Hydronix

Scalable Current Loop Display User Guide

To re-order quote part number:	HD0475
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Hydronix Limited
Units 11-12,
Henley Business Park
Pirbright Road
Normandy
Surrey
GU3 2DX
United Kingdom

Company Number: 01609365 | VAT Number: GB384155148

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ERRORS IN DOCUMENTATION

The product described in this documentation is subject to continuous development and improvement. All information of a technical nature and particulars of the product and its use including the information and particulars contained in this documentation are given by Hydronix in good faith.

Hydronix welcomes comments and suggestions relating to the product and this documentation

ACKNOWLEDGEMENTS

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If your feedback is concerning an Atex certified product or associated service it would be very helpful for you to give us your contact details and the model number and serial number of the product if possible. This will enable us to contact you with any relevant safety advice should this be necessary. It is not obligatory to leave your contact details and any information will be treated as confidential.

Hydronix Offices

UK Head Office

Address: Units 11-12,
Henley Business Park
Pirbright Road
Normandy
Surrey
GU3 2DX

Tel: +44 1483 468900

Email: support@hydronix.com
sales@hydronix.com

Website: www.hydronix.com

North American Office

Covers North and South America, US territories, Spain and Portugal

Address: 692 West Conway Road
Suite 24, Harbor Springs
MI 47940
USA

Tel: +1 888 887 4884 (Toll Free)
+1 231 439 5000
Fax: +1 888 887 4822 (Toll Free)
+1 231 439 5001

European Office

Covers Central Europe, Russia and South Africa

Tel: +49 2563 4858
Fax: +49 2563 5016

French Office

Tel: +33 652 04 89 04

Revision history

Revision No	Software Version	Date	Description of Change
1.0.0		April 2011	First Release
1.1.0		December 2011	Default factory settings added
1.2.0		April 2012	Wiring diagram for Thermo-Tuff added
1.3.0		November 2014	Reference to Hydro-Com versions > 1.80 added
1.4.0		June 2017	Updated Menu structure. Reference to Hydro-Com HS0099 v2.5.0 added
1.5.0		March 2026	Updated address Added customer feedback paragraph

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1 Introduction

This user guide is relevant for Scalable Current Loop Display units with the model number IL4-P-R-DC. For all other models see the relevant user guide provided.

The Scalable Current Loop Display unit is a cost effective method of displaying an analogue signal, such as the analogue output from a sensor.

One Scalable Current Loop Display unit is required for each sensor. The installer will need to provide an enclosure for the Scalable Current Loop Display and a power supply and associated connection terminals. The Scalable Current Loop Display is powered from a 24v DC power supply which may be the same supply that is providing the power to the sensor.

Sensor configuration and diagnostics is performed using Hydronix Hydro-Com software which can be run on a PC-compatible computer running Microsoft Windows XP service pack 3 or later.

Communications from the PC to the sensor can be achieved via USB (using a Hydronix USB Sensor Interface Module), via RS232 (using a Hydronix RS232 to RS485 converter) or via Ethernet (Using a Hydronix Ethernet Adapter Kit).

The sensor can be configured to output using either the 0-20mA or 4-20mA mode. Compatibility mode should not be used.

2 Safety

Please read this manual and all warnings. Install the Scalable Current Loop Display unit accordingly or severe electrical damage may occur to you or the device.

Check the supply voltage needed, the Scalable Current Loop Display is rated for 11 to 30v DC and is recommended to be used with Hydronix Part number 0116. The power supply must have an anti-surge (T) Fuse rated at 2A for DC supplies in the Range 11-30VDC.

The Scalable Current Loop Display is not designed to be installed in an area in which moisture and dust are present, unless mounted in a suitable enclosure. The unit should not be mounted in direct sunlight or high heat (>60°C) may cause damage as well.

Do not touch the internal or external connections while power is on. Electrical shock which may be lethal can occur.

Make sure all screw terminals are tight before the power is switched on.

Clean the front panel of the Scalable Current Loop Display with a soft, damp cloth. If cleaning is required behind the front panel then use a **dry** cloth.

1 Mounting Advice

The Scalable Current Loop Display should be installed in a suitable protective electrical control enclosure according to local wiring regulations. Space must be allowed in the enclosure to allow adequate air circulation to ensure the unit temperature is always kept below 60°C.

