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- Class 17 & 18 type 4/4X stainless steel enclosure kits – page 17-105.
- Class 87 pump panel enclosure kits – pages 17-108 and 17-109.
- Approval/submittal and as-built drawings – page 17-112.
- Quarter-turn latch replacement kits for enclosures - page 17-175.
- DP contactors and Class 81 pump panels have been discontinued.

- Factory Modification Options:
  
  **Mod Suffix: FE**
  Description: Pilot lights are transformer type as standard. For LED type bulbs, order this suffix in addition to the standard device suffix(es). For example, to order red “ON” and green “OFF” pilot lights with LED bulbs, order FA, FK and FE.
  Factory Modification Section of Catalog: Pilot Light Table

  **Mod Suffix: 24**
  Description: 1200Amp / 600 Volt fuse clip
  Factory Modification Section of Catalog: Factory Assembled Fuse Clips Table

  **Mod Suffix: EX1**
  Description: Order this suffix to order a combination starter without the overload relay and reset button. In essence, this mod converts a combination starter into a combination contactor.
  Factory Modification Section of Catalog: Overload Options Table

  **Mod Suffix: SP1 and SP2**
  Description: Order SP1 or SP2 to convert a standard three phase combination starter into a single phase 120VAC or 240VAC starter respectively.
  Factory Modification Section of Catalog: Control Options Table

  **Mod Suffix: R1**
  Description: R1 is an existing suffix for a relay that detects under-voltage, phase failure, phase sequence, phase unbalance and now also over-voltage. Additionally it is now multi-voltage and thus replaces suffixes R2, R3 and R4. Therefore regardless of the motor voltage order R1.
  Factory Modification Section of Catalog: Control Relays Table

  **Mod Suffix: M1 – M6**
  Description: Previously meters were limited to enclosure types 1, 3, 4 and 12. They are now also rated for enclosure type 4X.
  Factory Modification Section of Catalog: Meters Table
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NEMA & General Purpose Controls

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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 for flush mounting plates, NEMA Type 1 enclosures, and NEMA Type 4 enclosures. Pilot lights may be either factory or field installed. (For starters that contain a pilot light, a Red light is standard. For a Green pilot light add “G” to the end of the catalog 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.

**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 “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 enclosures include provisions for padlocking the device in the OFF position.
### Starter—Class SMF, Single Phase

<table>
<thead>
<tr>
<th>Type of Operator</th>
<th>No. of Poles</th>
<th>Starter Features</th>
<th>Open Type</th>
<th>Catalog Number</th>
<th>List Price</th>
<th>Gray Flush Plate</th>
<th>Standard Stainless Steel Flush Plate</th>
<th>Jumbo Stainless Steel Flush Plate</th>
<th>NEMA Type 1 General Purpose Enclosure, Surface Mounting</th>
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<tr>
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<td>SMFG01P</td>
<td>SMFGJ1P</td>
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<td>2</td>
<td>Standard 2</td>
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<td>SMFG02P</td>
<td>SMFGJ2P</td>
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<td></td>
<td>2</td>
<td>Red Pilot Light</td>
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### Starter With Handle Guard/Lock-Off—Class SMF, Single Phase

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

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<th>Starter Features</th>
<th>Open Type</th>
<th>Catalog Number</th>
<th>List Price</th>
<th>Gray Flush Plate For Wall or Cavity Mounting</th>
<th>Stainless Steel Flush Plate for Wall or Cavity Mounting</th>
<th>NEMA Type 1 General Purpose Enclosure, Surface Mounting</th>
<th>Replacement Starters</th>
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### Two Starters In Duplex Enclosure—Class SMF, Single Phase

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<th>Stainless Steel Flush Plate for Wall or Cavity Mounting</th>
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### Starter And “Auto-Off-Hand” SPDT Selector Switch (AC Only)—Class SMF, Single Phase

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<th>Open Type</th>
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<th>Gray Flush Plate For Wall or Cavity Mounting</th>
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### Two Speed Starters (AC Only)—Class SMF, Single Phase

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<th>Gray Flush Plate For Wall or Cavity Mounting</th>
<th>Stainless Steel Flush Plate for Wall or Cavity Mounting</th>
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</table>

