MOS Series Pump Protection / Monitoring Modules

Base Part Numbers: MOS-1P, MOS-1PE, MOS-1PR, MSS-2P, MSS-2PE, MSS-2PR, MTT-2P, MRS-1P, MRS-1PE, MRR-2P, MRT-1P

Overview

The MOS Series pump protection and monitoring modules are designed to provide a low-cost, flexible solution for protecting most brands of submersible sewage pumps against thermal and seal-failure conditions. Separate LED indication and relay contact outputs for each function are included. Flexible model options enable protection of any submersible sewage pump with heat sensor and/or seal-failure sensing devices installed. The MOS Series may be powered by 24 to 240 VAC, 50/60 Hz with no modifications. Standard models are available for monitoring via resistance probes, seal-failure float switches, Klixon thermal switches, RTDs and thermistors. Custom modules may also be factory configured.

Operation Description

The MOS Series combines detection circuits for both motor and bearing over-temperature and seal-failure in a single plug-in unit. In an alert condition, the appropriate LED is illuminated and relay contacts associated with the condition toggle. Thus a load, such as the motor contactor, may be turned off, or a warning light might be turned on. Upon occurrence of the first alarm condition, the proper LED will illuminate a steady alarm indication. If the alarm is cleared automatically, the LED will then begin to flash, so that the operator will know that one or more alarm occurrences has been detected, and automatically cleared.

A low voltage supply provides power to the over-temperature and seal-failure monitoring circuits which control relay outputs based on instructions contained in a microprocessor. The microprocessor circuitry includes power-on-reset and oscillator start-up timers as well as an independent watchdog timer to ensure reliable operation. Both hardware and software filtering is implemented on the sensor inputs for reliable signal integrity in noisy environments.

A Test push button simulates faults on both sensor channels, and a Reset push button clears the alert indicators after (1) The Test push button has been depressed, or (2) an actual alert has been corrected. The Reset push button performs a "hard" microprocessor reset.

To prevent dislodgement of the module it is designed to be mounted in an industrial type 12-pin socket with hold down clip.

Model Variations (Channel Usage)

The MOS channels (A and B) may be used independently in any combination, as shown in the following table.

Model	Channel A	Channel B
MOS-1P	120K resistance probe (seal-fail)	NC Klixon™ (thermal)
MOS-1PE	NC seal chamber float switch (seal-fail)	NC Klixon™ (thermal)
MOS-1PR	33k parallel resistor with 120k resistance probe (seal-fail)	NC Klixon™ (thermal)
MSS-2P	120K resistance probe (seal-fail)	120K resistance probe (seal-fail)
MSS-2PE	NC seal chamber float switch (seal-fail)	NC seal chamber float switch (seal-fail)
MSS-2PR	33k parallel resistor with 120k resistance probe (seal-fail)	33k parallel resistor with 120k resistance probe (seal-fail)
MTT-2P	Thermistor DIN44082/01D463 (thermal)	Thermistor DIN44082/01D463 (thermal)
MRS-1P	120K resistance probe (seal-fail)	Pt100 RTD (thermal)
MRS-1PE	NC seal chamber float switch (seal-fail)	Pt100 RTD (thermal)
MRR-2P	Pt100 RTD (thermal)	Pt100 RTD (thermal)
MRT-1P	Thermistor DIN44082/01D463 (thermal)	Pt100 RTD (thermal)

Common Features (All Models)

- ***Auto/Manual Reset:*** Channels that monitor temperature can be set for Manual or Auto reset after experiencing an alarm condition. (Seal failures automatically reset when the alarm condition is removed although the LED continues to flash until reset.)
- ***Reset Push-button:*** The reset button is used to reset all alarm conditions and clear flashing LED states.
- ***Test Push-button:*** The test button simulates an alarm condition in both channels until released. NOTE: In many cases this will cause the pump to stop because of the simulated high temperature condition.

