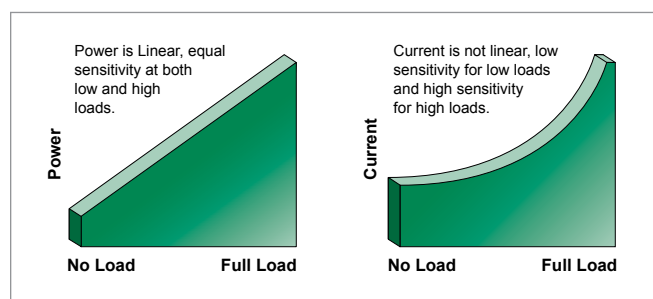


# Motor and Pump Protection Relays

## 77C-KW Series

### Single-Phase Current & Voltage Monitor



## Description

The 77C-KW single-phase relay is part of the 777/77C product family. The 77C-KW, 77C-KW/HP and 77C-LR-KW/HP are fully programmable pump protection relays that monitor for high or low voltage and overload and underload conditions based on power. These overload relays are designed to protect any motor drawing 2–800 full load A (external CTs are required above 90 A). The 777-HVR-SP and 77C are for single-phase 100–240 V ac applications.

All of the overload relays provide unsurpassed protection by combining overload, underload, and voltage in one unit. For standalone applications, the units incorporate a 3-digit LED display that is used for programming, providing real-time operational information, and displaying diagnostic codes to aid in troubleshooting a fault condition.

The units also feature a network communications port that can be used with communication modules, listed in the 777 accessories section, to form a Modbus\*, DeviceNet™, Profibus, or Ethernet network. Up to 99 units can be remotely monitored and controlled from a PC, PLC, or SCADA system, and data logging through a PC with the optional Solutions software. This capability allows for a simple, cost-effective way to meet new requirements for arc-flash safety.

The underpower trip feature is desirable anytime the current vs. load characteristic is non-linear or has little change. In general terms, smaller motors and slow-speed motors have little change in current over the normal load range. Larger motors that are running light loads will also show small current changes over the operating load range. Common uses include pumping applications where motors run slower than 3400 rpm and usually have small current versus load changes, such as slow speed mixers or agitator motors up to 50 hp, mag-drives, or can pumps.

Note: The Littelfuse PumpSaver® relay provides the high sensitivity of a power monitor to protect pump motors from dry run and dead head conditions.

\*Compatible with Modbus using optional communications module (RS485MS-2W).

## Features & Benefits

| FEATURES                                 | BENEFITS   |
|--|--|
| <b>Underload protection</b>              | Increases reliability for non-linear motors where the load characteristic has little change                                |
| <b>Built-in display</b>                  | Visual indication for programming, viewing real-time voltage, current, kilowatts or horsepower, and last fault code        |
| <b>15 programmable criteria settings</b> | Allows user flexibility to fine tune the relay for maximum protection with any application                                 |
| <b>Last fault memory</b>                 | Provides instant troubleshooting diagnostics   |
| <b>Remote display compatibility</b>      | Increases safety through remote display of real-time data and fault history. Aids with arc-flash safety regulations.       |
| <b>Flexible reset</b>                    | Reset options: automatic, manual using pushbutton on relay, or remote with optional 777-MRSW or OL-RESET remote reset kit. |

