# PSM INSTRUMENTATION LTD

# ISS
## Configuration software for the
## ICT 1000 series level transmitter

# Installation & Operation Manual V2.610

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**MAN 061 C July 2016**

# 1. Contents

**NOTE**
PSM Instrumentation has a policy of continual improvement of their product range.
Please ensure by visiting www.psmmarine.com/documentation that you are using the latest issue of this manual.
Where PSM manuals contain reference to specific firmware versions of the ICT 1000 please also ensure that the correct procedure is being followed for your firmware version

# 2. About the ISS configuration software

## 2.1    Application

The ISS configuration software is written specifically to configure  and test PSM Instrumentation ICT 1000 level transmitters.  It will also test their associated RS485 Modbus interconnection network if the transmitters are used in a digital operation mode.

The ISS software is not to be used with any other product from PSM or other manufacturers otherwise incorrect operation or damage may occur.

## 2.2    Notes about this manual

Incorrect function or damage to associated equipment may occur if ISS is not used in accordance with this manual.  The information in this manual may be highlighted by the following symbols indicating that special care should be taken when performing these associated actions.

A hazard indicates actions or procedures which if not performed correctly may invalidate safety certification.

A caution indicates actions or procedures if not performed correctly may cause incorrect functionality, loss of information or damage to the equipment.

A note indicates that further information or functionality is available.

## 2.3    Scope of this manual

This document describes the mechanical, electrical connection and user operator for the ISS configuration software only.

Refer to MAN 049 for installation and operation of the ICT 1000 level transmitters and other associated components such as power supplies, RFM ISR network safety barrier modules and RFM 1 & RFM 4 network connection modules.

## 2.4    Refer to MAN 053 for the full communications address map

## Safety instructions

To prevent any damage to the device or any injury to the user it is essential that you read the information in this document and observe applicable national standards and safety requirements.

This document is provided to help facilitate the safe and efficient operation of the product.

## 2.5 Product liability and warranty

All ICT transmitters are carefully assembled and fully tested before shipment and are sent out in perfect order and condition. We, therefore, give the following Guarantee which takes the place of any Guarantee by Statute, common law or otherwise. If within 12 months from date of despatch, any defect or fault is discovered in any component of our manufacture, due to faulty material or bad workmanship, we undertake to make good the defect without charge, provided that notice is given to us immediately on the discovery of the defect and the defective components or parts thereof, are forwarded to us carriage paid for inspection. This guarantee does not apply to defects caused by ordinary wear and tear, misuse, neglect, or by circumstances over which we have no control.

Full terms and conditions are available from our website: *www.psmmarine.com/about-us*

## 2.6 Scope of delivery

Not applicable for software products.

## 2.7 Storage

Not applicable for software products.

## 2.8 Product identification

For software products version number is identified under: Help > About

## 2.9 Operations and maintenance

Not applicable for software products.

## 2.10 Instrument return

Not applicable for software products.

## 2.11 EC Declaration of Conformity

The products detailed within this manual meet the legal requirements of the applicable EC Directives.
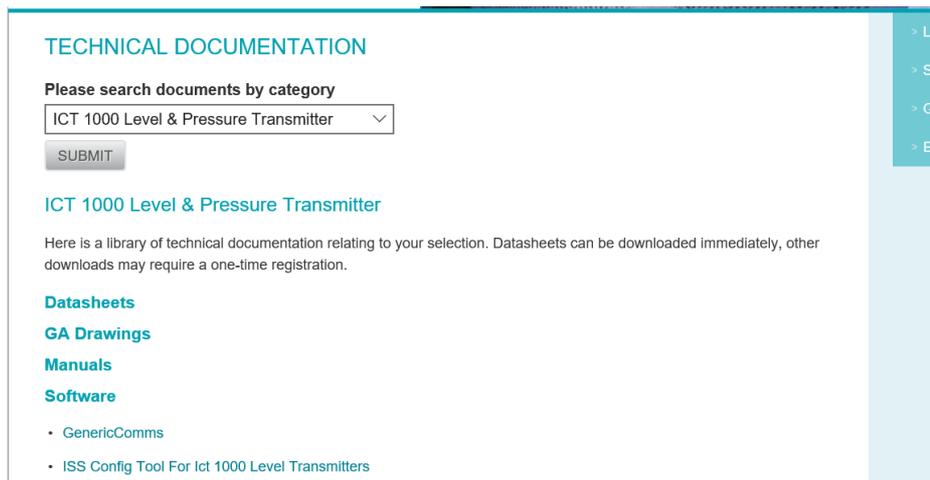
# 3. Installation of the ISS software

## 3.1 Download the ISS software AND Generic Comms file

### Location of software download
https://www.psmmarine.com/documentation.

Select the ICT 1000 transmitter product option from the dropdown document
**Java must be installed on the Laptop / PC for the software to run.**

This can be downloaded from https://www.java.com/en/download/

TECHNICAL DOCUMENTATION

**Please search documents by category**

ICT 1000 Level & Pressure Transmitter

SUBMIT

ICT 1000 Level & Pressure Transmitter

Here is a library of technical documentation relating to your selection. Datasheets can be downloaded immediately, other downloads may require a one-time registration.

**Datasheets**
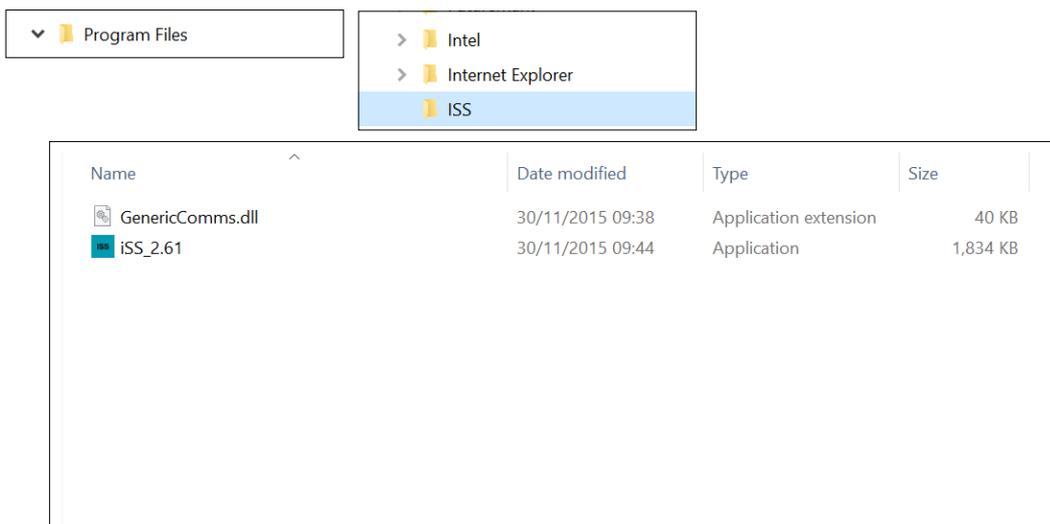
**GA Drawings**

**Manuals**

**Software**

- GenericComms

- ISS Config Tool For Ict 1000 Level Transmitters

**The software does not "Auto install" - create a folder on the Laptop / PC**
The location is not important.

## 3.2 Save both to the Laptop / PC

| Program Files | | Intel |
| | | Internet Explorer |
| | | ISS |

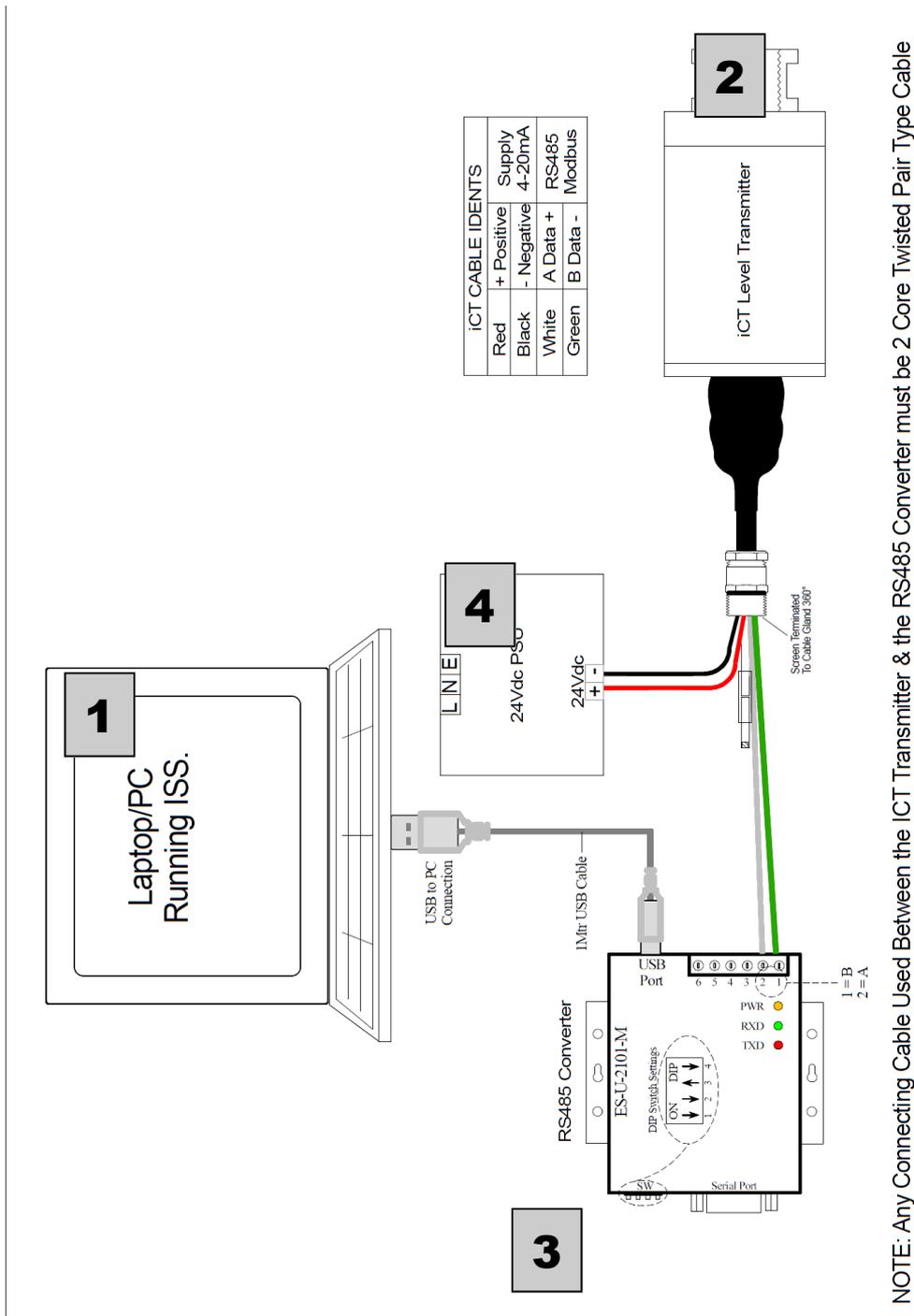| Name | Date modified | Type | Size |
| --- | --- | --- | --- |
| GenericComms.dll | 30/11/2015 09:38 | Application extension | 40 KB |
| iSS_2.61 | 30/11/2015 09:44 | Application | 1,834 KB |

