# Docking Stations
# DS-U1, DS-U2, DS-U4, DS-U4-WL and DS-U4-4-20

## Adjustment and configuration procedure for the analog inputs

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# 1 Foreword

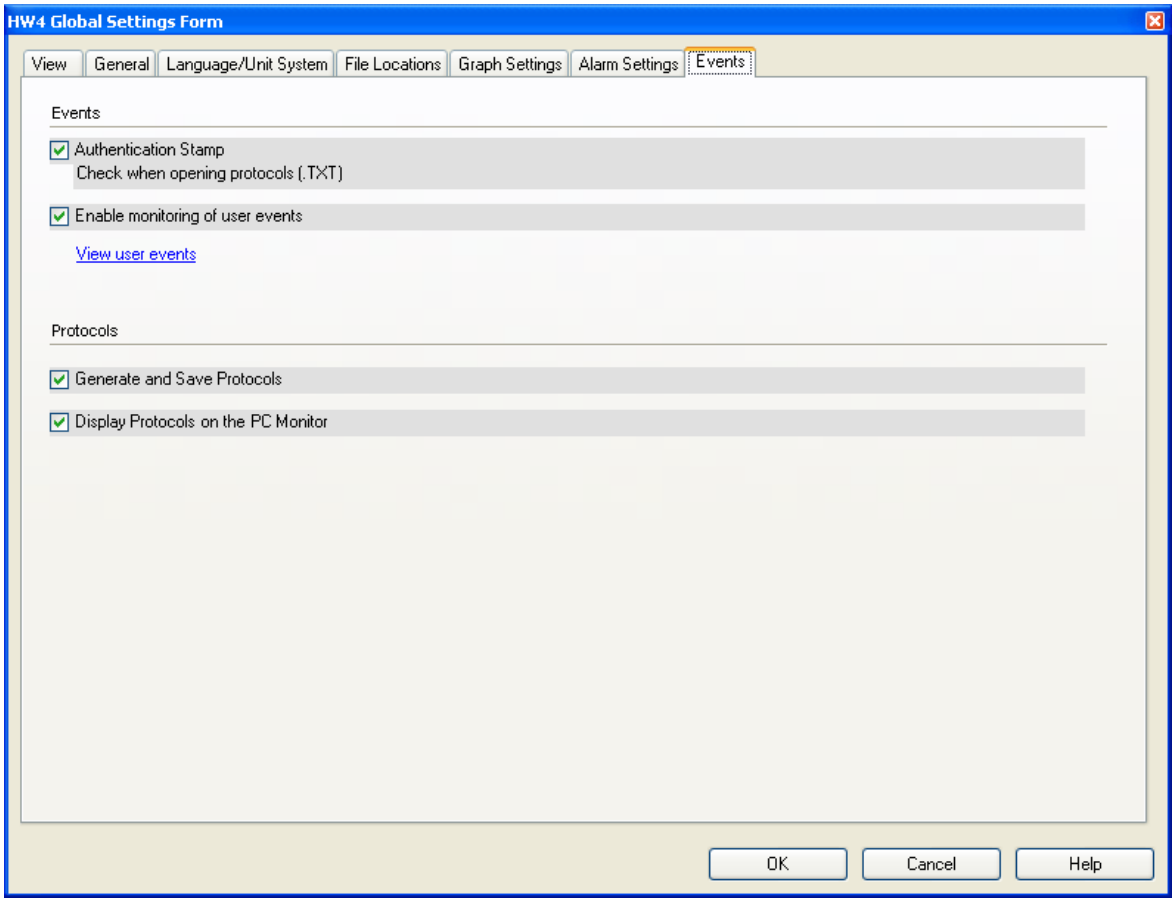
This document addresses exclusively the configuration of the analog inputs (inputs 4 to 7) of docking station models **DS-U1, DS-U2, DS-U4, DS-U4-WL and DS-U4-4-20**. All other configuration procedures and settings for these docking stations are described in the HW4 software manual.

Docking stations **DS-U4, DS-U4-WL and DS-U4-4-20:** prior to connecting the docking station to the local area network, please read the Device Configuration Certificate supplied with the docking station as well as document **IN-E-TCPIP-Conf_10.doc**. This document provides detailed instruction for configuring the internal Ethernet (TCP/IP) module of the docking station to make it compatible with your local area network.

**IMPORTANT:**

With the exception of the TCP/IP settings and other settings of the docking station internal Ethernet module, all configuration data is retained in the HygroLog NT non-volatile memory. In particular, no input configuration data is retained in the docking station proper. Therefore, it is important to observe the following:

- When a new docking station is associated with a specific HygroLog NT data logger, Device Manager (HW4 software) should be used to configure the data logger to match the docking station analog inputs after discovering the data logger in HW4.
- Prior to configuring the data logger to match a specific docking station, enable HW4 to generate and save protocols (see below). After using Device Manager in HW4 to configure the data logger, print the configuration protocol for your records. This protocol provides important information such as: data logger serial number and firmware version, docking station serial number and firmware version, detailed configuration settings of each input (logger and docking station), etc.




- Configuration data for the analog inputs is specific of each individual docking station. Input configuration data is provided by the factory only for the DS-U4-4-20 docking station (current input signal). This data can be used to configure the data logger to match the docking station. The configuration data can also be generated as explained under “Analog input adjustment procedure”.
- Avoid separating a matched pair of data logger and docking station. Every time that a data logger is used with a different docking station it must be configured to match the docking station.

