Scaleable Current Loop Display
User Guide

To re-order quote part number:	HD0475
Revision:	1.2.0
Revision Date:	May 2012

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ERRORS IN DOCUMENTATION

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

ACKNOWLEDGEMENTS
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Revision History

Revision Number	Software Version	Date	Description of Changes
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

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1   Introduction

The Scaleable Current Loop Display unit, Hydronix part number SCLD1, is a cost effective method of displaying an analogue signal, such as the analogue output from a sensor.

One display unit is required for each sensor. The installer will need to provide an enclosure for the display and a power supply and associated connection terminals. The 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 2000 or later.

Communications from the PC to the sensor can be achieved via USB (using a Hydronix USB Sensor Interface Module part number SIM01), via RS232 (using a KK Systems RS232 to RS485 converter Hydronix part number 0049A or 0049B) or via Ethernet (using Hydronix part number EAK01 or EPK01).

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 display unit accordingly or severe electrical damage may occur to you or the device.

Check the supply voltage needed, the SCLD1 is rated for 15 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 15-30VDC.

The display unit 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 display unit with a soft, damp cloth. If cleaning is required behind the front panel then use a **dry** cloth.

1 Mounting Advice

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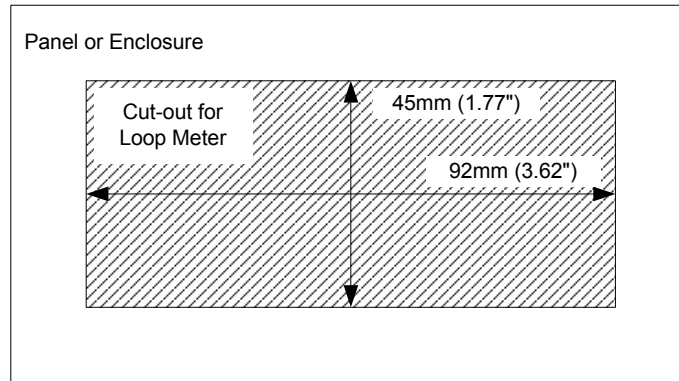
Figure 1: The panel cut-out needed for mounting the display

To fit the 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 display through the cut-out in the enclosure and then re-fit the U-Bracket to firmly clamp the display in place. Check that the gasket is evenly pinched between the front bezel and the enclosure front.
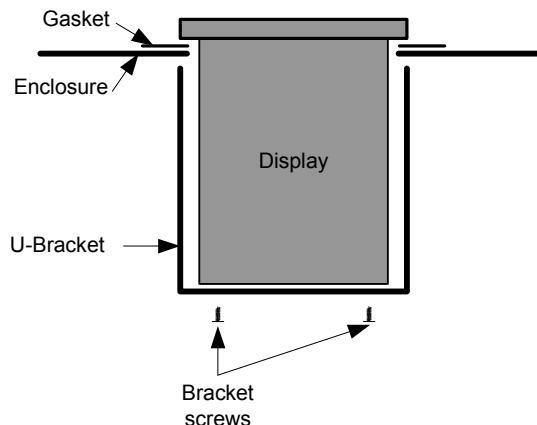
Figure 2: Re-fitting the U-Bracket

Figure 3 shows of the display from the side and shows the placement of the gasket between the front of the enclosure and the display.
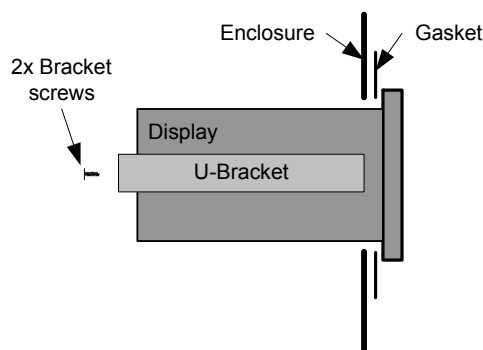
Figure 3: Side view of display installed in an enclosure