Both the ISS application (.exe) and Generic Comms extension (.dll) must be saved in the same directory.
The ISS software can be run directly from this folder or a desktop shortcut (right click > Send To > Desktop) can also be created,
An additional file named *Settings.ini* will be created once the software is used for the first time.

# 4. Electrical connection

## 4.1 System overview



iCT CABLE IDENTS

| | | Supply 4-20mA | RS485 Modbus |
|---|---|---|---|
| Red | + Positive | | |
| Black | - Negative | | |
| White | | A Data + | |
| Green | | B Data - | |

iCT Level Transmitter

NOTE: Any Connecting Cable Used Between the ICT Transmitter & the RS485 Converter must be 2 Core Twisted Pair Type Cable

Laptop/PC Running ISS.

24Vdc PSU

24Vdc

USB to PC Connection

1Mtr USB Cable

RS485 Converter

ES-U-2101-M

DIP Switch Settings

USB Port

PWR
RXD
TXD

1 = B
2 = A

Serial Port

## A complete configuration system
[1] Laptop / PC.
[2] ICT 1000 level transmitter.
[3] RS 485 <> USB adaptor—Converts the PC USB output to RS485 used by ICT
[4] 24 V dc power supply.—An ISOLATED power supply should be used

PSM has tested and can recommend the EasySYNC model ES-U-2101-M adapter: *www.easysync-ltd.com/product/543/es-u-2101-m.html*
Ensure that the adaptor dip switches are set according to the drawing.

# 5. Configuration of the PC / Laptop Comms Ports

## 5.1 Use Device Manager to identify connected devices

### Open the Device Manager tool on the PC / Laptop

Identify the devices that are connected to the Comms Ports.

Depending on the Windows version and installed drivers, the RS 485 <> USB adapter may show as a generic device or with its specific device name.

If the a different USB port is subsequently used to connect the adaptor, then this process may need to be repeated as the Port assignment may change.
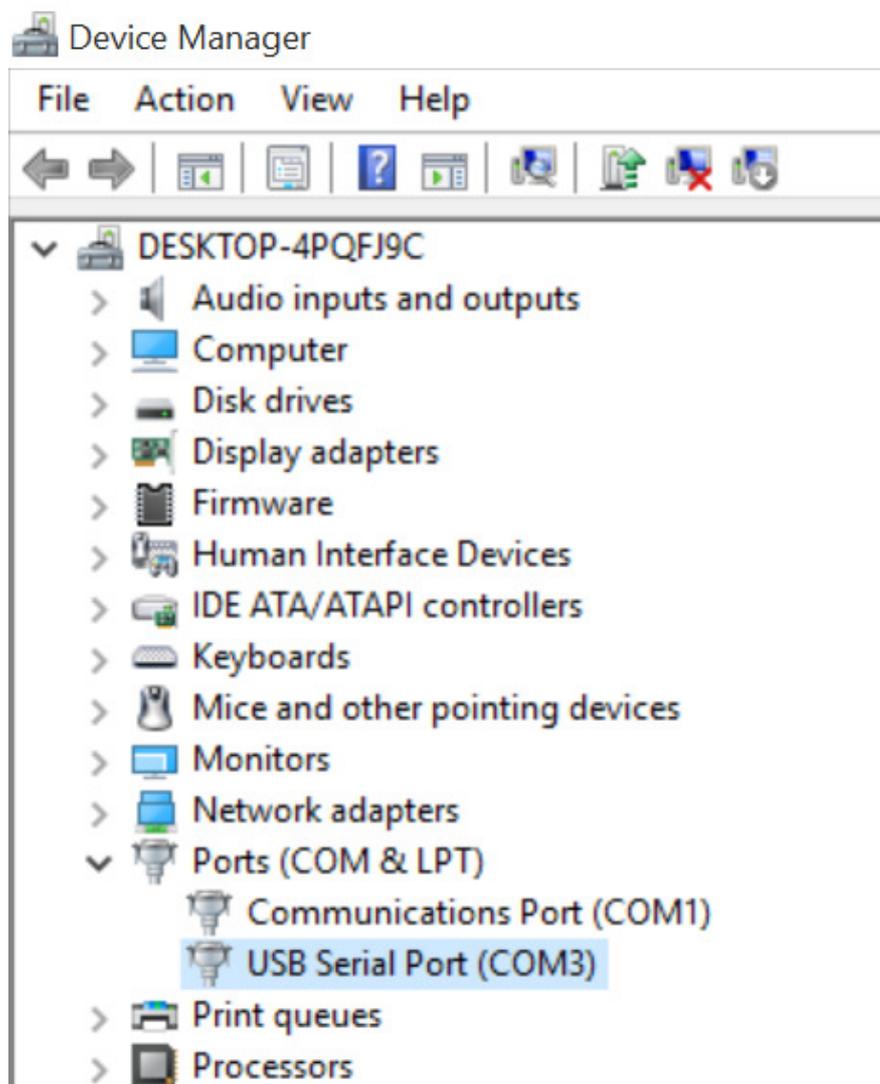
## 5.2 Set ISS software to the correct Port
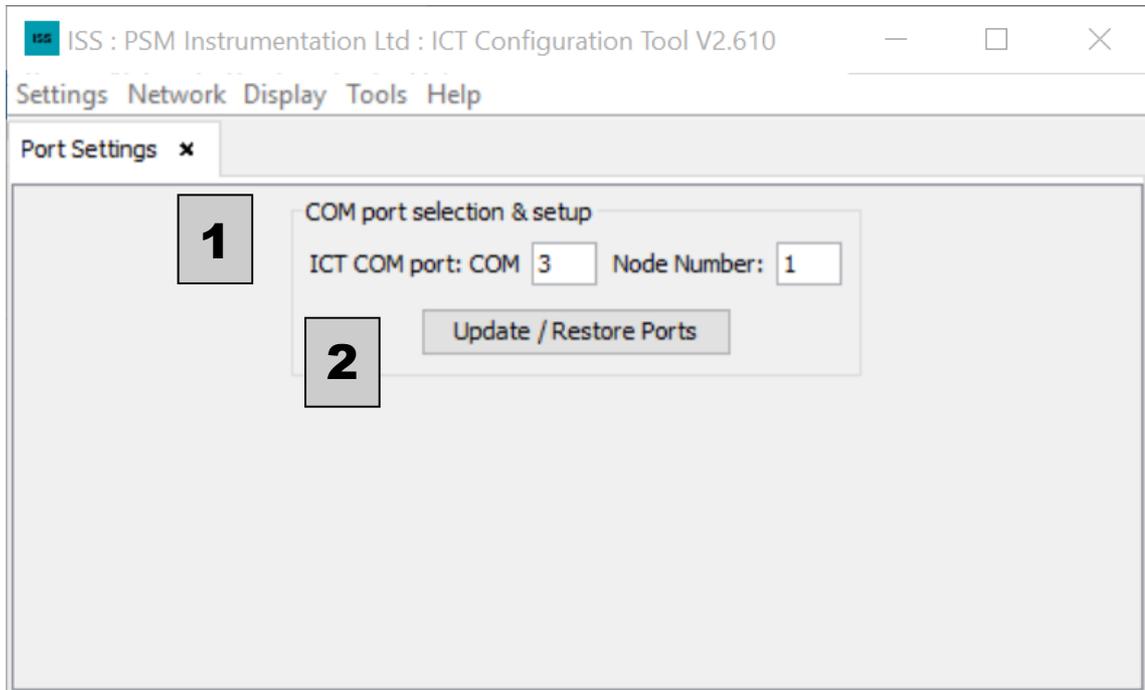


### 5.2.1    Configure the ISS software to use the correct Port

Run the ISS software from the saved folder location [3.2].

Open the Port Settings tab: Settings > Port Settings.

[1] Set ICT Comm Port option to match the identified connected Port [5.1.1].

[2] Save the configuration with the Update / Restore Ports button.

A confirmation message "COM Ports have been updated and reopened" will be then be shown if the process was successful.

If known, the Node Number (Modbus network address) of the ICT 1000 transmitter to be configured.  It can also be set with this function [7.3.1].

Node Number 254 can be used as a default and will always connect to a single ICT 1000 level transmitter irrespective of its actual programmed Node Number.

