



P49-LM1-T / P49-LM1-PT

0 – 20 mA / 4 – 20 mA loop monitor

including 4-20mA re-transmit and
optional 24V DC loop power supply (P49-LM1-PT ONLY)
Version 10.7

Operating instructions
and
Guarantee Certificate

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Description:

The input signal is converted and displayed as real-world values with up to 3 decimal places (eg 0-100.0°C, not 4 -20mA). The 4 -20mA re-transmitted signal is optically isolated from the input signal. By default the re-transmission parameters are set so that the output follows the input. By setting the Span to a negative value, the device can be used as an inverter, generating a decreasing output signal as the input increases.

An on-board 24V DC power supply (limited to 23mA) is included to power the loop (PLM1-PT ONLY). Maximum & Minimum values are logged for 24 hours (updated every 60 min). A latch facility is included (by shorting the latch terminals). Other features include adjustable signal damping, adjustable start-up and reaction delays, the ability to swap the relay's functionality. All settings may be locked & code protected to avoid changes from being made by unauthorised personnel.

Operation:

The value displayed is re-transmitted based on the re-transmit offset and span parameters. The output may be set to correspond to the entire input range or any part thereof. eg. An input signal of 0-100 °C may be re-transmitted as received

(4mA=0 °C, 20mA=100°C. set re-tx offset=0, span=100),

or 50 - 70 °C (4mA=50 °C, 20mA=70 °C. set re-tx offset=50, span=20).

By setting the retransmit span to a negative value, the re-transmitted signal drops as the input signal rises, effectively inverting the signal. The relay remains energised while the input signal is between the upper and lower set points. Once de-energised, the signal must change in the opposite direction by the hysteresis amount before the relay will re-energise. (unless the latch terminals are shorted).

Adjustable parameters:

• **Upper limit "Hi" (default: disabled)**

When the input rises above this value, the relay changes state until the signal drops by the hysteresis amount (see "HYSt" setting)

• **Lower limit "Lo" (default: disabled)**

When the input drops below this value, the relay changes state until the signal rises by the hysteresis amount (see "HYSt" setting)

• **Hysteresis value "HYSt" (default: 5)**

Once the set-point is reached, (& relay changed state), the input signal must change (in the opposite direction) by this value before the relay will return to its original state.

• **Start-up delay "St d" (default: 0.0 Sec, max: 100.0 Sec)**

Delay (after power-up) before monitoring starts (to allow the signal to stabilize).

• **Reaction delay "rE d" (default: 0.0 Sec, max: 100.0 Sec)**

A fault condition must occur for longer than this period before the relay changes state. (To allow fault conditions for short periods of time)

• **Relay function "rE.Fu" (default: De-energise)**

Relay state when the setpoint is reached "dE.En"=de-energise, "EnEr"= energise.

• **Fault indication "indi" (default: on)**

During fault conditions the display indicates whether the value is above or below the set point values ("r1.Hi","r1.Lo"). If a fault condition exists, but the relay is being held energised by the start-up or reaction delay timers, "-r1-" is displayed. Changing this setting to "off", disables these messages. Note: This setting does not affect the "Er.Hi" and "Er.Lo" messages. (see notes)

• **24 hour Minimum "24h.L" (monitoring starts 30 sec after power-up)**

Display the lowest value measured during the past 24 hours (Press "SELECT" to clear)

• **24 hour Maximum "24h.h" (monitoring starts 30 sec after power-up)**

Display the highest value measured during the past 24 hours (Press "SELECT" to clear)

• **Display Offset "OFSt" (default value:0)**

This value is displayed when the minimum signal is measured. (eg.4mA).

• **Display Span "SPAn" (default value:100)**

This value plus the "OFSt" value is displayed when the maximum signal is measured (20mA). Eg. If the input signal is 4-20mA, "OFSt" = 100, and "SPAn"=100. The display will indicate 100 when 4mA is applied, and 200 (100+100=200) when 20mA is applied.

• **Decimal pointer "dEci" (default value: no decimal pointer)**

Use this setting to adjust the decimal point to the desired position.(0.000/0.00/0.0/0)

• **Software damping filter "FiLt" (default value:6)**

Adjust from 1 to 15 to increase the amount of signal damping.

• **Calibrate / Set input Offset "CAL.O" (default value: 4.00 mA)**

This is the minimum input signal received. If a signal converter with an output of 4 – 20mA is used, change this value to "4.00" mA. This value may need to be adjusted in case the converter's offset has changed. (needs calibration)

• **Calibrate / Set input Span "CAL.S" (default value:16.00mA)**

This is the difference between the minimum and maximum input signals. If the converter output is 4-20 mA, change this value to "16.00" mA. This value may need to be adjusted in case the converter's span has changed. (needs calibration) Note: The controller cannot accept signals greater than 20.6 mA, and will not allow values greater than this to be entered. I.e. the total of "CAL.O" plus "CAL.S" values cannot exceed 20.6. It may be necessary to reduce one of these values in order to increase the other.

