masibus®

User's Manual

CLEAN ROOM DISPLAY UNIT

CDU-LCD

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1. INTRODUCTION

Foreword

Thank you for purchasing Clean Room Display Unit CDU-LCD.

This manual describes the basic functions and operation methods. Please read through this user's manual carefully before using the product.

Notice

The contents of this manual are subject to change without notice as a result of continuous improvements to the instrument's performance and functions.

Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform MASIBUS Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission.

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Checking the Contents of the Package
Unpack the box and check the contents before using the product. If the product is different from which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

Product Overview

The masibus Clean Room Display Unit (CDU-LCD) can measure Differential Pressure using inbuilt sensor and Temperature and Humidity through Wired Remote Sensor.

3.5" Liquid Crystal Display (LCD) used for displaying Differential Pressure, Temperature and Humidity. The CDU has inbuilt and external buzzer for audible process value violation and one digital input for door status. CDU-LCD also has Real Time Clock on display, PLC Communication DNP 3 protocol for interfacing. This instrument's design enables you for measuring of air relative humidity, temperature and differential Pressure in Pharmaceutical industry, HVAC (heating, Ventilation, Air conditioning, Cooling).

CDU-LCD comes with 3.5" LCD display for process value reading. Lab view based utility software for configuration and calibration. CDU-LCD is factory calibrated to specific ranges.

Safety Precautions

The product and the instruction manual describe important information to prevent possible harm to users and damage to the property and to use the product safely.

Understand the following description (signs and symbols), read the text and Observe Descriptions.

DESCRIPTION OF SIGN

⚠ WARNING	*This indicates a danger that may result in death or serious injury if not avoided.*
⚠ CAUTION	*This indicates a danger that may result in minor or moderate injury or only a physical damage if not avoided.*

Accessory

The product is provided with the following accessory (see the Table 1 below).

No	Item name	Part number	Qty	Remarks
1	Wired RH+T Sensor	CBL-CDU-TRH-10	1	

Table 1

2. SPECIFICATIONS

Input	
Number of channel	DP(Inbuilt Sensors) & RH,T (Wired Remote Sensor)
Measurement Range	±125 Pascal ,0.0 to 60.0 °C, 0 – 100% RH
Accuracy	DP: ± 1 % FS ± 1 count Temp.: ± 0.2 °C Typical, ±0.4 °C Maximum, %RH : ± 2%RH Typical, ± 4%RH Maximum
Resolution	0.1 °C for Temperature , 1 Pascal for Differential Pressure ,1% for Humidity
Response time	2 Sec
Display	
Display	Color Graphical 49.96 mm x 74.44 mm, 320x480 pixels, Backlight Touch LCD
Output	
Buzzer	Inbuilt and external Buzzer provided to beep in set values violated condition
RTC	Real time clock with battery backup
Communication O/P	
Interface	RS485 (2 Wire)
Protocol	DNP3
Baud Rate	9600,19200,38400 bps
Digital I/P	
No of DI	1
Input Type	Non-Voltage Contact
Rating	24VDC at 5mA
Purpose	Door status
Data Logging	
Memory	64Mbits
Record Type	Date/Time/Year/Temperature/Humidity/Differential Pressure
Total Records	Up to 400000
Power supply	
Standard	85-265VAC/ 100-300VDC
Optional	18-36VDC
Power Consumption	<3VA
Environmental Condition	
Humidity	20% to 95% RH (Non-Condensing)
Ambient temperature	0 to 55°C
Storage Temperature	0 to 80°C
Physical	
Enclosure Back Part	120 x 125 x 45 (W x H x D) in mm
Stainless Steel Front Plate	195 x 195(W x H) in mm
Conceal Box	174 x 163 x 26(W x H x D) in mm
Enclosure material	SS front with MS Powder Coated Body
Enclosure Mounting	Brick Wall Mount
Enclosure Protection	IP 20

Table 2

Features

- Elegant Appearance, easy to operate and compact in size
- Easy to use 3.5” Touch LCD.

- Hi/Lo Alarms with symbol for all three channel.
- Remote programmable from master device.
- RS-485 communication available.
- Inbuilt and external buzzer to audible process value violation.
- Lab view based utility software for configuration and calibration.
- User selectable set limits for process value violation.
- Incorporates built-in Differential Pressure sensor.

3. PHYSICAL SPECIFICATIONS & MOUNTING DETAILS

Enclosure Protection	IP 20	IP 65
Enclosure Back Part W mm x H mm x D mm	125x 120 x 45	156 x 116 x 48
Stainless Steel Front Plate : W mm x H mm	195 x 195	225 x 225
Conceal Box : W mm x H mm x D mm	174 x 163 x 26	200 x 190 x 46
Enclosure Material	M.S. Powder Coated Body with Stainless Steel Front Flush	
Weight Approx.	<1kg.	
Enclosure Mounting	Brick wall mounting	
Terminal Cable Size	2.5mm^2	

Table 2

CDU LCD IP 20

CDU LCD IP 65

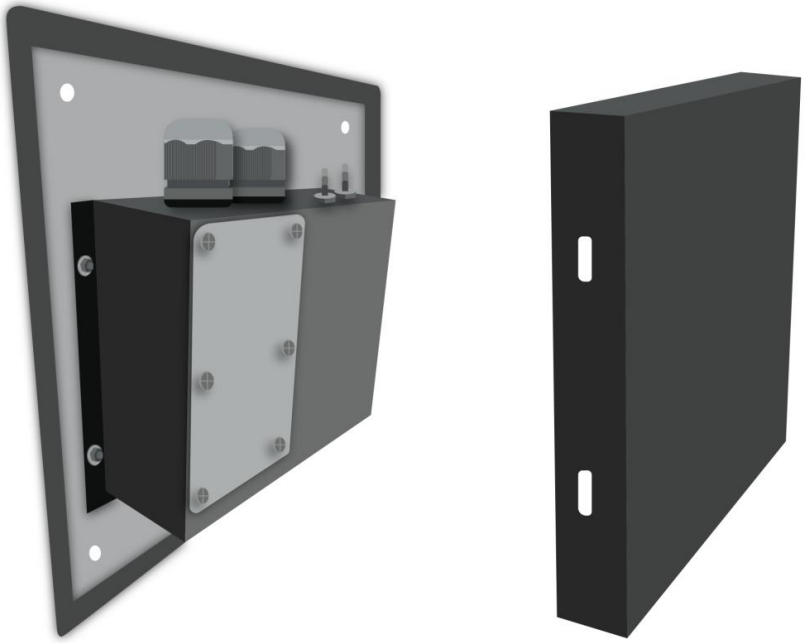


Fig 3.1: Whole Assembly Drawing

4. TERMINAL CONNECTIONS

Fig 4.1: Terminal Connection Detail of FDU

Terminal No.	Description
24VDC + **24VDC -**	Power Supply Input
RS 485 + **RS 485 -**	RS 485 Communication Output
DI	Digital Input for Door status

Table 3

4.1 How to connect wires?

Before carrying out wiring, turn off the power to the unit and check that the cables to be connected are not alive because there is a possibility of electric shock.

NOTE:

- ✓ All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for Voltage, Current and temperature rating of the system.
- ✓ Provide power from a single-phase instrument power supply. If there is a lot of noise in the power line, insert an insulating transformer into the primary side of the line and use a line filter on the secondary side. Do not place the primary and secondary power cables close to each other.
- ✓ Use repeater after each set of 32 instruments connected in RS-485 Communication.
- ✓ Unused terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.
- ✓ Use >250V-1Amp Cable for Power Supply.
- ✓ Supply voltage must be below maximum voltage rating specified on the label
- ✓ If cable has two parallel wires inside then isolation between them must be 2.5 KV.