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: 90C 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
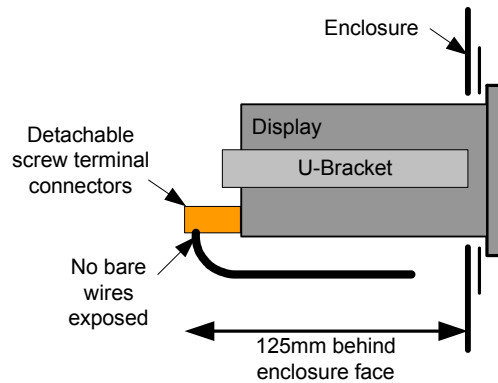

Figure 4: The display showing wiring connector location

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 display. The description of the connections used for installation with Hydronix sensors is given in **Figure 5**.
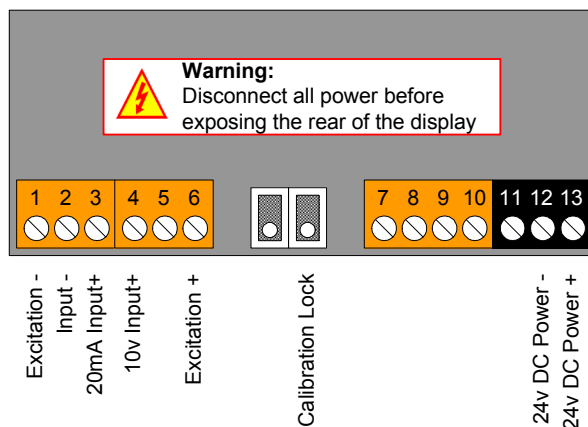
Figure 5: Display connections at rear of unit

As the analogue output of a Hydronix sensor is configurable, the actual connection wiring is dependant 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.

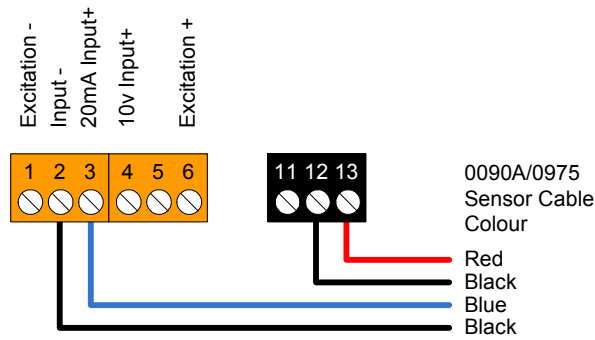**Figure 6: Basic connections in 0-20 or 4-20 mA mode**

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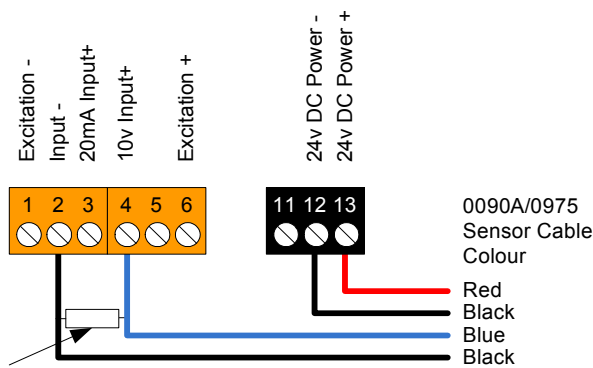
Figure 7: Basic connections in 0-10v mode

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

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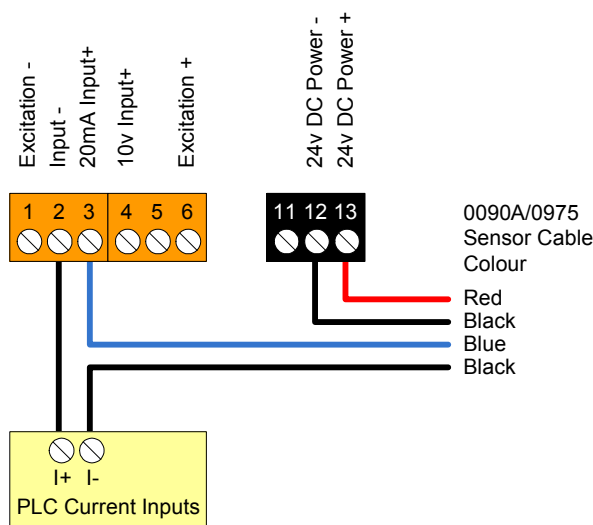
Figure 8: Connecing in series with a PLC current input