# 2 Configuration examples

## *2.1 Preparations*

- Place a HygroLog NT on the docking station and power the docking station.

  **DS-U4, DS-U4-WL and DS-U4-4-20:** prior to using a new docking station with a previously configured data logger, you should verify the Baud rate used by the data logger. If necessary, use HW4 Device Manager to change the Baud to the factory standard of 57600 bps (this will require a docking station with either a RS-232 or USB port)

- **DS-U4, DS-U4-WL and DS-U4-4-20**: configure the docking station Ethernet interface.

  The Ethernet (TCP/IP) interface of docking station model DS-U4-4-20 has to be configured so as to be compatible with the LAN to which the HW4 PC is connected. Instructions for configuring the Ethernet interface are provided in document **IN-E-TCPIP-Conf_10.doc**

  Connect the docking station to the same LAN as the HW4 PC.

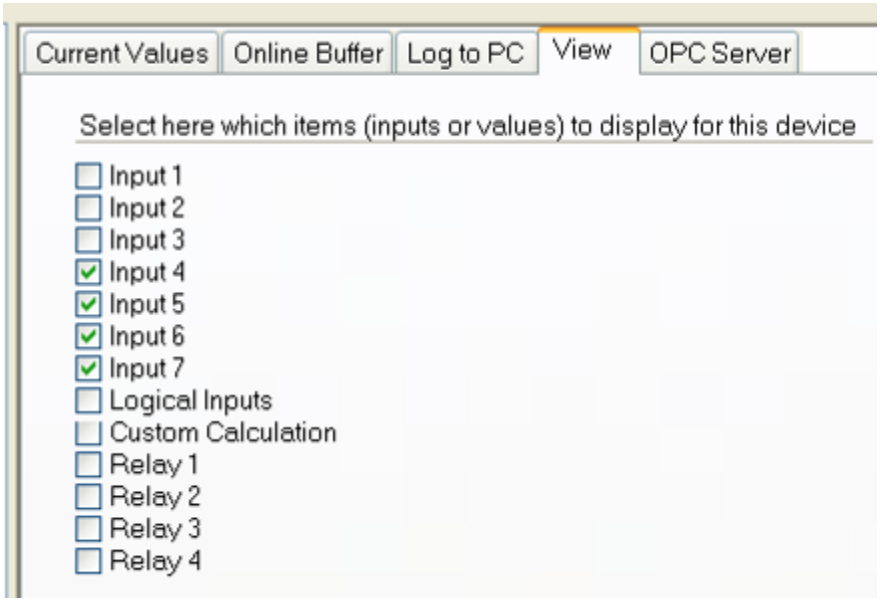
- Start HW4.

- In the HW4 main menu bar select Devices and Groups and:

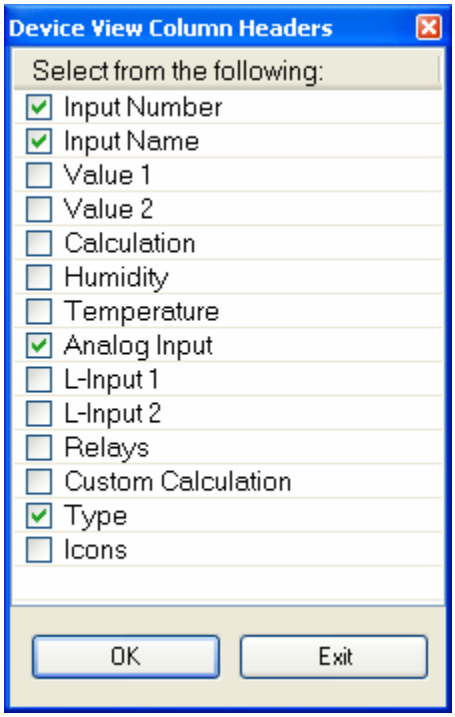
  **DS-U1** > Search for RS-232 Masters
  **DS-U2** > Search for USB Masters
  **DS-U4, DS-U4-WL and DS-U4-4-20** > Search for Ethernet Masters.

- After discovery of the HygroLog NT and docking station by HW4, use the mouse to select the HygroLog NT in the device tree (left pane of the HW4 main screen)

- In the right pane of the HW4 main screen, select the View tab. In the View tab, use the mouse to place a check mark next to inputs 4 to 7.




- In the HW4 main menu bar, select View > Column Headers. In the Device View Column Headers, make the selections shown below:

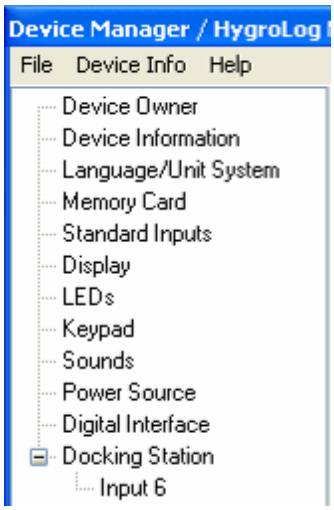


## *2.2 Procedure for DS-U1, DS-U2, DS-U4 and DS-U4-WL*

The following procedure assumes that input 6 of the docking station will be used to read an analog probe with the following output signal range:

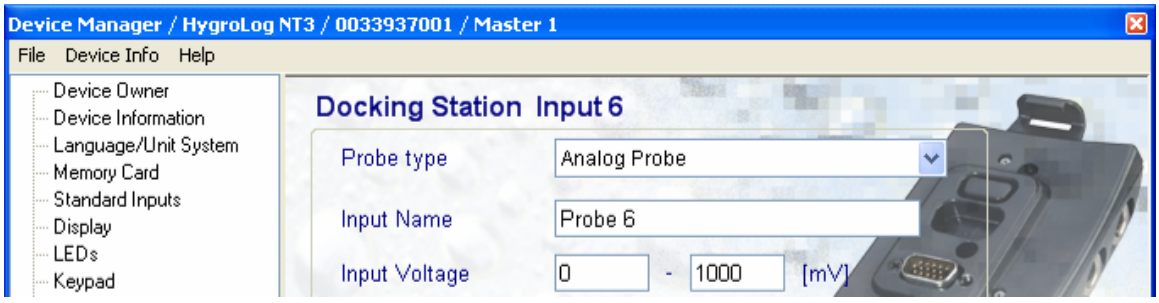
0…1000 mV = 0…100 psi

- In HW4, select the HygroLog NT in the device tree (left pane of the HW4 main screen). If necessary, expand the device and click on Device Manager.
- In the left pane of Device Manager, click with the mouse on the input to be configured (input 6 in this example):

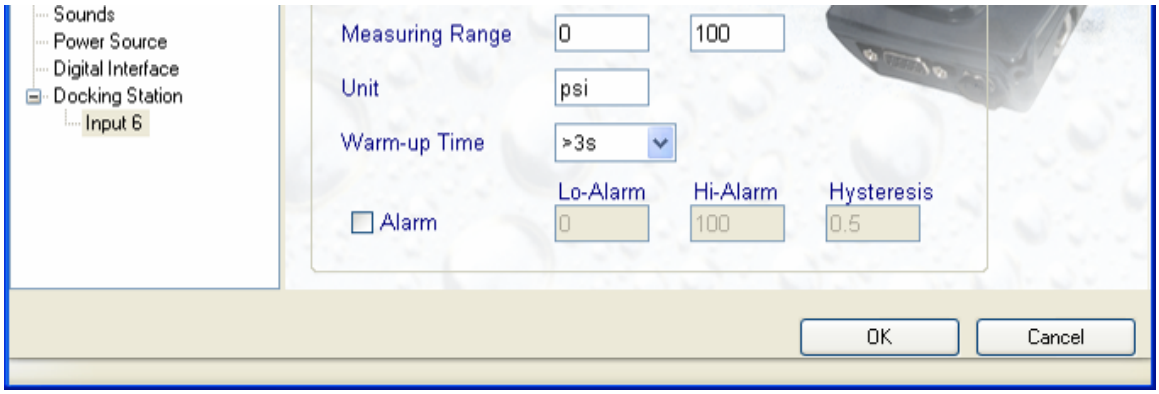



In the right pane of Device Manager:

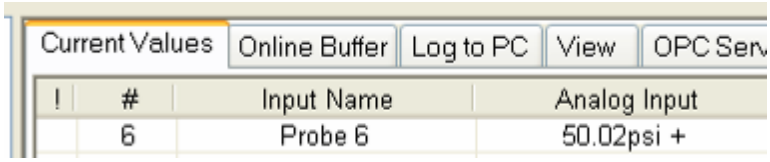
- Set “Probe type” to either Analog probe or Pressure probe. Pressure probe is a particular case of Analog probe: when the probe type is “Pressure probe” the input signal can be used by another input set to probe type “HygroClip” to calculate a psychrometric parameter that requires barometric pressure as an input value.
- Enter a name for the input
- Enter the following data in the two fields labeled “Input voltage”




- Enter the values 0 and 100 in the two fields labeled “Measuring range”
- Enter psi in the field labeled “Unit”. This engineering unit will displayed by both the data logger and HW4.
- The warm-up time should be set to the minimum value required by the probe used with the docking station input
- Set the alarm as desired (placing a check mark in the box labeled Alarm enables the alarm function for the input.




- Configure each input and click on the OK button when done. Print and retain the configuration protocol generated by HW4.
- Connect the analog probes to the inputs and verify the result either on the data logger display or in HW4 > Current Values Tab. The following example assumes a voltage 500 mV going into input 6:

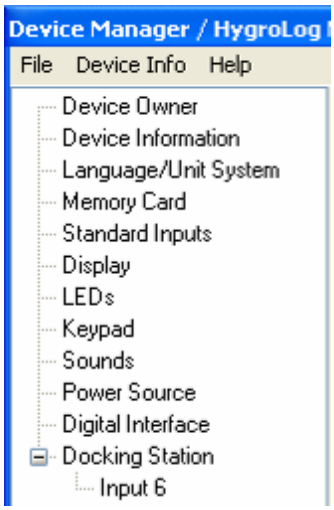


## *2.3 Procedure for DS-U4-4-20 (current input signal)*

The following procedure assumes that input 6 of the docking station will be used to read an analog probe with the following output signal range:

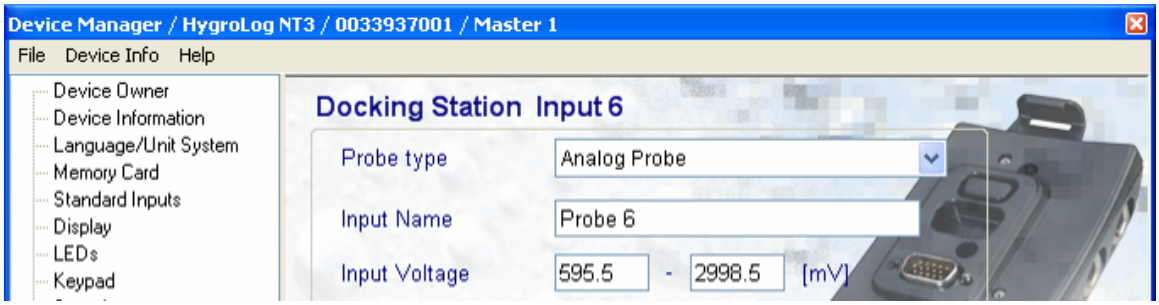
4…20 mA = 0…100 psi

- In HW4, select the HygroLog NT in the device tree (left pane of the HW4 main screen). If necessary, expand the device and click on Device Manager.
- In the left pane of Device Manager, click with the mouse on the input to be configured (input 6 in this example):

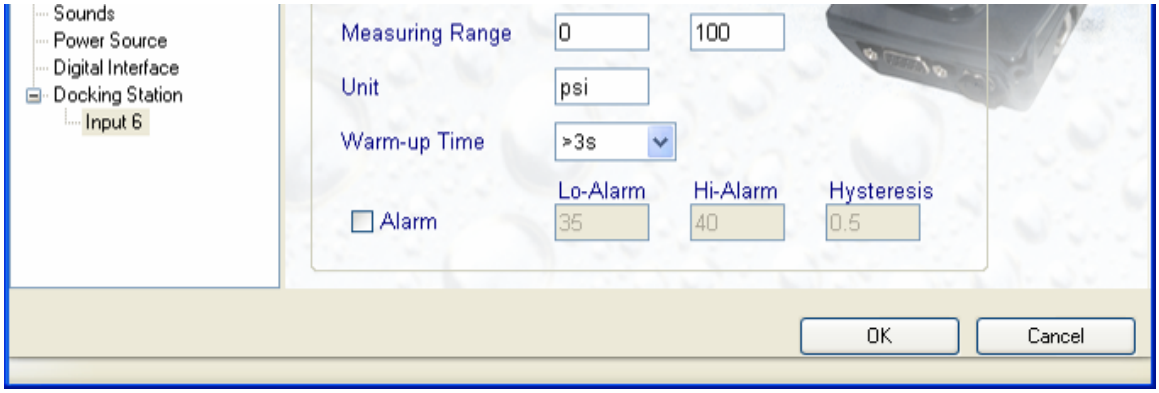



In the right pane of Device Manager:

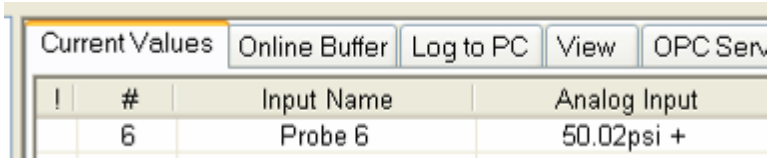
- Set “Probe type” to either Analog probe or Pressure probe. Pressure probe is a particular case of Analog probe: when the probe type is “Pressure probe” the input signal can be used by another input set to probe type “HygroClip” to calculate a psychrometric parameter that requires barometric pressure as an input value.
- Enter a name for the input
- Enter the factory supplied data for input 6 in the two fields labeled “Input voltage” (see example below)




- Enter the values 0 and 100 in the two fields labeled “Measuring range”
- Enter psi in the field labeled “Unit”. This engineering unit will displayed by both the data logger and HW4.
- The warm-up time should be set to the minimum value required by the probe used with the docking station input
- Set the alarm as desired (placing a check mark in the box labeled Alarm enables the alarm function for the input.




- Configure each input and click on the OK button when done. Print and retain the configuration protocol generated by HW4.
- Connect the analog probes to the inputs and verify the result either on the data logger display or in HW4 > Current Values Tab. The following example assumes a current of 12.00 mA going into input 6:



# 3 Analog input adjustment procedure

The following procedure is provided primarily for users who wish to validate the input data and for users who have misplaced the factory configuration data for docking station DS-U4-4-20.