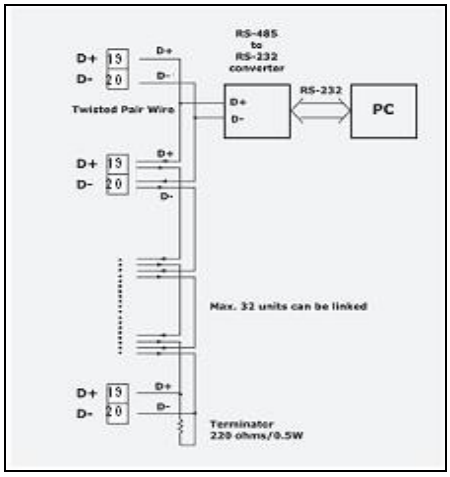
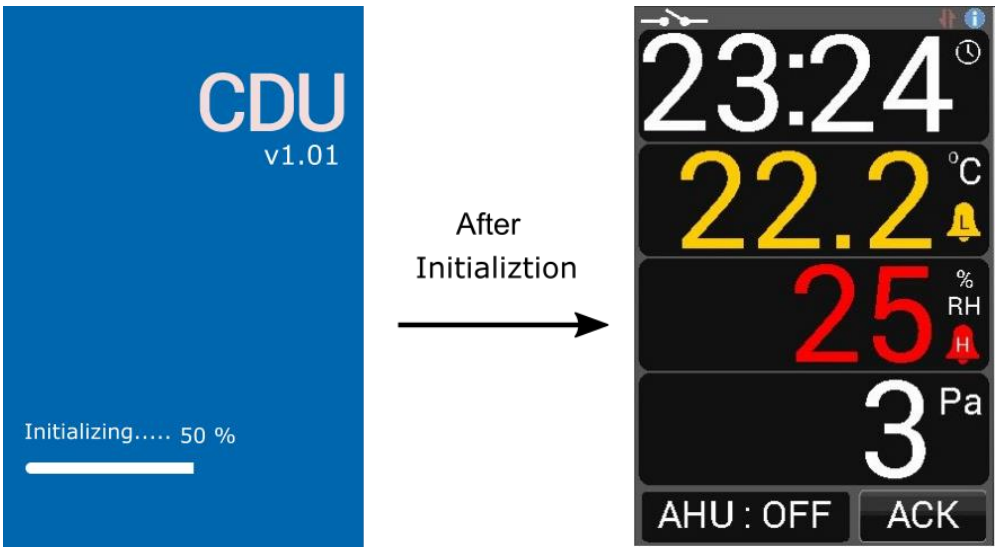


Fig 4.2: RS485 Connection Details

5. Start UP and Basic Operation

5.1 Power ON

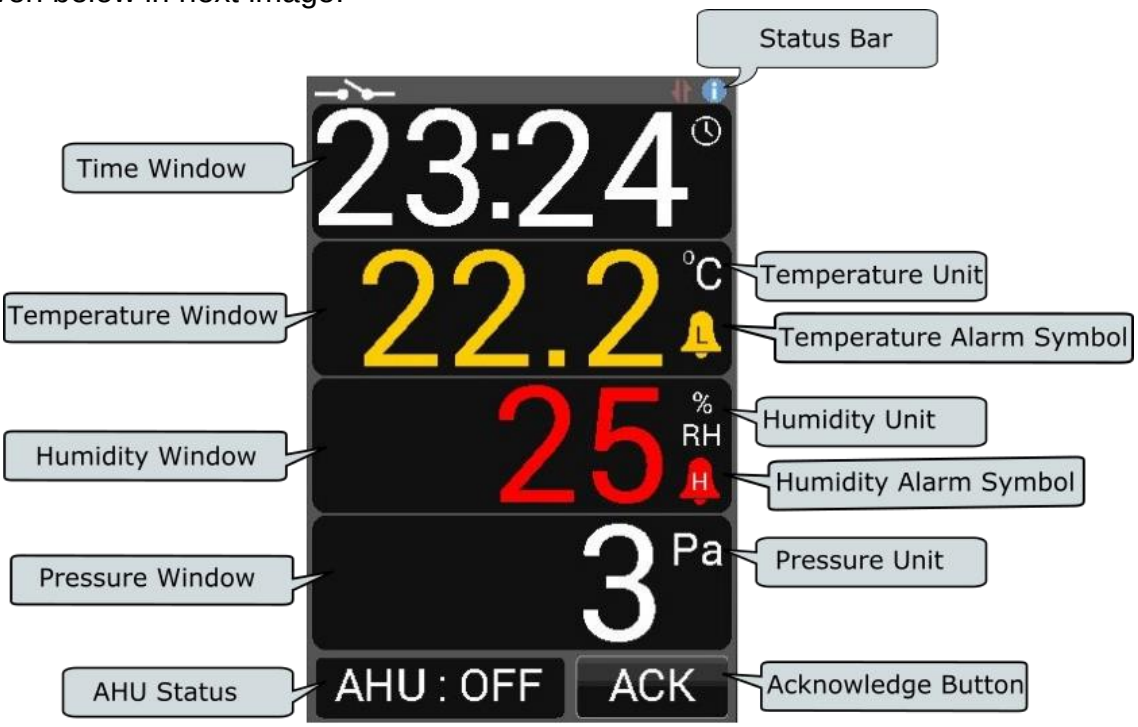
On Power on unit displays model name, software version and initializing sequence and after initialization shows RUN window as below.



Note: Run Window may differ as per model.

5.2 Use Interface

Every time CDU - LCD is switched on, initializing sequence ends in RUN mode. Description of different element is as per below. Description of status bar is also given below in next image.



Description of RUN mode Window is given below

<table>
<tr><th>Symbol</th><th>Function</th></tr>
<tr><td>Time Window</td><td>Time widow displays time in 24 hour format.</td></tr>
<tr><td>Temperature Window</td><td>Temperature window contains temperature value with 0.1° resolution, temperature unit (°C) and temperature alarm symbol. Alarm symbol description is given in below table 4

<table>
<tr><th>Symbol</th><th>Description</th></tr>
<tr><td>L</td><td>Low alarm : Low set point process value violation</td></tr>
<tr><td>H</td><td>High alarm : High set point process value violation</td></tr>
</table>
Table 4

Note: If Sensor is not working properly temperature value will start blinking and value will be displayed according to sensor break.</td></tr>
<tr><td>Humidity Window</td><td>Humidity window contains Humidity value with 1% resolution and Humidity alarm symbol. Alarm symbol description is given in table 4

Note: If Sensor is not working properly humidity value will start blinking and value will be displayed according to sensor break.</td></tr>
<tr><td>Differential Pressure Window</td><td>Differential Pressure window contains Differential Pressure value with 1 Pascal resolution and Differential Pressure alarm symbol. Alarm symbol description is given in table 4

Note: If Sensor is not working properly Differential Pressure value will start blinking and value will be displayed according to sensor break.</td></tr>
<tr><td>Acknowledge Button</td><td>Use to acknowledge the internal and external buzzer.</td></tr>
<tr><td>AHU Status</td><td>Displays AHU status if AHU is OFF, ON or TRIP.</td></tr>
<tr><td>DI Symbol</td><td>Displays if door is closed or open</td></tr>
<tr><td>Error Code</td><td>Displays error code as below

<table>
<tr><th>Error Code</th><th>Description</th></tr>
<tr><td>1</td><td>RHT Sensor malfunction</td></tr>
<tr><td>2</td><td>Differential Pressure Sensor malfunction</td></tr>
<tr><td>3</td><td>Data flash malfunction</td></tr>
<tr><td>4</td><td>Memory full</td></tr>
<tr><td>9</td><td>Multiple error</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>Table 5</td></tr>
<tr><td>Communication Symbol</td><td>Communication symbol description as below

<table>
<tr><td>Symbol</td><td>Description</td></tr>
<tr><td>  </td><td>Device is receiving some Data.</td></tr>
<tr><td>  </td><td>Device is transmitting some Data.</td></tr>
<tr><td>  </td><td>Device is not receiving some Data.</td></tr>
<tr><td>  </td><td>Device is not transmitting some Data.</td></tr>
</table>
Table 6</td></tr>
<tr><td>Info Icon</td><td>Clicking on info icon will display information of device.</td></tr>
</table>