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1. One heater element required.
2. Furnished with (1) ¾” NPT Outlet in bottom (reversible for top feed).
3. Two heater elements required.
4. Order Open Type starter plus separate handle guard kit.
5. For starters that contain a pilot light, a Red light is standard. For a Green pilot light add “G” to the end of the catalog number.
Manual Control

Fractional HP Switches, Class MMS, MRS

Class MMS, MRS

Class MMS and MRS motor starting switches provide manual “ON-OFF” control of single or three phase AC motors where overload protection is not required or is provided separately. Compact construction and a 600 volt rating make these switches suitable for a wide range of industrial and commercial uses. Typical applications include small machine tools, pumps, fans, conveyors and many other types of electrical machinery. They can also be used on non-motor loads such as resistance heating applications.

Continuous Current Rating

MMS & MRS: 30 amperes at 250 volts max, 26.4 amperes at 277 volts, 20 amperes at 600 volts max, 30 amperes resistive at 600 volts max.

Two Speed—Class MRS

Two speed manual switches may be used with separate winding three phase or single phase AC motors where overload protection is not required or is provided separately. Two switches are employed to give “ON-OFF” control in each speed.

Reversing—Class MRS

Reversing manual switches provide a compact means of starting, stopping and reversing AC motors where overload protection is not required or is provided separately. They are suitable for use with three phase squirrel cage motors and for single phase motors which can be reversed by reconnecting motor leads. Two switches are used, one to connect the motor forward rotation and one for reverse.

Enclosures

Class MMS, MRS, 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 for flush mounting plates, NEMA Type 1 enclosures, and NEMA Type 4 enclosures. Pilot lights may be either factory or field installed. (For switches that contain a pilot light, a Red light is standard. For a Green pilot light add “G” to the end of the catalog 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.

Emergency Off Actuator

A toggle operator extender is available for Class MMS, MRS, 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 MMS, MRS, NEMA Type 1 enclosed switches prevents accidental operation of the toggle operator and also allows the toggle operator to be padlocked in either the “ON” or “OFF” position. This handle guard is available in kit form for field installation on NEMA Type 1 surface and flush mounting enclosures. Standard NEMA Type 4 metallic enclosures include provisions for padlocking the device in the OFF position.
## Manual Control

### Switches, Class MMS, MRS

#### Switches — Class MMS, Single Phase and 3-Phase

<table>
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<th>Type of Operator</th>
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<th>Switch Features</th>
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### Reversing Switch — Class MRS, Single Phase and 3-Phase

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<th>Suitable Motor Types</th>
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### Two Speed Switch — Class MMS, Single Phase and 3-Phase

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<td>Single Phase</td>
<td>Standard</td>
<td>MMSK01</td>
<td>MMSK01A</td>
<td>MMSK01B</td>
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<td>MMSK01A</td>
<td>MMSK01B</td>
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<tr>
<td></td>
<td>3</td>
<td>3-Phase, 4-Lead Repulsion-Induction</td>
<td>Standard</td>
<td>MMSK02</td>
<td>MMSK02A</td>
<td>MMSK02B</td>
<td>(2) Red Pilot Devices—230V AC</td>
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<td>MRSK02T</td>
<td>MRSK02T</td>
</tr>
</tbody>
</table>

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- Manual switches do not include overloads.
- Furnished with (1) 3/4" NPT outlet in bottom (reversible for top feed). In order to obtain a 5/8" NPT outlet in top and bottom, add suffix letter "H" to type number with List Price adder.
- Do not use as replacement interiors for NEMA Type 4 metallic enclosures. For replacement unit, order Type MMSK01 or MMSK02 and separate pilot light kit.
- For switches that contain a pilot light, a Red light is standard. For a Green pilot light add "G" to the end of the catalog number.
Manual Control
Starter and Switches, Class 11 - 3RV

Class 11 - 3RV
Class 11 across the line manual starters and switches provide control for machinery where remote start stop control is not required.

Class 11 - 3RV manual starters are used for single and poly-phase motors up to 20HP @ 575V. Starters have bimetallic heater elements to provide class 10 overcurrent protection. Each starter has a fourth bimetallic strip that reacts only to the ambient temperature inside the control panel. This ambient compensation helps prevent the starter from nuisance tripping when the panel temperature is higher than the ambient temperature of the motor.