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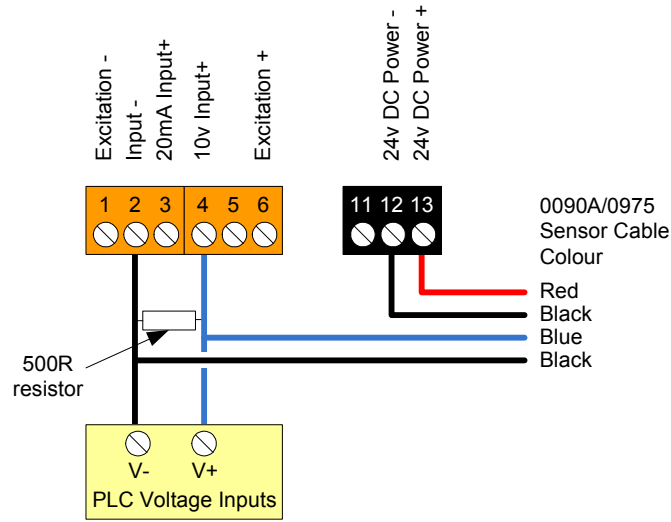
Figure 9: Connecting in parallel with a PLC voltage input

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

Figure 10: Connection in 2 wire 4-20 mA mode (eg. Thermo-Tuff, TT01)

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 display must be set to off (switch up).
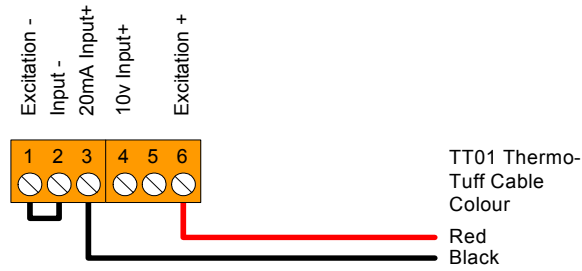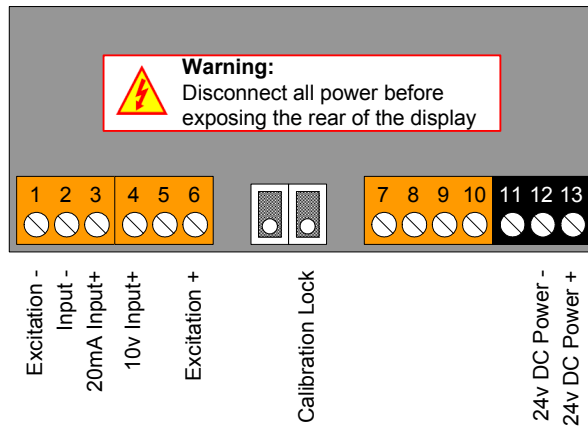

Figure 11: Display connections at rear of unit

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).
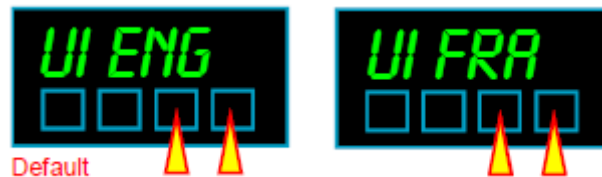
Figure 12: Selecting the Language

The next screen will give you the option to select you will see "EASY" or "Adu". Using the arrows, select "Adu", and then press the right hand button to accept (marked OK).

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.

Meter Bootup routine

Default

1. Activates all digit segments
2. Runs up and down brightness settings
3. Displays model number and installed options
4. Displays firmware version
5. Displays calibration audit number.
6. Goes to meter mode

1. Activates all digit segments
2. Runs up and down brightness settings
3. Displays model number and installed options
4. Goes to meter mode

1. Goes immediately to meter mode

Figure 14: Selecting the Bootup 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.

Tare Memory

Default

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

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

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

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.

