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# SEAL LEAKAGE & OVER TEMPERATURE RELAYS

CATALOG OF PRODUCTS











# PRODUCT SUMMARY

Macromatic offers Single or Dual Channel Seal Leakage Relays and Over Temperature & Seal Leakage Relays.

Over Temperature & Seal Leakage Relays protect submersible pump motors against damage from both over temperature and seal leakage.

Seal Leakage Relays monitor the shaft seals of submersible pumps for leakage.

Product Series	Protects Against	Leakage Detection Method	Mounting Configuration	Sensitivity Ranges	Input Voltages
 <b>SFP Series</b>	Seal Leakage Single or Dual Channel	Resistance Sensing	Plug-in	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC
 <b>SFF Series</b>	Seal Leakage Single or Dual Channel	Resistance Sensing	Deadfront on Inner Door ▲	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC
 <b>TCP Series</b>	Over Temperature & Seal Leakage	Resistance Sensing	Plug-in	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC
 <b>TCF Series</b>	Over Temperature & Seal Leakage	Resistance Sensing	Deadfront on Inner Door ▲	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC
 <b>TCF-E Series</b>	Over Temperature & Seal Leakage	Float Type Sensor	Deadfront on Inner Door ▲	N/A	24V AC, 120V AC, 240V AC
 <b>TCF-F Series</b>	Over Temperature & Seal Leakage	CLS or FLS Sensors	Deadfront on Inner Door ▲	N/A	24V AC, 120V AC

▲ These products can also be used with plug-in sockets for back-panel mounting.



# SEAL LEAKAGE

## SINGLE & DUAL CHANNEL | SFP SERIES



Single Channel

Dual Channel

- ◆ Monitors Submersible Pump Seals for Leakage
- ◆ Works with Pumps using Resistance Sensing Leakage Detection
- ◆ Single or Dual Channel for Monitoring 1 or 2 Pumps
- ◆ Two Adjustable Sensitivity Ranges
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ Low-Profile Adjustment Knob
- ◆ Uses Industry-Standard 8 & 11 Pin Octal Sockets



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SFP Series Seal Leakage Relays are designed to monitor the shaft seals of submersible pumps for leakage. LED status indication and low-profile sensitivity knob are on top for easy setup and troubleshooting. These products utilize a plug-in enclosure for panel or DIN-rail mounting with a socket.

Three output configurations are offered: an 8 pin SPDT single channel relay and an 11 pin DPDT single channel relay to monitor a single pump, and an 8 pin dual channel relay (with 2 SPNO contacts) to monitor two pumps. Probes are pulsed with a DC voltage to prevent electroplating issues.

**Operation:** Two wires from the relay are connected to a resistance-sensing probe in the pump seal cavity and the grounded motor housing or across two probes to monitor for seal leakage using a low-voltage DC signal. If the seal starts to leak, contaminating fluid enters the seal cavity. This lowers the resistance between the internal probe and the common connection. When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and the LED turns Red ON. The relay output can be used to give an alarm indication of a leaking seal.

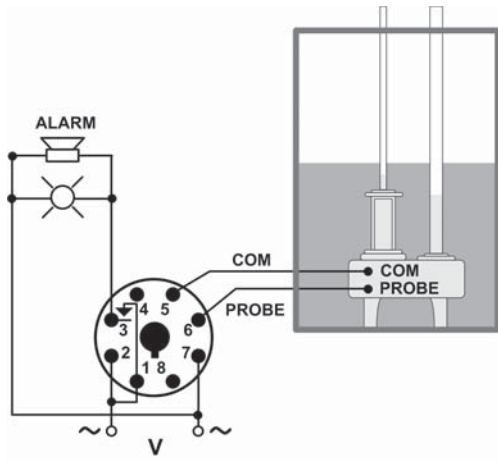
CONFIGURATION	INPUT VOLTAGE	SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET ■
SINGLE CHANNEL 8 Pin SPDT	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFP024A100 SFP024A250	<p>DIAGRAM 163</p>
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFP120A100 SFP120A250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFP240A100 SFP240A250	
SINGLE CHANNEL 11 Pin DPDT	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFP024B100 SFP024B250	<p>DIAGRAM 162</p>
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFP120B100 SFP120B250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFP240B100 SFP240B250	
DUAL CHANNEL 8 Pin (2) SPNO	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFP024C100 SFP024C250	<p>DIAGRAM 164</p>
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFP120C100 SFP120C250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFP240C100 SFP240C250	

Sockets & Accessories available

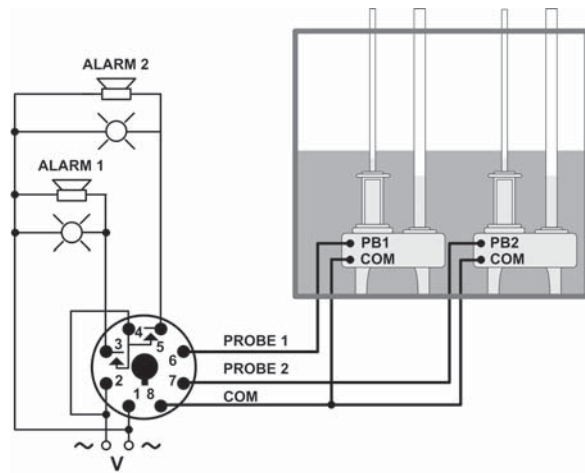
# SEAL LEAKAGE

## SINGLE & DUAL CHANNEL | SFP SERIES

### APPLICATION DATA



Single Channel (8 Pin SPDT Shown)



Dual Channel

#### Voltage Tolerance:

AC Operation: +10/-15% of nominal at 50/60 Hz.

