MACROMATIC

Better. By Design.

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

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

Product Series		Protects Against	Leakage Detection Method	Mounting Configuration	Sensitivity Ranges	Control Voltages
	**SFP Series**	Seal Leakage Single or Dual Channel	Resistance Sensing	Plug-in	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC, 24V AC/DC
	**SFF Series**	Seal Leakage Single or Dual Channel	Resistance Sensing	Flange (Door Mounted) ▲	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC, 24V AC/DC
	**TCP Series**	Over Temperature & Seal Leakage	Resistance Sensing	Plug-in	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC, 24V AC/DC
	**TCF Series**	Over Temperature & Seal Leakage	Resistance Sensing	Flange (Door Mounted) ▲	4.7K to 100KΩ 1K to 250KΩ	24V AC, 120V AC, 240V AC, 24V AC/DC
	**TCF-A Series**	Over Temperature & Seal Leakage	Resistance Sensing	Flange (Door Mounted) ▲	4.7K to 100KΩ	120V AC, 24V AC/DC
	**TCF-E Series**	Over Temperature & Seal Leakage	Float Type Sensor	Flange (Door Mounted) ▲	N/A	24V AC, 120V AC, 240V AC, 24V AC/DC
	**TCF-F Series**	Over Temperature & Seal Leakage	CLS or FLS Sensors	Flange (Door Mounted) ▲	N/A	24V AC, 120V AC, 24V AC/DC

▲ These products can also be used with plug-in sockets for back-panel or DIN-rail 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

c UL us CE c UL us

with appropriate socket

MACROMATIC

Better. By Design.

800.238.7474

WWW.MACROMATIC.COM

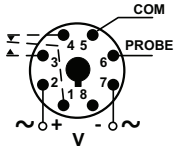
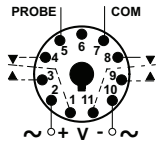
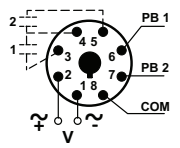
SALES@MACROMATIC.COM

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.

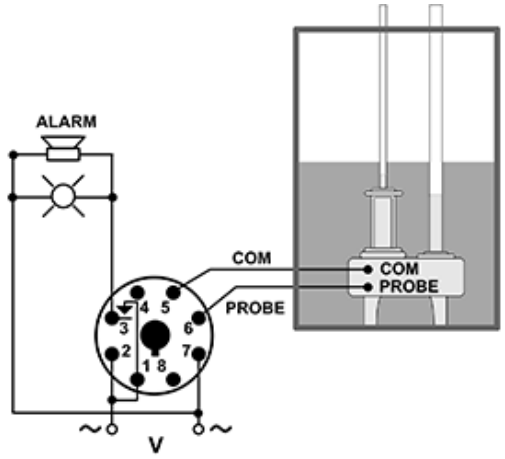
When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and the LED turns Red ON. The relay output can be used to give an alarm indication of a leaking seal.

CONFIGURATION	CONTROL VOLTAGE	SENSITIVITY RANGE	CATALOG NUMBER	WIRING/ SOCKET
SINGLE CHANNEL **8 Pin SPDT**	24V AC	4.7K to 100KΩ 1K to 250KΩ	SFP024A100 SFP024A250	8 Pin Octal **70169-D**  **DIAGRAM 234**
	24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	SFPAD7A100 SFPAD7A250	
	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	11 Pin Octal **70170-D**  **DIAGRAM 236**
	24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	SFPAD7B100 SFPAD7B250	
	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	8 Pin Octal **70169-D**  **DIAGRAM 235**
	24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	SFPAD7C100 SFPAD7C250	
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFP120C100 SFP120C250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFP240C100 SFP240C250	

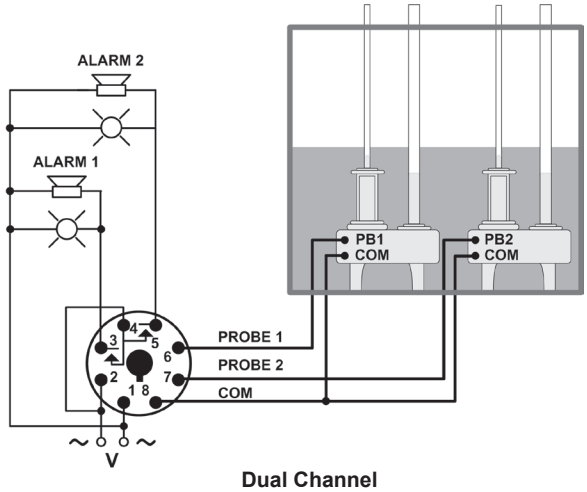
See page 18 for avaialble Sockets & Accessories

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)

