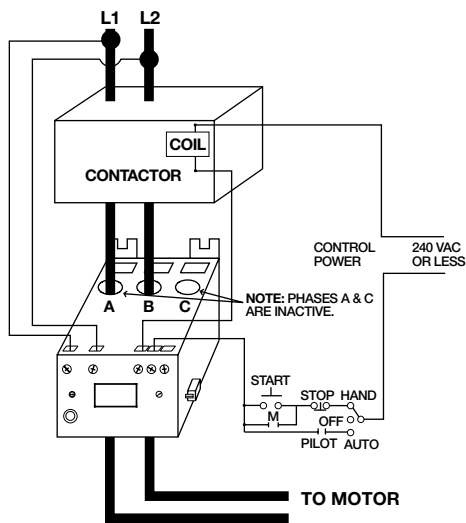# 77C-KW/HP SERIES
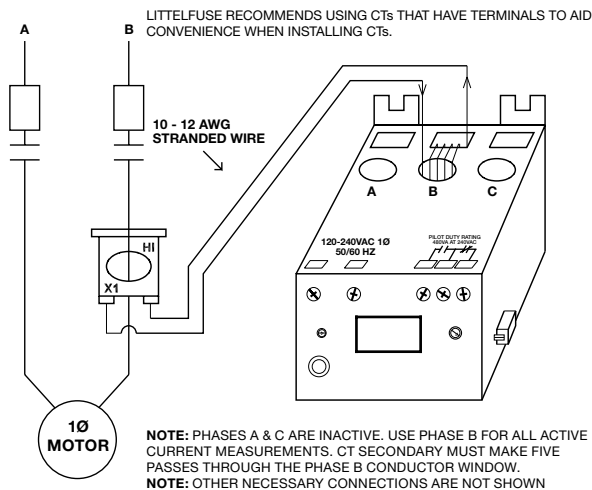
Single-Phase Current & Voltage Monitor

Wiring Diagram

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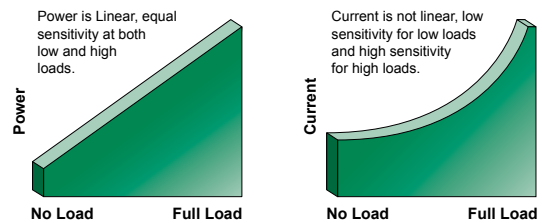WITH MOTOR CONTROL

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

LITTELFUSE RECOMMENDS USING CTs THAT HAVE TERMINALS TO AID CONVENIENCE WHEN INSTALLING CTs.

10 - 12 AWG STRANDED WIRE

NOTE: PHASES A & C ARE INACTIVE. USE PHASE B FOR ALL ACTIVE CURRENT MEASUREMENTS. CT SECONDARY MUST MAKE FIVE PASSES THROUGH THE PHASE B CONDUCTOR WINDOW.
NOTE: OTHER NECESSARY CONNECTIONS ARE NOT SHOWN

Description

The 77C-KW/HP and 77C-LR-KW/HP are fully programmable pump protection relays which will monitor the voltage and current for high or low voltage, overload and underload conditions based on power, in one package. 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 around 3400 rpm and usually have small current vs load changes; such as slow speed mixer or agitator motors up to 50 hp, and magdrive or can pumps.

Power is Linear, equal sensitivity at both low and high loads.

Current is not linear, low sensitivity for low loads and high sensitivity for high loads.

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

Features & Benefits

FEATURES	BENEFITS
Underload protection	Increases reliability for non-linear motors where the load characteristic has little change
Built-in display	Visual indication for programming, viewing real-time voltage, current, kilowatts or horsepower, and last fault code
15 programmable criteria settings	Allows user flexibility to fine-tune the relay for maximum protection in any application.
Last fault memory	Provides instant troubleshooting diagnostics
Remote display compatibility	Increases safety through remote display of real-time data and fault history, without the need to open the cabinet. Aids with arc flash safety regulations.
Flexible reset	Reset options: automatic, manual using pushbutton on relay, or remotely with optional 777-MRSW or OL-RESET remote reset kit.
Network communications capability	Compatible with Modbus using optional communications module (RS485MS-2W)

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

Rev: 2-C-042619

77C-KW/HP 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.