# Motor and Pump Protection Relays

## 77C-KW Series

### Applications

- Conveyor systems
- HVAC equipment
- Saws and grinders
- Fan motors

### Specifications

|  |   |
|--|---|
| <b>Input Voltage</b>                       | 100–240 V ac, 1Ø  |
| <b>Frequency</b>                           | 50–60 Hz  |
| <b>Motor Full Load Amp Range</b>           |   |
| <b>77C-KW/HP</b>                           | 2–25 A (loops required); 26–90 A (direct); 91–800 A (external CTs)            |
| <b>77C-LR-KW/HP</b>                        | 1.0 A - 2.0 A (additional loop); 2.0 A - 9.0 A (direct)                       |
| <b>Short Circuit Withstand Rating</b>      | 100 kA per UL and CSA   |
| <b>Power Consumption</b>                   | 5 W (Maximum)   |
| <b>Output Contact Rating SPDT (Form C)</b> | Pilot duty rating: 480 VA @ 240 V ac<br>General purpose: 10 A @ 240 V ac      |
| <b>Expected Life</b>                       |   |
| <b>Mechanical</b>                          | 1 x 10 <sup>6</sup> operations  |
| <b>Electrical</b>                          | 1 x 10 <sup>5</sup> operations at rated load                                  |
| <b>Accuracy at 25 °C (77 °F)</b>           |   |
| <b>Voltage</b>                             | ±1 %  |
| <b>Current</b>                             | ±3 % (Direct, No External CTs)  |
| <b>Timing</b>                              | 5 % ± 1 second  |
| <b>Repeatability</b>                       |   |
| <b>Voltage</b>                             | ± 0.5 % of nominal voltage  |
| <b>Current</b>                             | ± 1 % (Direct, No External CTs)   |
| <b>Standards Passed</b>                    |   |
| <b>Electrostatic Discharge (ESD)</b>       | IEC 61000-4-2, Level 3, 6 kV contact, 8 kV air                                |
| <b>Radio Frequency Immunity (RFI)</b>      |   |
| <b>Conducted</b>                           | IEC 61000-4-6, Level 3 10 V/m   |
| <b>Radiated</b>                            | IEC 61000-4-3, Level 3 10 V/m   |
| <b>Fast Transient Burst</b>                | IEC 61000-4-4, Level 3, 3.5 kV input power                                    |
| <b>Surge</b>                               |   |
| <b>IEC</b>                                 | IEC 61000-4-5, Level 3, 2 kV line-to-line; Level 4, 4 kV line-to-ground       |
| <b>ANSI/IEEE</b>                           | C62.41 Surge and Ring Wave compliance to a level of 6 kV line-to-line         |
| <b>Hi-potential Test</b>                   | Meets UL 508 (2 x rated V +1000 V for 1 min.)                                 |
| <b>Vibration</b>                           | IEC 68-2-6, 10-55 Hz, 1 mm peak-to-peak, 2 hours, 3 axis                      |
| <b>Shock</b>                               | IEC 68-2-27, 30 g, 3 axis, 11 ms duration, half-sine pulse                    |
| <b>Mechanical</b>                          |   |
| <b>Dimensions</b>                          | <b>H</b> 78.74 mm (3.1"); <b>W</b> 99.06 mm (3.9"); <b>D</b> 129.54 mm (5.1") |
| <b>Terminal Torque</b>                     | 7 in.-lbs.  |
| <b>Enclosure Material</b>                  | Polycarbonate   |
| <b>Weight</b>                              | 1.2 lbs   |
| <b>Maximum Conductor Size Through 777</b>  | 0.65" with insulation   |
| <b>Environmental</b>                       |   |
| <b>Temperature Range</b>                   |   |
| <b>Ambient Operating</b>                   | -20 °C–70° C (-4 °F–158 °F)   |
| <b>Ambient Storage</b>                     | -40 °C–80° C (-40 °F–176 °F)  |
| <b>Pollution Degree</b>                    | 3   |
| <b>Class of Protection</b>                 | IP20, NEMA 1  |
| <b>Relative Humidity</b>                   | 10–95 %, non-condensing per IEC 68-2-3  |
| <b>Programmable Operating Points</b>       | Range   |
| <b>LV- Low Voltage Threshold</b>           | 85 V - HV Setting   |
| <b>HV- High Voltage Threshold</b>          | 264 V - LV Setting  |

# Motor and Pump Protection Relays

## 77C-KW Series

**MULT- # of Conductors or  
CT Ratio (XXX:5)**

**77C:**

**77C-LR:**

**OC- Overcurrent Threshold**

**TC- Overcurrent Trip Class\***

**RD1- Rapid Cycle Timer**

**RD2- Restart Delay After All  
Faults Except Undercurrent  
(motor cool down timer)\*\***

**RD3- Restart Delay After Undercurrent  
(dry well recovery timer)**

**#RU- Number of Restarts  
After Undercurrent**

**ADDR- RS485 Address**

**#RO-Number of Restarts  
After Overcurrent**

**LP/PWS (PWS = LP Range)**

1–10 Conductors or 100-800 Ratio

1 or 2

(20–100 A) ÷ MULT or 80–120 % of CT Primary

5, J5, 10, J10, 15, J15, 20, J20, 30, J30, or LIn (linear)

0, 2–500 seconds

2–500 minutes/seconds

2–500 minutes/seconds

0, 1, 2, 3, 4, A (Automatic)

A01- A99

0, 1, 2, 3, 4, A (Automatic)

**1** = 0.01 - 0.99 KW

**2** = 1.00 - 9.95 KW

**3** = 10.0 - 99.5 KW

**4** = 100 - 650 KW

**5** = 0.01 - 1.30 HP

**6** = 1.34 - 13.3 HP

**8** = 13.4 - 133 HP

**9** = 134 - 871 HP

| SETTING | RD2     | RD3     |
|---------|---------|---------|
| 0       | Minutes | Minutes |
| 1       | Minutes | Seconds |
| 2       | Seconds | Minutes |
| 3       | Seconds | Seconds |

\* If J Prefix is displayed in trip class setting, jam protection is enabled. If programmed to LIn position, overcurrent trip delays are fixed linear-type delays set in OPT1 position.

\*\* RD2 & RD3 can be changed from minutes to seconds under program position OPT2.

## Certification & Compliance

|            |                              |
|------------|------------------------------|
| <b>UL</b>  | UL508, UL1053 (File #E68520) |
| <b>CSA</b> | C22.2                        |
| <b>CE</b>  | IEC 60947-1, IEC 60947-5-1   |

# Motor and Pump Protection Relays

## 77C-KW Series

### Accessories

#### RS485MS-2W Communication Module

Required to enable the Modbus communications function on Model 77X-type products.