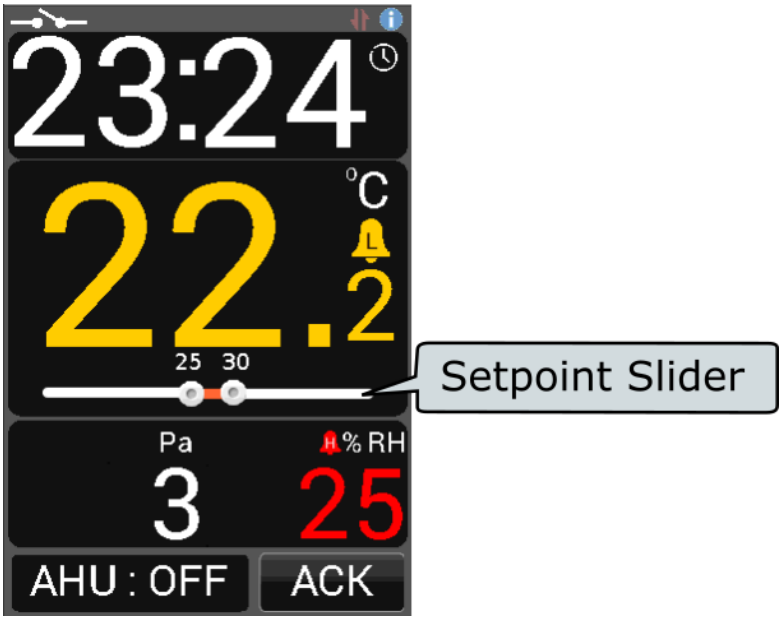
6. Menu Layout

6.1 Run Page

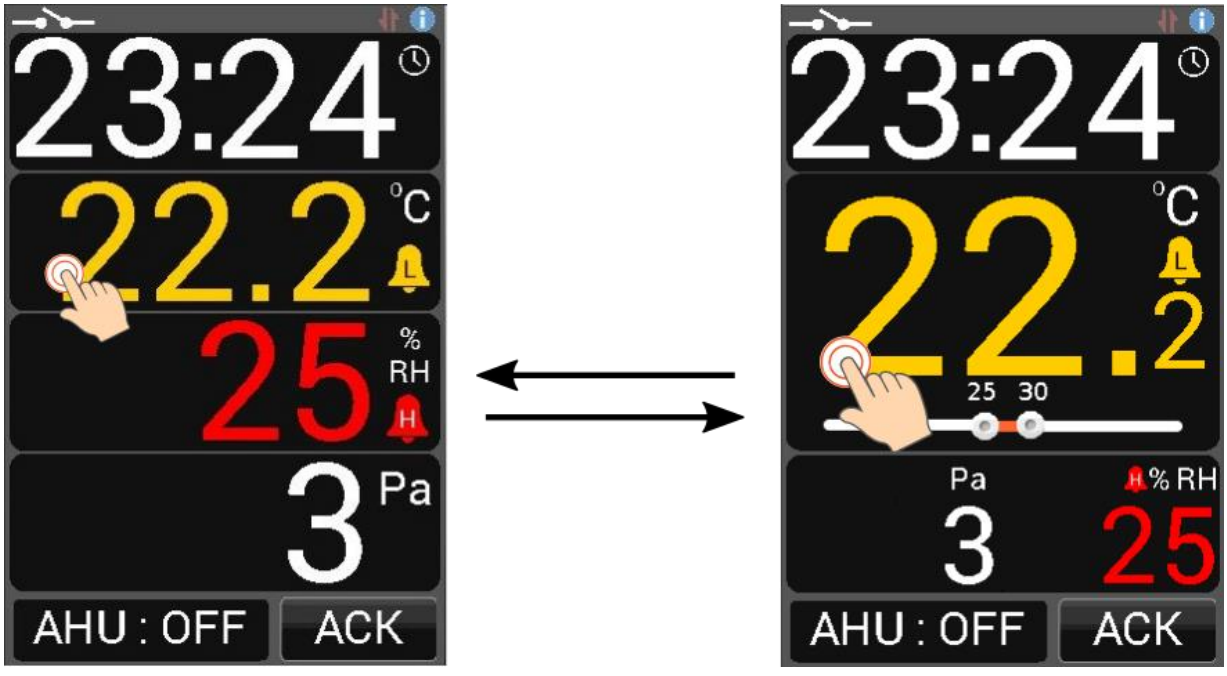
Description of Run page is given in section 5.2

6.2 Temperature Page

Temperature page shows Temperature as main parameter and humidity and Differential Pressure as secondary parameter. Set point value is also displayed. Value on left hand side of slider shows Low Set Point and right hand side shows High Set Point.

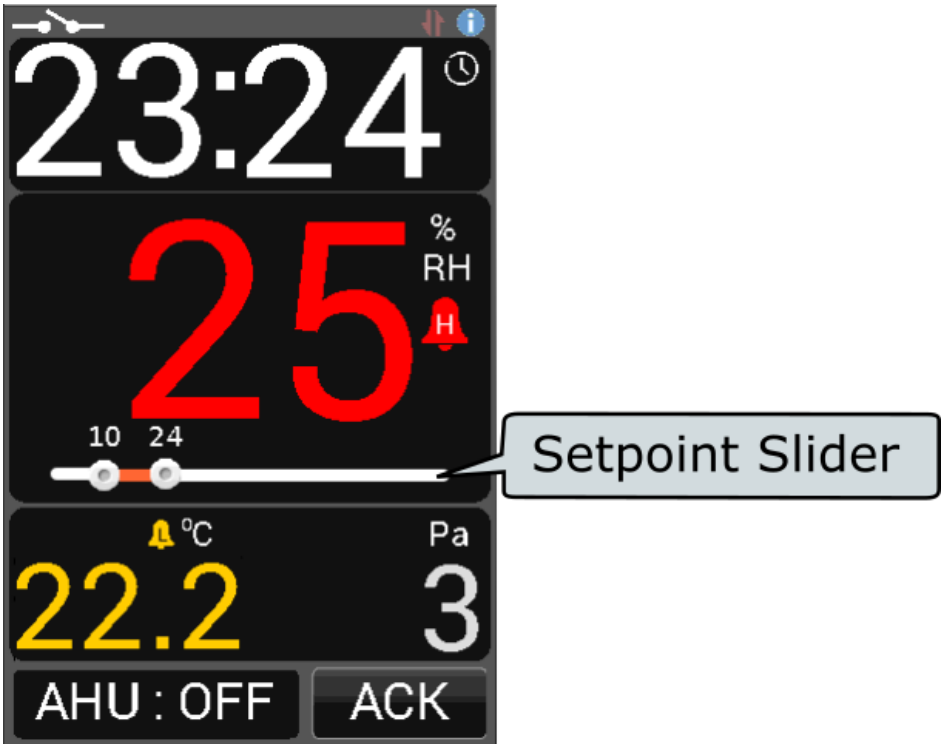


To enter Temperature page click on temperature window on run page as below.

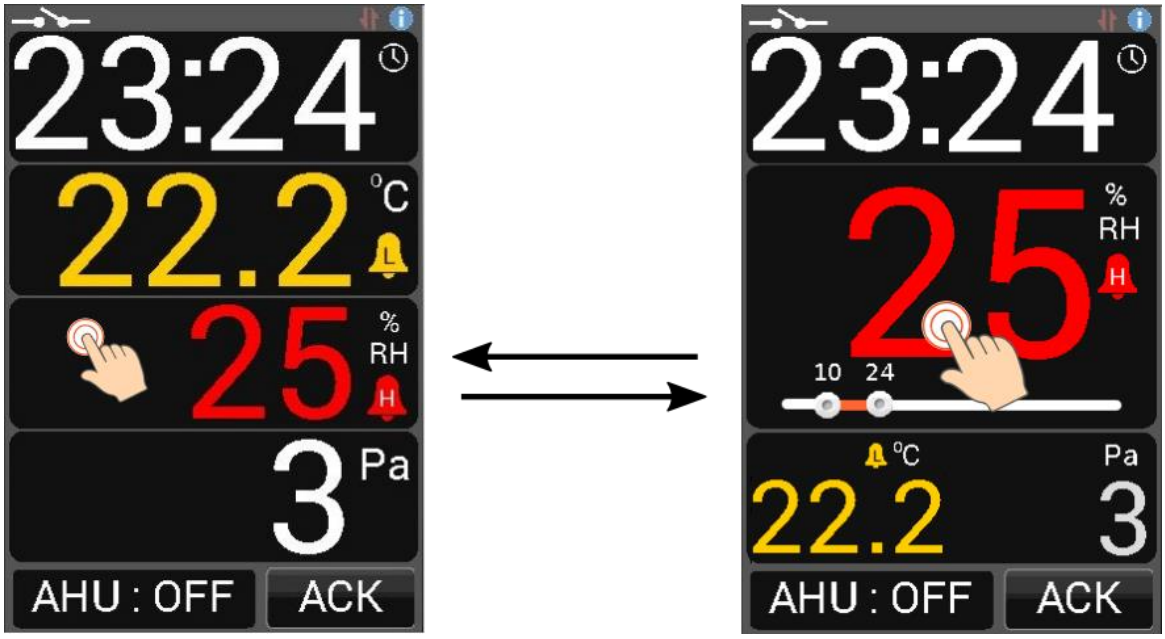


6.3 Humidity Page

Humidity page shows Humidity as main parameter and temperature and Differential Pressure as secondary parameter. Set point value is also displayed. Value on left hand side of slider shows Low Set Point and right hand side shows High Set Point.

