MOTOR STARTER–PROTECTOR COMBO (MSC) REFRIGERATION PACKAGE

Compact, Reliable, Low Power Consumption

Introduction

The Klixon® MSC refrigeration pack–age is a compact motor starter and motor protector package that dissipates less than 2 watts under typical operating conditions.

Standard

1-Piece (RSCR)

2-Piece (RSCR)

Terminal Board

Overview

The MSC by Sensata Technologies serves as a combination control that:

- Uses compact metal can motor protector and solid state PTC motor starter
- Includes Internal Back-up Protection System for the PTC motor starter
- Available for RSCR applications (Contact Sensata for alternate configurations)
- Plugs directly onto compressor terminal pins
- Dissipates less than 2 watts under typical operating conditions

Features

- Applicable to fractional horsepower compressors used in residential refrigerators and freezers, and similar refrigeration applications
- Utilizes ceramic PTC (Positive Temperature Coefficient) thermistor element to energize / de-energize motor start windings
- Available for 120 and 220 volt applications
- Configurations available to suit most residential applications
- Less costly to install than discrete motor starter and protector components

SPECIFICATIONS

General

Temperature Limits	Ambient Air: 0°C to 70°C
Electrical Requirements	120 or 240 VAC nominal voltage (50 or 60 Hz)

Motor Starter

Room Temperature Resistance	3.9Ω to 47Ω ratings available ±25% resistance tolerance
Switch Time	0.1 – 1.4s at 120 or 240 VAC
Reliability	500,000 cycles at maximum rated conditions of voltage and current

Motor Protector

Device Actuation Temperatures	Open Temperature: 100°C to 160°C ± 5°C Close Temperature: 55°C to 70°C ± 9°C Temperature Differential: 60°C typical
Rated Hot Locked Rotor Current	120 VAC: 18.0 A maximum 240 VAC: 10.0 A maximum 60% power factor
Ultimate Trip Current	0.5 – 5.5 A @ 71°C
Endurance[1]	Minimum of 15,000 cycles at maximum rated current at 120 and 240 volts, as predicted by Weibull analysis of the test data. This protection must be verified in the end application.

[1] A failure is defined as an open circuit or permanently closed circuit, rapid cycle (>3X normal rate), or by a change in the open or close temperature of more than 10% from the original values.

CONFIGURATIONS

MSC Standard

Multiple quick connect (QC) terminal configurations available; designed to be used with secondary compressor relay cover

MSC One-Piece Connector

3.2 mm x 0.5 mm terminals for use with standard insulated connector

MSC Two-Piece Connector

1/4" and/or 3/16" QC terminal configurations for use with standard insulated connectors

MSC Terminal Board

Multiple QC and screw terminal configurations available; designed to be used with secondary compressor relay cover

APPLICATION NOTES

1. The surface and terminals of the MSC device can reach high temperatures under typical running conditions. Any material in contact with the MSC and its terminals, including wire and quick-connect receptacle plastic insulation, should have a minimum temperature rating (UL RTI) of 105°C. Adequate spacing should be provided to insulate lower-rated materials from this heat source.

2. The MSC device should be protected from potential sources of liquid, such as the evaporator tray and water connections.