#### Communication Adapters

- **RS485-RS232**—Converter with cable & plug
- **RS485-USB**—Converter with cable & plug
- **RS232-USB**—Converter

Specifications match industry standard.

#### RM1000 Remote Monitor

The RM1000/777 motor management system combines unsurpassed electronic motor protection and critical, user-friendly, motor monitoring for up to 16 devices.

#### RM2000 Remote Monitor

The RM2000/777 motor management system combines unsurpassed electronic motor protection and critical, user-friendly, motor monitoring with event storage and real-time clock for date and time stamp.

#### Solutions Software: Solutions-M

Software features include data logging, real-time data monitoring and fault and event monitoring.

#### 777-MRSW Manual Remote Reset Kit

Allows the 777 line of MotorSaver® and PumpSaver® products to be manually reset without opening the panel door.

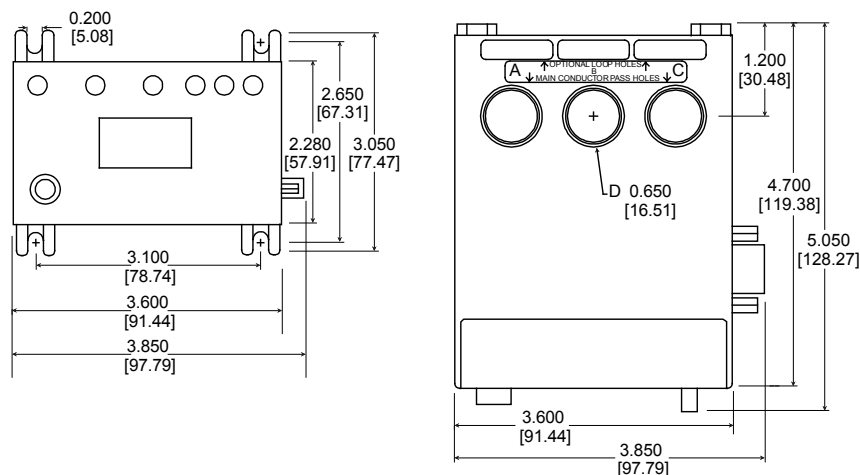
#### OL-RESET Manual Remote Reset Kit

Allows the 777 line of MotorSaver® and PumpSaver® products to be manually reset without opening the panel door.

### Ordering Information

| MODEL        | LINE VOLTAGE | MOTOR FULL AMP RANGE                      | DESCRIPTION  |
|--------------|--------------|---|--|
| 77C-KW/HP    | 100–240 V ac | 2–90 A (external CTs required above 90 A) | Provides 480 VA @ 240 V ac output SPDT (Form C) relay contacts |
| 77C-LR-KW/HP | 100–240 V ac | 1–9 A (external CTs required above 9 A)   | Provides 480 VA @ 240 V ac output SPDT (Form C) relay contacts |

### Dimensions Inches (mm)

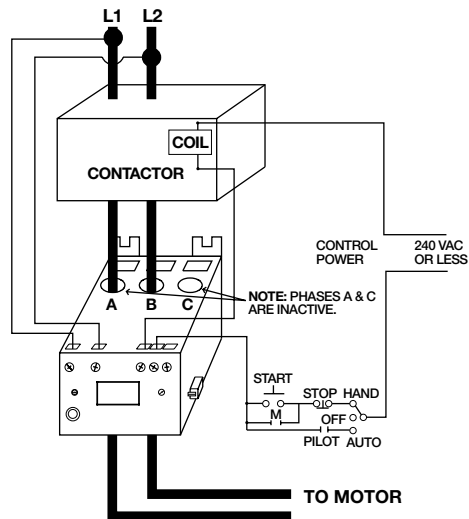


# Motor and Pump Protection Relays

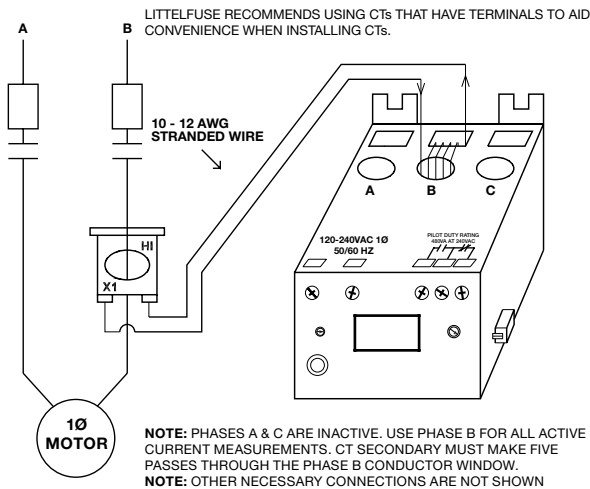
## 77C-KW Series

### Simplified Wiring Diagram

TYPICAL WIRING DIAGRAM FOR MODEL 77C-KW/HP WITH MOTOR CONTROL



TYPICAL WIRING DIAGRAM FOR MODEL 77C-KW/HP WITH EXTERNAL CT



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