## *3.1 Required equipment:*

- Adjustable precision voltage source (0 to 4 VDC)
- One or two precision DMMs (0 to 4 VDC and / or 0 to 20 mA DC)
- PC with the HW4 software (version 1.2.1 or higher)
- HygroLog NT1, 2 or 3
- Docking station DS-U4-4-20
- AC adapter to power the docking station

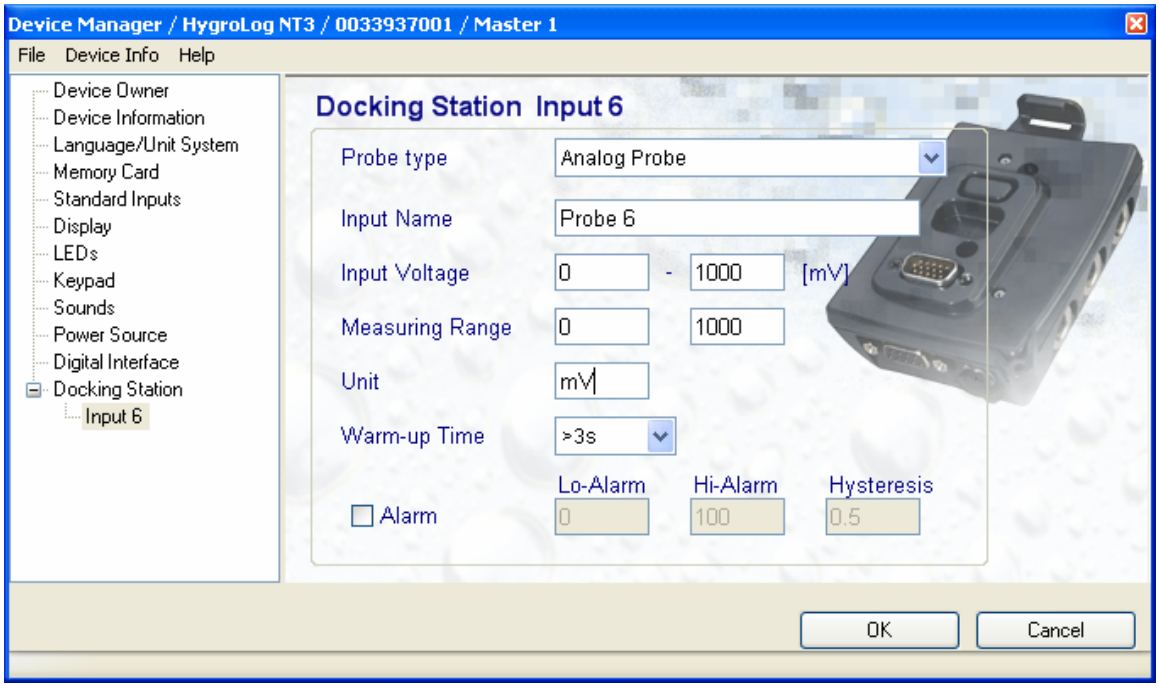
## *3.2 Preparations*

- Begin with the steps listed under 2.1
- **CAUTION**: set the adjustable voltage source to its minimum and always proceed in small increments. Connect the adjustable voltage source and DMM to one of the analog inputs of the docking station (inputs 4 to 7)
- In the HW4 device tree, click on the cross located to the right of the HygroLog NT and click on Device Manager
- In the left pane of Device manager, click on the cross located to the left of Docking Station and click on the input to which the adjustable current source is connected.

## *3.3 Procedure for a voltage input signal*

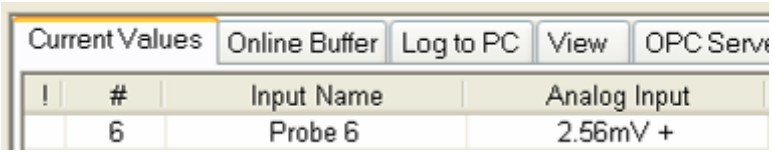
**NOTE**: The following procedure uses input 6 of the docking station as an example. All other inputs can be adjusted using the same procedure.

**Step 1:** In the right pane of Device Manager, select analog probe as the probe type and configure the input as shown below:




**Step 2:** Set the voltage source so as to generate a value as close as possible to 0.000 mV.

In HW4 > Current Values Tab, read the value in the column Analog Input:

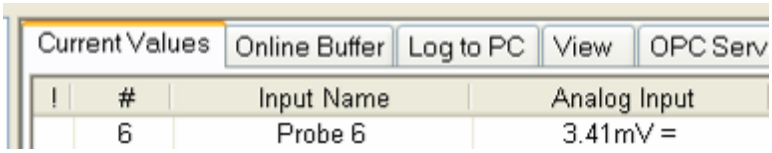



At the low end of the input voltage range, a tolerance of up to ± 4 to 5 mV should be used to accommodate the noise inherent to the analog to digital conversion.

If the value displayed by HW4 is clearly out of tolerance, use it as the new value for the low end of the input voltage.

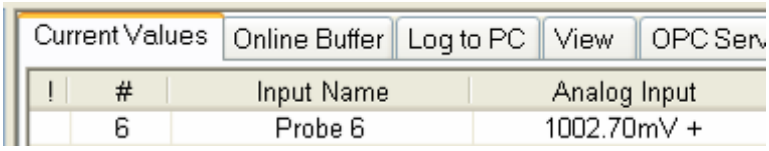
Click on the **OK** button.

Verify the result: HW4 > Current Values Tab



**Step 3:** Set the voltage source to generate a value as close as possible to 1000 mV

In HW4 > Current Values Tab, read the value in the column Analog Input:

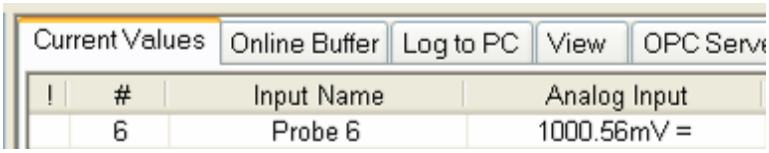



At the high end of the input voltage range, a tolerance of up to ± 2 mV should be used to accommodate the noise inherent to the analog to digital conversion.