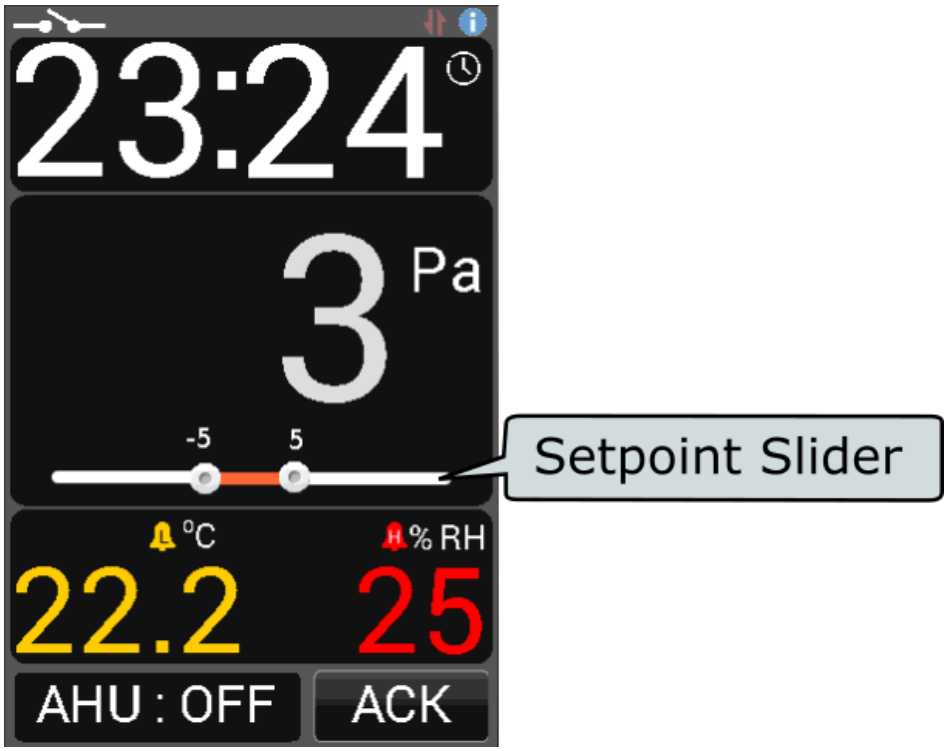


To enter Humidity page click on humidity window on run page as below.

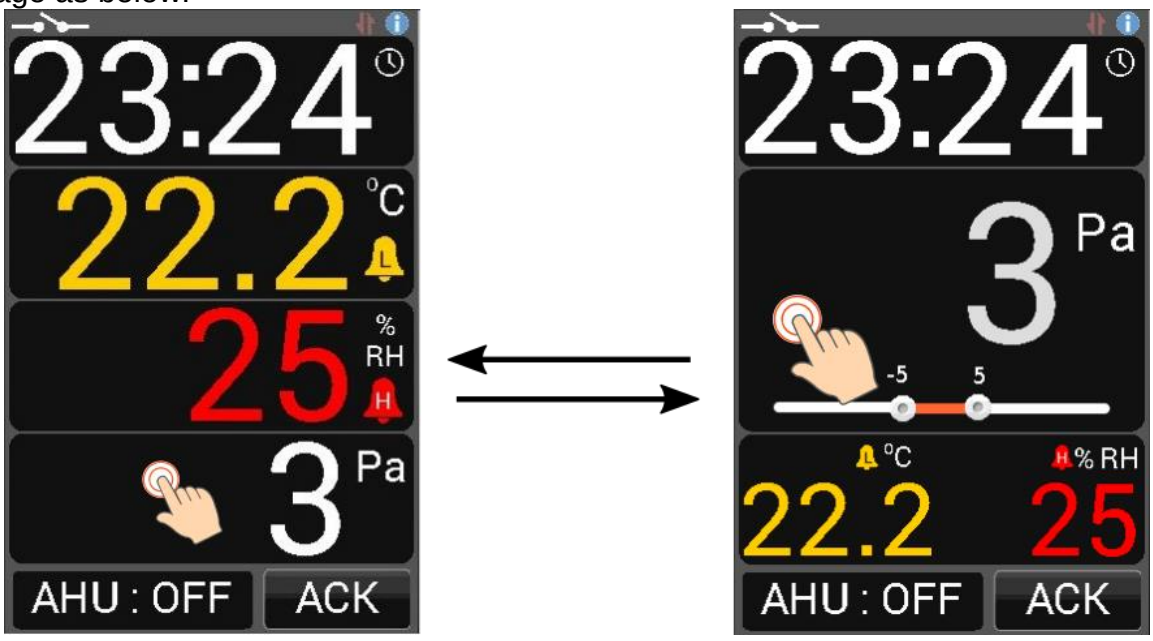


6.4 Differential Pressure Page

Differential Pressure page shows Differential Pressure as main parameter and temperature and humidity as secondary parameter. Set point value is also displayed. Value on left hand side of slider shows Low Set Point and right hand side shows High Set Point

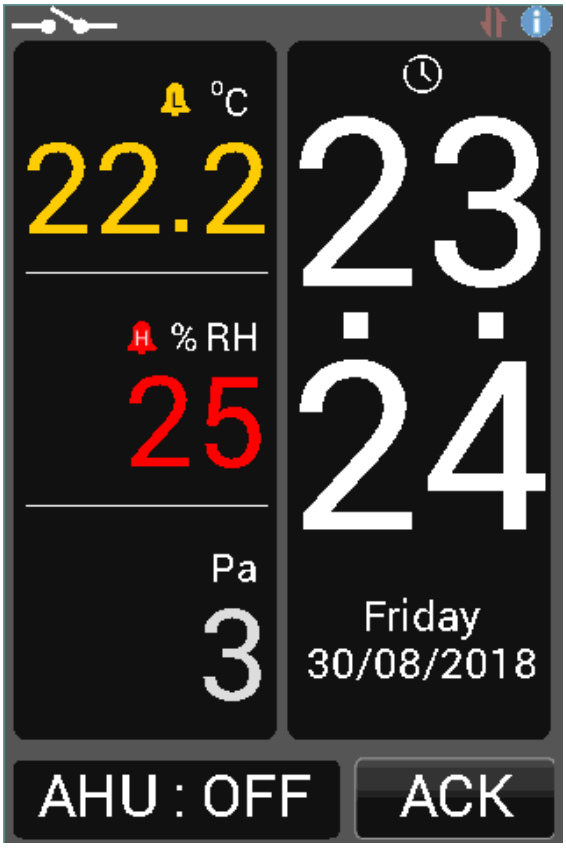


To enter Differential Pressure page click on Differential Pressure window on run page as below.

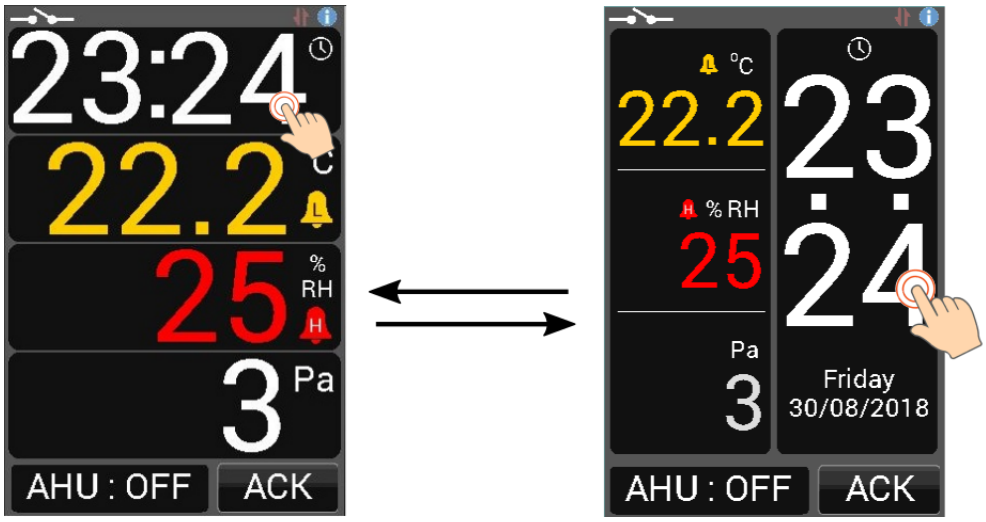


6.5 Time Page

Time page shows current date and time as shown in below

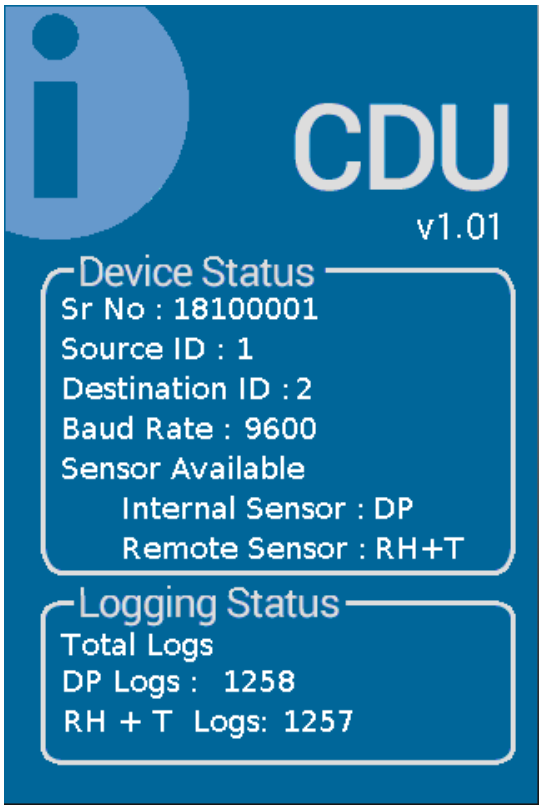


To enter Time page click on time window on run page as below.