# 6. Overview of ISS software

## 6.1 Function groups

ISS : PSM Instrumentation Ltd : ICT Configuration Tool V2.610

Settings  Network  Display  Tools  Help
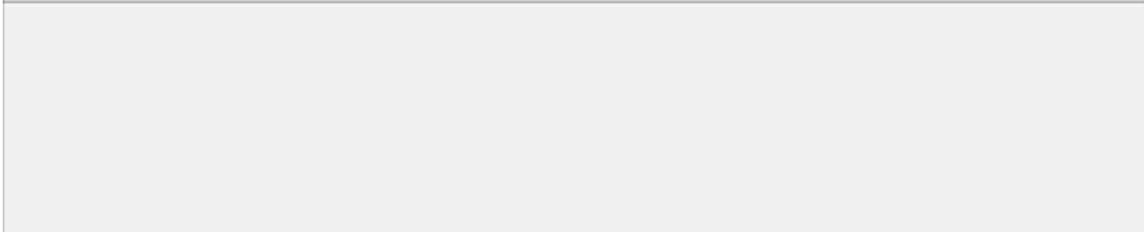
**6.1.1**

**The ISS software is organised in five functional groups (tabs)**

**Settings** configures:
- The PC / Laptop Comms Port and assign the Modbus address (Node Number) to communicate a specific ICT 1000 transmitter.
- mA Settings: Enable/Disable 4-20mA, define operating range
- Alarms: Low, High, Deviation & Control function.
- Unit Details: duty / application name / tag, Modbus address.
- Tank Profile: height <> volume table data.
- Overview: calculation chain for pressure <> product physical properties).

**Network** allows:
- Modbus Scanner: sequentially checks Modbus addresses for connected ICT 1000 transmitters.
- Network Test: repeatedly polls addresses to check connection integrity.

**Display** shows:
- Meter Display: real-time measurement and details of a single ICT 1000 transmitter.
- Dual Meter: real-time measurement for any two ICT 1000 transmitters plus trending.
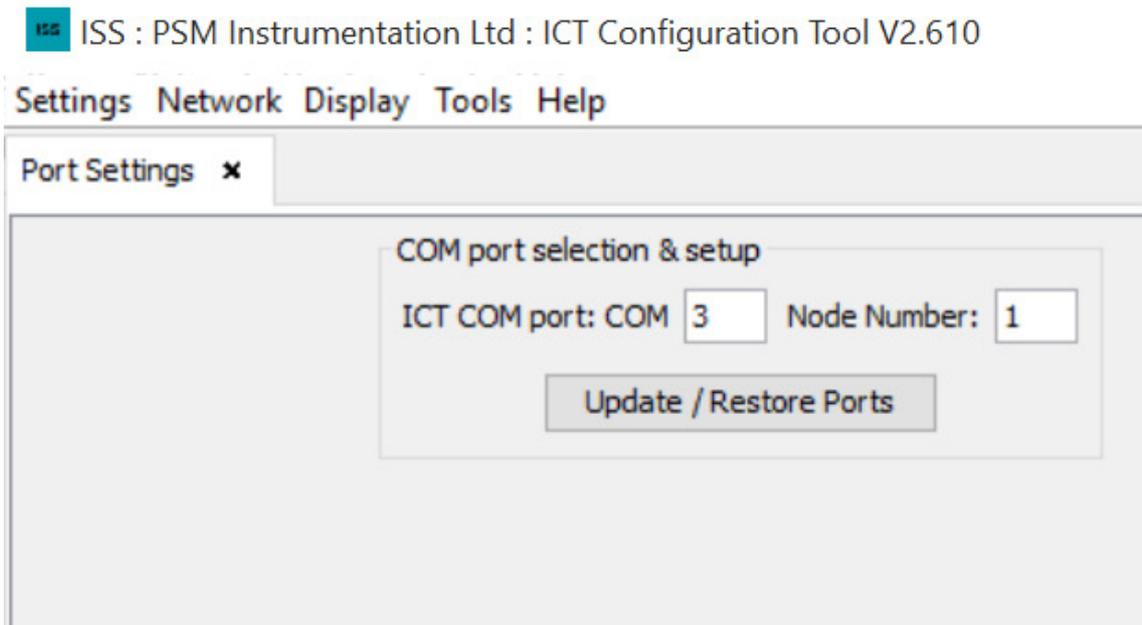- Multiple Unit Viewer: real-time measurement for a number of ICT 1000 transmitters plus trending.

**Tools** allows:
- ICT Memory Cloning: copy to file or write from file an ICT 1000 transmitter configuration.
- Datalogger: creates .xls log file on host PC / Laptop of measurements)
- ICT Test: simple test of comms and transmitter response).
- Zero Calibration: create and write a new zero measurement point for the ICT 1000 transmitter.
- Status: displays good / bad & active / inactive condition for ICT 1000 transmitter functions.

**Help**  shows:
- About: software version and PSM Instrumentation contact details.
- Documentation: web address for the latest version of this manual.

## 6.2 Closing function group tabs

ISS : PSM Instrumentation Ltd : ICT Configuration Tool V2.610

Settings  Network  Display  Tools  Help

Port Settings ✖

COM port selection & setup

ICT COM port: COM 3     Node Number: 1

Update / Restore Ports

### 6.2.1  Management of tabs

Multiple tabs can be opened in the same instance.  These can be made active by clicking on them and closed by selecting the X.

# 7. Settings (key functions)

## 7.1 mA Loop Settings

The ICT provides a standard 4-20mA current output, the output value can be modified by any Zero and Span parameter settings, and also subject to the Force Zero and Force Span parameters.

Zero and Span applies when the Analogue Output Source is set to scaled pressure only.

In cases where the Output Source is set to Percentage Level or Volume, the Zero and Range Offset parameters apply.



### 7.1.1 Configure zero (4mA) & span (20 mA)

[1] Enable the mA Mode: switches on the analogue output.

[2] Assign the mA Output to Scaled Pressure (mm H20 hydrostatic level). It can also be set over % Volume and % Level.

[3] Set the Zero & Span pressure points (Note that the Span is limited by the maximum pressure range of the ICT 1000 transmitter construction [7.2.2].

[4] Set Zero and Span Limit Clamping: mA output will move and hold to 4 or 20 mA if the measurement is with the % programmed limit band for either.
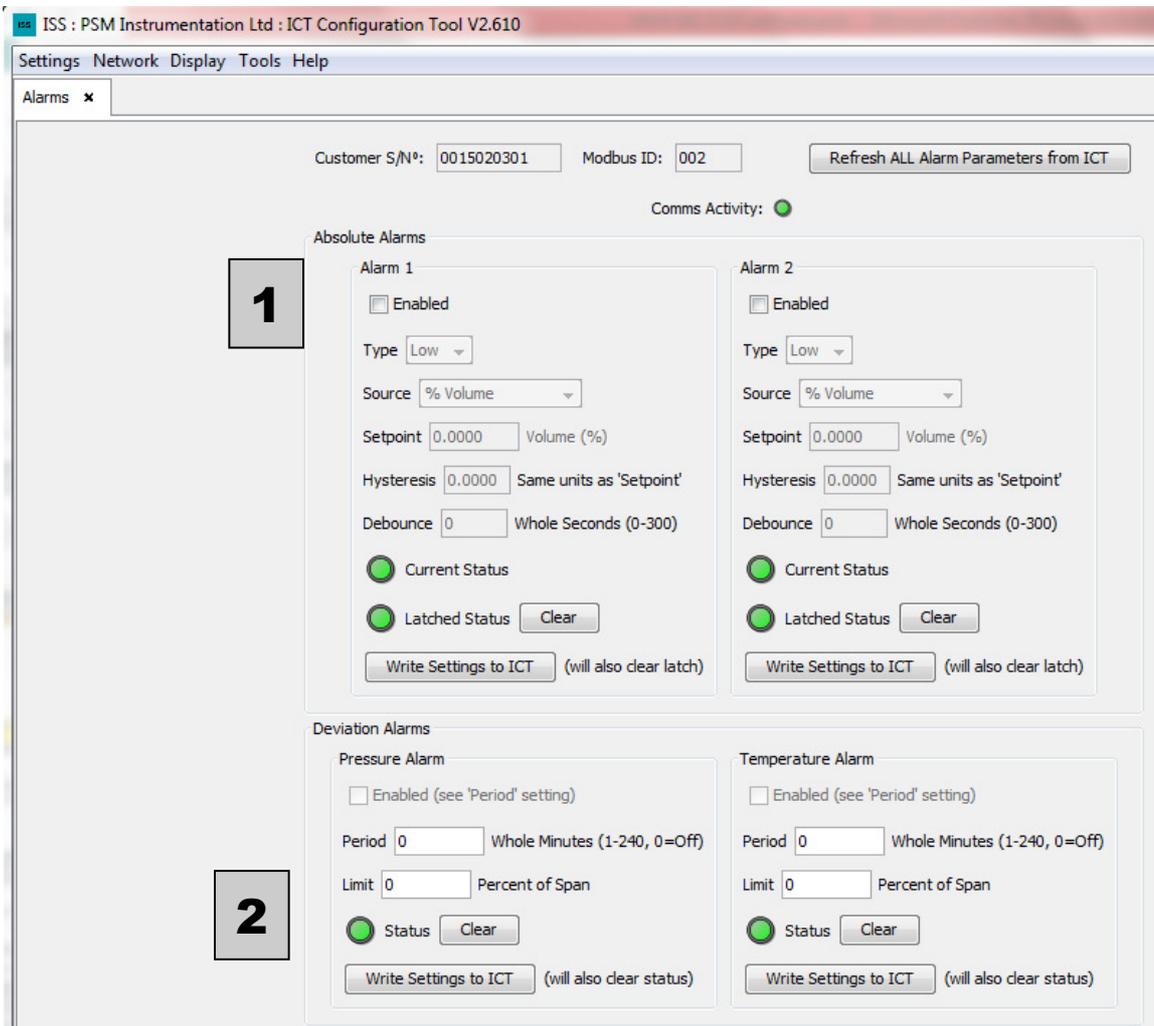
[5] Write to ICT: configures the ICT 1000 transmitter.

[6] Set mA Test Mode: manually step the analogue output to specific % measurement range or specific mA values (for loop testing).

[7] Select the tick box for either High  (22mA) or Low (3.5mA) as the indication that any of the selected alarm conditions have been met.

# 7. Settings (key functions)

## 7.2 Alarms



### 7.2.1 Two types of Alarm are provided; Rate of Change and Absolute

(1) Two Absolute Alarms are provided that may be configured.  These can be set to operate with respect to either:

- Percentage Tank Volume
- Percentage Tank Level
- Temperature
- Scaled Pressure
- Non-scaled Pressure

Each Alarm may be set to operate as either a Rising or as a Falling Alarm. Rising Alarms trigger when their Source Value is greater than thei Set-point and Falling Alarms trigger when their Source Value is less than the Set-point. Each Alarm is provided with a definable Hysteresis value, which will prevent the Alarm de-activating until the Source Value has crossed a suitable threshold in the safe direction.