Once setup of the display is complete, the Hydronix sensor needs to be configured using the Hydro-Com Software installed on a PC and connected using an RS485 communication link (for example via a SIM01 USB interface or an Ethernet Adapter).

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

The display can show one of the available output variables. The most common display will be either the Filtered Moisture Percentage (also known as the 'Now' figure), or the "Average Moisture Percentage". The selection can be made from the Configuration tab in Hydro-Com as shown in Figure 18.
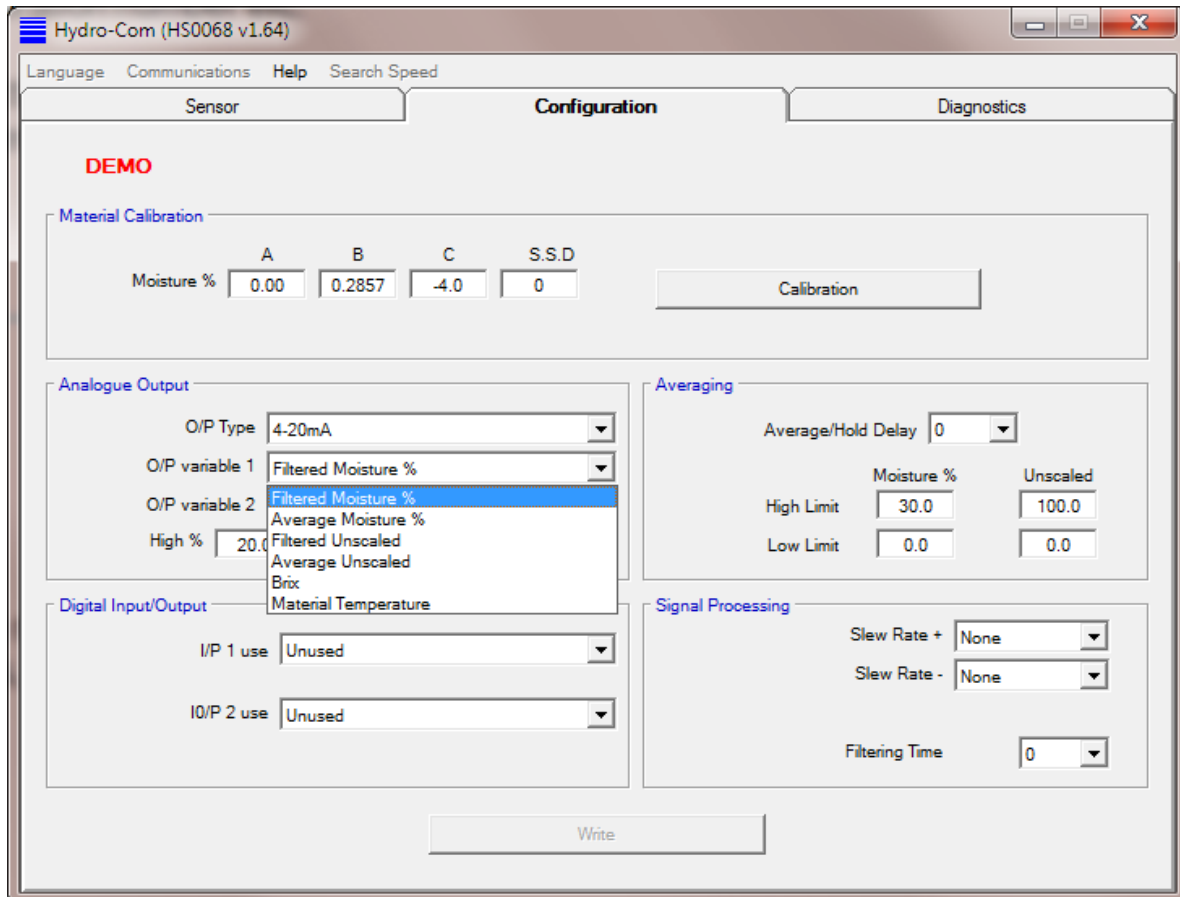

Figure 18: The sensor configuration page

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. The display will need to be configured to so that the "In Lo" parameter matches the sensor output setting.