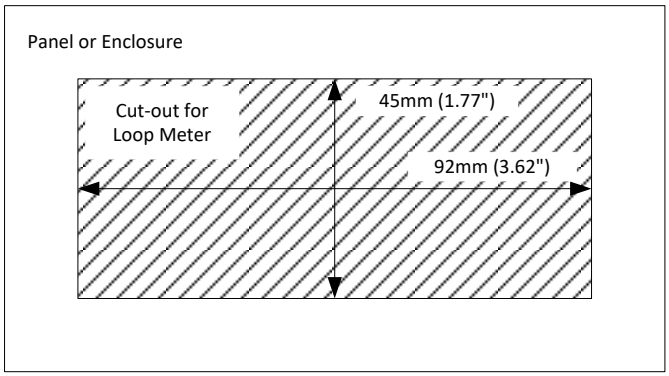

Figure 1: The panel cut-out needed for mounting the display

To fit the Scalable Current Loop Display, remove the two rear bracket screws and safely store them and the U-Bracket for later refitting.

Cut a hole in the enclosure or panel to the dimensions specified in Figure 1. Insert the Scalable Current Loop Display through the cut-out in the enclosure and then re-fit the U-Bracket to firmly clamp in place. Check that the gasket is evenly pinched between the front bezel and the enclosure front.

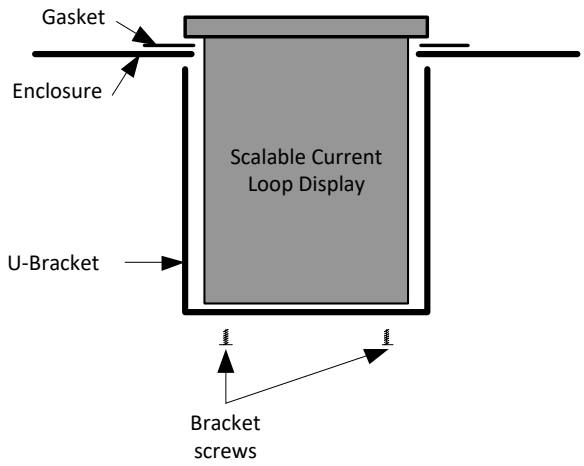

Figure 2: Re-fitting the U-Bracket

Figure 3 shows of the Scalable Current Loop Display from the side and shows the placement of the gasket.

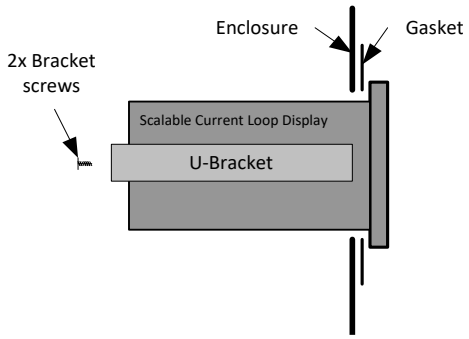

Figure 3: Side view of Scalable Current Loop Display installed in an enclosure

1 Wiring Advice

The installation must be undertaken by a suitably qualified person and must conform to any local regulations.

The unit uses four detachable screw terminal connectors, as shown in Figure 4 below. These should be connected using standard multi strand equipment cable with a specification of at least the following:

Air Temperature Rating:	90°C continuous
Gauge Wire and screw Torque:	22 gauge to 16 gauge multi-strand and 0.8 Nm (7.0 lb/in) torque
Voltage Rating:	Wire should have insulation rating of 380V continuous

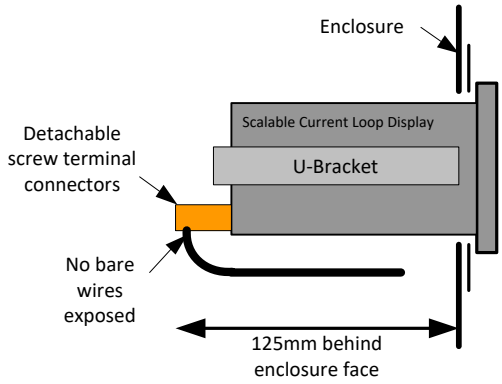

Figure 4: The Scalable Current Loop Display showing wiring connector location

Hydronix recommends Multi-Strand cable that is shielded with the screen connected at the plant end only. Cable should be routed away from any high voltage lines which may cause Electrical Noise interference.