Specifications

Input Voltage	100-240 V ac, 1Ø
Frequency	50-60 Hz
Motor Full Load Amp Range	
77C-KW/HP	2-25 A (Loops Required)
	26-90 A (Direct)
	91-800 A (External CT's)
77C-LR-KW/HP	1.0 A - 2.0 A (additional Loop)
	2.0 A - 9.0 A (Direct)
Short Circuit Withstand Rating	100 kA per UL and CSA
Power Consumption	5 W (Maximum)
Output Contact Rating SPDT (Form C)	Pilot duty rating: 480 VA @ 240 V ac
	General purpose: 10 A @ 240 V ac
Expected Life	
Mechanical	1×10^6 operations
Electrical	1×10^5 operations at rated load
Accuracy at 25 °C (77 °F)	
Voltage	±1 %
Current	±3 % (Direct, No External CT's)
Timing	5 % ± 1 second
Repeatability	
Voltage	± 0.5 % of nominal voltage
Current	± 1 % (Direct, No External CT's)
Safety Marks	
UL	UL 508, UL 1053
CE	IEC 60947-1, IEC 60947-5-1
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6 kV contact, 8 kV air
Radio Frequency Immunity (RFI), Conducted	IEC 61000-4-6, Level 3 10 V/m
Radio Frequency Immunity (RFI), Radiated	IEC 61000-4-3, Level 3 10 V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5 kV input power
Surge	
IEC	IEC 61000-4-5, Level 3, 2 kV line-to-line; Level 4, 4 kV line-to-ground
ANSI/IEEE	C62.41 Surge and Ring Wave compliance to a level of 6 kV line-to-line
Hi-potential Test	Meets UL 508 (2 x rated V +1000 V for 1 min.)
Vibration	IEC 68-2-6, 10-55 Hz, 1 mm peak-to-peak, 2 hours, 3 axis
Shock	IEC 68-2-27, 30 g, 3 axis, 11 ms duration, half-sine pulse
Mechanical	
Dimensions	**H** 78.74 mm (3.1"); **W** 99.06 mm (3.9"); **D** 129.54 mm (5.1")
Terminal Torque	7 in.-lbs.
Enclosure Material	polycarbonate
Weight	1.2 lbs
Maximum Conductor Size Through 777	0.65" with insulation

77C-KW/HP SERIES

Environmental

Temperature Range
Ambient Operating -20 °C - 70° C (-4 °F - 158 °F)
Ambient Storage -40 °C - 80° C (-40 °F - 176 °F)
Pollution Degree 3
Class of Protection IP20, NEMA 1
Relative Humidity 10-95 %, non-condensing per IEC 68-2-3
Programmable
  Operating Points Range
LV- Low Voltage Threshold 85 V - HV Setting
HV- High Voltage Threshold 264 V - LV Setting
MULT- # of Conductors or
  CT Ratio (XXX:5)
  77C: 1-10 Conductors or 100-800 Ratio
  77C-LR: 1 or 2
OC- Overcurrent Threshold (20-100 A) ÷ MULT or 80-120 % of CT Primary
TC- Overcurrent Trip Class * 5, J5, 10, J10, 15, J15, 20, J20, 30, J30, or
LIn (linear)
RD1- Rapid Cycle Timer 0, 2 - 500 seconds
RD2- Restart Delay After All
  Faults Except Undercurrent
  (motor cool down timer)** 2 - 500 minutes/seconds

RD3- Restart Delay
  After Undercurrent
  (dry well recovery timer) 2 - 500 minutes/seconds
#RU- Number of Restarts
  After Undercurrent 0, 1, 2, 3, 4, A (Automatic)
ADDR- RS485 Address A01- A99
#RO-Number of Restarts
  After Overcurrent 0, 1, 2, 3, 4, A (Automatic)
LP/PWS (PWS = LP Range) **1** = 0.01 - 0.99 KW **5** = 0.01 - 1.30 HP
2 = 1.00 - 9.95 KW **6** = 1.34 - 13.3 HP
3 = 10.0 - 99.5 KW **8** = 13.4 - 133 HP
4 = 100 - 650 KW **9** = 134 - 871 HP

SETTING	RD2	RD3		SETTING	RD2	RD3
0	Minutes	Minutes		2	Seconds	Minutes
1	Minutes	Seconds		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.