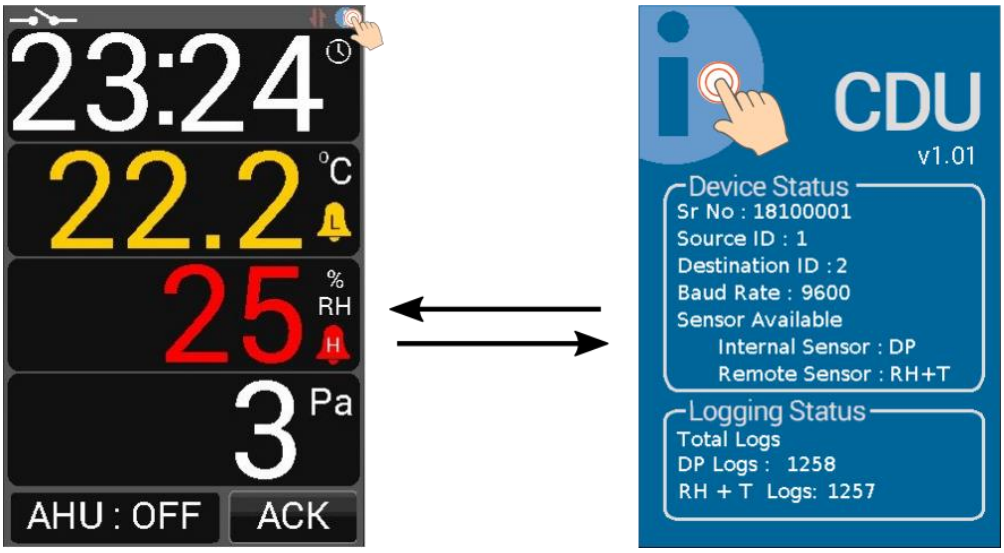
6.6 INFO Page

Info page shows Sr No, Source ID, Destination ID, Baud Rate, Available Sensor, and Total Logs. Description of these parameters is given in below table.

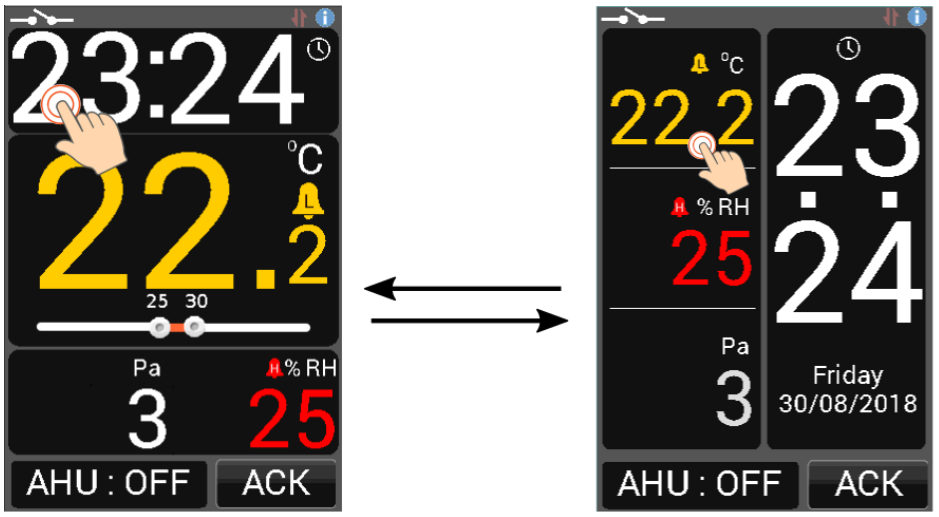


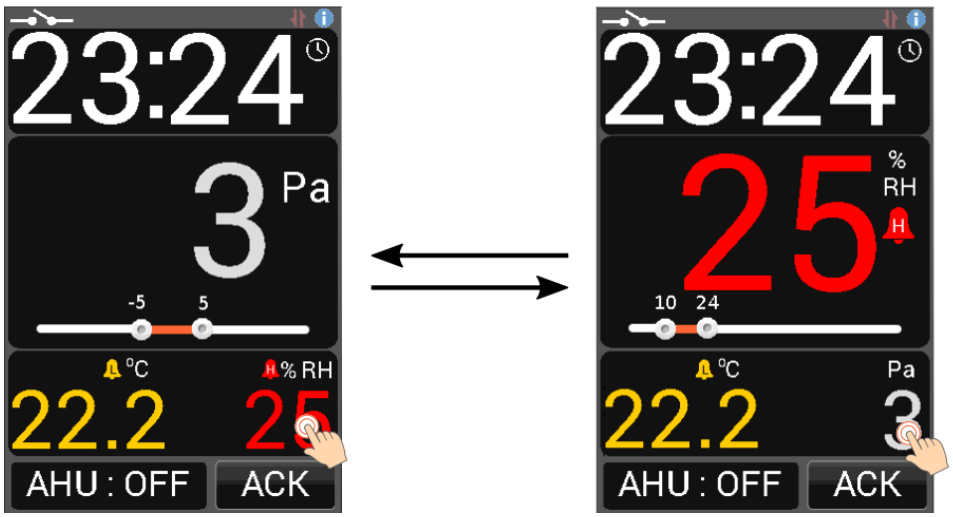
<table>
<tr><th>Parameters</th><th>Description</th></tr>
<tr><td>Sr No</td><td>Device Serial No</td></tr>
<tr><td>Source ID</td><td>Source ID for DNP3 protocol</td></tr>
<tr><td>Destination ID</td><td>Destination ID for DNP3 protocol/ Slave ID for Modbus Protocol</td></tr>
<tr><td>Baud Rate</td><td>Baud rate for Communication</td></tr>
<tr><td>Sensor Available</td><td>Available Sensor
<table>
<tr><td>Internal Sensor : DP</td><td>Unit can be used for measurement of Differential Pressure</td></tr>
<tr><td>Internal Sensor : NA</td><td>Unit cannot be used for measurement of Differential Pressure</td></tr>
<tr><td>Remote Sensor : RH + T</td><td>Unit can be used for measurement of Temperature and Humidity</td></tr>
<tr><td>Remote Sensor : NA</td><td>Unit cannot be used for measurement of Temperature and Humidity</td></tr>
</table></td></tr>
<tr><td>DP Logs</td><td>Differential Pressure logs remains to retrieve from device</td></tr>
<tr><td>RH + T Logs</td><td>RH + T logs remains to retrieve from device</td></tr>
</table>

To enter Info page click on info icon on run page as below.



Note: User can directly change from one page to other by clicking on parameter value as shown below





7. CALIBRATION PROCEDURE

7.1 Procedure for calibration zero and span

The instrument is factory calibrated for the specified range of Differential Pressure input (PV), but due to long term drift of components, re-calibration may be necessary in some cases. For calibrating the instrument a reliable source is required. This source should be at least ten times accurate compared to the range of the instrument. The unit can be calibrated without opening it and without trim pots.

To calibrate Differential Pressure Sensor of CDU-LCD zero calibration, span point 1 calibration and span point 2 calibrations are required.

Zero calibration: The value should be calibrated to zero only.
Example: if process value is 2, then calibrate that value to 0.

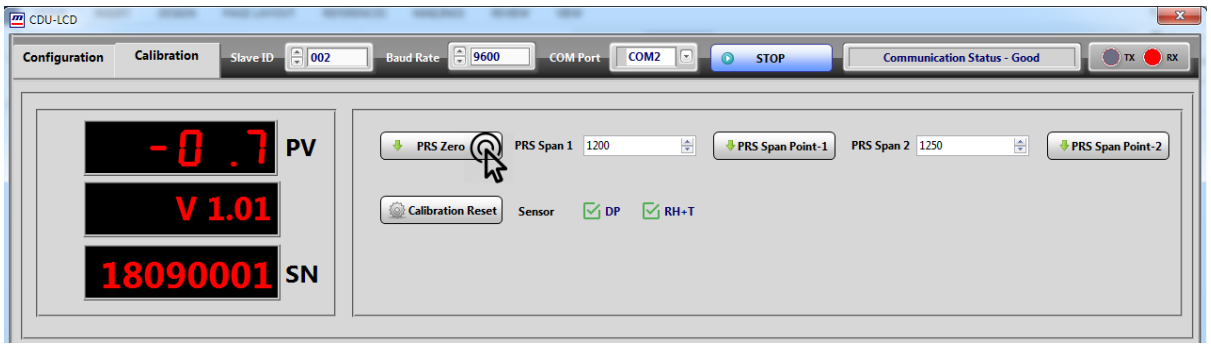
Span Point 1 Calibration: It can be done either at positive side or negative side.
Example:

- 0 to 120 Pascal. 0 means zero calibration and 120 means span point 1 calibration.
- 0 to -120 Pascal. 0 means zero calibration and -120 means span point 1 calibration.