2 Electrical Connections

Connections to the unit are made using the four detachable screw terminal connectors on the rear of the Scalable Current Loop Display. The description of the connections used for installation with Hydronix sensors is given in Figure 5.

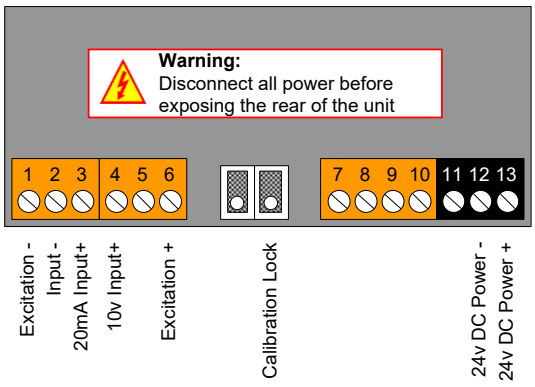

Figure 5: Scalable Current Loop Display connections at rear of unit

As the analogue output of a Hydronix sensor is configurable, the actual connection wiring is dependent on the installation required. The next pages show wiring diagrams for each of the options including wiring in conjunction with a control system PLC input.

Figure 6 gives the connection details if the output is being used in either the 0-20mA or 4-20mA current modes.

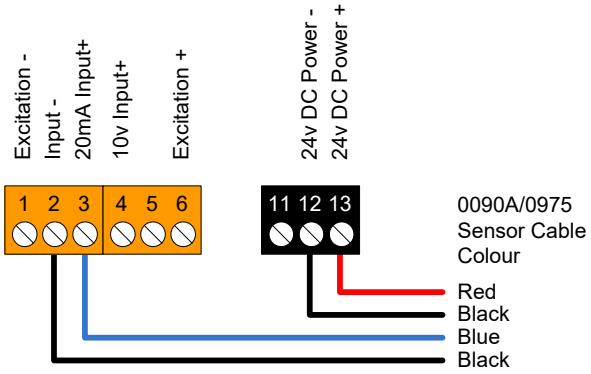

Figure 6: Basic connections in 0-20 or 4-20 mA mode

Figure 7 shows the connection details if the output is connected using the 0-10v mode.

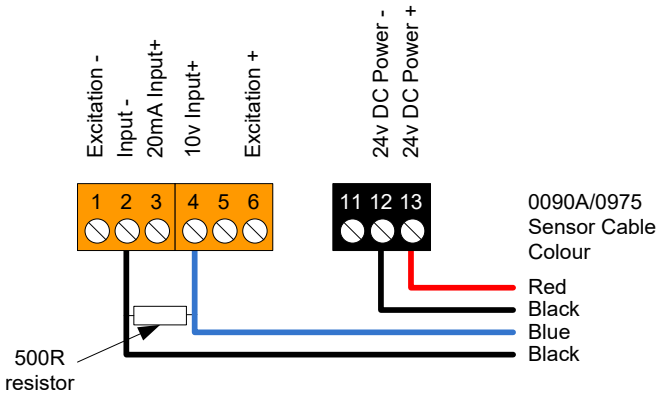

Figure 7: Basic connections in 0-10v mode

Figure 8 shows installation in series with a PLC current input. This can be used to provide a slave display whilst reading the sensor into a control system

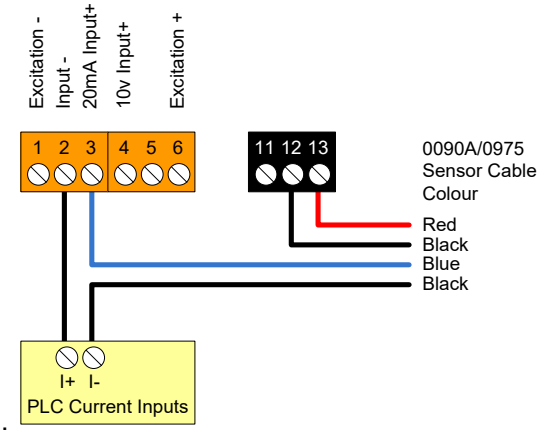

Figure 8: Connecting in series with a PLC current input

Figure 9 shows how to connect in parallel with a PLC voltage input to provide a slave display whilst reading into a control system.