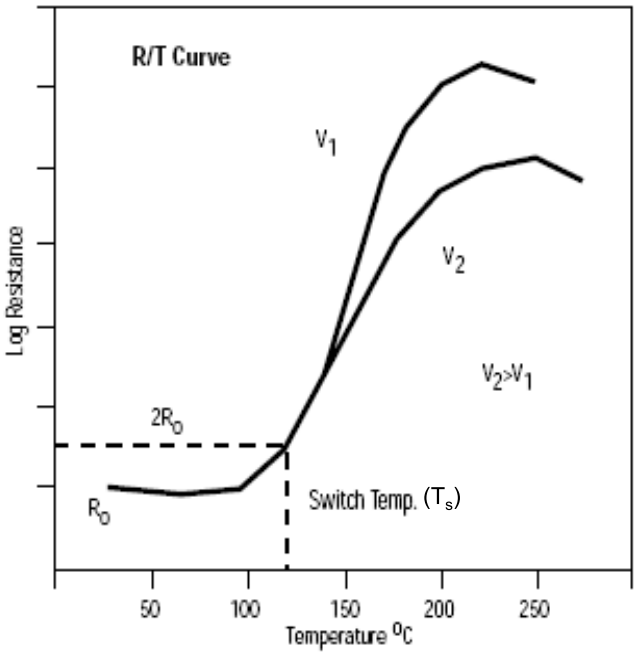
3. Certain materials, such as chlorine (Cl) containing gases, can degrade the characteristics of the MSC device. The MSC device should not be exposed to sulphur (S) or chlorine (Cl) containing gases, and must be kept away from materials that can generate them. In particular, avoid the use of polyvinyl chloride (PVC) insulation in contact with the MSC terminals.

4. The MSC device should not be exposed to hydrocarbon based materials, as they can cause a degradation in the PTC characteristics.

5. The final device configuration selection will determine the necessity for a secondary compressor relay cover and or supplemental retention requirements.

6. The installation force applied to the MSC device must be in parallel with the compressor feedthrough pins and must not exceed 20 kgf (44 lbs).

CURVES

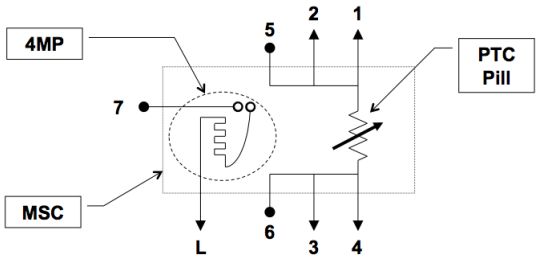


Glossary

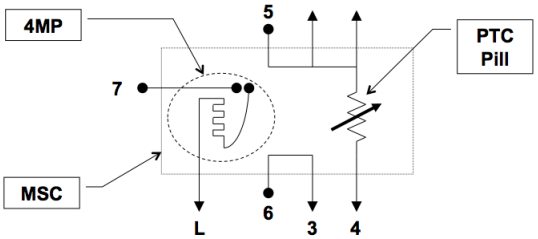
R_0	Measured resistance value at 25°C at maximum of 2.0 volts
Switch Time (t_s)	Time required for the inrush current to decrease to 1/2 of its initial value
Switch (Curie) Temp. (T_s)	Temperature at which the PTC resistance value is 2X the 25C value (R0)
Reset Time	Time required for the PTC resistance to return to 2X the initial value (2R0)
V_{max}	Maximum operating voltage that may be applied across the PTC
V_r	Nominal rated supplied voltage: 120 or 240 VAC (<Vmax)
I_{ss}	Steady state current remaining at maximum operating voltage
I_{max}	Maximum operating (inrush) current