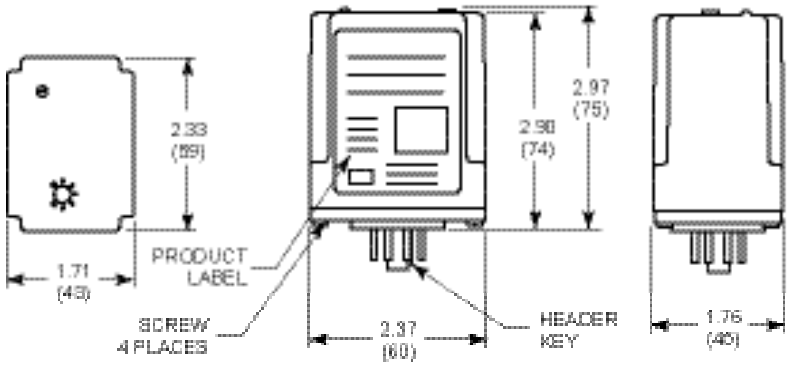
Output Contacts:
Single Channel Relays:
8 Pin SPDT: 10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)
11 Pin DPDT: 7A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)
Dual Channel Relays:
(2) 5A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)

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

DIMENSIONS

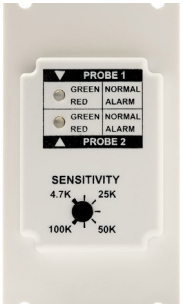


All Dimensions in Inches (Millimeters)

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 for Door-Mounting
- 8 Pin Back-Mounted Socket Provided with Relay

c US CE c UL us
with appropriate socket

MACROMATIC

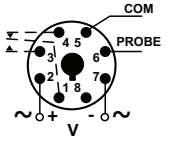
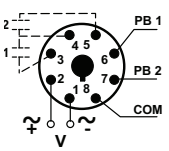
Better. By Design.

800.238.7474
WWW.MACROMATIC.COM
SALES@MACROMATIC.COM

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 mountedon 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.

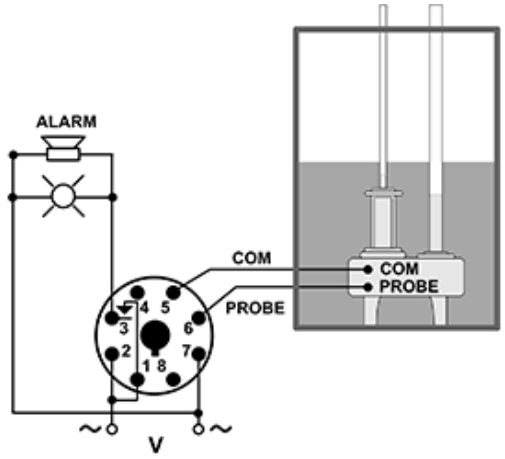
Operation: Two wires from the relay are connected to a resistance-sensing probe in the pump seal cavity and the grounded motor housing or across two probes to monitor for seal leakage using a low-voltage DC signal. If the seal starts to leak, contaminating fluid enters the seal cavity. This lowers the 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	CONTROL 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 SRP-M08G ■  DIAGRAM 234
	24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	SFFAD7A100 SFFAD7A250	
	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 SRP-M08G ■  DIAGRAM 235
	24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	SFFAD7C100 SFFAD7C250	
	120V AC	4.7K to 100KΩ 1K to 250KΩ	SFF120C100 SFF120C250	
	240V AC	4.7K to 100KΩ 1K to 250KΩ	SFF240C100 SFF240C250	

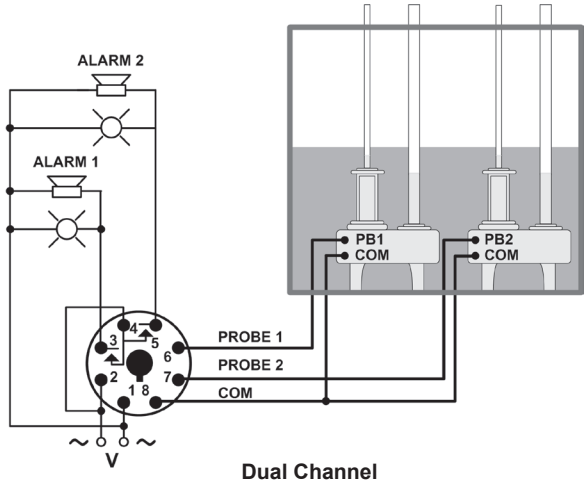
■ 8 Pin Back-Mounted Socket Provided with Relay

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

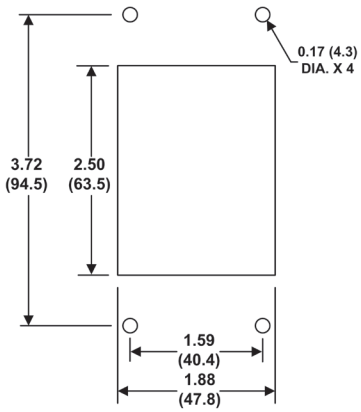
Mounting:
For mounting on an inner door, use 8 Pin Back-Mounted Socket (IDEC SR6P-M08G which is provided with the relay). For panel-mounting, use industry-standard 8 Pin Octal socket (Macromatic 70169-D or equivalent).