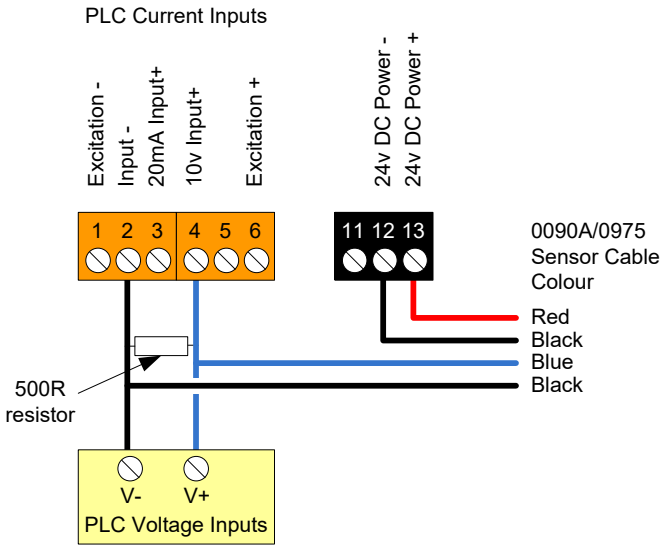

Figure 9: Connecting in parallel with a PLC voltage input

Figure 10 gives the connection details if a sensor is loop powered (2 wire) with the output in 4-20mA current mode.

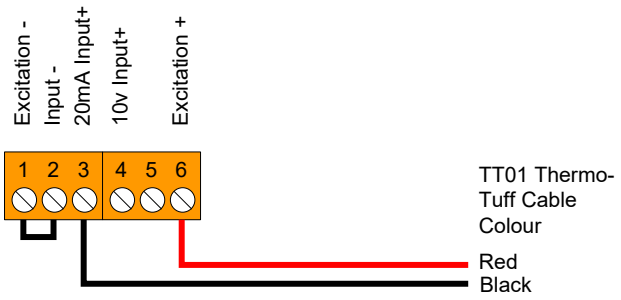

Figure 10: Connections for 2-wire 4-20 mA mode (eg. Hydronix Thermo-Tuff temperature sensor)

1 Setting the unit for use with Hydronix sensors

To make changes to the basic configuration of the unit, the calibration switch on the rear of the Scalable Current Loop Display must be set to off (switch up).

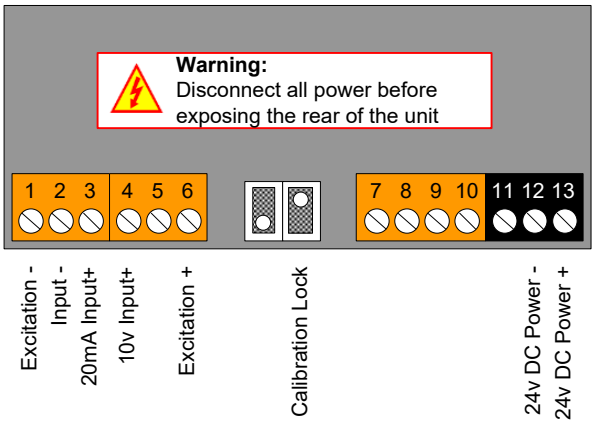

Figure 11: Scalable Current Loop Display connections

1.1 Initial Setup

Press the 2 right hand buttons at the same time (marked Output and Alarms). This gives access to the language option. Press the up and down buttons to select the desired language then press the right hand button to accept (marked OK).

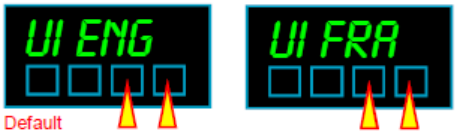

Figure 12: Selecting the Language

The next screen allows configuration of the drift cancellation option which should be left at the default value of “DRIFT 0”. Press the right hand button to accept (marked OK).

Figure 13: Selecting the Drift Cancellation

The next screen shows the boot option, which can be set using the arrow keys to “BOOT 1”. Pressing the right hand button (marked OK) will accept this.