In addition, each Alarm is provided with a Debounce Timeout, which prevents the Alarm from triggering until the Alarm's limit has been active continuously for more than a certain number of seconds. This timeout is also applied to the Alarm's deactivation.

(2) Two Rate of Change Alarms are provided. One uses the Pressure Value and the other uses the Temperature Value as its input. Both Alarms can be set to trigger if the rate of change exceeds a defined limit within a defined time period. Once one of these Alarms has triggered, its status will be saved into non-volatile memory, so that any intervening power-downs will not remove the alarm condition. The relevant alarm condition may be cleared via the Digital Communications facility only.

# 7. Settings (key functions)

## 7.3 Unit Details



### 7.3.1 Configure ICT 1000 transmitter unit details (identification)

[1] Set a Name for the ICT 1000 related to the application or tank function.
[2] Configure the unique Modbus address identity (range 1 > 253)
For an ICT 1000 transmitter which will be used in a mA analogue mode then this Ident can be set to 1 for the purposes of connection [5.2.1], configuration [7.2.1] and testing [10.1] functionality.
[3] Set the Input Filter Time (over a range of 0 … 10 secs) :  This variable acts to "dampen" the measurement and mA output response as the level  measurement changes.  The longer the Time, the greater the effect.
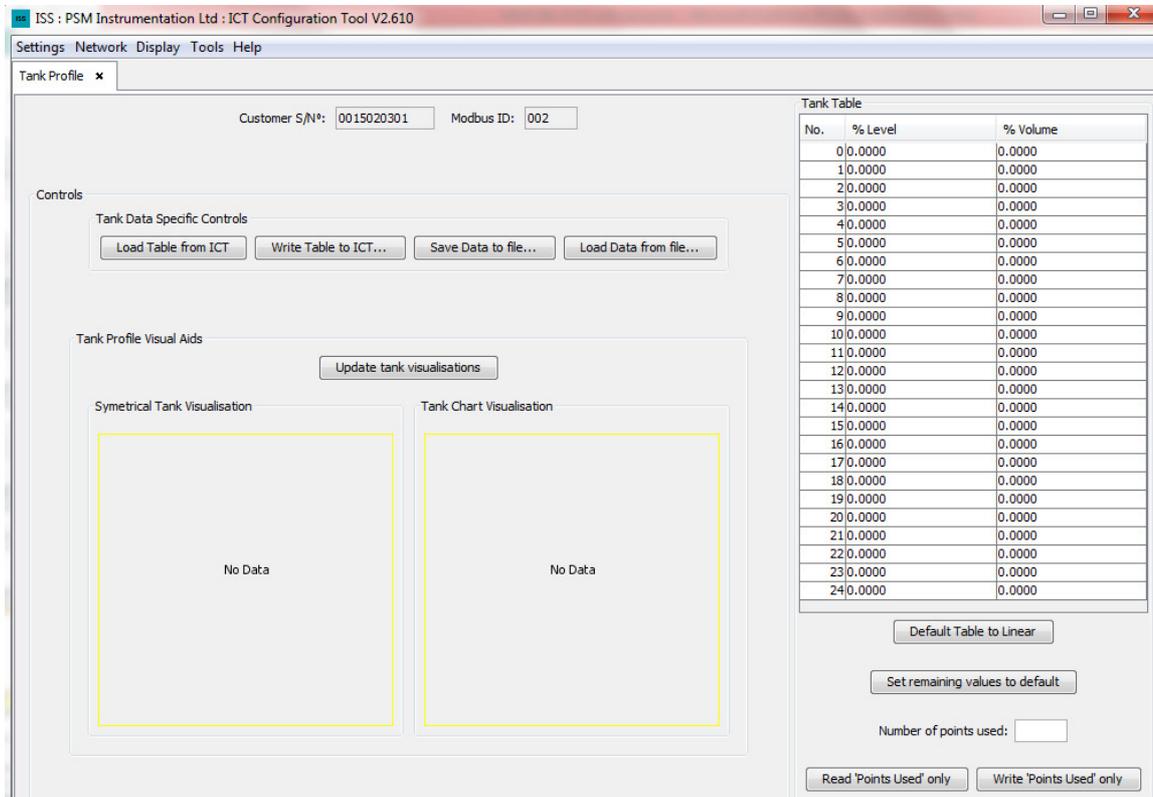
### 7.3.2 Read-only ICT 1000 transmitter unit details
[4] Information that is unique to each specific ICT 1000 transmitter  manufactured and is programmed during assembly.   It cannot be changed by the ISS software.

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# 7. Settings (key functions)

## 7.4 Tank Profile

Default when tab opened



### 7.4.1  Used to configure the tank shape

The table is used to enter %Level Vs %Volume values.
Each column must contain equal or incrementing values, decrementing values are not acceptable.
The "Number of Points Used" field should be set to the number of rows used to define the tank profile.
The buttons on this tab can be used to read the current information from the ICT as well as write any changes to it.
There are also buttons for reading / writing the data to / from file.

The "Symmetrical Tank Visualisation" area will display a 2 dimensional, symmetrical representation of the tank as configured in the profile table when the "Update Tank Visualisation" button is pressed. This can be used to check the settings within the profile table for sanity.



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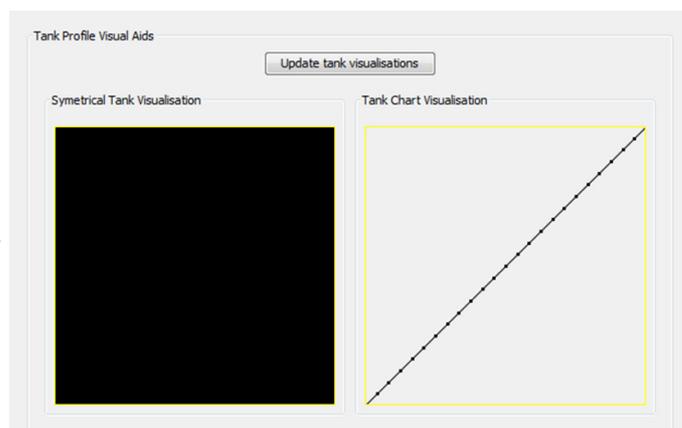
# 7. Settings (key functions)

## 7.5 Overview

Shows the chain of calculations being made by the ICT, in real time, as well as the results

The fields with a white background are editable whereas the fields with grey background are not.

Once a field has been edited the contents will turn red until the changes are written and will turn black once the write is complete

The highlighted green box, displays where in the chain the mA output is being calculated .
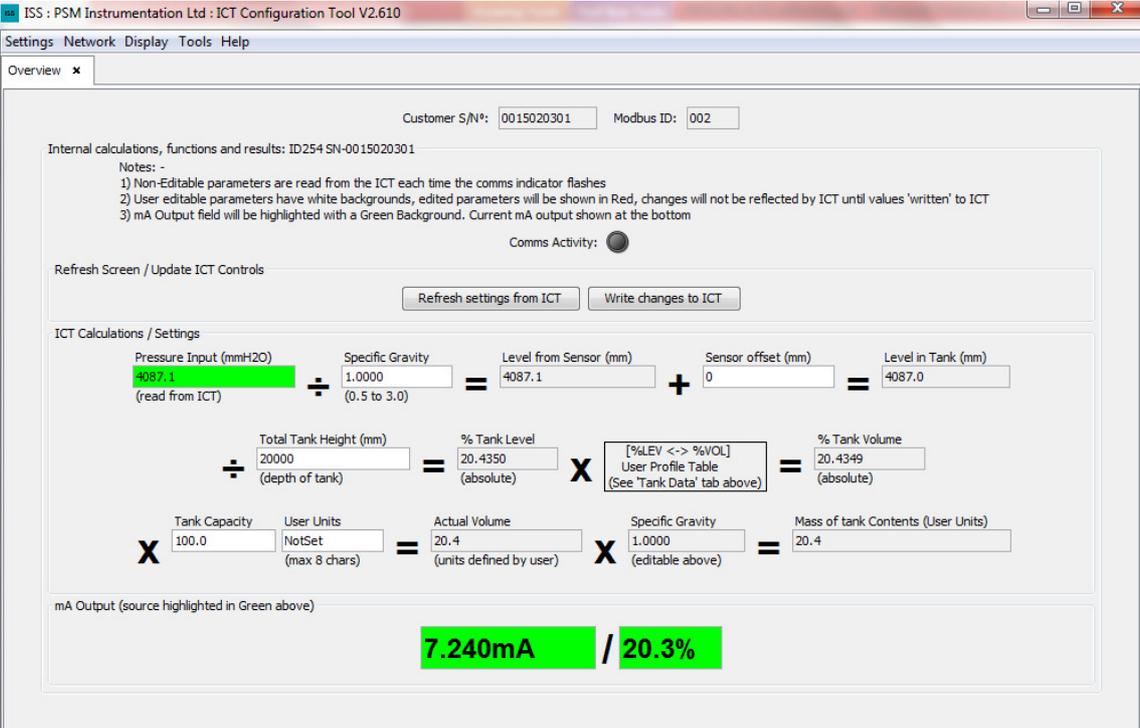
## 7.5.1    ICT Parameters

**Pressure Input**
This is the value the ICT is measuring in mmH2O

**Specific Gravity**
Enter the specific gravity value of the contents being measured

**Level from Sensor (mm)**
ICT is measurement  in mmH2O with the SG factor applied

**Sensor Offset (mm)**
Enter the fitting height of the instrument from the bottom of the tank.

**Level in Tank (mm)**
ICT is measurement in mm, taking account of location in the tank

**Total Tank Height (mm)**
This field is used to enter the total height of the tank

**% Tank Level**
ICT is measurement  in percent, taking account of the total tank height

**Tank Table**
The 4-20mA output can be linear or corrected for non-linear shaped tanks using the programmable look up table to provide a volumetric output