Approvals:
c US
File #E109466

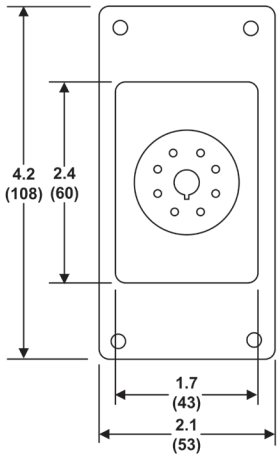
CE

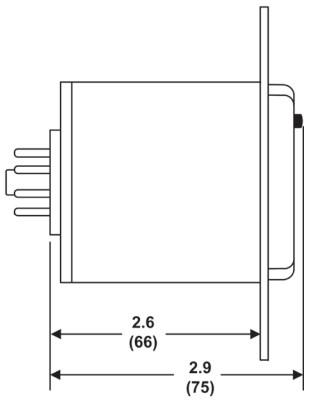
c UL us
with appropriate socket

DIMENSIONS



Panel Cutout

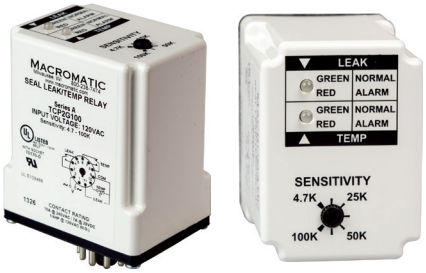




All Dimensions in Inches (Millimeters)

OVER TEMPERATURE & SEAL LEAKAGE

AUTO RESET | TCP SERIES



- 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

c US CE c UL us

with appropriate socket

MACROMATIC

Better. By Design.

800.238.7474

WWW.MACROMATIC.COM

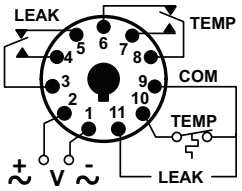
SALES@MACROMATIC.COM

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.

CONTROL VOLTAGE	SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET
24V AC	4.7K to 100KΩ 1K to 250KΩ	TCP8G100 TCP8G250	11 Pin Octal **70170-D**
24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	TCP7G100 TCP7G250	
120V AC	4.7K to 100KΩ 1K to 250KΩ	TCP2G100 TCP2G250	
240V AC	4.7K to 100KΩ 1K to 250KΩ	TCP1G100 TCP1G250	**DIAGRAM 233**

See page 18 for available Sockets & Accessories

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 / 7A @ 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

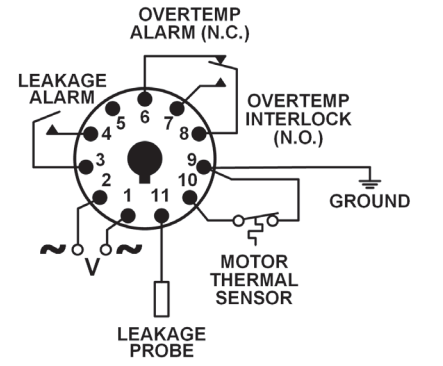
Mounting:
Requires industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