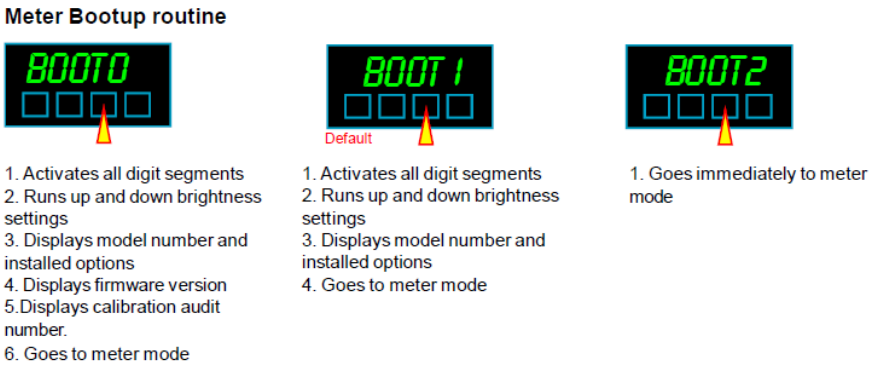

Figure 14: Selecting the Boot-up Sequence

The next screen allows selection of the Tare Memory function. This should be set to “TARE N”. Pressing the right hand button (marked OK) will accept.

Figure 15: Selecting the Tare

The next screen allows you to change the menu timeout delay. This can be left at the default value of 10 seconds. Pressing the right hand button (marked OK) will accept this.

Figure 16: Selecting the Delay

The next screens enable the configuration of the logic input functions (CC.1, CC.2 and CC.3). These are not used when connecting a Hydronix sensor and can be left as default. Press the right hand button (marked OK) until the main display is shown.

Once the initial settings have been completed it is possible to setup the calibration mode and parameters.

1.2 Theoretical Calibration mode setup

Figure 17: Selecting the calibration source

Pressing the two buttons on the left (marked “Set 1” and “Set 2”) gives access to the calibration settings. The first option selection is for the calibration source. After “CAL.Src” is displayed for a few seconds, the unit allows either “THEOR” or “DIRECT” to be selected using the arrow keys. Press the up and down buttons to change the to “THEOR” and then press the right hand button (marked OK) to accept this.

The next screen configures the input type. After displaying “Input” briefly, the unit will give the option to select between either the voltage (“dc U”) or current (“dc A”) mode. Press the up and down buttons to change the input type and then press the right hand button (marked “OK”) to accept.

The unit will then return to the main numeric display.

1.3 Setting up the zero range value

Figure 18: Set zero range value

To enter the setup for the zero range parameters, the left hand button (marked “Set 1”) must be held in until the display shows first “THEOR”, then “dc A” or “dc U”, and then the parameter name to be changed. After this the display will read “In Lo”, and finally the zero input setting in mA. The arrow buttons can be used to set the currently highlighted digit and the left hand button (marked “Digit”) can be used to move to the next digit. When the value is correct the right hand button (marked “OK”) can be used to confirm the entry.

After confirming the “In Lo” parameter, the next value shown is “rd Lo”. This is the reading that is shown when the input current is at “In Lo”. The arrow buttons can be used to set the currently highlighted digit and the left hand button (marked “Digit”) can be used to move to the next digit. When the correct value has been entered the right hand button (marked “OK”) can be used to confirm the entry.

Normally the “In Lo” parameter would be set to 0mA (“00.0000”) or 4mA (“04.0000”) depending on the sensor configuration. The “Rd Lo” parameter would be set to “0000.00”.

1.4 Setting up the full range value

Figure 19: Set full range value

To enter the setup for the full range parameters, the 2nd button from the left (marked “Set 2”) must be held in until the display shows first “THEOR”, then “dc A”. After this the display will read “In Hi”, and finally the high input setting in mA. The arrow buttons can be used to set the currently highlighted digit and the left hand button (marked “Digit”) can be used to move to the next digit. When the value is correct the right hand button (marked “OK”) can be used to confirm the entry.

The normal value for the “In Hi” parameter is “20.0000”.

After confirming the “In Hi” parameter, the next value shown is “rd Hi”. This is the reading that is shown when the input current is at “In Hi”. The arrow buttons can be used to set the currently

highlighted digit and the left hand button (marked “Digit”) can be used to move to the next digit. When the correct value has been entered the right hand button (marked “OK”) can be used to confirm the entry.

