Type 1 surface mounted units. The extender has a red vinyl button that provides a fast and easy method for locating and switching the device's toggle operator into the OFF position. The Emergency Off Actuator is available in kit form only for field installation.

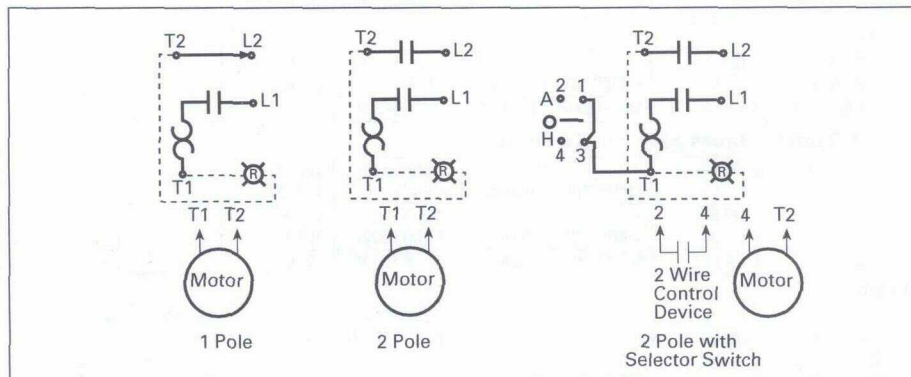
#### Handle Guard/Lock-Off

An optional handle guard on Class SMF, NEMA Type 1 enclosed starters prevents accidental operation of the toggle operator and also allows the toggle operator to be padlocked in either the "ON" or the "OFF" position. This handle guard can be factory installed on NEMA Type 1 enclosed starters and is also available in kit form for field installation on NEMA Type 1 surface and flush mounting enclosures. Standard NEMA Type 4 metallic includes provision for padlocking in the OFF position.

2

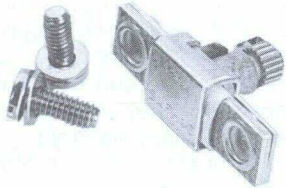
NEMA and HP  
Rated Control

### Typical Wiring Diagrams—Class SMF





## Heater Elements, Class SMF



### Heater Elements Class SMF

All tables are based on the operation of the motor and controller in the same ambient temperature, 40°C (104°F) or less. Always be certain the correct heater element is installed in the starter before operating the motor.

### Ordering Information

1. Determine number of heater elements required from Table A.
2. Determine motor full load current and service factor.

**NOTE: If motor amps are unknown, an approximate value may be found on page 883.**

**These values should be used with caution and only when motor amps are not available.**

3. If the motor and controller are in the same ambient temperature:
  - a. For 1.15 to 1.25 service factor motors use 100% of motor full load current for heater element selection.
  - b. For 1.0 service factor motors use 90% of motor full load current for heater element selection.
4. If the motor and controller are in different ambient temperatures multiply motor full load current by the multiplier in Table B. Use the resultant full load current for heater element selection.
5. Select proper heater element from table below.

| Heater Catalog No | Motor Full-Load Current (Amps) | Price \$ |
|-------------------|--------------------------------|----------|
| SMFH01            | 0.157-0.173                    | 11.60    |
| SMFH02            | 0.174-0.192                    | 11.60    |
| SMFH03            | 0.193-0.212                    | 11.60    |
| SMFH04            | 0.213-0.235                    | 11.60    |
| SMFH05            | 0.236-0.261                    | 11.60    |
| SMFH06            | 0.262-0.289                    | 11.60    |
| SMFH07            | 0.290-0.321                    | 11.60    |
| SMFH08            | 0.322-0.355                    | 11.60    |
| SMFH09            | 0.356-0.399                    | 11.60    |
| SMFH10            | 0.41-0.44                      | 11.60    |
| SMFH11            | 0.45-0.49                      | 11.60    |
| SMFH12            | 0.50-0.53                      | 11.60    |
| SMFH13            | 0.54-0.58                      | 11.60    |
| SMFH14            | 0.59-0.65                      | 11.60    |
| SMFH15            | 0.66-0.71                      | 11.60    |
| SMFH16            | 0.72-0.78                      | 11.60    |
| SMFH17            | 0.79-0.85                      | 11.60    |
| SMFH18            | 0.86-0.96                      | 11.60    |
| SMFH19            | 0.97-1.04                      | 11.60    |
| SMFH20            | 1.05-1.16                      | 11.60    |
| SMFH21            | 1.17-1.25                      | 11.60    |
| SMFH22            | 1.30-1.39                      | 11.60    |
| SMFH23            | 1.38-1.54                      | 11.60    |
| SMFH24            | 1.48-1.63                      | 11.60    |
| SMFH25            | 1.57-1.75                      | 11.60    |
| SMFH26            | 1.66-1.86                      | 11.60    |