Approvals: c US CE c UL us with appropriate socket

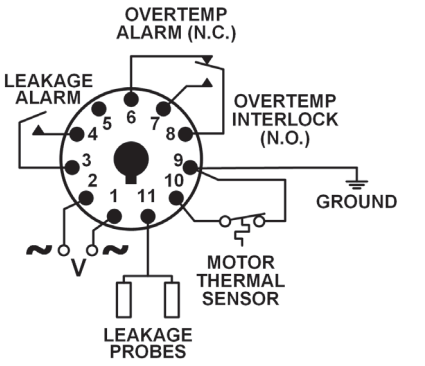
CONNECTION DIAGRAMS

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

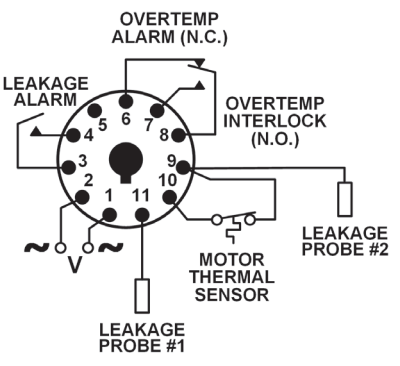
BETWEEN ONE PROBE & MOTOR HOUSING



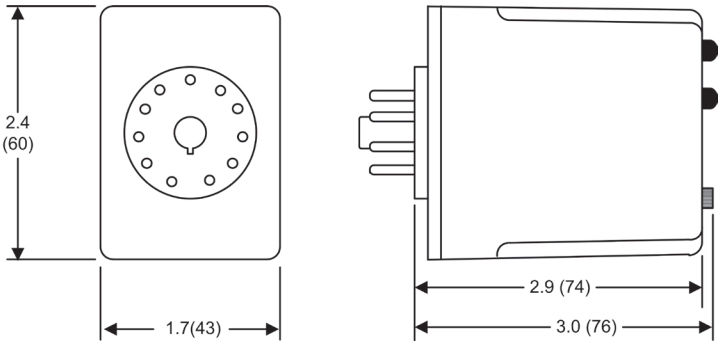
BETWEEN TWO PROBES & MOTOR HOUSING



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 for 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

with appropriate socket

MACROMATIC

Better. By Design.

800.238.7474
WWW.MACROMATIC.COM
SALES@MACROMATIC.COM

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 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.

CONTROL VOLTAGE	SENSITIVITY RANGE	CATALOG NUMBER	WIRING/SOCKET
24V AC	4.7K to 100KΩ 1K to 250KΩ	TCF8D100 TCF8D250	11 Pin Octal **SR6P-M11G** ■
24V AC/DC	4.7K to 100KΩ 1K to 250KΩ	TCF7D100 TCF7D250	
120V AC	4.7K to 100KΩ 1K to 250KΩ	TCF2D100 TCF2D250	
240V AC	4.7K to 100KΩ 1K to 250KΩ	TCF1D100 TCF1D250	

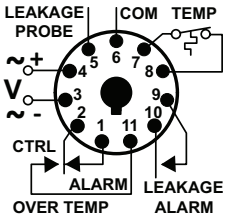


DIAGRAM 232

■ 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 / 7A @ 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

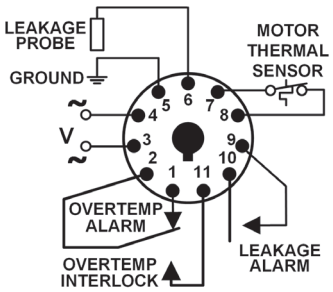
Mounting:
For mounting on an inner door, use 11 Pin Back-Mounted Socket (IDEC SR6P-M11G which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

Approvals: with appropriate socket

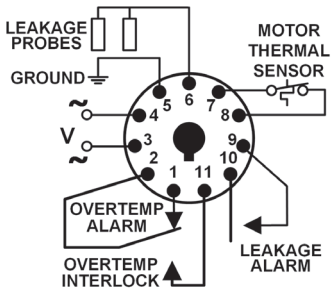
CONNECTION DIAGRAMS

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

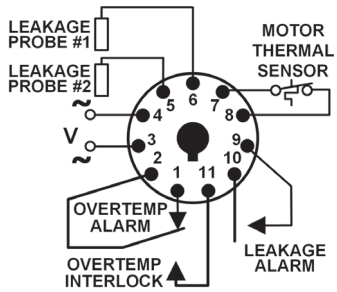
BETWEEN ONE PROBE & MOTOR HOUSING



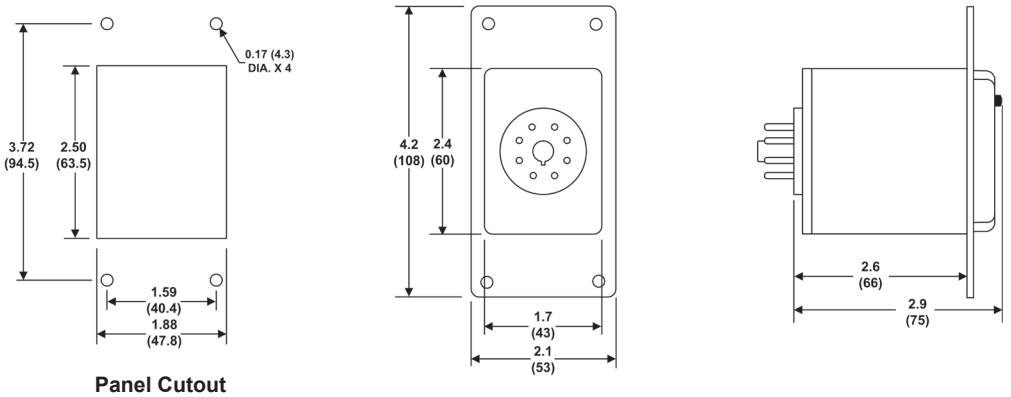
BETWEEN TWO PROBES & MOTOR HOUSING



BETWEEN TWO PROBES



DIMENSIONS



Panel Cutout

All Dimensions in Inches (Millimeters)

OVER TEMPERATURE & SEAL LEAKAGE

AUTO & MANUAL RESET | TCF-A SERIES

RETROFIT FLYGT CONTROLS FOR PUMPS WITH 3-WIRE SENSING

- Monitors Submersible Pumps for Over Temperature & Seal Leakage
- Retrofits Flygt controls for pumps with 3-wire sensing
- Auto & Manual Reset for Over Temperature
- Flange Enclosure for Door-Mounting
- DIN-Rail mounting available using 70170-D socket
- Low-Profile Adjustment Switch & Reset Button
- Full Status Indication on Top of Unit for Easy Troubleshooting
- 11 Pin Back-Mounted Socket Provided with Relay

c US CE c UL us
with appropriate socket

MACROMATIC

Better. By Design.