To display the moisture as a percentage with the sensor set to the default value, set the “rd Hi” value to “0020.00”.

To display the Unscaled value or the temperature set the “rd Hi” value to “0100.00”.

Note: After configuration, return the Calibration Switch to ON.

1.5 Brightness Setting

Once you have the calibration switch in the locked Position

Press the 2nd button from the Left (Set 2) you will see “Bright” Release button and press up and down buttons to change. Press OK to accept.

Figure 20: Brightness settings

Once the setup of the Scalable Current Loop Display is complete, the Hydronix sensor needs to be configured using Hydro-Com Software installed on a PC and connected using an RS485 communication link (for example via a Hydronix Sensor Interface Module or an Ethernet Adapter).

Note: References to Hydro-Com in this user guide refer to software versions HS0099 v2.5.0 and above. For further information please refer to the relevant Hydro-Com user guide. Some screen configurations may be different, however, all sensor setting are still valid.

For wiring and calibration information, please refer to the appropriate user guide for the sensor you are installing in conjunction with the Hydro-Com user guide.

The Scalable Current Loop Display can show one of the available output variables. The most common output will be either the Filtered Moisture Percentage or the Average Moisture Percentage. The selection can be made from the Configuration tab in Hydro-Com as shown in Figure 21.

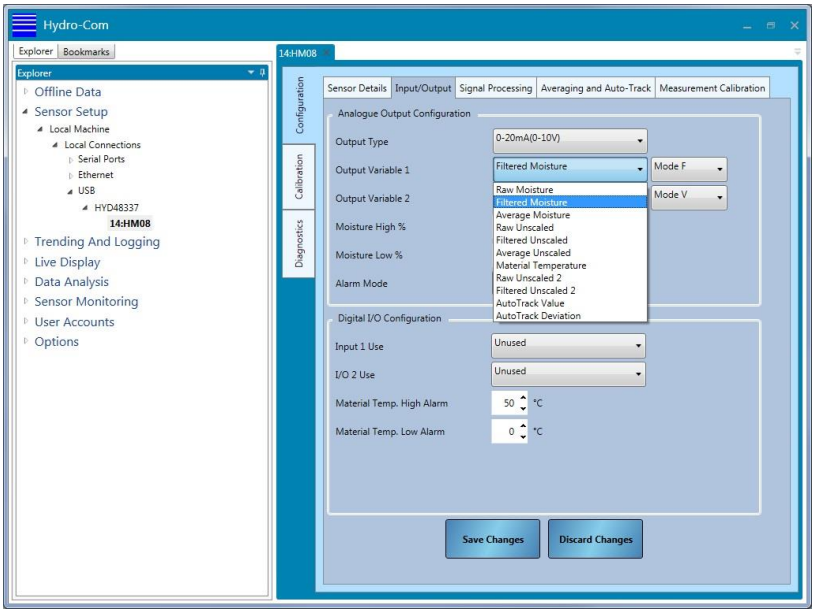

Figure 21: The sensor configuration page

The sensor analogue output can be scaled to either 0-20mA or 4-20mA depending on the requirements of the installation. By default the sensor has the output set to 0-20mA. This can be changed on the configuration page of Hydro-Com. The Scalable Current Loop Display will need to be configured to so that the “In Lo” parameter matches the sensor output setting, see section 1.3 for details.

When the output is set to moisture, the sensor default has the output scaling set so that the minimum (0 or 4mA) is set to 0% moisture and the maximum (20mA) is set to 20%. This can also be changed using the High % and Low % entry fields on the configuration page (Figure 22).

If the sensor is configured to output Filtered/Average Unscaled the scaling is automatically configured so that the minimum (0 or 4mA) is set as 0 Unscaled and the maximum (20mA) is set as 100 Unscaled.