• **Re-transmit output Offset "rt.OS" (default value: programmed display offset value)**

When the display indicates this value, 4mA will be transmitted. (see notes)

• **Re-transmit output SPan "rt.SP" (default value: programmed display span value)**

When the display indicates this value PLUS the offset value ("rt.SP"+"rt.OS"), 20mA is transmitted. (see notes)

• **Reset "RESt"**

By selecting this setting, the device is reset to the factory defaults

Menu functionality:

All adjustments are made via the three front mounted buttons. Press the "MENU" button repeatedly until the desired setting is reached, press "SELECT" to display the current value of the selected setting. The "+" and "-" buttons are used to change the value. "ENTER" will return the device to the menu. The "BACK" button will exit the menu.

Example: Set the device to convert a 4 to 20mA signal to -1.00 to +1.00.

If all of the following settings are NOT available, exit the menu and activate the advanced menu.

Press "MENU" until "OFST" is displayed. Press "SELECT" to display the current offset. Use the "+" and "-" buttons to change the value to "-100". Press "ENTER". "SPAN" is displayed. Press "SELECT" and change the value to "200". Press "ENTER". "dECi" is displayed. Press "SELECT" and change the value until "1.00" is displayed. Press "ENTER". "CAL.O" is displayed. Press "SELECT" and change the value to "4.00". Press "ENTER". "CAL.S" is displayed. Press "SELECT" and change the value to "16.00". Press "ENTER". Press "BACK" to exit the menu.

With a signal of 4mA, the device will now display "-1.00", at 12mA, the display will show "0.00", and at 20mA the display will indicate "1.00". To display values from 0 to 1.000, change the offset and span settings to 0 and 1000, and set the decimal pointer the left most position.

Now set the device to de-energise the relay if the display indicates a value greater than 0.75, and smaller than 0.25. Press "MENU" to display "Hi". Press "SELECT" and change the value to "0.75". Press "ENTER". "Lo" is displayed. Press "SELECT" and change the value to "0.25". Press "ENTER". Press "BACK" to exit the menu.

Notes:

- The output 4-20mA is dependant on the value being displayed, and is set up in a similar manner to the display. The offset parameter determines when 4mA is output, and the span is the amount required for the output to increase by an additional 16mA ie. 20mA is output when the value displayed = re-transmit OFFSET+SPAN
- To set the re-transmission signal to follow the input signal (the output 4-20mA follows the 4-20mA received), set the re-tx offset and span settings to the same value as the display offset and span settings.
- To set the re-transmission signal to invert the input signal (the output = 4mA when the input = 20mA), set the re-tx offset = (display offset+span) and re-tx span = (display span x -1).
- Whenever the input signal is above or below the "CAL.O" or "CAL.S" values by more than 3%. The display indicates "Er.Hi" or "Er.Lo".
- Certain settings are reset to default when the device is re-configured. Re-check all settings to ensure they are correct before commissioning. (use the advanced menu)

Menu options:

Exit the menu before making the following adjustments.

1. Lock / unlock parameters: (default: unlocked)

Press "BACK", then "ENTER" and hold the 2 buttons until the desired option is displayed. The display cycles between "Loc" (no changes allowed) & "u.Loc" (parameters may be adjusted)

2. Full / reduced menu (default: Full)

Press "SELECT", then "ENTER" and hold the 2 buttons until the desired option is displayed. The display cycles between "rEdu" (limited menu) & "Full" (all parameters are accessible)

3. Access Code: (default: no code)

Once options 1 & 2 are set as required, Press "BACK" and "SELECT" simultaneously until "CODE" is displayed. Now use the "+" & "-" to enter a code. (1-9999) Once a code is entered, access options 1 & 2 is not permitted. To clear the code, re-enter the same code again. If the code is forgotten. Press and hold "+" & "-" until "CODE" is displayed while re-applying power to the device. To skip code entry, press "Enter" while "Code" is displayed.

Specifications:

Display offset:	-999 to 9999
Display span:	-1999 to 9999
Display resolution:	0.01 to 1.000 (adjustable)
Input offset:	0 to 20.6 mA
Input span:	0 to 20.6 mA (offset + span maximum = 20.6 mA)
24V DC supply current limit (P49-LM2-P)	23mA
Measurement resolution:	20 uA
Accuracy	±0.3% @ 25°C (% of full scale)
Input voltage:	±15% of rated input

12 Month guarantee:

Our product is guaranteed for a 12 (twelve) month period from date of purchase. This guarantee is valid for defects arising from failure during specified conditions. This guarantee does not cover damage due to abuse, tampering or improper installation. Our company does not accept liability for any consequential damage or loss arising from product malfunction. Should this product prove to be defective, kindly return for inspection or repair. For further information contact your nearest distributor.

Relay specifications:

Contact rating:	10A @ 250V AC
Mechanical life:	30 million operations
Electrical life:	250 000 operations (at maximum load)

P49-LM0/1/2(0/4-20mA) LOOP MONITOR + 24V PSU www.iconelectronics.co.za