#### Load (Burden):

3 VA

#### Probe Voltage:

5V DC Pulsed

#### Response Time:

Pick-up: 1 Second

Drop-out: 1 Second

#### LED Indicator:

Green ON with input voltage applied; Red ON when seal leak detected and relay energized

#### Temperature:

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

#### Output Contacts:

Single Channel Relays:

8 Pin SPDT: 10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)

11 Pin DPDT: 7A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)

Dual Channel Relays:

(2) 5A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

#### Life:

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

#### Mounting:

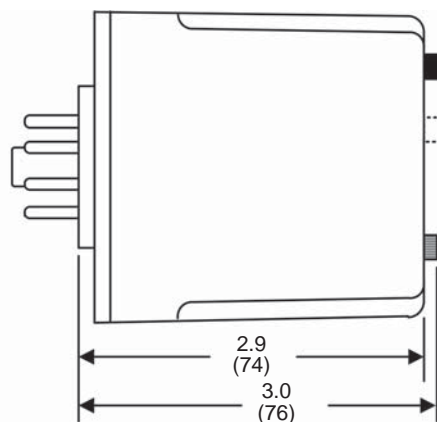
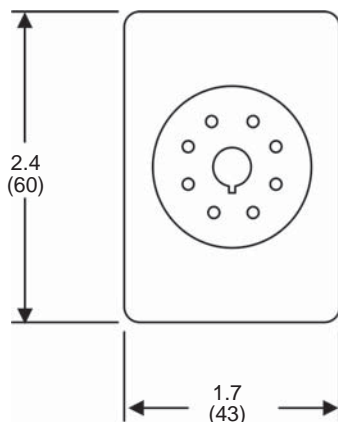
Requires industry-standard 8 Pin Octal Socket (Macromatic 70169-D or equivalent) or 11 Pin Octal Socket (Macromatic 70170-D or equivalent)

#### Approvals:



with appropriate socket  
File #E109466

### DIMENSIONS



All Dimensions in Inches (Millimeters)

# SEAL LEAKAGE

## SINGLE & DUAL CHANNEL | SFF SERIES



Single Channel      Dual Channel

- ◆ Monitors Submersible Pump Seals for Leakage
- ◆ Works with Pumps using Resistance Sensing Leakage Detection
- ◆ Single or Dual Channel for Monitoring 1 or 2 Pumps
- ◆ Two Adjustable Sensitivity Ranges
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ Low-Profile Adjustment Knob
- ◆ Flange-enclosure designed for deadfront door-mounting
- ◆ 8 Pin Back-Mounted Socket Provided with Relay



SFF Series Seal Leakage Relays are designed to monitor the shaft seals of submersible pumps for leakage. These products utilize a flange-enclosure designed to be deadfront-mounted on an inner door and used with back-mounted sockets. Everything needed for setup, use and troubleshooting is on the top of the unit: LED status indication and low-profile sensitivity adjustment knob.

Two output configurations are offered: an 8 pin SPDT single channel relay and an 8 pin dual channel relay (with 2 SPNO contacts) to monitor two pumps. Probes are pulsed with a DC voltage to prevent electroplating issues.

**Operation:** Two wires from the relay are connected to a resistance-sensing probe in the pump seal cavity and the grounded motor housing or across two probes to monitor for seal leakage using a low-voltage DC signal. If the seal starts to leak, contaminating fluid enters the seal cavity. This lowers the resistance between the internal probe and the common connection. When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and the LED turns Red ON. The relay output can be used to give an alarm indication of a leaking seal.

CONFIGURATION	INPUT VOLTAGE	SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET
SINGLE CHANNEL 8 Pin SPDT	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFF024A100 SFF024A250	8 Pin Octal <b>OR08-PC</b> DIAGRAM 163
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFF120A100 SFF120A250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFF240A100 SFF240A250	
DUAL CHANNEL 8 Pin (2) SPNO	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFF024C100 SFF024C250	8 Pin Octal <b>OR08-PC</b> DIAGRAM 164
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFF120C100 SFF120C250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFF240C100 SFF240C250	

■ 8 Pin Back-Mounted Socket Provided with Relay

Sockets & Accessories available



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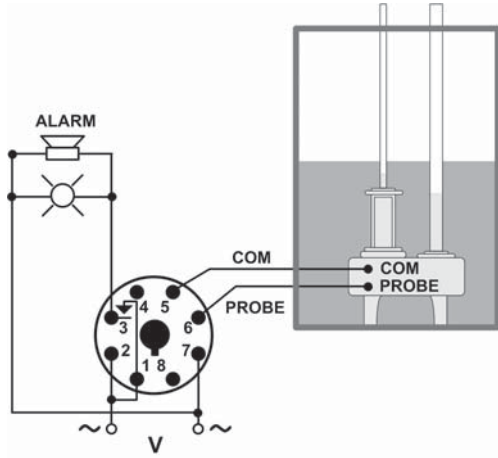
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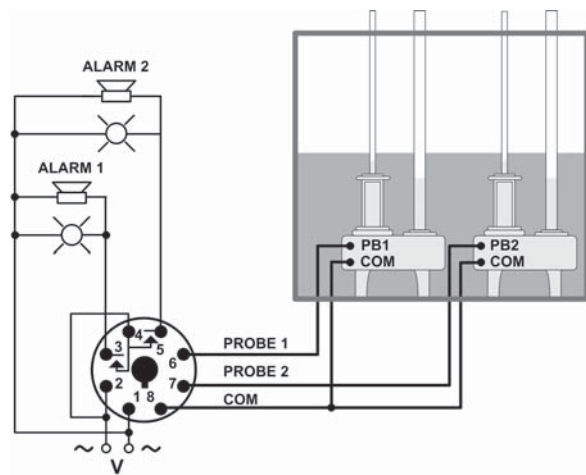
# SEAL LEAKAGE

## SINGLE & DUAL CHANNEL | SFF SERIES

### APPLICATION DATA



Single Channel



Dual Channel

#### Voltage Tolerance:

AC Operation: +10/-15% of nominal at 50/60 Hz.

