Procedure for Fitment of Temperature Monitors

Applicable Vehicles: All Redmond Gary MEWPs with serial numbers from 1438 to 1480

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Overview: This procedure outlines the actions required to correctly install the temperature monitor in the electrical cabinet. For general details of the temperature monitor, refer to Appendix A.

Ensure all of this work is carried out in a safe working environment. All work is to be carried out by a competent tradesperson in a well ventilated area.
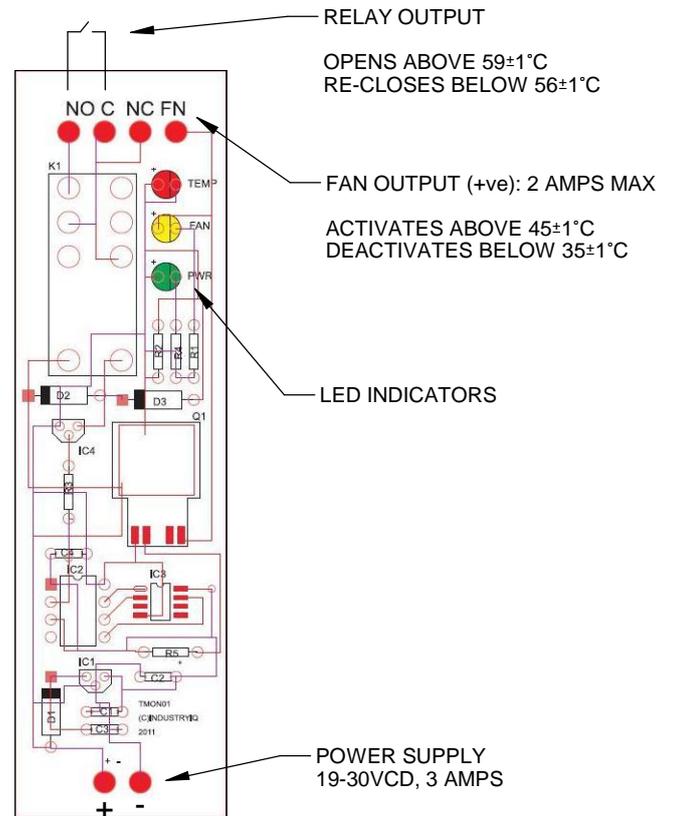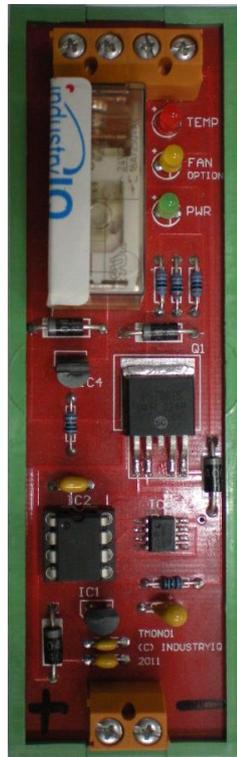
Parts & Equipment Required:

Safety Glasses & relevant PPE
'Tagging Out' / machine shutdown equipment as required by work practices
Electrical cabinet key
Screwdrivers
Side/wire cutters
Wire stripping tools
Cordless drill, drill bits and thread taps
New parts as provided by Redmond Gary:

Part Number	Description	Quantity
54N26004	MEWP Temperature Monitor	1
54D01001	Red 3 mm insulated automotive electrical wire	1
54D01002	Black 3 mm insulated automotive electrical wire	1
54F14001	DIN Rail Mounting Segment, 50 mm long	1
-	Updated paper copies of the electrical circuit diagrams	3

Parts Identification:

Temperature Monitor:

