



D3  
53mm  
DIN rail mount



P44  
48mmx48mm  
panel mount



P49  
48mmx96mm  
panel mount

## 4-20mA LOOP MONITOR

incl 4-20mA or 0-10V re-transmit

**D3-LM 0/1/2-T**  
**P44-LM 0/1/2-T**  
**P49-LM 0/1/2-T**  
**P49-LM 0/1/2-P\***  
**P49-LM 0/1/2-P\*T**

\*optional 24V DC loop power supply (P49-LMx ONLY)

EXAMPLE: D3-LM 0-T = 0 RELAY

Operating instructions and Guarantee Certificate  
[www.iconelectronics.co.za](http://www.iconelectronics.co.za)

### **ReTransmit devices (-T)**

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 full scale input.

#### **P49-LMx-P and P49-LMx-PT ONLY**

An on-board 24V DC power supply (limited to 23mA) is included to power the loop

### **Description:**

The input signal is converted and displayed as real-world values with up to 3 decimal places. Maximum & Minimum values are logged for 24 hours (updated every 60 min). The latch facility may be de-activated for one or both the relays allowing one relay to be used for control (not latched), and the other as a latched alarm. Other features include adjustable signal damping, 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.

### **0 RELAY:**

The signal is displayed as 'real world' values.(eg 0-100°C ,not 4 -20mA). By setting the span to a negative value, the display will indicate lower values as the input rises.

### **1 RELAY:**

The signal is displayed as 'real world' values.(eg 0-100°C ,not 4 -20mA). By setting the span to a negative value, the display will indicate lower values as the input rises. 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. Note: the relay will NOT re-energise while the **latch pins are shorted**. The latch pins can also be used as a reset.

### **2 RELAY :**

The signal is displayed as 'real world' values. (eg 0-100°C ,not 4 -20mA). By setting the span to a negative value, the display will indicate lower values as the input rises. The relays remain 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. Either relay's action may be swapped to energise when the setpoint is reached.

**Adjustable parameters: Please note:** Depending on the model of the device purchased, some of the parameters listed below may not be available

#### **· Upper limit for relay 1 "Hi 1" (default: disabled)**

When the input rises above this value, the relay changes state until the signal drops by the hysteresis amount (see "HYS.1" setting)

#### **· Lower limit for relay 1 "Lo 1" (default: disabled)**

When the input drops below this value, the relay changes state until the signal rises by the hysteresis amount (see "HYS.1" setting)

#### **· Hysteresis value for relay 1 "HYS.1" (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 for relay 1 “St.d.1” (default: 0.0 Sec, max: 100.0 Sec)**  
Delay (after power-up) before monitoring starts (to allow the signal to stabilize).
- **Reaction delay for relay 1 “rE.d.1” (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 1 function “rE.F.1” (default: De-energise)**  
Relay state when the setpoint is reached “dE.En”=de-energise, “EnEr”= energise.
- **Latch enable for Relay “LAt.1” (default: Enable)**  
When the setpoint is reached, & the relay has changed state, the relay will NOT revert back to the original state while the **latch pins are shorted** (with this parameter enabled), even if the measured value drops below the setpoint & hysteresis level. The latch pins can also be used to reset relay 1 if enabled. If disabled, the latch pins do NOT affect relay 1’s functionality. “En.Ab”=enabled, “diS.A”= disabled.
- **Upper limit for relay 2 “Hi 2” (default: disabled)**
- **Lower limit for relay 2 “Lo 2” (default: disabled)**
- **Hysteresis value for relay 2 “HYS.2” (default: 5)**
- **Start-up delay for relay 2 “St.d.2” (default: 0 Sec, max: 100.0 Sec)**
- **Reaction delay for relay 2 “rE.d.2” (default: 0 Sec, max: 100.0 Sec)**
- **Relay 2 function “rE.F.2” (default: De-energise)**
- **Latch enable for Relay 2 “LAt.2” (default: Enable)**
- **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”, “r2.Hi”, “r2.Lo”). If a fault condition exists, but the relay is being held energised by the start-up or reaction delay timers, “-r1-” or “-r2-” 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)
- **Lower display value DUAL DISPLAY DEVICE ONLY “diSP”**  
Select the value to be displayed on the lower LED display. “Hi 1”, “Lo 1” or “off”
- **24 hour Minimum “24h.l”**  
Display the lowest value measured during the past 24 hours (Press “SELECT” (“▲”) to clear)
- **24 hour Maximum “24h.h”**  
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. The input offset and span may be adjusted for calibration purposes.
- **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 transducer with an output of 0 – 20mA is used, change this value to “0.00” mA. This value may need to be adjusted in case the transducer’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 transducer output is 0-20mA, change this value to “20.00” V. This value may need to be adjusted in case the transducer’s span has changed. (needs calibration) Note: The controller cannot accept signals greater than 20.3mA, and will not allow values greater than this to be entered. I.e. the total of “CAL.O” plus “CAL.S” values cannot exceed 20.3mA. 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(“▲”& “▼”)