#### Load (Burden):

3 VA

#### Probe Voltage:

5V DC Pulsed

#### Response Time:

Pick-up: 1 Second

Drop-out: 1 Second

#### LED Indicator:

Green ON with input voltage applied; Red ON when seal leak detected and relay energized

#### Temperature:

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

#### Output Contacts:

Single Channel Relays:

10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)

Dual Channel Relays:

(2) 5A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

#### Life:

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

#### Mounting:

For deadfront-mounting on an inner door, use 8 Pin Back-Mounted Socket (Custom Connector OR08-PC which is provided with the relay). For panel-mounting, use industry-standard 8 Pin Octal socket (Macromatic 70169-D or equivalent).

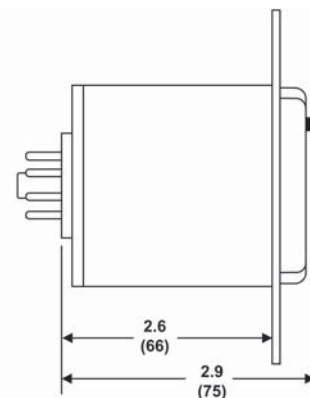
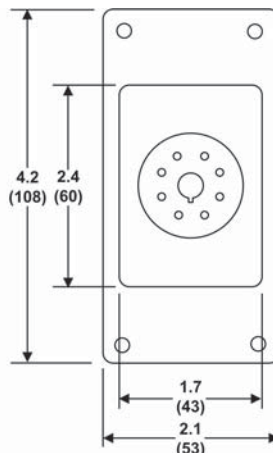
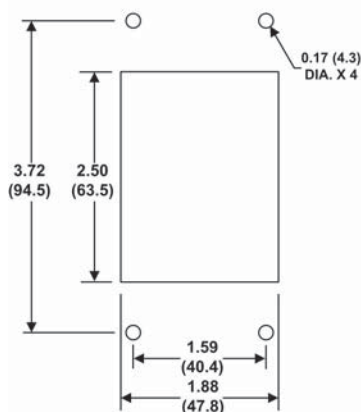
#### Approvals:



with appropriate socket

File #E109466

### DIMENSIONS



All Dimensions in Inches (Millimeters)

# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO RESET | TCP SERIES

OVER TEMPERATURE & SEAL LEAKAGE RELAYS | PLUG-IN



- ◆ Monitors Submersible Pumps for Over Temperature & Seal Leakage
- ◆ Works with Pumps using Resistance Sensing Leakage Detection
- ◆ Auto Reset for Over Temperature
- ◆ Two Adjustable Sensitivity Ranges for Seal Leakage
- ◆ Low-Profile Adjustment Knob
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ Utilizes industry-standard 11 pin octal socket



with appropriate socket

Macromatic TCP Series products protect submersible pump motors against damage from both over temperature and seal leakage. The TCP Series products come with automatic reset for over temperature (for units with a choice of either automatic or manual reset in a flange-mounted enclosure, see the TCF Series products). These products utilize an industry-standard plug-in enclosure for panel or DIN-rail mounting.

### Operation:

Two wires from the relay are connected to a N.C. thermal switch in the windings of the pump motor to monitor for overheating. A low-voltage DC signal is applied to check the status of the thermal switch. Two additional wires are connected to a single or dual resistance-sensing probe and the grounded motor housing, or across two probes to monitor for seal leakage using a low-voltage DC signal. These products have isolated output contact relays, one for over temperature and one for seal leakage. The over temperature set-point is fixed at 5K ohms. Two adjustable seal leakage sensitivity ranges are available: 4.7K-100K ohms and 1K-250K ohms.

With input voltage applied, normal temperature condition (thermal switch closed) and no seal leakage, the over temperature relay is energized and the seal leak relay is de-energized. Both LEDs are Green, indicating normal conditions and input voltage applied. When the motor temperature rises and the N.C. thermal switch opens, the over temperature relay is de-energized, opening a contact that had been closed and turning off the pump contactor. The TEMP LED turns Red. If the over temperature condition is cleared, the unit will reset automatically.

If the seal starts to leak, contaminating fluid enters the pump motor cavity. This lowers the resistance between the internal probe and the common connection. When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and closes a contact, which can be used to give an alarm indication of a leaking seal. The LEAK LED turns Red.

INPUT VOLTAGE	LEAKAGE SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET
24V AC	4.7K to 100KΩ 1K to 250KΩ	TCP8G100 TCP8G250	<p>11 Pin Octal <b>70170-D</b></p> <p>DIAGRAM 207</p>
120V AC	4.7K to 100KΩ 1K to 250KΩ	TCP2G100 TCP2G250	
240V AC	4.7K to 100KΩ 1K to 250KΩ	TCP1G100 TCP1G250	



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Sockets & Accessories available



# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO RESET | TCP SERIES

### APPLICATION DATA

**Voltage Tolerance:**

AC Operation: +10/-15% of nominal at 50/60 Hz.