**% Tank Volume**
This is the value the ICT is measuring in percent, taking account of the tank table.

**% Tank Capacity**
This field is used to enter the total capacity of the tank.

**User Units**
This field is used to enter the units of measure.  Maximum 8 characters.

**Actual Volume**
This is the volumetric value the ICT is measuring, taking account of the tank capacity.

**Mass of Tank Contents**
This is the value the ICT is measuring in mass.

**Duty Name**
This field is used to enter the user defined name of the instrument location. Maximum 32 characters.

# 8. Network

## 8.1 Modbus Scanner
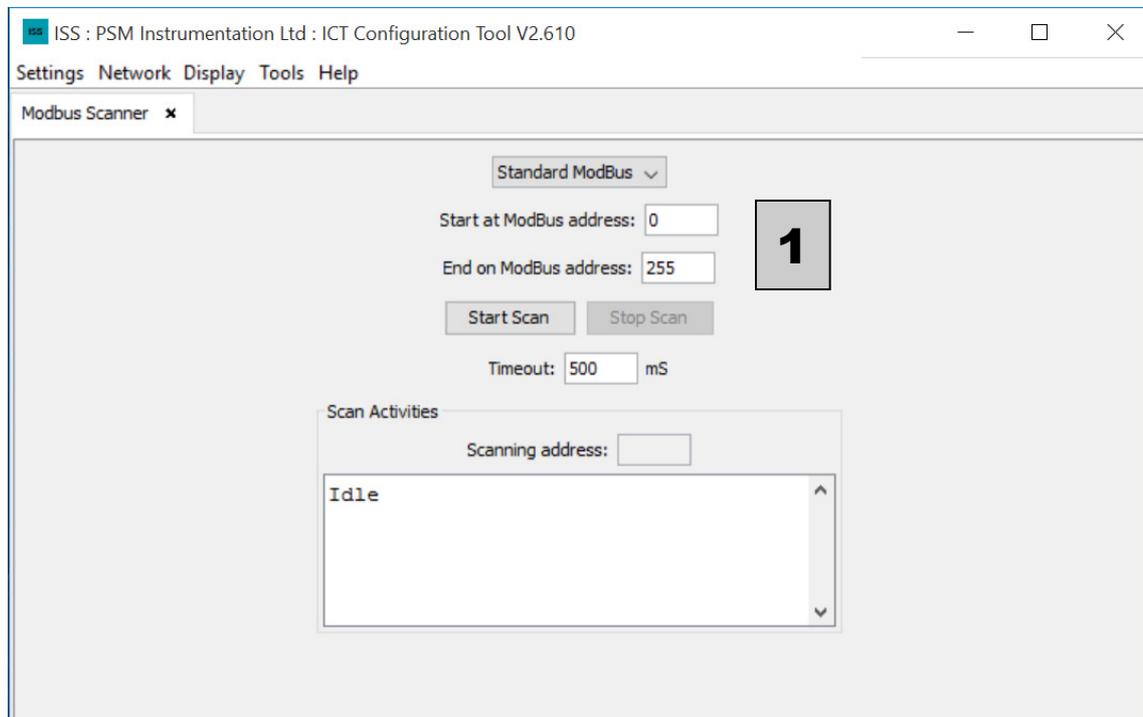


**8.1.1**

**The Modbus Scanner is used to identify the Modbus node addresses of ICT 1000 transmitters connected on the network**
[1] If the addresses are unknown, then set the scan range to the complete possible range of 0 > 255.

Use this function to identify the Modbus address (Node Number) of the ICT 1000 transmitter to be configured [5.2.1]

## 8.2 Network Test



**8.2.1** **The Network Test function is used to check and report the health (connectivity & reliability) of the Modbus network**
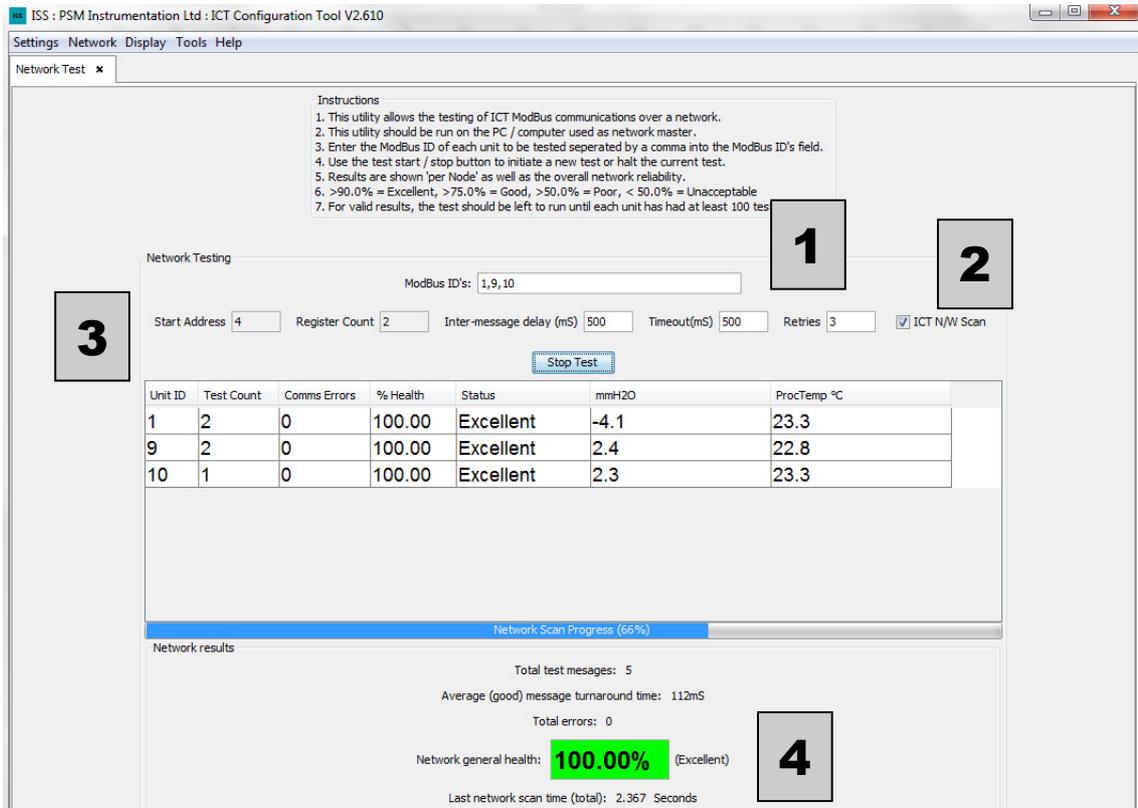
[1] Set the complete range of Modbus address nodes to include all the connected ICT 1000 level transmitters.

[2] This box MUST be ticked for scanning the ICT network

[3] The following settings should be used

| | |
|---|---|
| Inter message delay (ms) | 500 |
| Timeout (ms) | 500 |
| Retries | 3 |

[4] If the results fall below the 90% threshold, then check the wiring integrity of the network.

# 9. Display

## 9.1 Meter Display
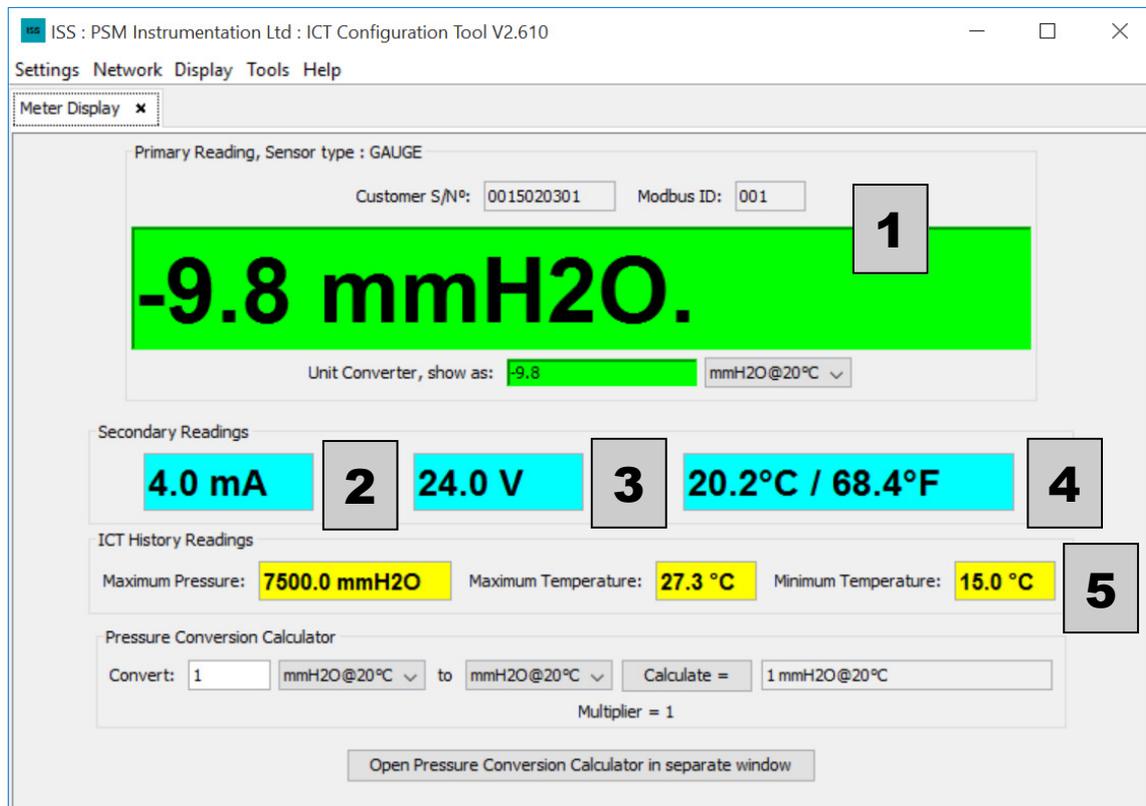


### 9.1.1 This page is used to display the measurement information from one ICT 1000 transmitter

[1] The pressure measurement updated in real time

[2] The mA output loop

[3] The supply voltage

[4] The process temperature (at the measurement cell)

[5] Maximum and minimum measurements recorded since the ICT transmitter was first connected.