800.238.7474

WWW.MACROMATIC.COM

SALES@MACROMATIC.COM

Macromatic TCF-A Series products monitor for over temperature and seal leakage on submersible pumps with 3-wire sensing (resistive seal, N.C. over temp). Product can be installed in place of existing Flygt MiniCAS with minimal rewiring. 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 mounted on an inner door and used with a back-mounted socket (included). Product can also be DIN-rail mounted using socket 70170-D (not 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.

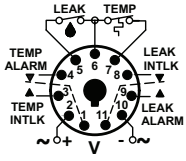
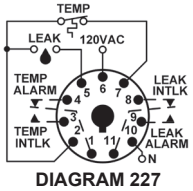
Operation:

A normally closed thermal switch in the windings of the pump motor is connected to the TEMP input to monitor for overheating of the pump. A low-voltage DC signal is applied to monitor the thermal switch. The pump seal leakage sensor(probes) are connected to the LEAK input to monitor for seal leakage using a low-voltage DC signal. Isolated output contact relays are provided, one for over temperature and one for seal leakage. The over temperature trip point is fixed at 5K ohms. Adjustable seal leakage sensitivity range is 4.7K-100K ohms.

With input voltage applied, normal temperature condition (thermal switch closed) and seal leakage above the sensitivity set-point, 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 motor temperature rises and the N.C. thermal switch opens, the over temperature relay is de-energized opening the contact that had been closed 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 AUTO-MANUAL RESET 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. (Note: If fault still exists when the Over Temp Reset button is depressed, it will not reset.)

If the shaft seals start to leak, contaminating fluid enters the pump motor cavity. This lowers the resistance of the lubricant inside the pump. 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. If the seal leak condition is cleared, the unit will reset automatically.

If either a TEMP or SEAL leak alarm 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 reset by pressing the Over Temp Reset button.

CONTROL VOLTAGE	CATALOG NUMBER	WIRING/SOCKET
24V AC/DC	TCF7A	11 Pin Octal **SR6P-M11G** ■  **DIAGRAM 237**
120V AC	TCF2A	11 Pin Octal **SR6P-M11G** ■  **DIAGRAM 227**

■ 11 Pin Back-Mounted Socket Provided with Relay

OVER TEMPERATURE & SEAL LEAKAGE

AUTO & MANUAL RESET | TCF-A SERIES

RETROFIT FLYGT CONTROLS FOR PUMPS WITH 3-WIRE SENSING

APPLICATION DATA

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

Load (Burden):
3 VA

Response Time:

Power-up/Restart Delay	100 ms
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), Hold reset switch	> 500 ms
Seal Leakage Fault (Relay Energize)	3 seconds
Seal Leakage Fault Clears (Relay De-energize)	3 seconds

Resistance Sensitivity Range (Seal Leakage):
4.7 - 100 KΩ

Temperature:
Operating: -28° to 65°C (-18° to 149°F)
Storage: -40° to 85°C (-40° to 185°F

Output Contacts:

7A @ 240V AC / 7A @ 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

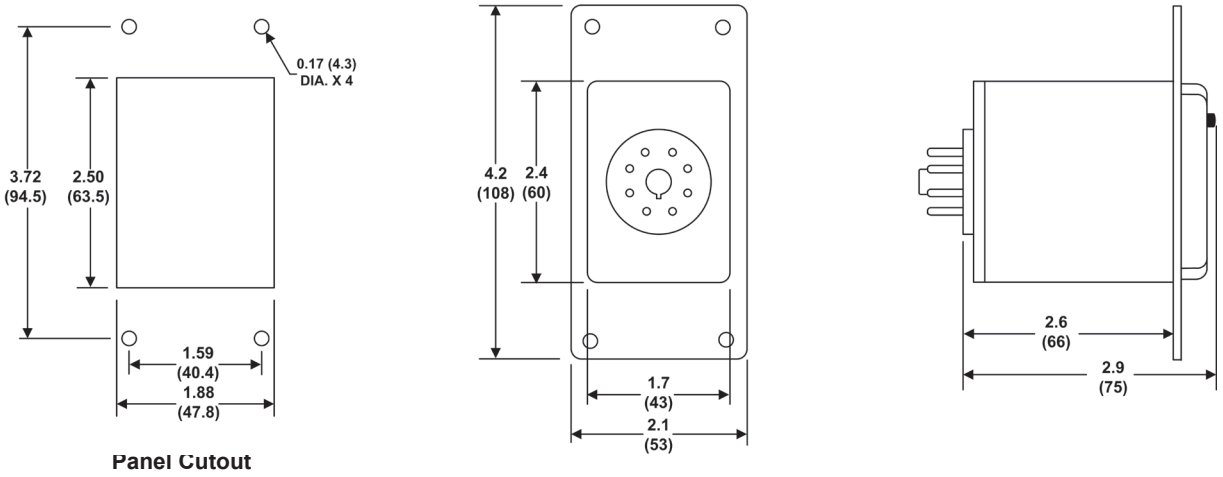
Seal: Green ON with input voltage applied, no seal leak and relay de-energized; Red ON when seal leak detected and relay energized; Red Flashing when seal leakage condition has been cleared