RELAY OUTPUT

OPENS ABOVE 59±1˚C
RE-CLOSES BELOW 56±1˚C

FAN OUTPUT (+ve): 2 AMPS MAX

ACTIVATES ABOVE 45±1˚C
DEACTIVATES BELOW 35±1˚C

LED INDICATORS

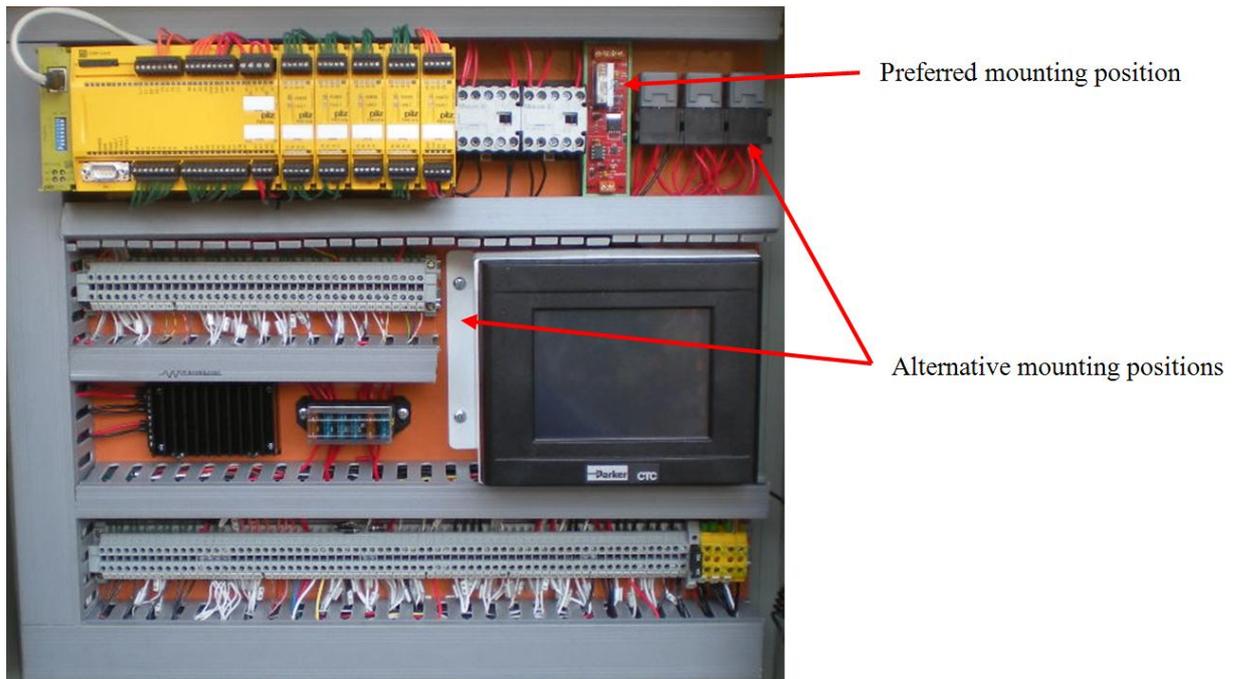POWER SUPPLY
19-30VCD, 3 AMPS

Electrical cabinet configuration:
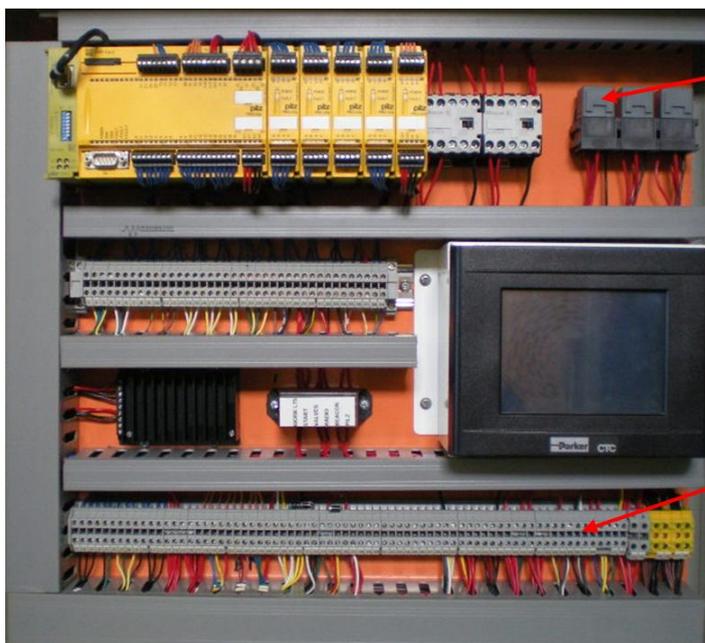
Relay R3 (also called R8 on some
drawings). Found on Sheet 3 of the
Electrical Circuit Diagrams

Row B DIN Rail Connectors

Possible mounting positions for Temperature Monitor:

Preferred mounting position
Alternative mounting positions

Installation Procedure:

Step 1:   Read Appendix A to gain an understanding of how the temperature monitor works. If a fan or additional buzzer is to be installed, you should briefly familiarise yourself with Appendix B. Note the fan or buzzer are entirely optional and are not required for standard installations.