These cannot be reset using the ISS software

# 9. Display

## 9.2 Dual Meter Display
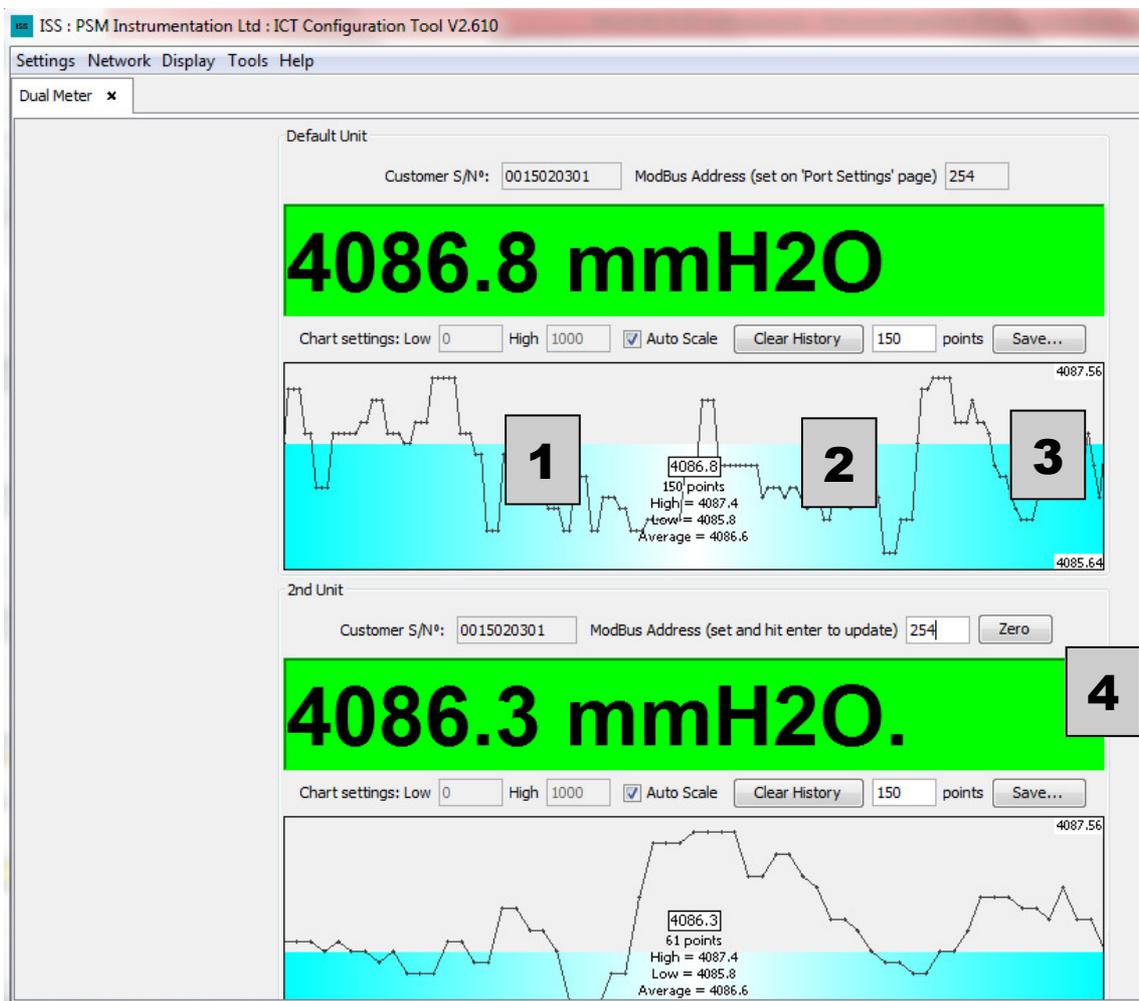


**9.2.1**  **This page is used to display two ICT transmitters at once and compare trends**

The top display will default to the Modbus address set in port settings

[1] Untick auto scale to scale over actual tank height or transmitter nominal range in mmH20

[2] Select the amount of readings that will be displayed on the trend graph

[3] The graph can be saved to file

[4] Enter the Modbus address of the second ICT transmitter you would like to view

# 9. Display

## 9.3 Multiple unit Viewer
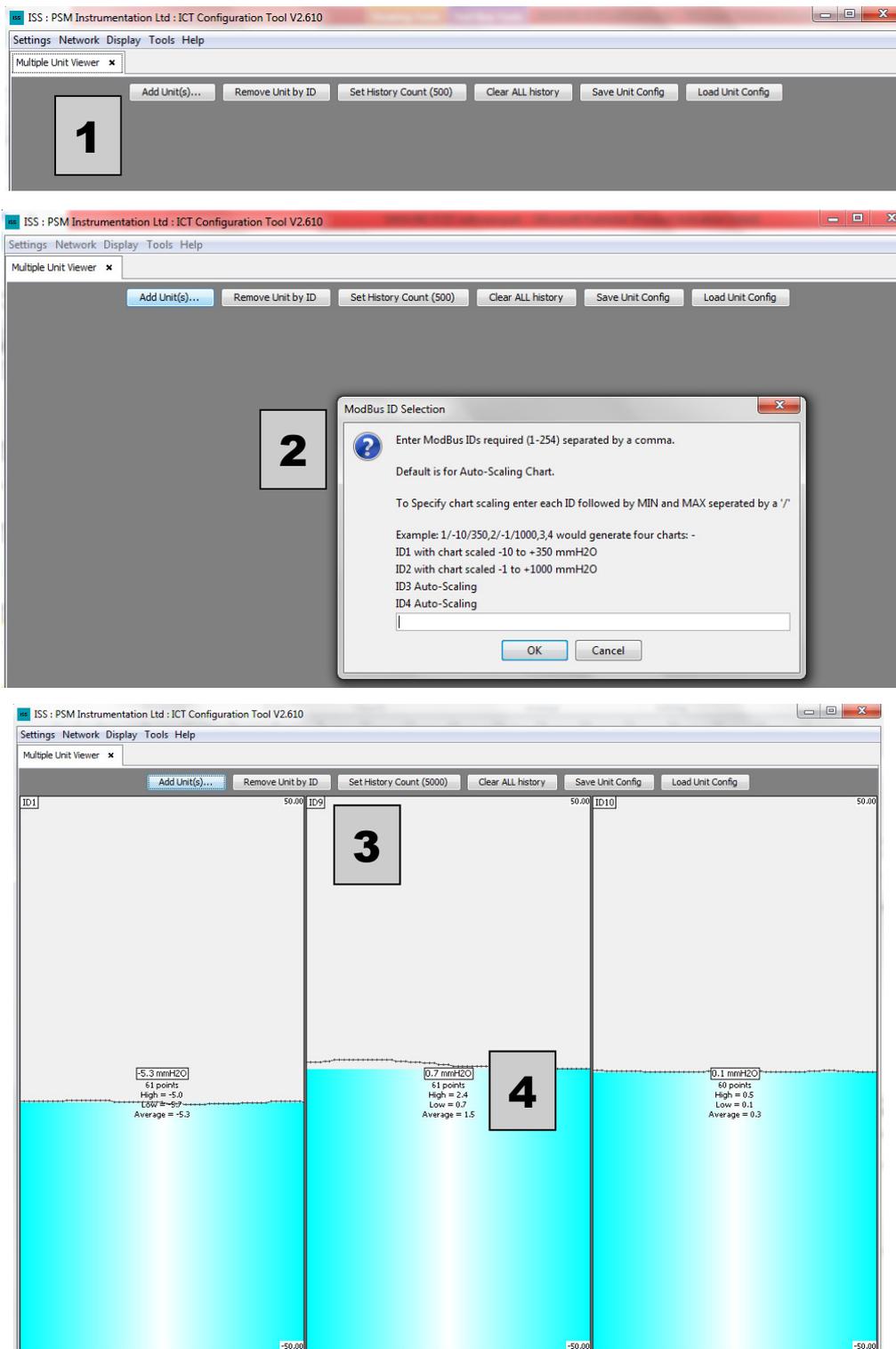






**9.3.1** **This page is used to display multiple ICT transmitters at once**
[1] Select Add units
[2] Follow the on screen instructions
[3] Select the amount of readings that will be displayed on the trend graph
[4] provides a numeric value of the reading and Highest measurement recorded,
Lowest measurement recorded, Measurement average.