| Heater Catalog No | Motor Full-Load Current (Amps) | Price \$ |
|-------------------|--------------------------------|----------|
| SMFH27            | 1.80-1.99                      | 11.60    |
| SMFH28            | 1.96-2.15                      | 11.60    |
| SMFH29            | 2.16-2.38                      | 11.60    |
| SMFH30            | 2.39-2.75                      | 11.60    |
| SMFH31            | 2.76-2.84                      | 11.60    |
| SMFH32            | 2.85-3.06                      | 11.60    |
| SMFH33            | 3.07-3.45                      | 11.60    |
| SMFH34            | 3.46-3.70                      | 11.60    |
| SMFH35            | 3.71-4.07                      | 11.60    |
| SMFH36            | 4.08-4.32                      | 11.60    |
| SMFH37            | 4.33-4.90                      | 11.60    |
| SMFH38            | 4.91-5.35                      | 11.60    |
| SMFH39            | 5.36-5.85                      | 11.60    |
| SMFH40            | 5.86-6.41                      | 11.60    |
| SMFH41            | 6.42-6.79                      | 11.60    |
| SMFH42            | 6.80-7.57                      | 11.60    |
| SMFH43            | 7.58-8.15                      | 11.60    |
| SMFH44            | 8.16-8.98                      | 11.60    |
| SMFH45            | 8.99-9.67                      | 11.60    |
| SMFH46            | 9.68-9.95                      | 11.60    |
| SMFH47            | 9.96-10.8                      | 11.60    |
| SMFH48            | 10.9-12.1                      | 11.60    |
| SMFH49            | 12.2-13.1                      | 11.60    |
| SMFH50            | 13.2-13.9                      | 11.60    |
| SMFH51            | 14.0-15.0                      | 11.60    |
| SMFH52            | 15.1-16.0                      | 11.60    |

**Table A**  
Number of Heater Elements

| Device                                                         | Number of Heater Elements | Notes                                                                    |
|----------------------------------------------------------------|---------------------------|--------------------------------------------------------------------------|
| SMF-F*1<br>SMF-F*2<br>SMF-F*3<br>SMF-F*4<br>SMF-F*5<br>SMF-F*6 | 1                         | All single pole and two pole SMF starters require only 1 Heater Element. |
| SMF-F*22<br>SMF-F*44                                           | 2                         | Duplex Unit. One Heater Element per starter.                             |
| SMF-F*11<br>SMF-F*22                                           | 2                         | Two Speed Starter. One Heater Element per speed.                         |

**Note:** SMFH\*\* Heater Elements are not interchangeable with MSFG30M\*\* Heater Elements used on obsolete MSF manual starter line. MSFG30\*\* Heater Elements are available for replacement purposes, contact sales office for availability. SAGGMGF.

**Table B—Special Applications**  
Heater Element Selection

| Continuous Duty Motor Service Factor | Melting Alloy Type Thermal Overload Relays |                                                     |                                                    |
|--------------------------------------|--------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
|                                      | Ambient Temperature of Motor               |                                                     |                                                    |
|                                      | Same as Controller Ambient                 | Constant 10°C (18°F) Higher Than Controller Ambient | Constant 10°C (18°F) Lower Than Controller Ambient |
| Full Load Current Multiplier         |                                            |                                                     |                                                    |
| 1.15 to 1.25                         | 1.0                                        | 0.9                                                 | 1.05                                               |
| 1.0                                  | 0.9                                        | 0.8                                                 | 0.95                                               |