Step 2:   Turn the vehicle's ignition keys off and remove them from the ignition, storing them in a safe place. Isolate the batteries and hydraulic power and 'tag' the machine in accordance with safe work practices.

Step 3:   Open the machine's electrical cabinet and identify the DIN rail connections and decide on a suitable mounting position. If there is sufficient room on the DIN rail in the preferred location, mounting will be fairly easy. If there is no free DIN rail for mounting, it may be necessary to drill tapped holes and mount a small segment of DIN rail. If this is not possible in either the preferred or alternative positions, the Temperature Monitor can be mounted on high quality double sided tape, provided the surfaces are cleaned prior to application of the tape. For mounting on double sided tape, the DIN rail mount on the rear of the temperature monitor's plastic case should be removed to provide a flat surface. If these options do not work due to insufficient space, it will be necessary to move the mountings for R3 and adjacent relays to provide the required mounting area.

Step 4:   Once a mounting position has been decided, mount the temperature monitor with either the DIN rail or double sided tape. Ensure it is securely mounted and will not break free.
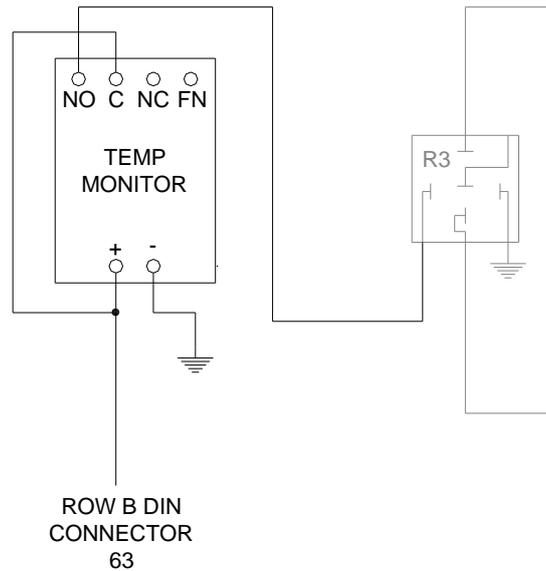
Figure 1: Wiring diagram for temperature monitor installation

Step 5: Remove the wire connected to terminal 85 of relay R3 (sometimes labelled as R8– see sheet 3 of the electrical circuit diagrams). Keep this wire connected to Row B DIN rail connector 63.

Step 6: Connect this wire to the positive power supply terminal of the temperature monitor, as shown in Figure 1. If the wire is too long, cut to an appropriate length. Using a separate piece of red wire, connect the positive power supply terminal to the common terminal (labelled 'C') of the temperature monitor.

Step 7: Connect a piece of red wire from the NO terminal of the temperature monitor and connect it to terminal 85 of relay R3.

Step 8: Connect a piece of black wire from the negative power supply terminal of the temperature monitor to the main earth terminals (Row B DIN rail connectors 74-77).

Step 9: Check the connections you have made comply with those given in Figure 1. If they are correct, re-connect the truck batteries, turn the ignition keys and PTO switch on.

Step 10: Check the PLC and touch screen start up. If possible, check the operation of the temperature monitor using a heat gun on the lowest possible setting. To do this, carefully project warm air from the gun at a distance no closer than 300 mm (1ft). Once the temperature of the monitor has risen above 45°C, the yellow 'fan' LED should become illuminated. Continue heating until the red 'temp' LED becomes illuminated. When this happens, the temperature monitor should open circuit and drop power to relay R3. The PLC and touch screen should shut down. Remove and turn off the heat gun. After waiting a few moments, when the red 'temp' LED turns off, the temperature monitor should close circuit and allow the PLC and touch screen to operate again.

Step 11: If a fan or additional buzzer is to be installed, refer to the instructions in Appendix B.

Step 12:   If a fan or additional buzzer will not be installed, restore hydraulic power and check the operation of the machine through all movements.

Step 13:   If the operation is satisfactory and the work is complete, restore the machine to an operable state, removing the 'tag-out' equipment in compliance with safe work practices.