Mounting:
For mounting on an inner door, use 11 Pin Back-Mounted socket (IDEC SR6P-M11G, which is provided with the relay).

For DIN-Rail or panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

Approvals: c US CE c UL us with appropriate socket

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

- 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 for 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

MACROMATIC

Better. By Design.

800.238.7474
WWW.MACROMATIC.COM
SALES@MACROMATIC.COM

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.

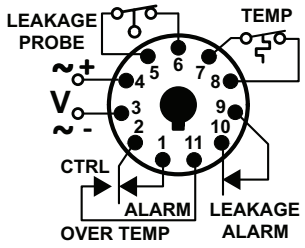
The flange-enclosure is designed to be mounted on an inner door and used with a back-mounted socket (included). Everything needed for setup, use and troubleshooting is on the top of the unit: status LEDs, switch to choose Automatic or Manual Reset mode for temperature, and a pushbutton for Manual Reset 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	11 Pin Octal **SR6P-M11G ■**  **DIAGRAM 231**
24V AC/DC	TCF7E	
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 / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)

Life:
Mechanical: 10,000,000 operations
Full Load: 100,000 operations

LED Indicator:

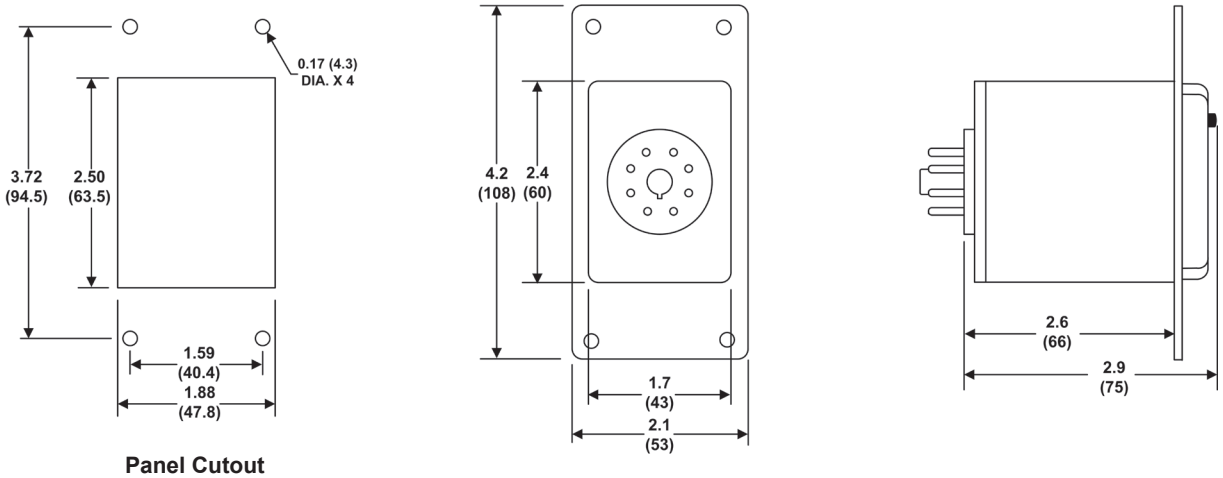
Temp: Green ON with input voltage applied, normal temperature condition and relay energized; Red ON when over temperature detected and relay de-energized

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 mounting on an inner door, use 11 Pin Back-Mounted Socket (IDEC SR6P-M11G which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

Approvals: c US, CE, c UL us with appropriate socket

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
- Direct replacement for Flygt Submersible Pumps Using a FLS or CLS Sensor (MINI-CAS).
- Auto & Manual Reset for Over Temperature
- Flange-enclosure for 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

c UL us CE c UL us

with appropriate socket

MACROMATIC

Better. By Design.