If the value displayed by HW4 is clearly out of tolerance, use it as the new value for the high end of the input voltage.

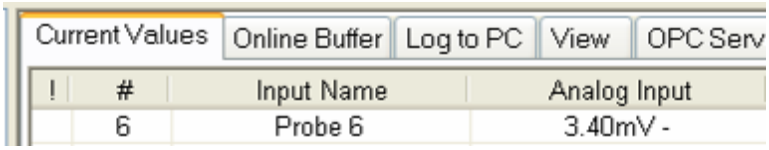
Click on the **OK** button.

Verify the result: HW4 > Current Values Tab



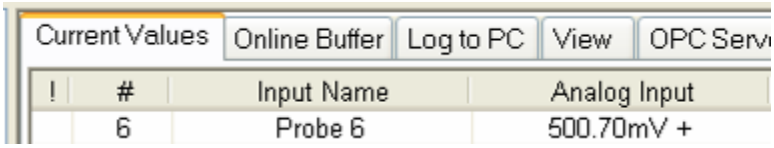

**Step 4:** Set the voltage close to 0.000 mV

HW4 > Current Values Tab:




Set the voltage close to 500 mV

HW4 > Current Values Tab:

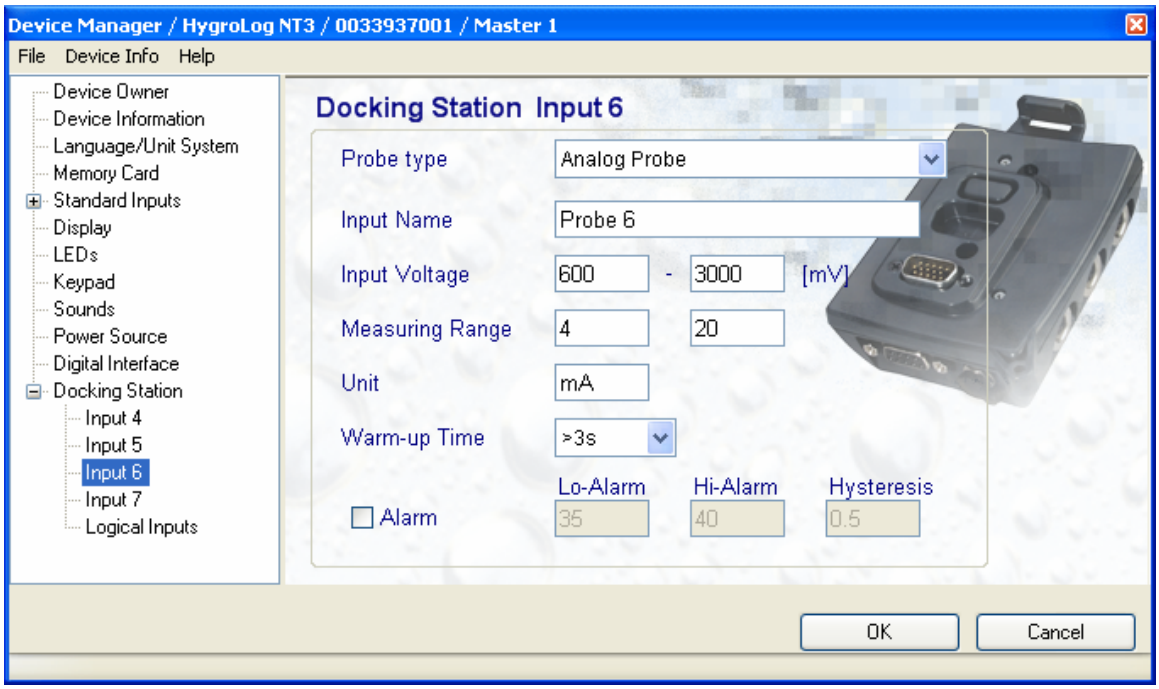



Note: tolerance: ± 3 to 4 mV

## *3.4 Procedure for a current input signal (DS-U4-4-20)*

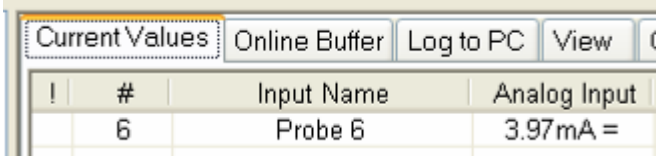
**NOTE**: The following procedure uses input 6 of the docking station as an example. All other inputs can be adjusted using the same procedure.

**Step 1:** In the right pane of Device Manager, select analog probe as the probe type and configure the input as shown below:




**Step 2:** Set the voltage source so as to generate a current to 4.00 mA (the nominal value of the docking station internal resistance is 150 Ohm).