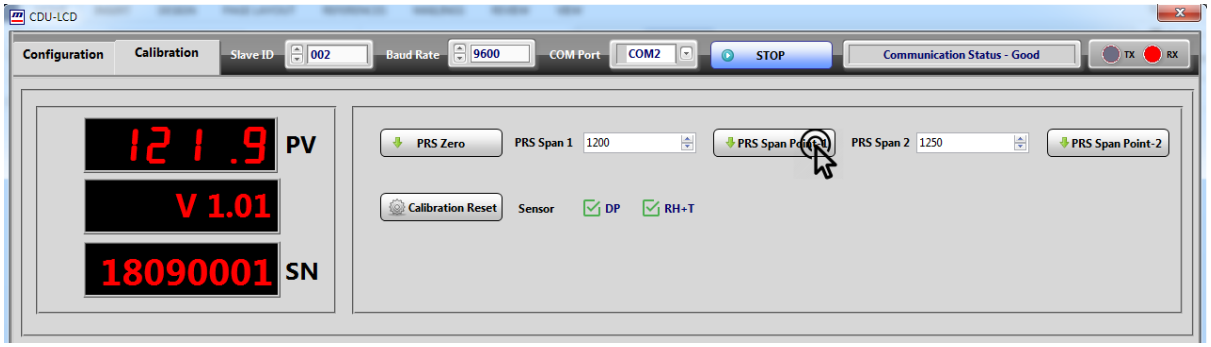
Span Point 2 Calibration: It can be done at positive side only.
Example:

0 to 200 Pa. 0 means zero calibration and 200 means span point 2 calibration.

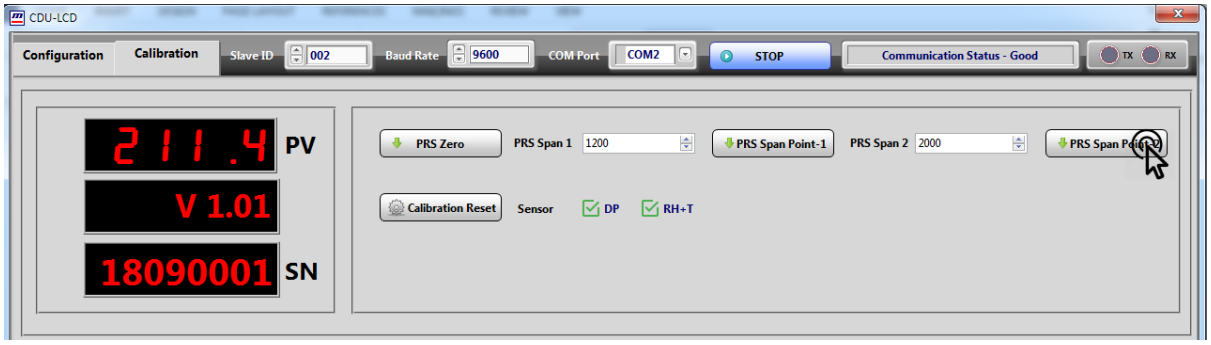
For Calibration, use utility software.
Apply appropriate Input from the source, and press buttons for **PRS Zero.**



For span point -1 calibration, user can enter value or default point is also given set appropriate source and press button **PRS Span Point – 1.**



For span point - 2 calibrations, user can enter value or default point is also given set appropriate source and press button **PRS Span Point – 2.**



8. COMMUNICATION PROTOCOL– MODBUS RTU

8.1 Introduction

The unit can be connected in RS-485 communication data link either in multi drop or repeat mode. Each unit must have unique Serial Number. Entire range of addresses (1 to 247) may be used. Before starting any communication, choose a baud rate compatible to the host computer. The serial protocol used is MODBUS RTU.

8.2 Function Code for Modbus

CODE	NAME	Function
03	Read Holding registers	Use to read PV.
04	Read input registers	Use to read programmable registers
06	Preset Single register	Use to write programmable register
16	Preset Multiple register	Use to write programmable register(Time, Serial No. etv)

Table 7

The error checking field contains a 16-bit value implemented as two eight-bit bytes. The error check value is the result of a Cyclical Redundancy Check (CRC) calculation performed on the message contents.

8.3 Temperature

Parameter (PV display)		Setting Name & Description	Default Value
Modbus Absolute Addresses	Name		
40001	Set Point High	Adjust SET POINT High value 0 to 600 For °C - 0.1 degree Resolution	250
40002	Set Point Low	Adjust SET POINT Low value 0 to 600 For °C - 0.1 degree Resolution	150
40003	Alarm High	Set Alarm Type for Alarm HIGH 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	HIGH
40004	Alarm Low	Set Alarm Type for Alarm LOW 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	LOW
40008	Band	Set band for data logging 0 to 100 For °C - 0.1 degree Resolution	5
40013	Sensor	Set Sensor Break Value	LAST

	Break	0 : MIN (Display minimum value of temperature range) 1 : LAST (Display Last value of parameter in CDU) 2 : MAX (Display Maximum Value of temperature range)	

Table 8

8.4 Humidity

40021	Set Point High	Adjust SET POINT High value 0 to 100 For %RH - 1% Resolution	55
40022	Set Point Low	Adjust SET POINT Low value 0 to 100 For %RH -1% Resolution	30
40023	Alarm High	Set Alarm Type for Alarm HIGH 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	HIGH
40024	Alarm Low	Set Alarm Type for Alarm LOW 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	LOW
40028	Band	Set band for data logging 0 to 10 For %RH – 1% Resolution	1
40033	Sensor Break	Set Sensor Break Value 0 : MIN (Display minimum value of humidity range) 1 : LAST (Display Last value of parameter in CDU) 2 : MAX (Display Maximum Value of humidity range)	LAST

Table 9

8.5 Differential Pressure

40041	Set Point High	Adjust SET POINT High value -990 to 5000 For Pa – 0.1 Pascal Resolution	50
40042	Set Point Low	Adjust SET POINT Low value -990 to 5000 For Pa – 0.1 Pascal Resolution	0
40043	Alarm High	Set Alarm Type for Alarm HIGH 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	HIGH

40044	Alarm Low	Set Alarm Type for Alarm LOW 0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	LOW
40048	Band	Set band for data logging 0 to 100 For Pa - 0.1 Pascal Resolution	20
40051	Differential Pressure High range	It is a Differential Pressure High range for display. 0 to 5000 For Pa – 0.1 Pascal Resolution	1250
40052	Differential Pressure Display Range	Set Display Range For Differential Pressure Input Unidirectional/Bidirectional 0: UN.DR 1: BI.DR	UN.DR
40053	Sensor Break	Set Sensor Break Value 0 : MIN (Display minimum value of Differential Pressure range) 1 : LAST (Display Last value of parameter in CDU) 2 : MAX (Display Maximum Value of Differential Pressure range)	LAST
40054	Pressure Lower Limit	Set Pressure Lower Limit. Below this value pressure will be displayed 0. 0.0 to 10.0	0.0

Table 10

8.6 OUT

40071	Source ID	Source ID 1 to 9999	1
40072	Destination / Slave ID	Destination ID DNP3 and Slave ID for modbus 1 to 247	2
40073	Baud Rate	Set Serial Communication Baud Rate 0 : 9.6K (9600 bps) 1 : 19.2K (19200 bps) 2 : 38.4K (38400 bps)	9.6K
40074	Buzzer Delay	It is a delay time to Buzzer ON. 0 to 3600 Sec	30
40075	Buzzer Status	Set Enable or Disable For Audible Process value violation 0 : DIS 1 : EN	EN

40076	Memory Erase	Clear DP & RH + T Log 1: Clear Log	-
40077	Factory Default	Factory reset 1975 : Configuration reset 1976 : Calibration reset	-
40078	Software Version	- -	-
40079	Internal Sensor	Available Internal Sensor 0 : NA 1 : DP	NA
40080	Remote Sensor	Available Internal Sensor 0 : NA 1 : RH + T	NA
40081	Log Mode Type	Log Mode Type 0 : HOLD 1 : OVERLAP Note: 1. In Hold Type CDU will stop storing data after maximum limit (4 lakh) of log is reached. User has to clear data using SCADA or Utility software 2. In OVERLAP type CDU will reset counter after maximum limit is reached so old data will be lost if data is not retrieved.	OVERLAP
40082	Log Alarm	Buzzer on memory full(Applicable if Log mode type is HOLD) 0 : Buzzer OFF 1 : Buzzer ON	Buzzer OFF
40083	AHU	AHU Enable or Disable on GUI 0 : Disable 1 : Enable	Enable
40084	Digital Input	Digital Input Enable or Disable on GUI 0 : Disable 1 : Enable	Enable
40085	Periodically LCD Reset	Periodically LCD Reset Enable or Disable 1 : Enable 2 : Disable	Enable
40086	Time	Time Enable or Disable on GUI 1 : Enable	Enable