# 10. Tools

## 10.1 ICT Memory Cloning
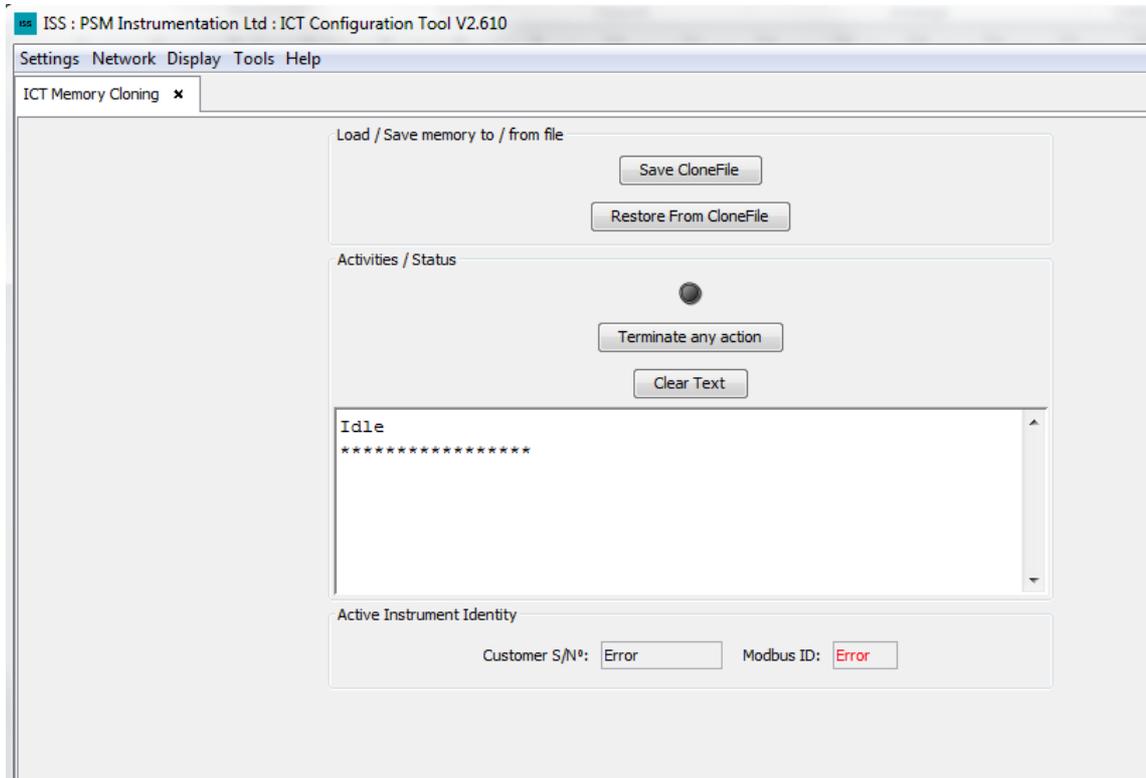


### 10.1.1 Restore or Save the unit configuration

A full back up of the ICT configuration can be saved to file

If required the file can be restored to the unit

If incorrect changes are made to the unit during service, the original data can be requested from PSM Instrumentation and reloaded into the ICT

# 10. Tools

## 10.2 Data Logger
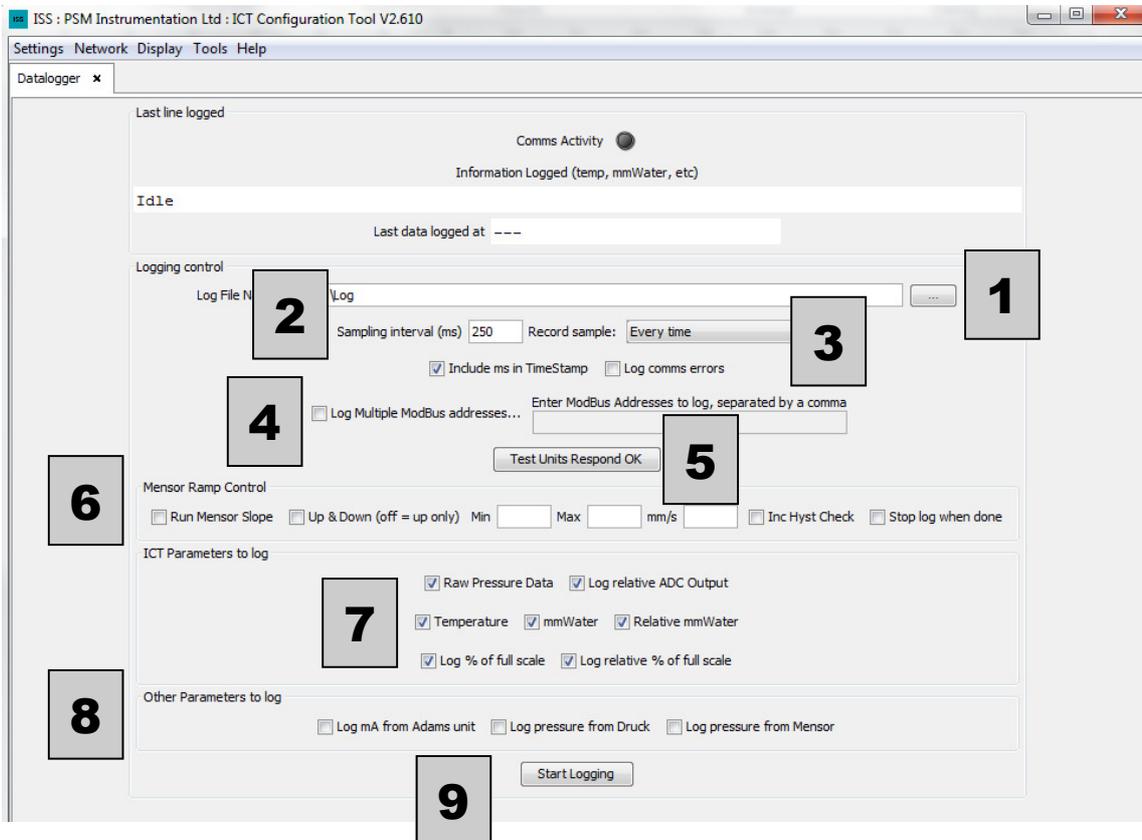


### 10.2.1    Log a single or multiple ICT transmitters

[1]    Press the button to select where to save the excel file and name it
[2]    Define in millseconds the duration of each sample to be taken
[3]    Define when the sample is to be taken
[4]    Tick and enter Modbus address if more than one is required to be logged
[5]    Press to confirm a response from all units before logging starts
[6]    Only applicable if a mensor pressure source is connected
[7]    Tick which parameters you require to be logged
[8]    Only applicable if connected
[9]    Start the log and required press to again to stop logging

# 10. Tools

## 10.3 ICT Communications Test
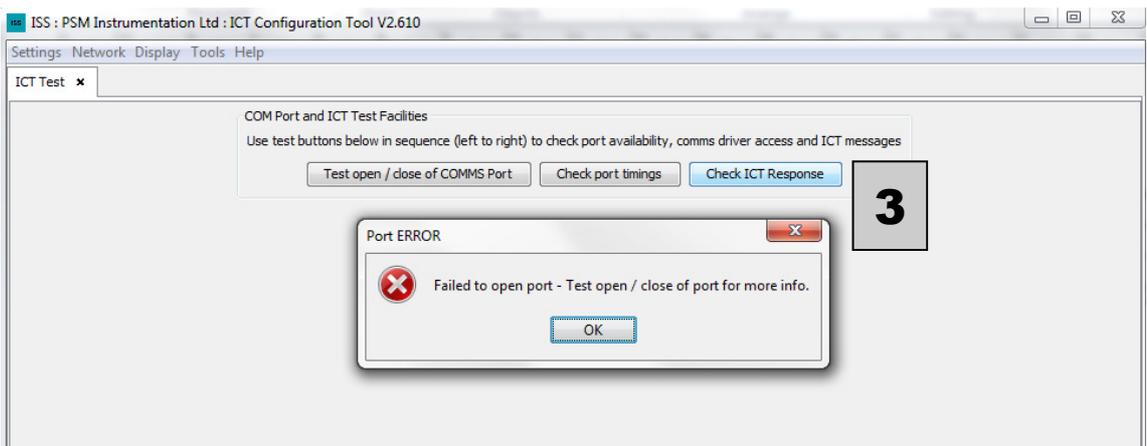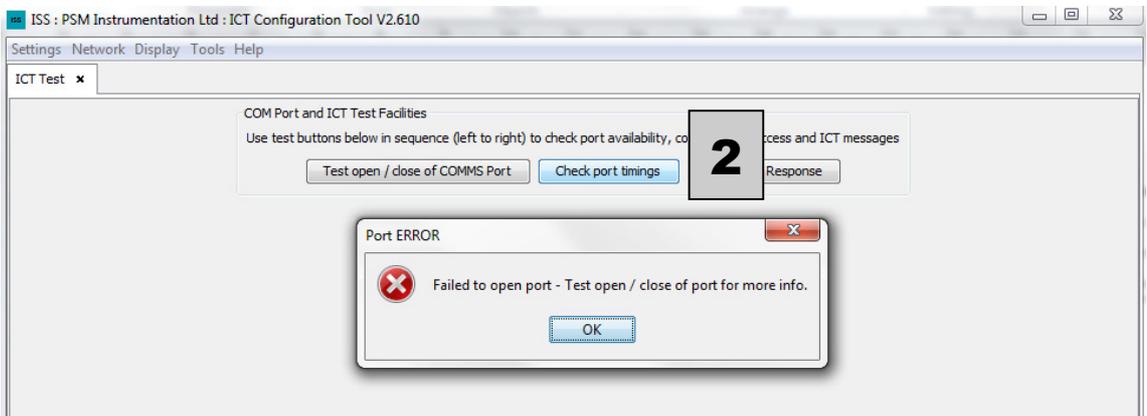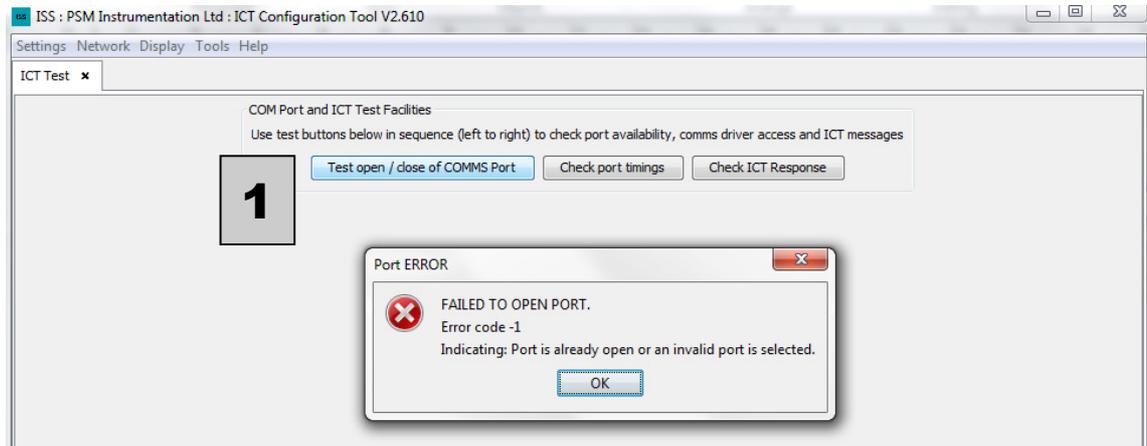