800.238.7474
WWW.MACROMATIC.COM
SALES@MACROMATIC.COM

Macromatic TCF-F Series products monitor for over temperature and seal leakage on Flygt submersible pumps using either FLS or CLS leakage sensors (MINI-CAS). 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 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.

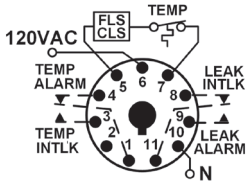
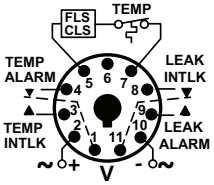
In a seal leakage condition, contaminating fluid enters the pump motor cavity. The sensor lowers its resistance, increasing the sensor circuit current above the trip point. The seal leakage output relay energizes and closes a contact, which can be used to give an alarm indication of a leaking seal. The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

CONTROL VOLTAGE	CATALOG NUMBER	WIRING/SOCKET
120V AC	TCF2F	11 Pin Octal **SR6P-M11G ■**  **DIAGRAM 219**
24V AC	TCF8F	11 Pin Octal **SR6P-M11G ■**  **DIAGRAM 230**
24V AC/DC	TCF7F	

■ 11 Pin Back-Mounted Socket Provided with Relay

OVER TEMPERATURE & SEAL LEAKAGE

AUTO & MANUAL RESET | TCF-F SERIES FOR PUMPS WITH FLS OR CLS 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 / 7A @ 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

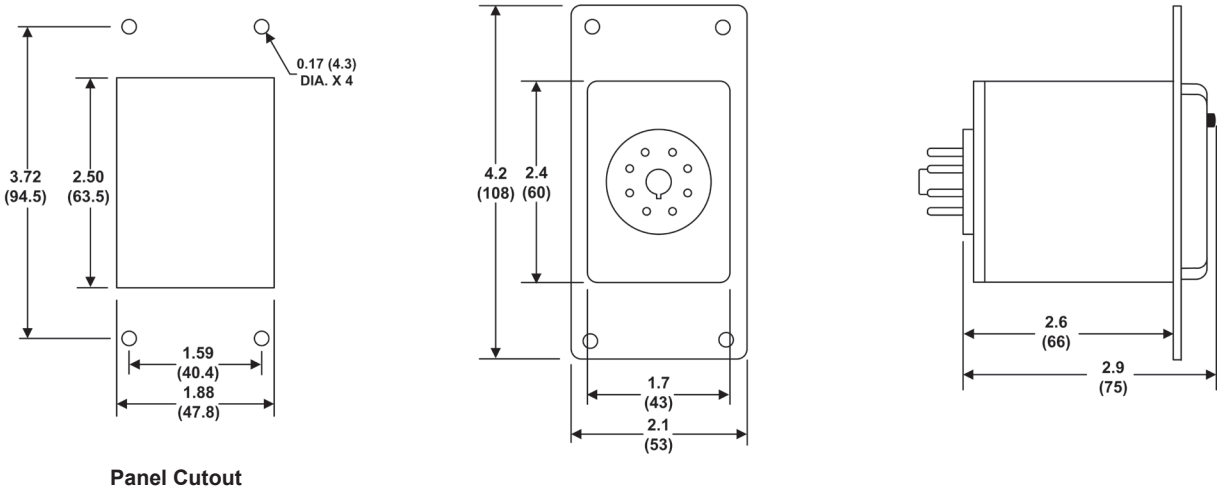
Seal: Green ON with input voltage applied, no seal leak and relay de-energized; Red ON when seal leak detected and relay energized; Red Flashing when seal leakage condition has been cleared

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

Mounting:
For mounting on an inner door, use 11 Pin Back-Mounted Socket (IDEC SR6P-M11G which is provided with the relay). For panel-mounting, use industry-standard 11 Pin Octal socket (Macromatic 70170-D or equivalent).

Approvals: c US, CE, c UL us with appropriate socket

DIMENSIONS



Panel Cutout

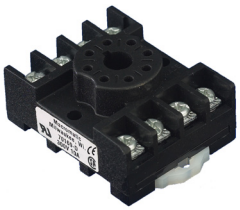
All Dimensions in Inches (Millimeters)

SOCKETS & ACCESSORIES

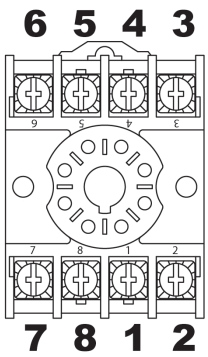
8 Pin Octal Socket
Surface or DIN Rail-Mounted

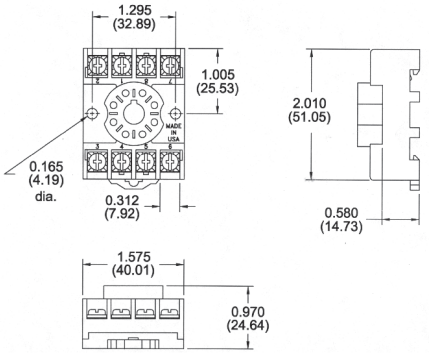
- 10A @ 600V
- 1 or 2 #12-20 AWG Wire
- Pressure Wire Clamp Terminations
- Recommended Tightening Torque 12 in-lbs