Step 14:   Remove the existing electrical circuit diagrams attached to the inside of the electrical cabinet door and in both copies of the machine manuals. Replace with the updated versions. Leave the existing hydraulic circuit diagrams as they are.

If you are unsure of any instructions please ask.

Regards,

Darren Hoare
Service & Parts Manager
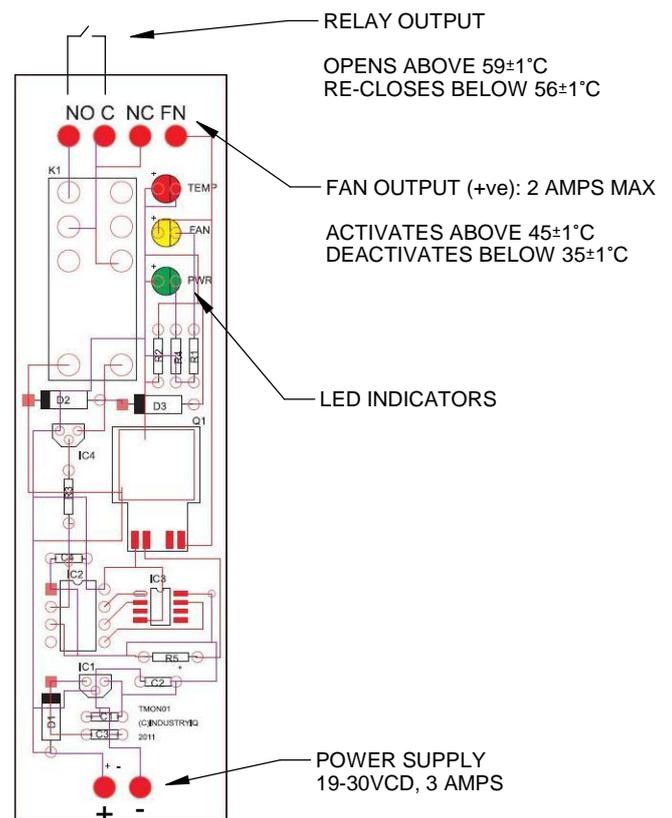Redmond Gary Australia
(07) 55949844

Appendix A – Temperature Monitor Information (from the Manual)

The Pilz PNOZmulti Safety PLC is rated to operate in ambient temperatures up to 60°C. The safety functions of the PLC cannot be guaranteed if operation continues at temperatures exceeding 60°C. To ensure the integrity of the safety control system, the PLC must be shut down at these temperatures. Note: this will cause the machine to become inoperable. The emergency stop alarm will sound when the temperature monitor is activated.

A Temperature Monitor has been installed in the electrical cabinet to monitor the cabinet's ambient temperature.

How it works

- Temperature Monitor takes an input power supply of 19-30 VDC from the DC-DC Converter

- When temperature reaches 59±1°C, relay output opens to remove power from the PLC (shuts down safety control system)

- When temperature drops back to 56±1°C, relay output closes to allow startup of PLC

- LED indicating lights:
  - Green = ON
  - Yellow = temperature above 45°C (fan switches on if fitted)
  - Red = temperature above 60°C

RELAY OUTPUT

OPENS ABOVE 59±1°C
RE-CLOSES BELOW 56±1°C

FAN OUTPUT (+ve): 2 AMPS MAX

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DEACTIVATES BELOW 35±1°C

LED INDICATORS

POWER SUPPLY
19-30VCD, 3 AMPS

Fan Output Option

As a standard installation, the Fan Output is not used. However, it is possible to fit a cooling fan if cabinet temperatures are expected to exceed 60°C. Details of the Fan Output are:

- Fan Output = 24 VDC, 2 Amps max.
- Switches fan on above 45±1°C
- Switches fan off (after being on) below 35±1°C
- Yellow LED will be illuminated when the Fan Output is on

Appendix B – Installing a Fan or Buzzer

When the electrical cabinet temperature reaches 59±1°C, the temperature monitor will shut down the safety system (PLC) and the emergency stop alarm will sound. This should be sufficient for all applications.

If it is desired, it is possible to fit a cooling fan to actively prevent the cabinet temperatures reaching 59°C. Installation of fans will require inlet and exhaust vents for the electrical cabinet. It is important that these vents will not let moisture or dust into the cabinet. It is preferable that any venting has an IP rating of IP65 or above. Otherwise, the lifespan and reliability of the electrical components may be compromised. For technical details of the fan output on the temperature monitor, refer to Appendix A. Note the maximum permitted current draw for a fan is 2 amps. If additional current is required, a relay should be used.