ELECTRICAL SCHEMATICS

MSC STD

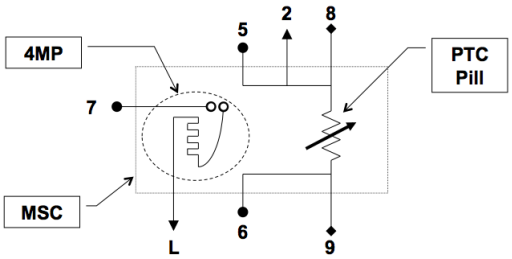


RS*R

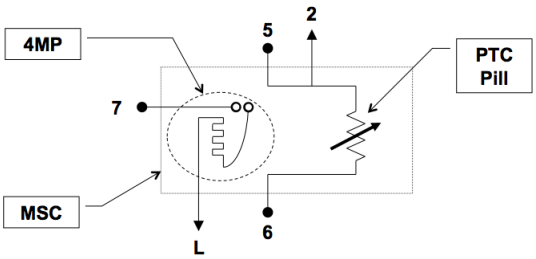


CS*R

MSC 1-PC
MSC 2-PC



RSCR

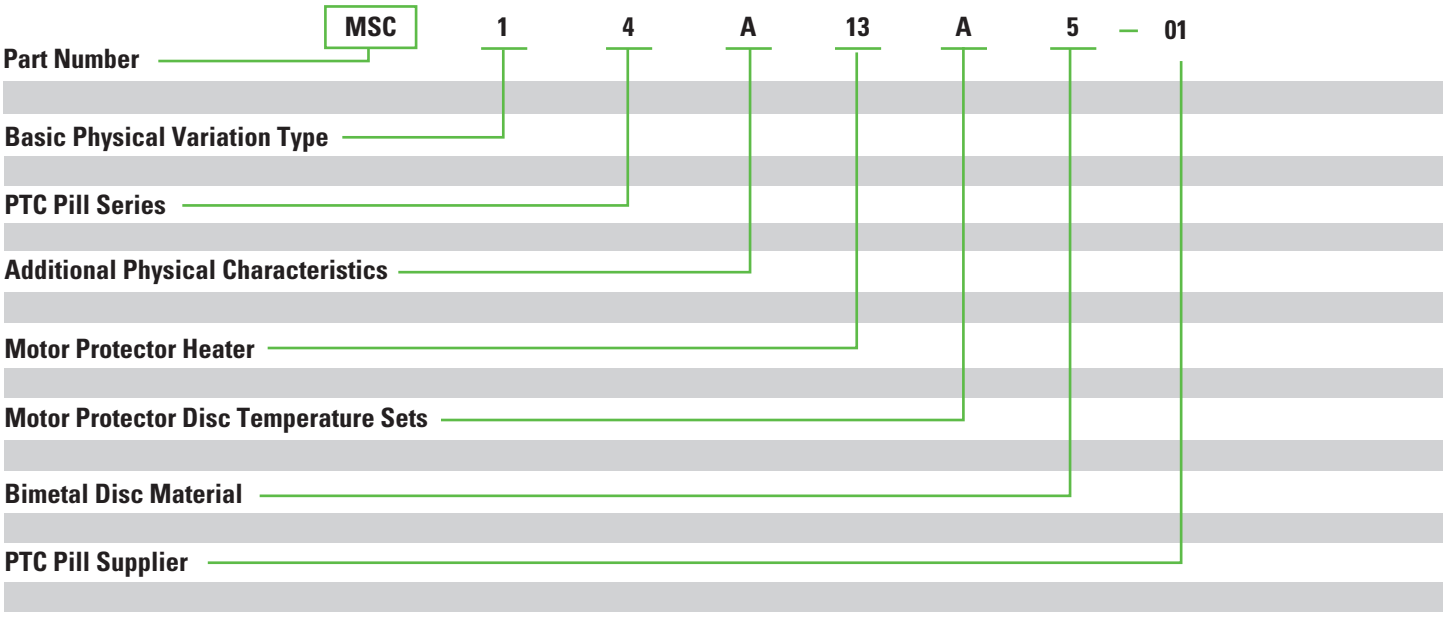


RSIR

- Quick-connect terminal
- Pin connector
- Run Capacitor connector (outputs)

ORDERING OPTIONS

Example : MSC 1 4 A 13 A 5 - 01



AGENCY APPROVALS & CERTIFICATIONS

UL / C-UL	File# SA3745
KEMA / ENEC	Certification # 2014531.01 IEC/EN 60730-2-4: 2007 IEC/EN 60730-2-10: 2007 IEC/EN 60079-15: 2005 IEC/EN 60335-1: 2001, clause 30.2.3
CQC	Certification 08002025660

RoHS Compliant

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