**Load (Burden):**

3 VA

**Temp & Leakage Voltage:**

5V DC Pulsed

**Resistance Sensitivity Range (Seal Leakage):**

4.7K - 100KΩ or 1K - 250KΩ

**Resistance Setting (Over Temperature):**

5KΩ

**Response Time:**

Pick-up: 1 Second

Drop-out: 1 Second

**Temperature:**

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

**Output Contacts:**

7A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

**Life:**

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

**LED Indicator:**

Temp: Green ON with input voltage applied, normal temperature condition and relay energized; Red ON when over temperature detected and relay de-energized

Seal: Green ON with input voltage applied and no seal leak; Red ON when seal leak detected and relay energized

**Mounting:**

Requires industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

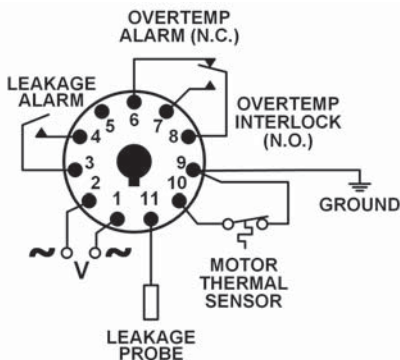
**Approvals:**



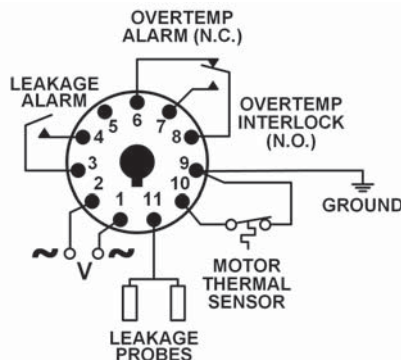
### CONNECTION DIAGRAMS

This flexible product offers three options for connection to monitor over temperature and seal leakage:

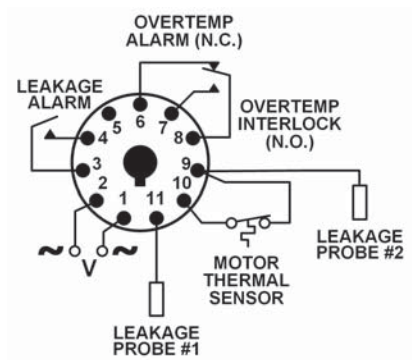
**BETWEEN ONE PROBE & MOTOR HOUSING**



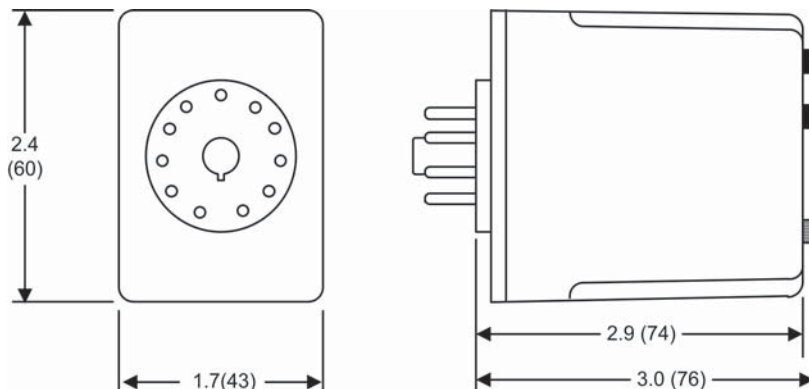
**BETWEEN TWO PROBES & MOTOR HOUSING**



**BETWEEN TWO PROBES**



### DIMENSIONS



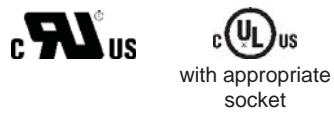
All Dimensions in Inches (Millimeters)

# OVER TEMPERATURE & SEAL LEAKAGE

**AUTO & MANUAL RESET | TCF SERIES FOR PUMPS USING RESISTANCE SENSING LEAKAGE DETECTION**



- ◆ Monitors Submersible Pumps for Over Temperature & Seal Leakage
- ◆ Works with Pumps using Resistance Sensing Leakage Detection
- ◆ Auto & Manual Reset for Over Temperature
- ◆ Flange-enclosure Designed for Deadfront Door-Mounting
- ◆ Two Adjustable Sensitivity Ranges for Seal Leakage
- ◆ Low-Profile Adjustment Knobs & Switch
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ 11 Pin Back-Mounted Socket Provided with Relay



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Macromatic TCF Series products protect submersible pumps against damage from both over temperature and seal leakage. This flexible unit can be connected in one of three ways to monitor for seal leakage: one probe to ground, two probes to ground and probe to probe. These products come with a switch to select either automatic reset or manual reset for an over temperature condition (for automatic reset only in a standard plug-in enclosure, see the TCP Series products).

The flange-enclosure is designed to be deadfront-mounted on an inner door and used with a back-mounted socket (included). Everything needed for setup, use and troubleshooting is on the top of the unit: status LEDs, switch to choose Automatic or Manual Reset mode for temperature, and a pushbutton for Manual Reset of an over temperature condition. They are all visible so that the door need not be opened to see the status of the over temperature or seal leakage condition.

**Operation:**

Two wires from the relay are connected to a N.C. thermal switch in the windings of the pump motor to monitor for overheating. A low-voltage DC signal is applied to check the status of the thermal switch. Two additional wires are connected to a single or dual resistance-sensing probe and the grounded motor housing, or across two probes to monitor for seal leakage using a low-voltage DC signal. These products have isolated output contact relays, one for over temperature and one for seal leakage. The over temperature set-point is fixed at 5K ohms. Two adjustable seal leakage sensitivity ranges are available: 4.7K-100K ohms and 1K-250K ohms.

With input voltage applied, normal temperature condition (thermal switch closed) and no seal leakage, the over temperature relay is energized and the seal leak relay is de-energized. Both LEDs are Green, indicating normal conditions and input voltage applied. When the motor temperature rises and the N.C. thermal switch opens, the over temperature relay is de-energized, opening a contact that had been closed and turning off the pump contactor. The TEMP LED turns Red. If the over temperature condition is cleared, the unit will reset based on the setting of the Over Temp switch. In the AUTO mode, the unit will reset automatically. In the MANUAL mode, the Over Temp Reset button must be pushed to clear the alarm and reset the relay.