		2 : Disable	
40087	IIR Filter	IIR Filter 0 to 120	10
40088	Periodic Time	Set Periodic time 1 to 59	1

Table 11

8.7 CAL

40091	Differential Pressure PV	Differential Pressure process value	-
40092	Calibration Point for Differential Pressure	Calibration Zero and Span 1 : Zero calibration 2 : Span1 Calibration 3 : Span2 Calibration	-
40093	Calibration Span Point 1 for Differential Pressure	Calibration Point-1 for Differential Pressure	1200
40094	Calibration Span Point 2 for Differential Pressure	Calibration Point-2 for Differential Pressure	1250
40095	Calibration Mode	Calibration Mode Enable/Disable 0 : Disable 1 : Enable	0
40096	Temperature PV	Temperature process value	-
40097	Calibration Slope for Temperature	Calibration Slope for Temperature	10000
40098	Calibration Offset for Temperature	Calibration Offset for Temperature	0
40099	Humidity PV	Humidity process value	-
40100	Calibration Slope for Humidity	Calibration Slope for Humidity	10000
40101	Calibration Offset for Humidity	Calibration Offset for Humidity	0

Table 12

8.8 Info

40201	Sr No.	Set Serial No	-
40203	DP Log	Show DP Log	-
40205	RH+T Log	Show RH+T Log	-
40207	DP	Read or Write Retrieved index	-
40209	RH+T	Read or Write Retrieved index	-
40211	DI	Read or Write Retrieved index	-

8.9 Exceptional Response

CODE	MEANING
01	Function code Invalid. It must be 03, 04, 06 or 16.The function code received in the query is not allowable action for the slave.
02	Illegal address value. The data address received in the query is not an allowable address for the salve.
03	Illegal data value. A value contained in the query data field is not an allowable value for the salve.

Table13

9. COMMUNICATION PROTOCOL-DNP 3

9.1 Introduction

The unit can be connected in RS-485 communication data link either in multi drop or repeat mode. Each unit must have unique Destination ID. Entire range of addresses (1 to 247) may be used. Before starting any communication, choose a baud rate compatible to the host computer. The serial protocol used is DNP 3.

9.2 Analog Input

Sr. No	Parameter Description	DNP 3 Point no.	Parameter Type	Access
1	Differential Pressure _ PV with time stamp	1	Integer	R
2	Temperature _ PV with time stamp	2	Integer	R
3	Humidity _ PV with time stamp	3	Integer	R
4	Error Code*	4	Integer	R
5	Power On Time stamp	5	Integer	R
6	Door Open Close DI #	6	Integer	R

Table 14

* Error Code:
1 - RH+T Sensor Break,
2 - Differential Pressure Sensor Break,
3 - Data Flash Not Working,
4 - Memory full (Applicable only if Log Mode Type is HOLD)
9 - Multiple Errors

Door Open Close DI:
0 - Open
1 - Close

9.3 Analog Output

Sr. No	Parameter Description	DNP 3 Point no.	Parameter Type	Access
1.	Set point 2 of Differential Pressure H	0	Integer	R/W
2.	Set point 2 of Temperature H	1	Integer	R/W
3.	Set point 2 of Humidity H	2	Integer	R/W
4.	Set point 1 of Differential Pressure L	3	Integer	R/W
5.	Set point 1 of Temperature L	4	Integer	R/W
6.	Set point 1 of Humidity L	5	Integer	R/W
7.	Acknowledge Write	6	Integer	R/W
8.	Buzzer Delay	7	Integer	R/W
9.	Band Differential Pressure	8	Integer	R/W
10.	Band Temperature	9	Integer	R/W
11.	Band Humidity	10	Integer	R/W
12.	Buzzer Enable/Disable**	11	Integer	R/W
13.	AHU Status##	12	Integer	R/W
14.	Memory Erase$$	13	Integer	R/W

Table 15

** Buzzer Enable/Disable: 0 – Disable, 1 - Enable
AHU Status: 1 – OFF, 2 – ON, 3 - TRIP
$$ Memory Erase: 1 - Clear Log

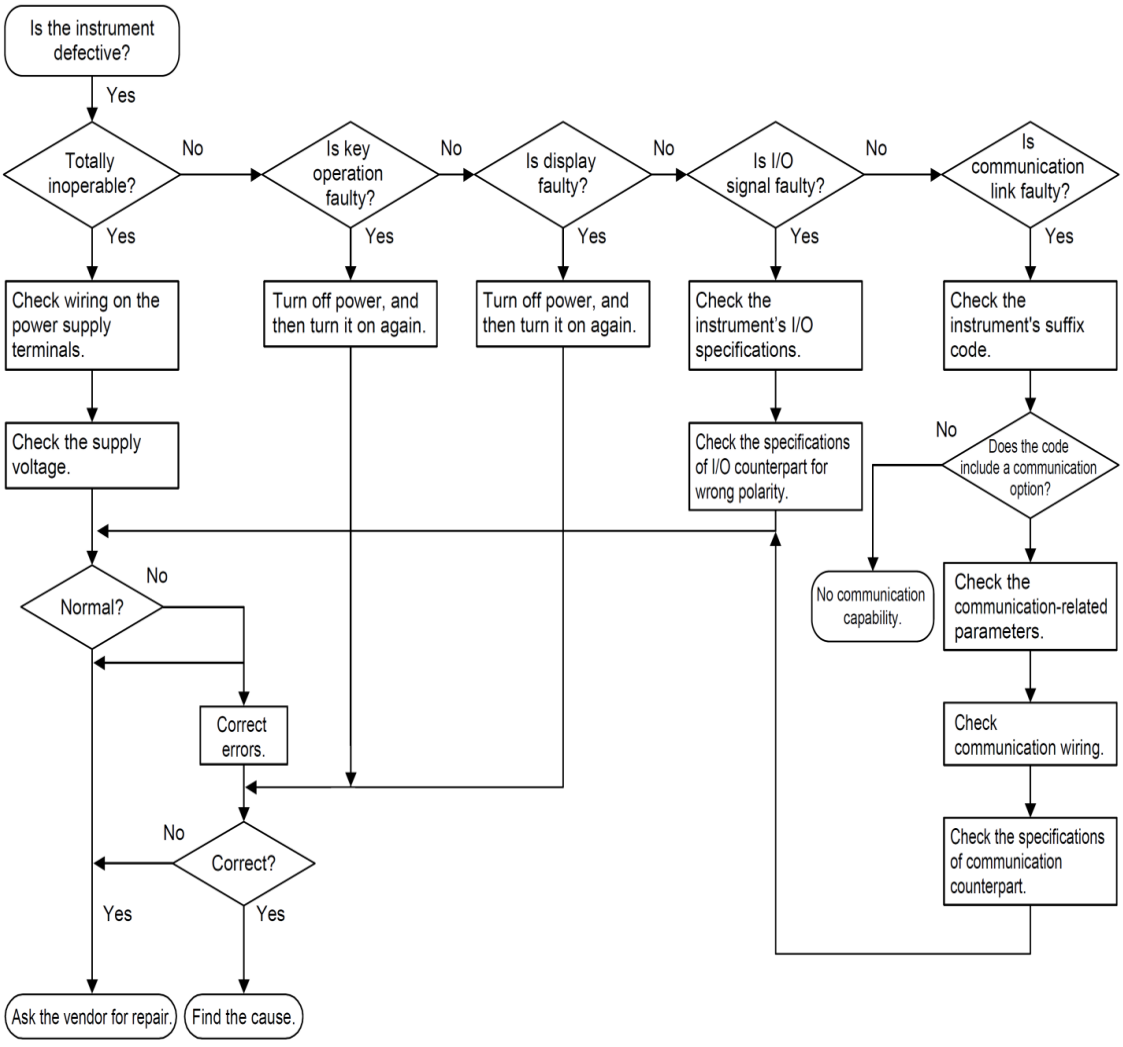
10.APPENDIX

10.1 Relative Humidity

It is the percentage of Actual Vapor density to the saturated Vapor density of the air.
%RH = (Actual Vapor density/Saturated Vapor density) * 100.

10.2 Troubleshooting

If the operating display does not appear after turning on the unit's power, follow the measures in the procedure below.