When the output is set to moisture, the sensor default has the output scaling set so that the minimum is set to 0% moisture and the maximum is set to 20%. This can also be changed using the High % and Low % entry fields on the configuration page.
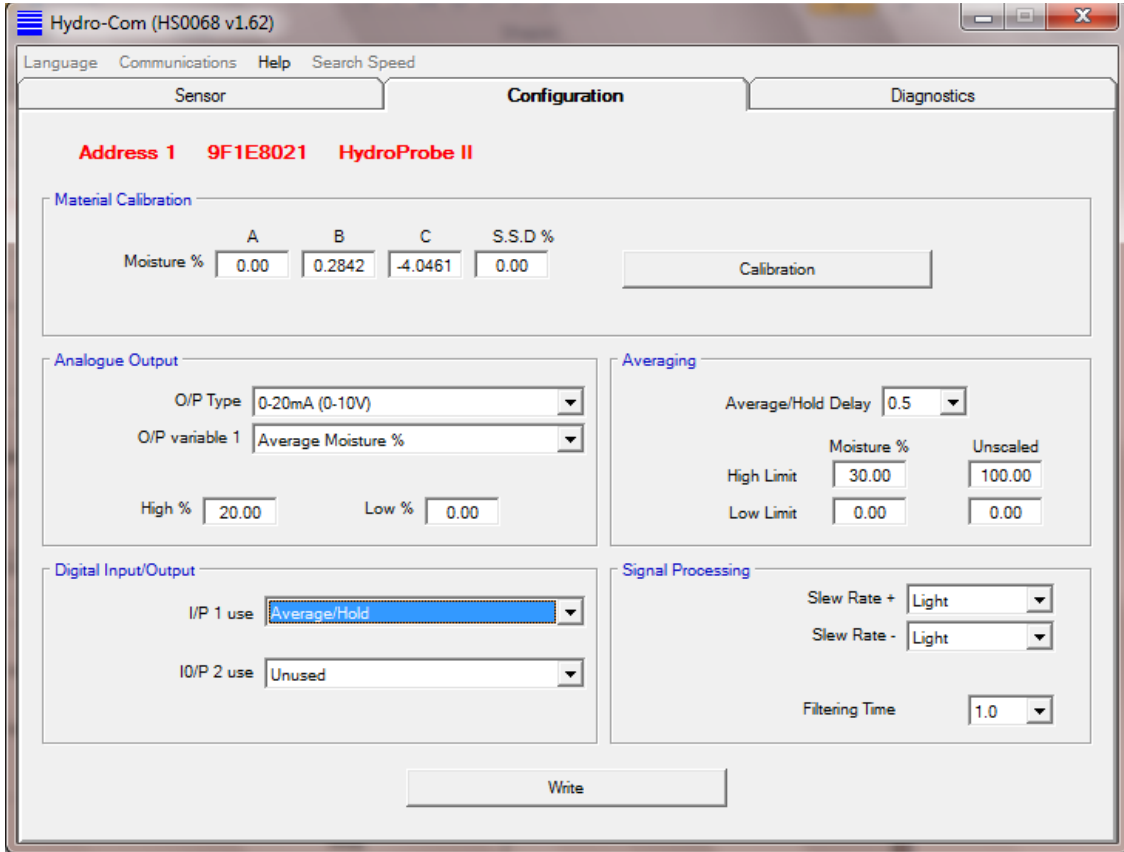
Figure 19: The sensor configuration page with the output High and Low %

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 degrees C, non condensing
- Operating temperature range to 50 degrees C, non condensing / 32 degrees F to 122 degrees
- Front sealed IP65
- Power 15-30 VDC optional
- Burden 5VA maximum
- Input Signals (bipolar) 4 to 20mA, 0-10V, 1-5V, 0-5V bipolar
- Input Resistance >1 Megohms for voltage, 33 Ohms for current
- Accuracy +/-0.05% of range
- Span tempco 25 ppm/Degree Celsius
- Zero Tempco 30 ppm/Degree Celsius
- Excitation voltage 24VDC nominal rated at 40mA.
- Filtering / smoothing Selectable time constants of 0 to 5 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 Scaleable Loop Display are:

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

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