A built-in differential trip bar causes the starter to trip faster on a phase loss condition to help reduce motor damage. Magnetic trip elements in each starter take the device off line when it senses current of 13 times the maximum FLA dial setting.

Class 11 - 3RV switches provide control for inherently protected motors. Typical applications include metal and woodworking machinery, grinders, power saws, conveyors, fans, pumps, blowers, textile and packaging machinery, and paper cutters.

Each switch is provided with magnetic trip elements which take the device off line when it senses current of 13 times the maximum switch rating.

Class 11 - 3RV manual starters can be used as Type E self-protected manual combination starters (up to 22 amps) per UL508 or as components in Group Installation per NEC 430.53. When using the Class 11 - 3RV as a manual combination starter upstream protection is not required.

Class 11 - 3RV controllers are available with low voltage protection which will automatically open the power poles when the voltage drops or the power is interrupted. Controllers with the LVP option provide the OSHA requirements for protecting personnel from potential injury caused by the automatic start-up of machinery following a voltage drop or power interruption when low voltage protection is specified.

Class 11 - 3RV is available as Open style, or in NEMA 1, NEMA 7 & 9 or NEMA 7 & 9 / 3 & 4 enclosures.

Standard Features include:
- ON/OFF rotary handle with lockout and visible trip indication
- Adjustment dial for setting to motor FLA (Starters only)
- Low Voltage Protection (LVP) Option
- Short Circuit trip at 13 times the maximum setting of the FLA dial or rated current
- Ambient compensated up to 140°F
- Phase loss sensitivity
- Test trip function
- LVP Option Meets OSHA Requirements
- UL Listed
- CSA Certified
### Manual Control

**Starters and Switches, Class 11 - 3RV**

#### Ordering Information

- No heaters required.
- Field Modification Kits see page 17-91.
- Dimensions see page 17-115.
- Wiring Diagrams see page 17-143.
- For applications requiring a low voltage protection coil see table at right.

#### Low Voltage Protection Coil Table

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Letter</th>
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<tr>
<td>120V</td>
<td>+F</td>
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<tr>
<td>208V</td>
<td>+D</td>
</tr>
<tr>
<td>240V</td>
<td>+G</td>
</tr>
<tr>
<td>460V</td>
<td>+H</td>
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</tbody>
</table>

*Add corresponding letter to end of base Class 11 catalog number for low voltage protection coil with List Price adder.

Note: The LVP option for Open type 3RV is available from the factory, please order separately from the field modification kits on page 17-92. The coil voltage should correspond with the line voltage.

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#### Manual Starter—Class 11 - 3RV

<table>
<thead>
<tr>
<th>FLA Adjustment Range</th>
<th>Max HP</th>
<th>Single Phase HP Ratings</th>
<th>3-Phase HP Ratings</th>
<th>Open Type</th>
<th>NEMA 1 General Purpose</th>
<th>NEMA 7 &amp; 9 Class I Groups C &amp; D</th>
<th>NEMA 7 &amp; 9 Class II Groups E, F &amp; G</th>
<th>NEMA 3 &amp; 4, NEMA 7 &amp; 9 Watertight (Outdoor use)</th>
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#### Manual Switch—Class 11 - 3RV

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<th>Max HP</th>
<th>Single Phase HP Ratings</th>
<th>3-Phase HP Ratings</th>
<th>Open Type</th>
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<th>NEMA 7 &amp; 9 Class II Groups E, F &amp; G</th>
<th>NEMA 3 &amp; 4, NEMA 7 &amp; 9 Watertight (Outdoor use)</th>
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<td>11D10B</td>
<td>11D10B</td>
<td>11D10B</td>
</tr>
</tbody>
</table>

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1. Instantaneous Magnetic Trip will occur at 13 times the maximum FLA dial setting or rated switch current.
2. Shaded Ratings apply for Manual Motor Controllers Only! These Ratings do not apply as UL Listed Manual Combination Starters.
3. Add 1 to the end of the catalog number for 1/2 inch drain hole with plug and list price adder. Drain fitting not supplied, order separately from 0.89-1.25.