If the seal starts to leak, contaminating fluid enters the pump motor cavity. This lowers the resistance between the internal probe and the common connection. When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and closes a contact, which can be used to give an alarm indication of a leaking seal. The SEAL LED turns Red.

INPUT VOLTAGE	LEAKAGE SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET
24V AC	4.7K to 100KΩ 1K to 250KΩ	TCF8D100 TCF8D250	<p>11 Pin Octal <b>OR11-PC</b></p> <p>DIAGRAM 202</p>
120V AC	4.7K to 100KΩ 1K to 250KΩ	TCF2D100 TCF2D250	
240V AC	4.7K to 100KΩ 1K to 250KΩ	TCF1D100 TCF1D250	

■ 11 Pin Back-Mounted Socket Provided with Relay

# OVER TEMPERATURE & SEAL LEAKAGE

**AUTO & MANUAL RESET | TCF SERIES FOR PUMPS USING RESISTANCE SENSING LEAKAGE DETECTION**

## APPLICATION DATA

**Voltage Tolerance:**

AC Operation: +10/-15% of nominal at 50/60 Hz.

**Load (Burden):**

3 VA

**Temp & Leakage Voltage:**

5V DC Pulsed

**Resistance Sensitivity Range (Seal Leakage):**

4.7K - 100KΩ or 1K - 250KΩ

**Resistance Setting (Over Temperature):**

5KΩ

**Response Time:**

Power-up/Restart Delay (Over Temp Relay Energize)	1 second
Over Temp Fault (Relay De-energize)	1 second
Over Temp Fault Clears-Auto Reset (Relay Energize)	1 second
Over Temp Fault Clears-Manual Reset (Relay Energize)	500ms
Seal Leakage Fault (Relay Energize)	1 second
Seal Leakage Fault Clears (Relay De-energize)	1 second

**Temperature:**

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

**Output Contacts:**

7A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

**Life:**

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

**LED Indicator:**

**Temp:** Green ON with input voltage applied, normal temperature condition and relay energized; Red ON when over temperature detected and relay de-energized

**Seal:** Green ON with input voltage applied and no seal leak; Red ON when seal leak detected and relay energized

**Mounting:**

For deadfront-mounting on an inner door, use 11 Pin Back-Mounted Socket (Custom Connector OR11-PC which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

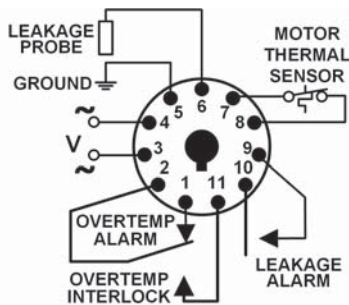
**Approvals:**



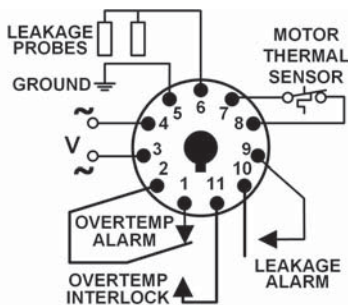
## CONNECTION DIAGRAMS

This flexible product offers three options for connection to monitor over temperature and seal leakage:

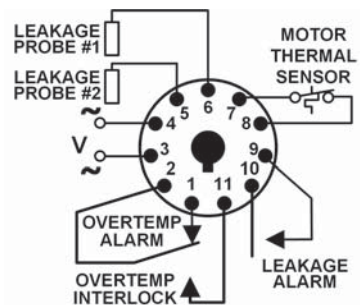
**BETWEEN ONE PROBE & MOTOR HOUSING**



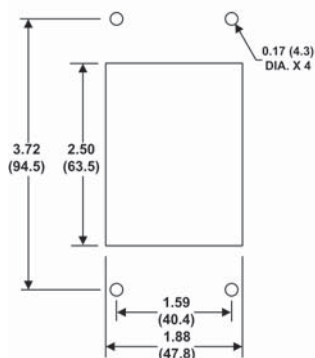
**BETWEEN TWO PROBES & MOTOR HOUSING**



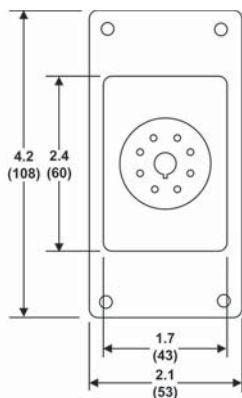
**BETWEEN TWO PROBES**



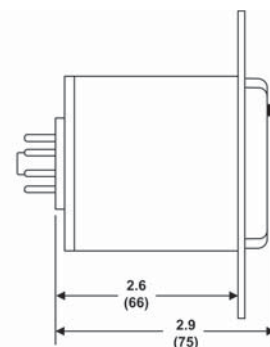
## DIMENSIONS



Panel Cutout



All Dimensions in Inches (Millimeters)



# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO & MANUAL RESET | TCF-E SERIES FOR PUMPS WITH FLOAT TYPE LEAKAGE DETECTOR

OVER TEMPERATURE & SEAL LEAKAGE RELAYS | INNER DOOR MOUNTING



- ◆ Monitors Submersible Pumps for Over Temperature & Seal Leakage
- ◆ Works with Pumps Using a Float Type Leakage Detector
- ◆ Auto & Manual Reset for Over Temperature
- ◆ Flange-enclosure Designed for Deadfront Door-Mounting
- ◆ Low-Profile Adjustment Switch & Reset Button
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ 11 Pin Back-Mounted Socket Provided with Relay



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Macromatic TCF-E Series products monitor for over temperature and seal leakage on submersible pumps using a float type leakage detector. These products come with a switch to select either automatic reset or manual reset for an over temperature condition.