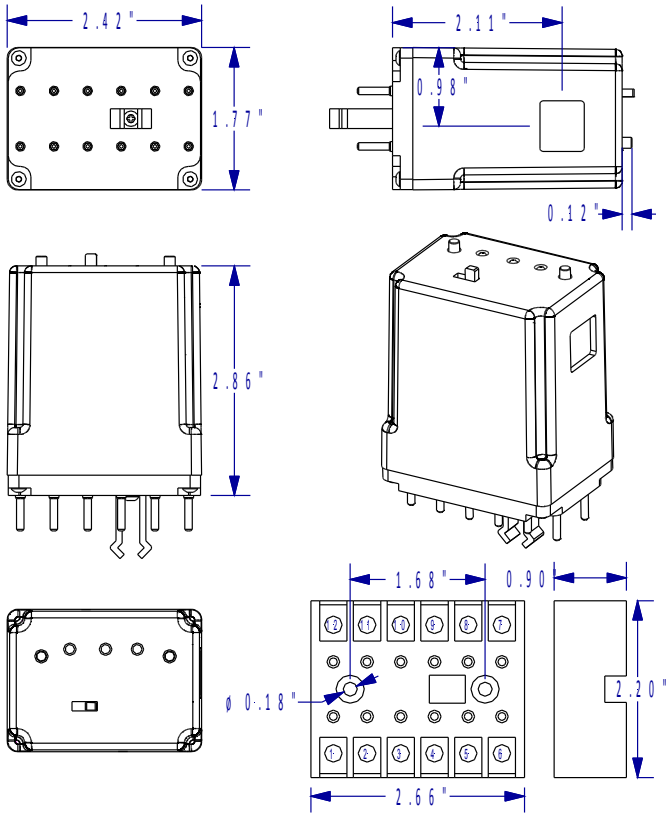
Technical Specifications

Measurement Principle	Current sensing.
Environment	-40 to 55 °C (-40 to 131 °F)
Supply Voltage	24 to 240 VAC, 50-60 Hz. / 24-48 VDC
Power Consumption	24 VAC - 50/60 Hz 1.7 VA 120 VAC – 50/60 Hz 1.9 VA 240 VAC – 50/60 Hz 2.4 VA 24 VDC 1.4 Watts
Relay Contact Rating	NEMA B300 Pilot Duty, 1/6th HP, 3A @240VAC; Form C
Sensor Voltage	Voltage varies with resistance. Not to exceed 10 VDC±2% Current cannot exceed 3 mA.
LED States (Both Channels)	GREEN: no fault RED: thermal fault AMBER: seal-fail fault FLASHING: fault automatically cleared
Contact States	N.O. contact closes on fault condition **or** on loss of supply power.

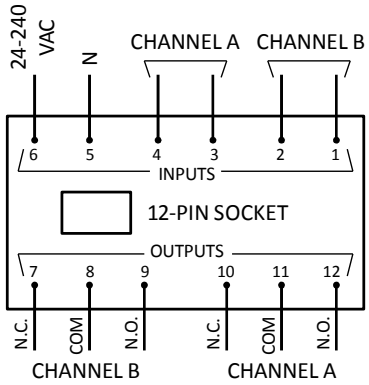
Model	Channel A		Channel B	
	Fault	Timing	Fault	Timing
MOS-1P	R < 120k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	Klixon™ open (thermal)	7 sec. event
MOS-1PE	Float switch opens (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	Klixon™ open (thermal)	7 sec. event
MOS-1PR	R < 26k or R > 40k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	Klixon™ open (thermal)	7 sec. event
MSS-2P	R < 120k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	R < 120k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours
MSS-2PE	Float switch opens (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	Float switch opens (seal-fail)	45 sec. or 3 15-sec. events in 24 hours
MSS-2PR	R < 26k or R > 40k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	R < 26k or R > 40k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours
MTT-2P	R > 4k 130°C nom. (thermal)	7 second event	R > 4k 130°C nom. (thermal)	7 sec. event
MRS-1P	R < 120k (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	R > 150 130 °C nom. (thermal)	7 sec. event
MRS-1PE	Float switch opens (seal-fail)	45 sec. or 3 15-sec. events in 24 hours	R > 150 130 °C nom. (thermal)	7 sec. event
MRR-2P	R > 150 130 °C nom. (thermal)	7 sec. event	R > 150 130 °C nom. (thermal)	7 sec. event
MRT-1P	R > 4k 130°C nom. (thermal)	7 second event	R > 150 130 °C nom. (thermal)	7 sec. event

NOTE: Timing values are nominal. Hardware and digital filtering will affect absolute response times by as much as 3 seconds total.

Mechanical



Electrical Wiring



* On 1-wire seal-fail circuits attach Pin 4 to COMMON GROUND point with PUMP SAFETY GROUND WIRE.

NOTE: N.O. contact closes on fault or loss of supply power.

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