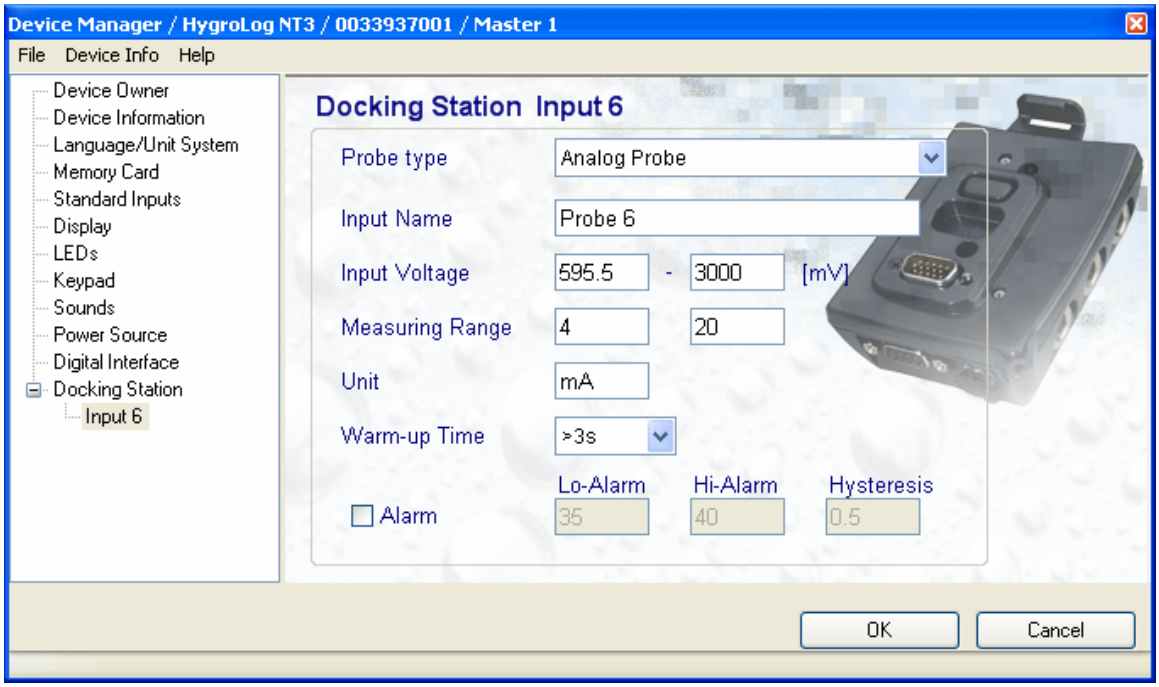
In HW4 > Current Values Tab, read the value in the column Analog Input:




Use the value displayed by HW4 to compute a new value for the low end of the input voltage:

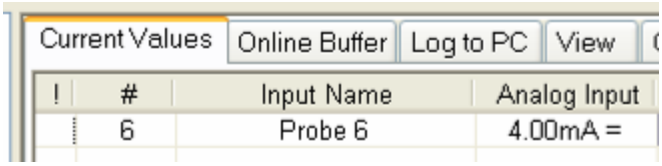
600 mV x **3.97** / 4.00 = **595.5 mV**

Enter this value in Device Manager:



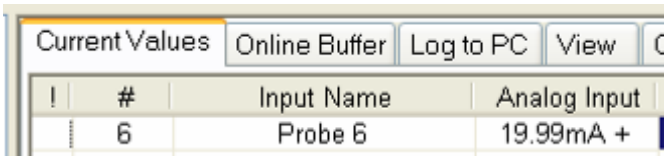

Click on the **OK** button.

Verify the result: HW4 > Current Values Tab




**Step 3:** Set the voltage source to generate a current of 20.00 mA

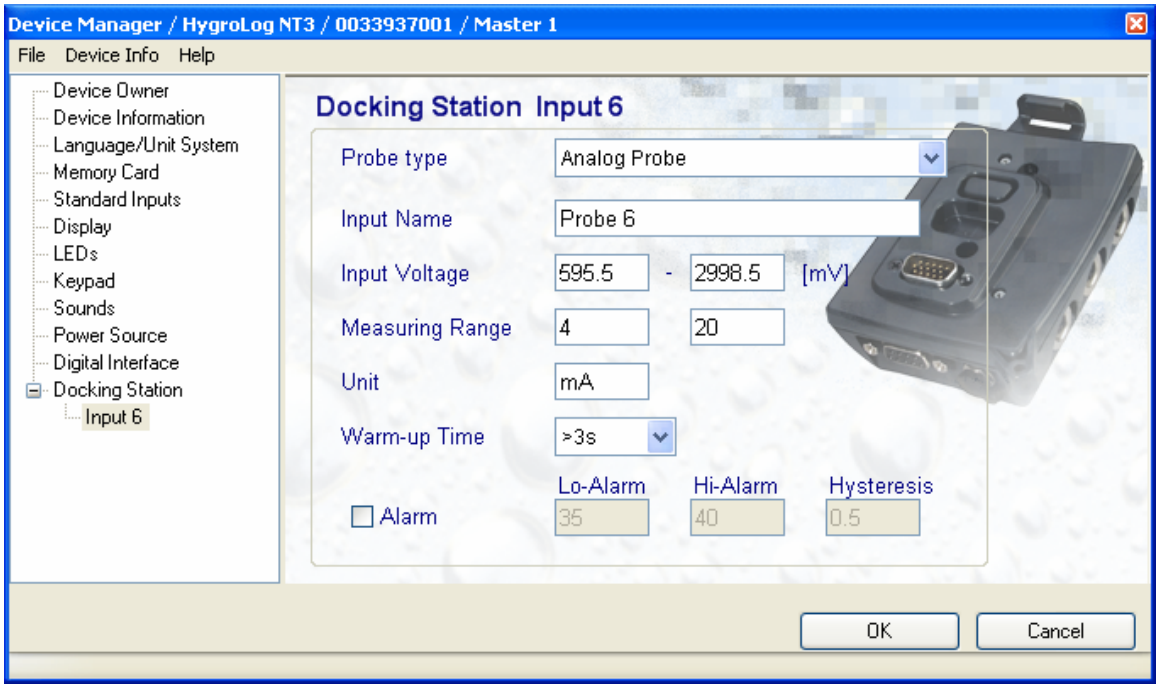
In HW4 > Current Values Tab, read the value in the column Analog Input:




Use the value displayed by HW4 to compute a new value for the high end of the input voltage:

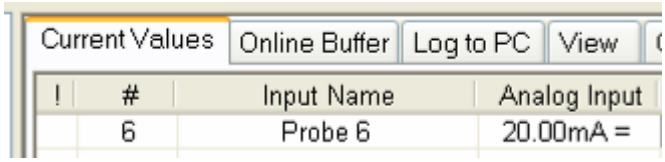
3000 x **19.99** / 20.00 = **2998.5**

Enter this value in Device Manager:



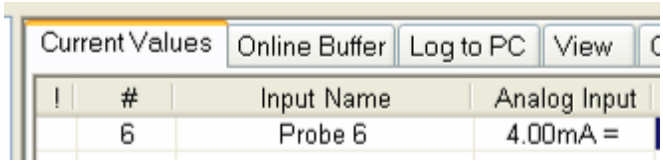

Click on the **OK** button.

Verify the result: HW4 > Current Values Tab



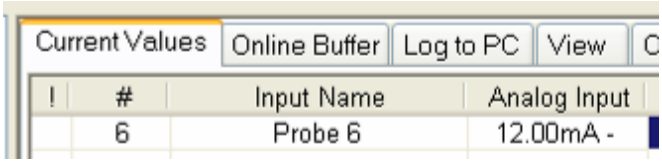

**Step 4:** Set the current back to 4.00 mA

HW4 > Current Values Tab:

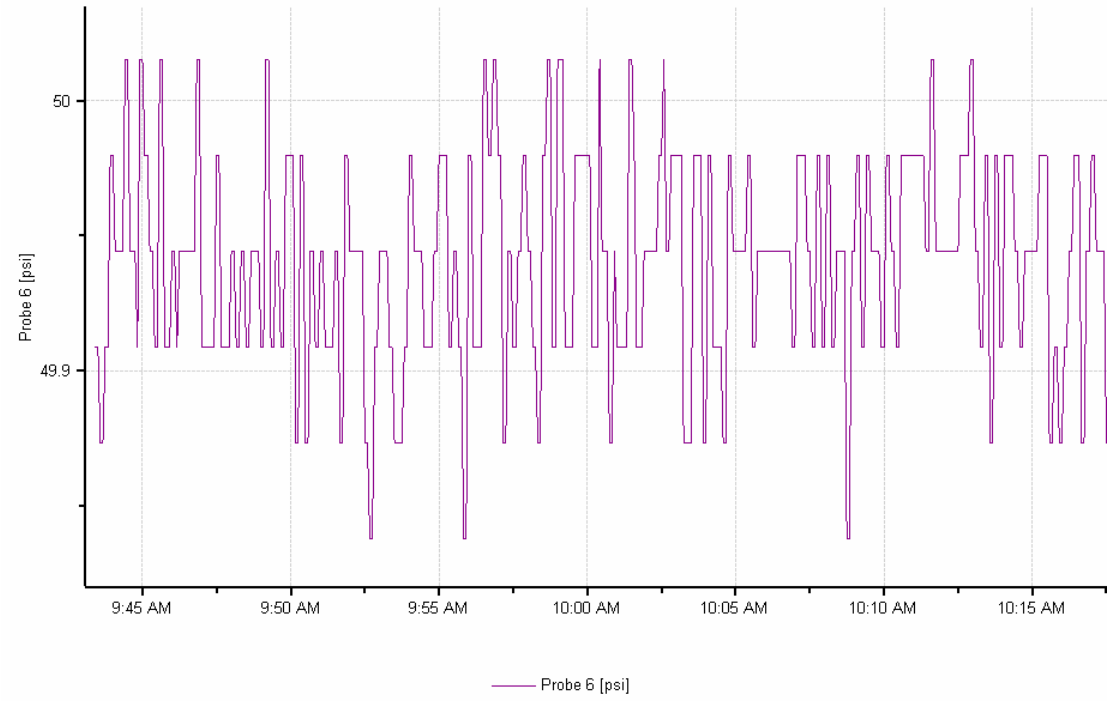



Set the current to 12.00 mA

HW4 > Current Values Tab:




**NOTE**: A noise of up to 0.02 mA pp is typical of the analog to digital conversion made by the docking station. In the example shown below, this translates into 0.10 to 0.15 psi for a measuring range of 0…100 psi.




# 4 Document releases

| Release | Date | Notes |
|---|---|---|
| _10 | Jan.16, 2007 | Original release |
| _11 | May 3, 2007 | Made minor editorial changes |