The flange-enclosure is designed to be deadfront-mounted on an inner door and used with a back-mounted socket (included). Everything needed for setup, use and troubleshooting is on the top of the unit: status LEDs, switch to choose Automatic or Manual Reset mode for temperature, and a pushbutton for Manual Reset of an over temperature condition. They are all visible so that the door need not be opened to see the status of the over temperature or seal leakage condition.

### Operation:

Two wires from the Over Temp/Seal Leakage relay are connected to a N.C. thermal switch in the windings of the pump motor to monitor for overheating. A low-voltage DC signal is applied to check the status of the thermal switch. Two additional wires are connected to a N.C. float switch in the Leakage Sensor. A separate low-voltage DC signal is applied to check the status of the Leakage Sensor. These products have isolated output contact relays, one for over temperature and one for seal leakage.

With input voltage applied, normal temperature condition (thermal switch closed) and no seal leakage (Leakage Sensor contact closed), both the over temperature relay and the seal leakage relay are energized. The TEMP & SEAL LEDs are both Green, indicating normal conditions and input voltage applied.

When the motor temperature rises and the N.C. thermal switch opens, the over temperature relay is de-energized, opening a contact that had been closed and turning off the pump contactor. The TEMP LED turns Red. If the over temperature condition is cleared, the unit will reset based on the setting of the Over Temp switch. In the AUTO mode, the unit will reset automatically. In the MANUAL mode, the Over Temp Reset button must be pushed to clear the alarm and reset the relay.

If the seal starts to leak, contaminating fluid enters the pump motor cavity. The contact in the Leakage Sensor will open and the seal leakage relay is de-energized, reclosing a contact that was opened and providing an alarm indication of a leaking seal. The SEAL LED turns Red.

INPUT VOLTAGE	CATALOG NUMBER	WIRING/SOCKET
24V AC	TCF8E	<p>11 Pin Octal OR11-PC■</p> <p>DIAGRAM 217</p>
120V AC	TCF2E	
240V AC	TCF1E	

■ 11 Pin Back-Mounted Socket Provided with Relay

# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO & MANUAL RESET | TCF-E SERIES FOR PUMPS WITH FLOAT TYPE LEAKAGE DETECTOR

### APPLICATION DATA

**Voltage Tolerance:**

AC Operation: +10/-15% of nominal at 50/60 Hz.

**Load (Burden):**

3 VA

**Temp & Leakage Voltage:**

5V DC Pulsed

**Resistance Setting (Over Temperature):**

5KΩ

**Response Time:**

Power-up/Restart Delay (Over Temp Relay Energize)	1 second
Over Temp Fault (Relay De-energize)	1 second
Over Temp Fault Clears-Auto Reset (Relay Energize)	1 second
Over Temp Fault Clears-Manual Reset (Relay Energize)	500ms
Seal Leakage Fault (Relay Energize)	1 second
Seal Leakage Fault Clears (Relay De-energize)	1 second

**Temperature:**

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

**Output Contacts:**

7A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

**Life:**

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

**LED Indicator:**

**Temp:** Green ON with input voltage applied, normal temperature condition and relay energized; Red ON when over temperature detected and relay de-energized

**Seal:** Green ON with input voltage applied, no seal leak and relay energized; Red ON when seal leak detected and relay de-energized

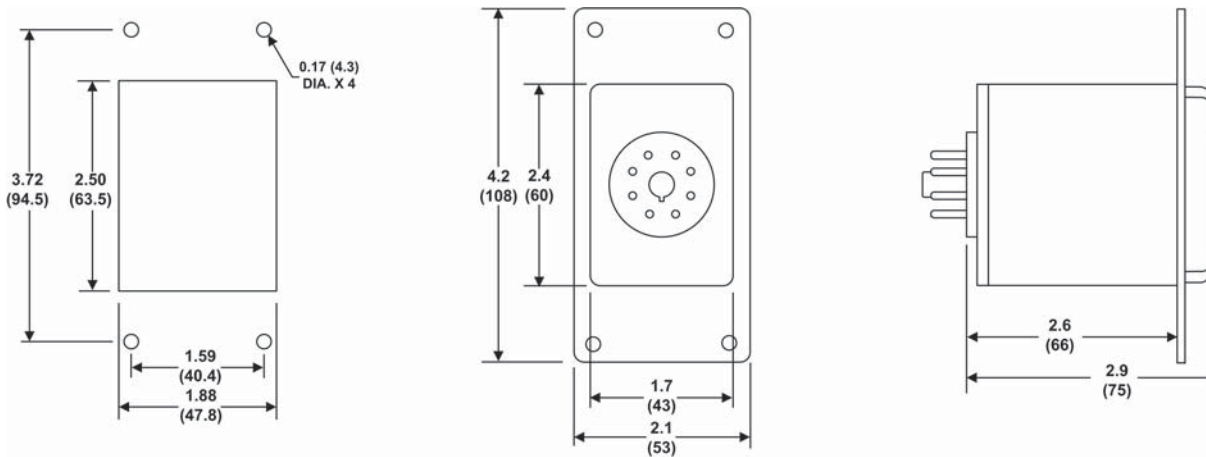
**Mounting:**

For deadfront-mounting on an inner door, use 11 Pin Back-Mounted Socket (Custom Connector OR11-PC which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

**Approvals:**



### DIMENSIONS



Panel Cutout

All Dimensions in Inches (Millimeters)

# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO & MANUAL RESET | TCF-F SERIES FOR PUMPS WITH FLS OR CLS LEAKAGE SENSOR



- ◆ Monitors Submersible Pumps for Over Temperature & Seal Leakage
- ◆ Works with Pumps Using a FLS or CLS Leakage Sensor
- ◆ Auto & Manual Reset for Over Temperature
- ◆ Flange-enclosure Designed for Deadfront Door-Mounting
- ◆ Low-Profile Adjustment Switch & Reset Button
- ◆ Full Status Indication on Top of Unit for Easy Troubleshooting
- ◆ 11 Pin Back-Mounted Socket Provided with Relay



with appropriate socket



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Macromatic TCF-F Series products monitor for over temperature and seal leakage on submersible pumps using either FLS or CLS leakage sensors. These units come with a switch to select either automatic reset or manual reset for an over temperature condition.