**10.3.1**  **Test the comms ports and ICT communication**

[1]   Press to check if the port is available

[2]   Checks port settings

[3]   Confirms if communication with the ICT can be achieved

# 10. Tools

## 10.4 Zero Calibration
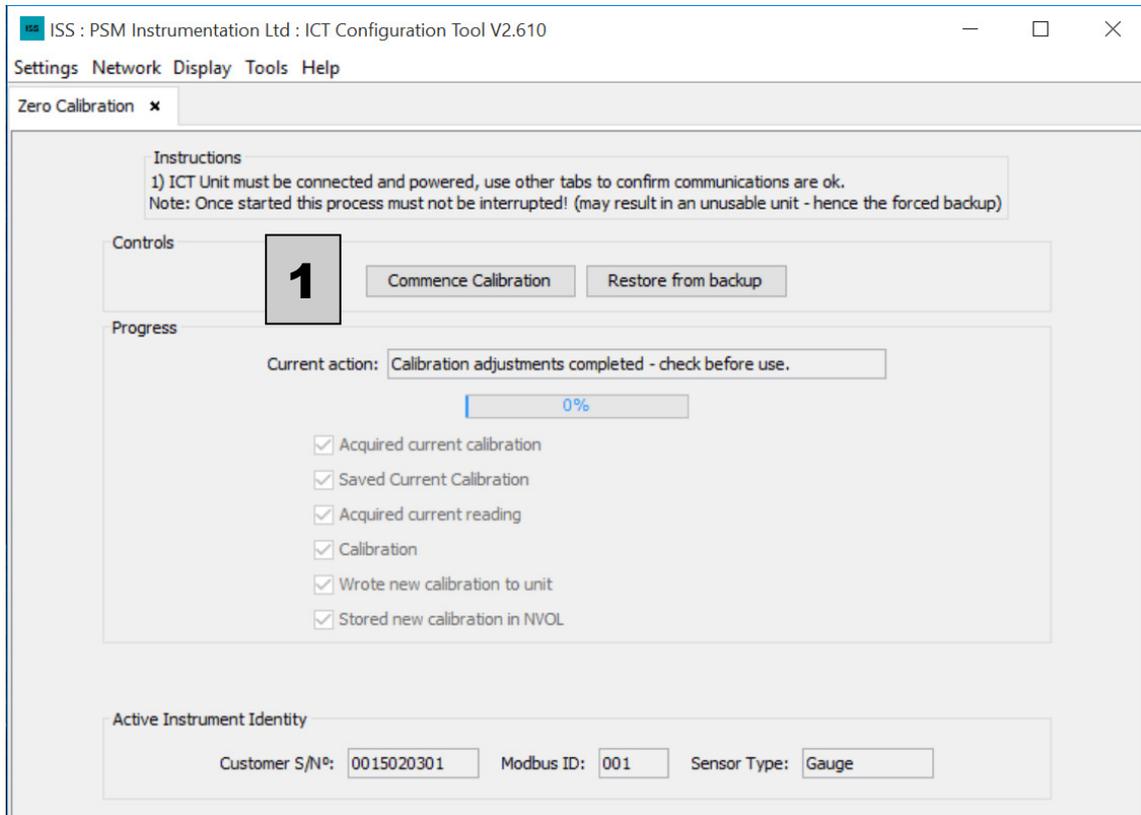


### 10.4.1 Adjust zero (pressure input) calibration of the ICT 1000 transmitter

The ICT 1000 transmitter is factory calibrated during manufacture. Following installation the zero pressure reading of the units should be checked to ensure it is accurate and to remove any influences caused by the installation.

Ensure the transmitter powered on for 30 minutes and temperature stabilised to the operating environment.

[1] Will start the procedure. Ensure that the checks highlighted in the pop up dialogue box are made correctly or a Zero Calibration offset may be introduced. The user will be prompted to backup the original factory configured settings as a failsafe before the new calibration is performed.

**NOTE**
- For a Gauge transmitter enter 0 as the current pressure in mmH2O

- For an Absolute transmitter enter the actual barometric (atmospheric) pressure in mmH2O

Following calibration ensure that the Meter Display [9.1.1] is now reading zero.

## 10.5 Status



The status screen shows: ISS : PSM Instrumentation Ltd : ICT Configuration Tool V2.610, with menus Settings, Network, Display, Tools, Help, and a "Status" tab.

Customer S/Nº: 0015020301  Modbus ID: 001

**Bits 0-15**
- (0) Pressure Rate of Change Alarm
- (1) Temperature Rate of Change Alarm
- (2) Latching Absolute Alarm 1 Active
- (3) Latching Absolute Alarm 2 Active
- (4) Absolute Alarm / Control 1 Active
- (5) Absolute Alarm / Control 2 Active
- (6) Pressure Input Fail
- (7) Temp. Input Fail
- (8) Loop Current Fail
- (9) Possible Loop Fault
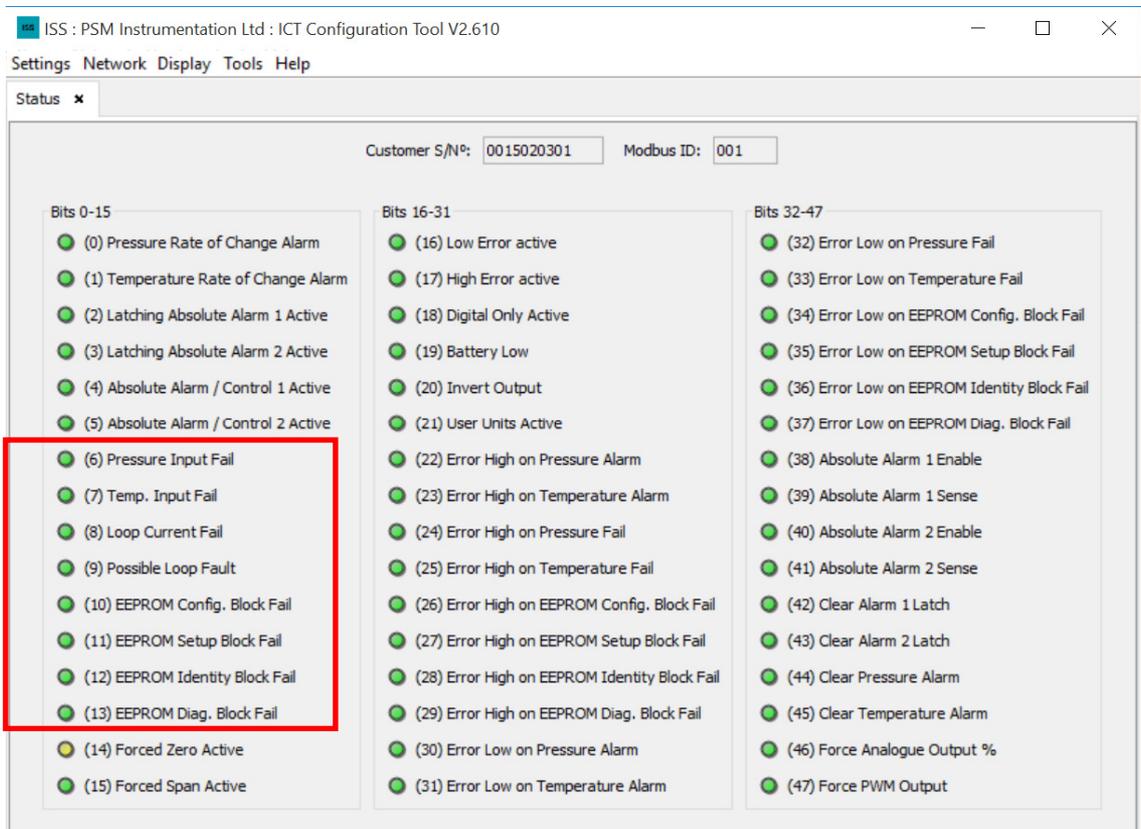- (10) EEPROM Config. Block Fail
- (11) EEPROM Setup Block Fail
- (12) EEPROM Identity Block Fail
- (13) EEPROM Diag. Block Fail
- (14) Forced Zero Active
- (15) Forced Span Active

**Bits 16-31**
- (16) Low Error active
- (17) High Error active
- (18) Digital Only Active
- (19) Battery Low
- (20) Invert Output
- (21) User Units Active
- (22) Error High on Pressure Alarm
- (23) Error High on Temperature Alarm
- (24) Error High on Pressure Fail
- (25) Error High on Temperature Fail
- (26) Error High on EEPROM Config. Block Fail
- (27) Error High on EEPROM Setup Block Fail
- (28) Error High on EEPROM Identity Block Fail
- (29) Error High on EEPROM Diag. Block Fail
- (30) Error Low on Pressure Alarm
- (31) Error Low on Temperature Alarm

**Bits 32-47**
- (32) Error Low on Pressure Fail
- (33) Error Low on Temperature Fail
- (34) Error Low on EEPROM Config. Block Fail
- (35) Error Low on EEPROM Setup Block Fail
- (36) Error Low on EEPROM Identity Block Fail
- (37) Error Low on EEPROM Diag. Block Fail
- (38) Absolute Alarm 1 Enable
- (39) Absolute Alarm 1 Sense
- (40) Absolute Alarm 2 Enable
- (41) Absolute Alarm 2 Sense
- (42) Clear Alarm 1 Latch
- (43) Clear Alarm 2 Latch
- (44) Clear Pressure Alarm
- (45) Clear Temperature Alarm
- (46) Force Analogue Output %
- (47) Force PWM Output

**Transmitter Operation conditions** (bits 6 through 13)

### 10.5.1 An overview of the programming and functional status of the ICT 1000 transmitter

Provides an overview of any active alarms of fault conditions within the ICT

If
(6)     Pressure Input Fail
(7)     Temp Input Fail
(8)     Loop Current Fail
(9)     Possible Loop Fault
(10)   EEPROM Config Block Fail
(11)   EEPROM Setup Block Fail
(12)   EEPROM Identity Block Fail
(13)   EEPROM Diag Block Fail

Are active contact PSM Instrumentation for further assistance

**END OF MANUAL**