File #E169693 File #LR701114



Catalog Number: 70169-D

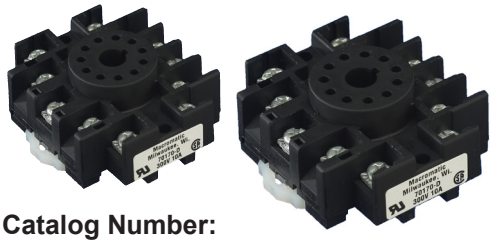




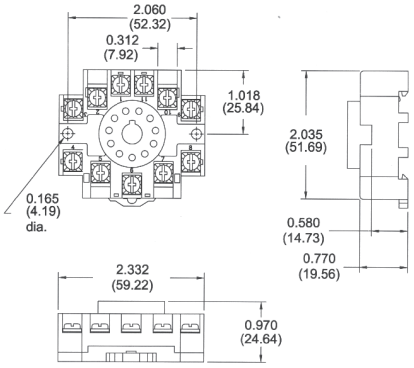
11 Pin Octal Socket
Surface or DIN Rail-Mounted

- 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

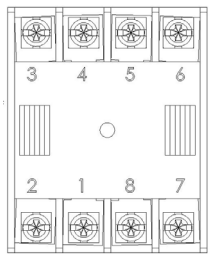


8 Pin Octal Socket
Back-Mounted

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

File #E60008

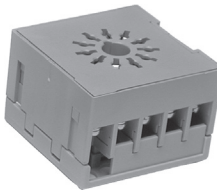
Catalog Number: SR6P-M08G



11 Pin Octal Socket
Back-Mounted

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

File #E62437



Catalog Number: SR6P-M11G

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 (not included). Contact Macromatic or see www.macromatic.com/70166 for more information.

Catalog Number: 70166

Your source for quality, innovative industrial control solutions

Macromatic Industrial Controls, Inc. designs and manufactures control, monitoring and protection products to manage your electrical processes and to protect your equipment from damaging fault conditions.

With a 45-year legacy of high-quality products and outstanding customer service, we continue to introduce innovative solutions that help our customers be more productive and efficient.

Our design and application experience makes it easy to find cost-effective advantages for your applications.

We continuously improve our products by integrating new technology and improving our manufacturing processes. The result is innovative reliable products, delivered on-time, every time.

www.macromatic.com

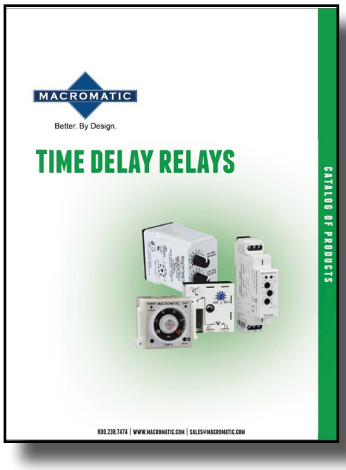
800.238.7474

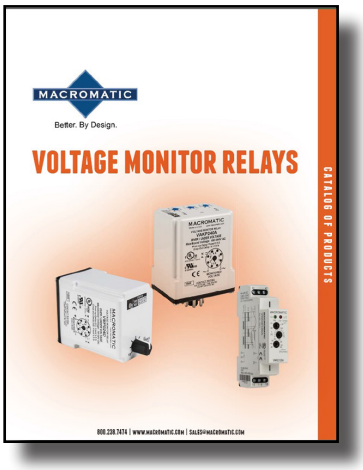
MACROMATIC

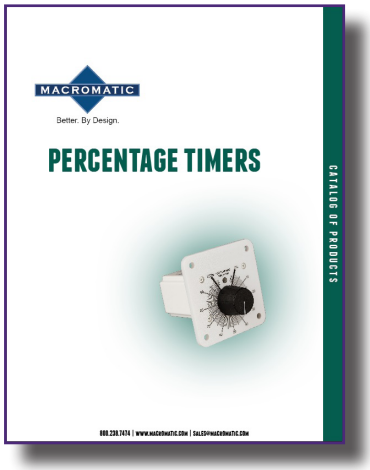
Better. By Design.

MACROMATIC INDUSTRIAL CONTROLS

Macromatic Industrial Controls Family of Products







MACROMATIC

Better. By Design.

800.238.7474 | WWW.MACROMATIC.COM | SALES@MACROMATIC.COM

LCTLL00AEN0322

Specifications subject to change without notice | Macromatic is a registered tradename of Macromatic Industrial Controls, Inc.