The flange-enclosure is designed to be deadfront-mounted on an inner door and used with a back-mounted socket (included). Everything needed for setup, use and troubleshooting is on the top of the unit: status LEDs, switch to choose Automatic or Manual Reset mode for temperature, and a pushbutton for Manual Reset of an over temperature condition. They are all visible so that the door need not be opened to see the status of the over temperature or seal leakage condition.

### Operation:

Two wires from the relay are connected to the FLS or CLS sensor which is in series with the pump over temperature switch. A low-voltage DC signal is applied to measure the current flow through the sensor and over temperature switch. The sensor controls the current in this circuit. These products have isolated output contact relays, one for over temperature and one for seal leakage.

With input voltage applied, normal temperature condition (thermal switch closed) and no seal leakage, the sensor current will be in the normal range. The over temperature relay is energized and the seal leak relay is de-energized. Both LEDs are Green, indicating normal conditions and input voltage applied.

When the motor temperature rises and the N.C. thermal switch opens, the sensor current drops to zero. The over temperature relay is de-energized, opening a contact that had been closed and turning off the pump contactor. The TEMP LED turns Red. If the over temperature condition is cleared, the unit will reset based on the setting of the Over Temp switch. In the AUTO mode, the unit will reset automatically. In the MANUAL mode, the Over Temp Reset button must be pushed to clear the alarm and reset the relay.

In a seal leakage condition, contaminating fluid enters the pump motor cavity. The sensor lowers its resistance, increasing the sensor circuit current above the trip point. The seal leakage output relay energizes and closes a contact, which can be used to give an alarm indication of a leaking seal. The SEAL LED turns Red.

### Cleared Fault Condition

If either an Over Temp fault condition when the Over Temp switch is set to AUTO or a Seal Leakage fault has been automatically cleared, a cleared fault indication is displayed by flashing the corresponding Red TEMP LED or Red SEAL LED. The flashing indication may be manually reset by pressing the Over Temp Reset button. Note: if either fault still exists when the Over Temp Reset button is depressed, it is ignored.

### Shorted Sensor

If the sensor wires are shorted, the unit will display a Shorted Sensor condition by alternately flashing the Red SEAL LED and the Red TEMP LED. If the short is removed, the fault will automatically reset within 30 seconds.

INPUT VOLTAGE	CATALOG NUMBER	WIRING/SOCKET
120V AC	TCF2F	<p>11 Pin Octal OR11-PC ■</p> <p>DIAGRAM 219</p>
24V AC	TCF8F	<p>11 Pin Octal OR11-PC ■</p> <p>DIAGRAM 218</p>

■ 11 Pin Back-Mounted Socket Provided with Relay

# OVER TEMPERATURE & SEAL LEAKAGE

## AUTO & MANUAL RESET | TCF-F SERIES FOR PUMPS WITH FLS OR GLS LEAKAGE SENSOR

### APPLICATION DATA

**Voltage Tolerance:**

AC Operation: +10/-15% of nominal at 50/60 Hz.

**Load (Burden):**

3 VA

**Response Time:**

Power-up/Restart Delay (Over Temp Relay Energize)	3 seconds
Over Temp Fault (Relay De-energize)	3 seconds
Over Temp Fault Clears-Auto Reset (Relay Energize)	3 seconds
Over Temp Fault Clears-Manual Reset (Relay Energize)	500ms
Seal Leakage Fault (Relay Energize)	3 seconds
Seal Leakage Fault Clears (Relay De-energize)	3 seconds
Cleared Fault Indication	500ms
Shorted Sensor—Auto Reset	30 seconds

**Temperature:**

Operating: -28° to 65°C (-18° to 149°F)

Storage: -40° to 85°C (-40° to 185°F)

**Output Contacts:**

7A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

**Life:**

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

**LED Indicator:**

**Temp:** Green ON with input voltage applied, normal temperature condition and relay energized; Red ON when over temperature detected and relay de-energized; Red Flashing when over temperature condition has been cleared in AUTO mode

**Seal:** Green ON with input voltage applied, no seal leak and relay de-energized; Red ON when seal leak detected and relay energized; Red Flashing when seal leakage condition has been cleared