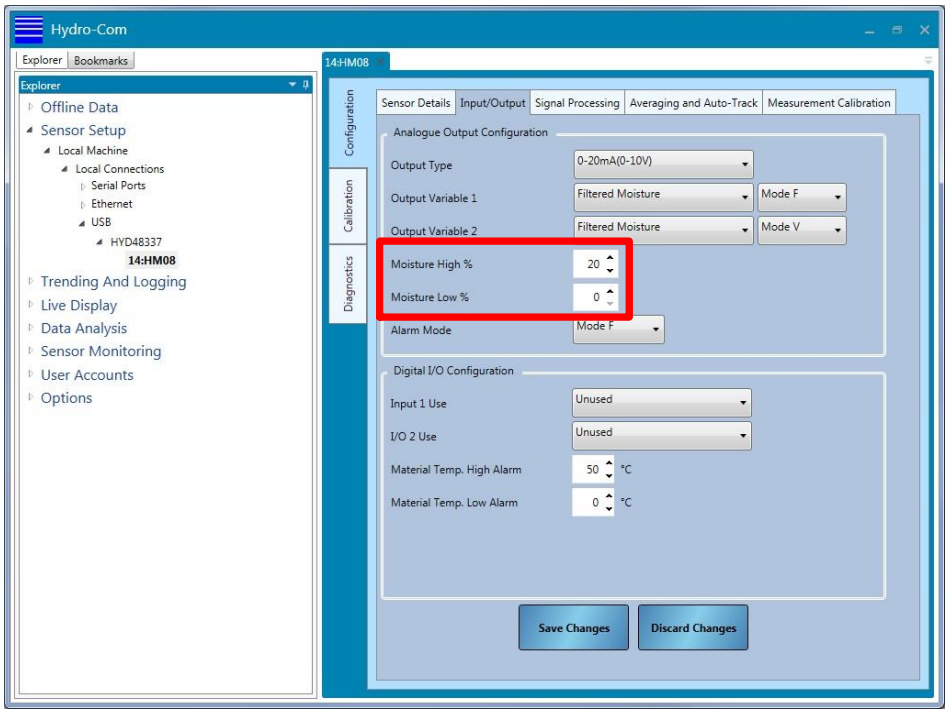

Figure 22: The sensor configuration page with the output High and Low %

1 Equipment Specifications

- Bezel size 48mm high by 96 mm wide (1/8 DIN) / 1.85 Inches high by 3.7 inches wide.
- Panel Cutout 45 mm high by 92 mm wide / 1.77 Inches high by 3.62 Inches wide.
- Case Depth 125 mm including connectors / 4.93 Inches including connectors
- Weight 300 grammes / 0.66 Pounds
- Case Material Black polycarbonate
- Connectors Detachable Screw Terminal connectors
- Environmental storage temperature range -20 to +70°C, non condensing
- Operating temperature range 0 to 50°C, non condensing / 32°F to 122°F
- Front sealed IP65
- Power 11-30 VDC
- Burden 10VA maximum
- Input Signals (bipolar) 0-20mA, 4 to 20mA, 0-10V, 1-5V, 0-5V
- Input Resistance 1 Megohms for voltage, 2 Ohms for current
- Accuracy +/-0.05% of range
- Span tempco 25 ppm/°C
- Zero Tempco 30 ppm/°C
- Excitation voltage 24VDC nominal rated at 60mA.
- Filtering / smoothing Selectable time constants of 0 to 25 seconds.
- A/D conversion Sigma-Delta 10 conversions per second, 50/60Hz rejection
  Resolution 1 in 400 000 max. over full range
- Display update rate 10 readings per second
- Display Range (max) -199999 to +199999, depending on available signal level

2 Default Factory Settings

The default factory settings for the 0700 Scalable Current Loop Display are:

	Analogue Current	**Display Reading**
Low	4mA	0
High	20mA	100

Chapter 7 Troubleshooting

The following tables list the most common faults found when using the display. If you are unable to diagnose the problem from this information, please contact your local distributor or the Hydronix technical support team on +44 (0) 1483 468900 or by email: support@hydronix.com.

Symptom: Display blank

Possible explanation	Check	Required result	Action required on failure
No power	Voltage across power terminals	24v DC present	Check power supply and wiring

Symptom: Display not changing

Possible explanation	Check	Required result	Action required on failure
No analogue input	Current in analogue input circuit	0-20 mA depending on installation	Check analogue output from sensor using Hydro-Com and wiring

1 Document Cross Reference

This section lists all of the other documents that are referred to in this User Guide. You may find it beneficial to have a copy available when reading to this guide.

Document Number	Title
HD0682	Hydro-Com User Guide
HD0678	Sensor Electrical Installation Guide

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