A piezo alarm buzzer can also be fitted if the emergency stop alarm is not considered satisfactory. The buzzer will sound whenever the temperature monitor shuts down the safety system. However, the additional buzzer will sound in conjunction with the emergency stop alarm and potentially may not be heard by operators. For this reason, if a buzzer is to be installed, it is recommended that it have a distinctly different sound and substantial loudness. The maximum permitted current draw for a buzzer is 2 amps. If additional current is required, a relay should be used.

When installing a fan and/or buzzer, read the relevant instructions and documentation before proceeding with installation. Pay particular attention to the mounting and wiring instructions. These must be taken into consideration when installing the components!
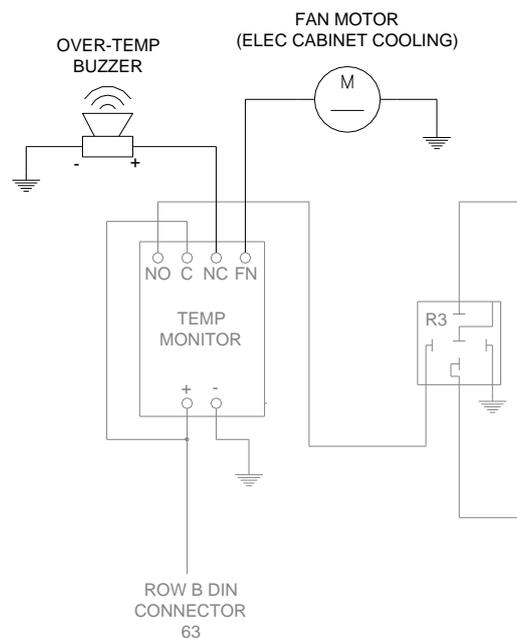

Figure 2: Wiring diagram for fan and buzzer installation

Installation Procedure:

Step 1:   Read the instructions provided for the fan and/or buzzer. Ensure it is possible to install the components in compliance with the manufacturer's instructions before proceeding.

Step 2:   Read Appendix A and install the temperature monitor as per the main installation procedure.

Step 3:   Turn the vehicle's ignition keys off and remove them from the ignition, storing them in a safe place. Isolate the batteries and hydraulic power and 'tag' the machine in accordance with safe work practices.

Step 4:   Open the machine's electrical cabinet and decide on a suitable mounting position for the fan and/or buzzer. It may be necessary to relocate some components to provide sufficient mounting space.

Step 5:   Once a mounting position has been decided, mount the fan and/or buzzer. Ensure they are securely mounted and will not break free.

Step 6:   If installing a fan, connect a wire from the FN terminal of the temperature monitor to the positive power supply terminal of the fan. If installing a buzzer, connect a wire from the NC terminal of the temperature monitor to the positive power supply terminal of the buzzer. For both components, connect the negative power supply terminal to the main earth terminals (Row B DIN rail connectors 74-77).

Step 7:   Check the connections you have made comply with those given in Figure 2. If they are correct, re-connect the truck batteries, turn the ignition keys and PTO switch on.

Step 8:   Check the PLC and touch screen start up. If possible, check the operation of the temperature monitor using a heat gun on the lowest possible setting. To do this, carefully project warm air from the gun at a distance no closer than 300 mm (1ft). Once the temperature of the monitor has risen above 45°C, the yellow 'fan' LED should become illuminated and the fan (if fitted should begin operating). Continue heating until the red 'temp' LED becomes illuminated. When this happens, the temperature monitor should open circuit and drop power to relay R3.

If an additional buzzer was fitted, it should be operating. The PLC and touch screen should shut down. Remove and turn off the heat gun. After waiting a few moments, when the red 'temp' LED turns off, the temperature monitor should close circuit and allow the PLC and touch screen to operate again and it should switch off the installed buzzer. After a while, when the temperature falls below 35°C, the fan output should switch off.

Step 9:   Restore hydraulic power and check the operation of the machine through all movements.

Step 10:   If the operation is satisfactory and the work is complete, restore the machine to an operable state, removing the 'tag-out' equipment in compliance with safe work practices.