**DUAL DISPLAY DEVICE programming Example:**

*Set the device to convert a 0 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 “ $\cup$ ” repeatedly until “OFSt” is displayed.

Use the “▲”& “▼” buttons to change the value to “-10.0”.

Press “ $\cup$ ”. “SPAn” is displayed. Change the value to “20.0”.

Press “ $\cup$ ”. “dECi” is displayed. Change the value to “2.00”.

Press “ $\cup$ ”. “CAL.O” is displayed. Change the value to “0.00”.

Press “ $\cup$ ”. “CAL.S” is displayed. Change the value to “20.00”.

Press and hold “ $\cup$ ” for 3 seconds to exit the menu.

With a signal of 0mA, the device will now display “–1.00”, at 10mA, the display will show “0.00”, and at 20mA the display will indicate “1.00”.

Now set the device to de-energise relay 1 if the display indicates a value greater than 0.75, and smaller than 0.25.

Press “ $\cup$ ” to display “Hi 1”. Use “▲”& “▼” to change the value to “0.75”. Press “ $\cup$ ”. “Lo 1” is displayed. Change the value to “0.25”.

Press and hold “ $\cup$ ” for 3 seconds to exit the menu.

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.

**SINGLE DISPLAY DEVICE programming 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 relay 1 if the display indicates a value greater than 0.75, and smaller than 0.25.

Press “MENU” to display “Hi 1”.

Press “SELECT” and change the value to “0.75”.

Press “ENTER”. “Lo 1” is displayed.

Press “SELECT” and change the value to “0.25”.

Press “ENTER”.

Press “BACK” to exit the menu.

**Specifications:**

Display offset:	-999 to 9999
Display span:	-1999 to 9999
Display resolution:	0.01 to 1.000 (adjustable)
Input offset:	0 to 20.3V
Input span:	0 to 20.3V (offset + span maximum = 20.3V)
Measurement resolution:	20 uA
Accuracy	$\pm 0.3\%$ @ 25°C (% of full scale)
Input voltage:	$\pm 15\%$ of rated input

**Notes:**

- 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)

**re-transmit 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 12mA 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 operation (single display):**

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 parameter, or sub menu (if applicable).

The "+" and "-" buttons are used to change the value.

"ENTER" will return the device to the menu.

The "BACK" button will exit the menu.

**Menu operation (dual display):**

Press the menu "U" button repeatedly until the desired setting is reached.

The "▲" and "▼" buttons are used to change the value.

"U" will display the next menu item.

To exit the menu hold "U" button for 3 seconds.

**Menu options:**

Exit the menu before making the following adjustments.

**Lock / unlock parameters:****(default: unlocked)**

Press "BACK" ("▼"), then "ENTER" ("U") 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)

**Full / reduced menu (default: Full)**

Press "SELECT" ("▲"), then "ENTER" ("U") and hold the 2 buttons until the desired option is displayed.

The display cycles between "rEdu" (limited menu) & "Full" (all parameters are accessible)

**Access Code: (default: no code)**

Once the above options have been set as required, Press "BACK" and "SELECT" ("▼" and "▲") simultaneously until "CODE" is displayed.

Now use the "+" & "-" ("▲" and "▼") to enter a code.

Once a code is entered, access to the options above is not permitted.

To clear the code, re-enter the same code again.

If the code is forgotten. Press and hold "+" & "-" ("▲" and "▼") until "CODE" is displayed while re-applying power to the device.

**Please Note ( for 1 and 2 relay devices ONLY):**

- As a power saving feature, the display dims if settings are not being made.
- Even though the device seems to operate correctly, the relay(s) will not energise if the input voltage is below the operating voltage.

**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.

**Relay specifications:**

Contact rating: 10A 250 VAC 2500VA

Mechanical life: 30 million operations

Electrical life: 250 000 operations (at maximum load)