**Shorted Sensor:** If sensor wires are shorted, TEMP & SEAL LEDs will alternately flash Red

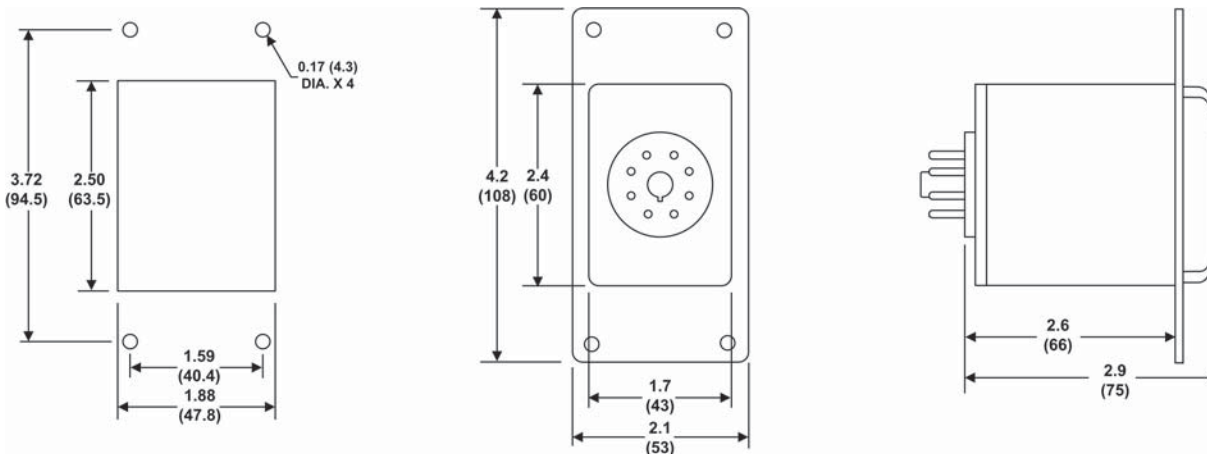
**Mounting:**

For deadfront-mounting on an inner door, use 11 Pin Back-Mounted Socket (Custom Connector OR11-PC which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

**Approvals:**



### DIMENSIONS



Panel Cutout

All Dimensions in Inches (Millimeters)

# SOCKETS & ACCESSORIES

## 8 Pin Octal Socket Surface or DIN Rail-Mounted

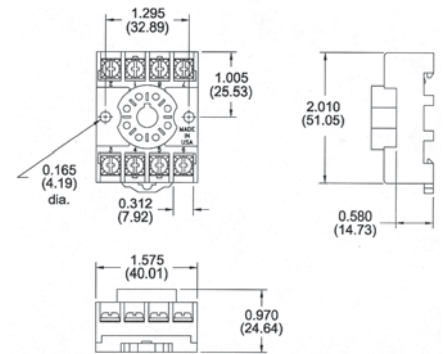
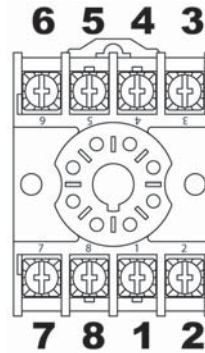
- ◆ 10A @ 600V
- ◆ 1 or 2 #12-20 AWG Wire
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque 12 in-lbs



File #E169693 File #LR701114



Catalog Number:  
70169-D



## 11 Pin Octal Socket Surface or DIN Rail-Mounted

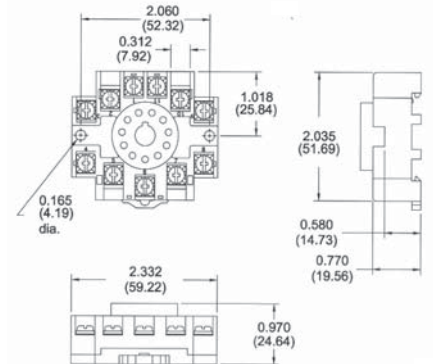
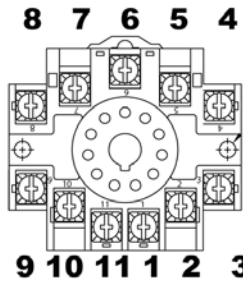
- ◆ 10A @ 300V
- ◆ 1 or 2 #12-20 AWG Wire
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque 12 in-lbs



File #E169693 File #LR701114



Catalog Number:  
70170-D



## 8 Pin Octal Socket Back-Mounted

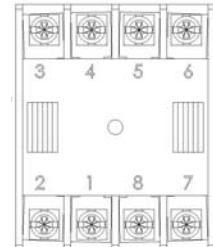
- ◆ 10A @ 300V
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque 7 in-lbs



File #E60008



Catalog Number:  
OR08-PC



## 11 Pin Octal Socket Back-Mounted

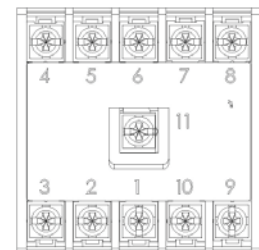
- ◆ 10A @ 300V
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque 7 in-lbs



File #E60008



Catalog Number:  
OR11-PC



## Hold Down Spring

Can be used for:

- ◆ Panel-Mounted Sockets
- ◆ Sockets Mounted to 35mm DIN Rail \*

\* Requires two #8, 3/4" length machine screws with washers & nuts--contact Macromatic or [www.macromatic.com/70166](http://www.macromatic.com/70166) for more information.



Catalog Number: 70166





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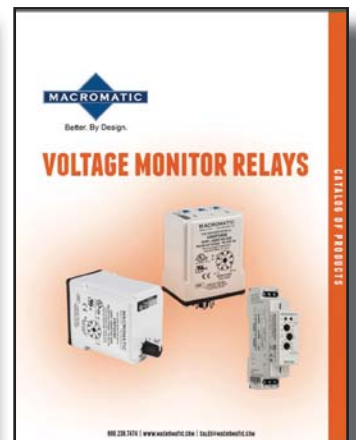
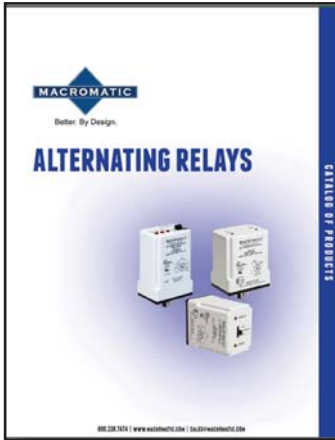
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