If a problem appears complicated, contact our sales representative.

IMPORTANT

Take note of the parameter settings when asking the vendor for repair.

10.3 Buzzer & LED Status with respect to AHU Status

AHU Status	Alarm Status	External/Internal Buzzer(Audio) Status		External LED(Visual) Status	
		Without Pressing ACK Button	With Pressing ACK Button	Without Pressing ACK Button	With Pressing ACK Button
OFF	Unhealthy	OFF	OFF	Blinking	Steady ON
OFF	Healthy	OFF	OFF	Off	Off
ON	Unhealthy	ON	OFF	Blinking	Steady ON
ON	Healthy	OFF	OFF	Off	Off
TRIP	Unhealthy	ON	OFF	Blinking	Steady ON
TRIP	Healthy	ON	OFF	Off	Off

11.FAQ

1. **When CDU will Display "OVER" Message?**

   Over Message will only be displayed only in case of Differential Pressure input if Differential Pressure is greater than Differential Pressure high range unit will display "over" with red font.

2. **Why time synchronization is required?**

   To avoid data mismatch between SCADA and CDU.

3. **How to know that connection is break between CDU and Sensor?**

   If the Sensor (Remote Sensor for RH+T, Inbuilt Sensor for Differential Pressure) will no response for 10 Sec parameter will start blinking and parameter value will be set as per sensor break.

4. **What will happen after connection is established from connection lost between SCADA and CDU?**

   Logged data will be retrieved first and then it will update set point, band and other parameters, as well as live data frame.

5. **What will happen with the data when the connection break between SCADA and CDU?**

   Data will be saved in memory of CDU that is called as logging of data.

6. **What is band?**

   Band is defined as the exception for data logging to save the memory during connection break with SCADA.
   For example if the value of band is set as 1.0 from menu parameter setting.
   If PV = 2 than CDU will log the data, if PV is >= 3(PV + BAND) or PV is <= 1 (PV - BAND).

7. **How to know that the memory is full in CDU?**

Memory full only occurs when selected Log Mode Type is HOLD. When memory is full error code in status bar is 4 and buzzer will start if Log Alarm is selected Buzzer ON.
Buzzer can be acknowledged by pressing the acknowledgement button on LCD.

8. How to analyse data on wire shark?

As shown in figure 1 it shows queries and response of different devices, it is filter with dnp3.

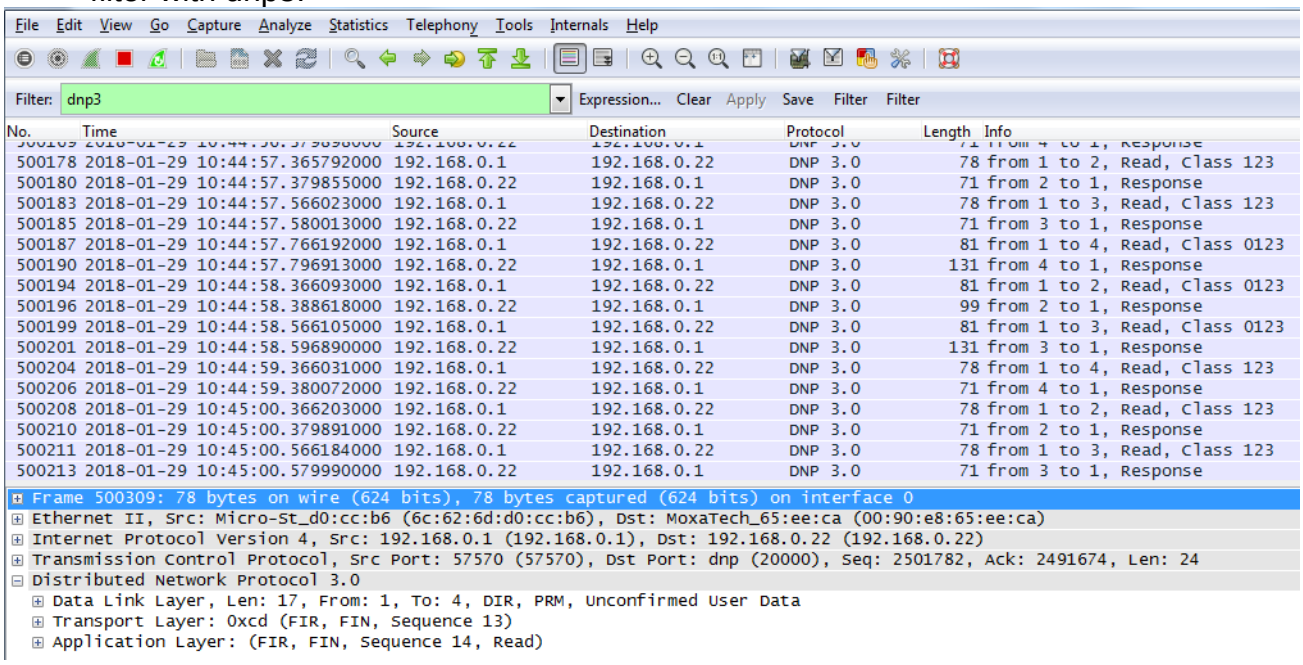


Figure 1

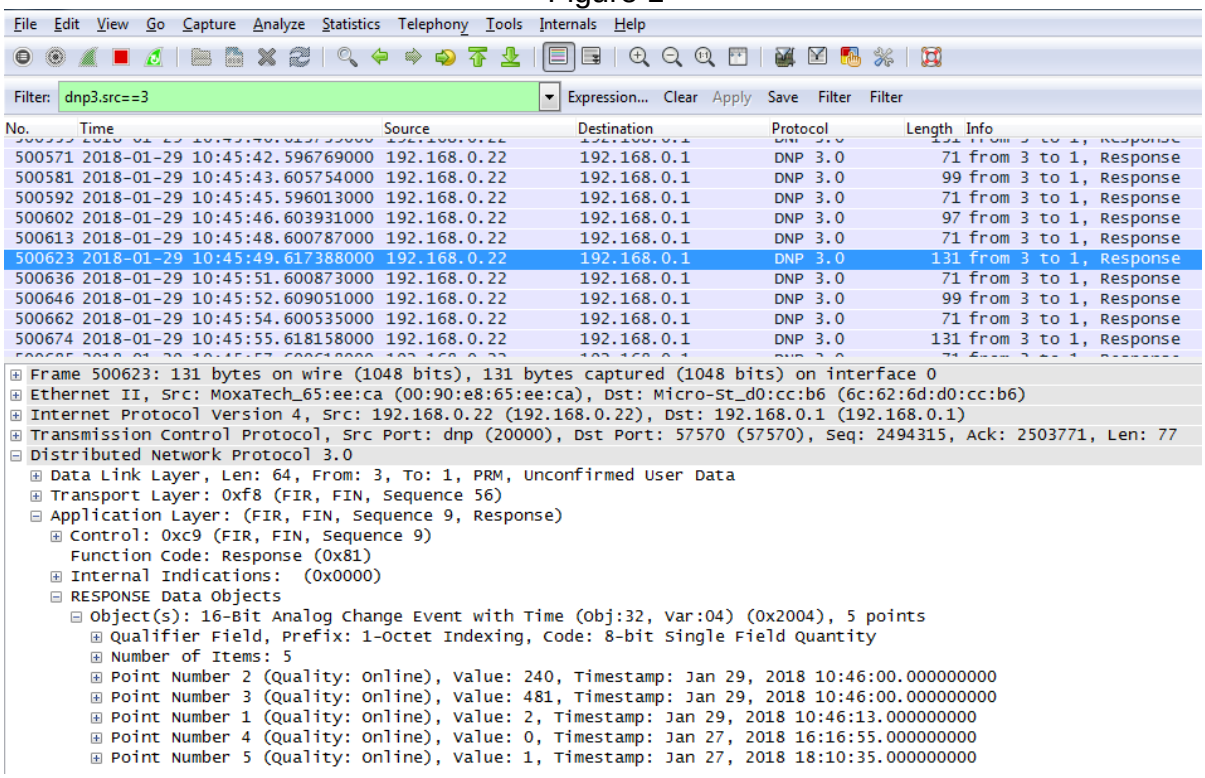


Figure 2

As shown from figure 2 we can filter device response with syntax dnp3.src=device destination ID.
Blue highlight shows data byte received from device having destination ID=3.
To analyze the data follow the steps mentioned below:
Click on Distributed network protocol3.0 it expands the details.
Click on application layer it expands the details.
Click on response data objects.
Point number 1 gives Differential Pressure value
Point number 2 gives Temperature value
Point number 3 gives Humidity value
Point number 4 gives error code.
Point number 5 gives is reserved for future use.
Point number 6 gives DI status.

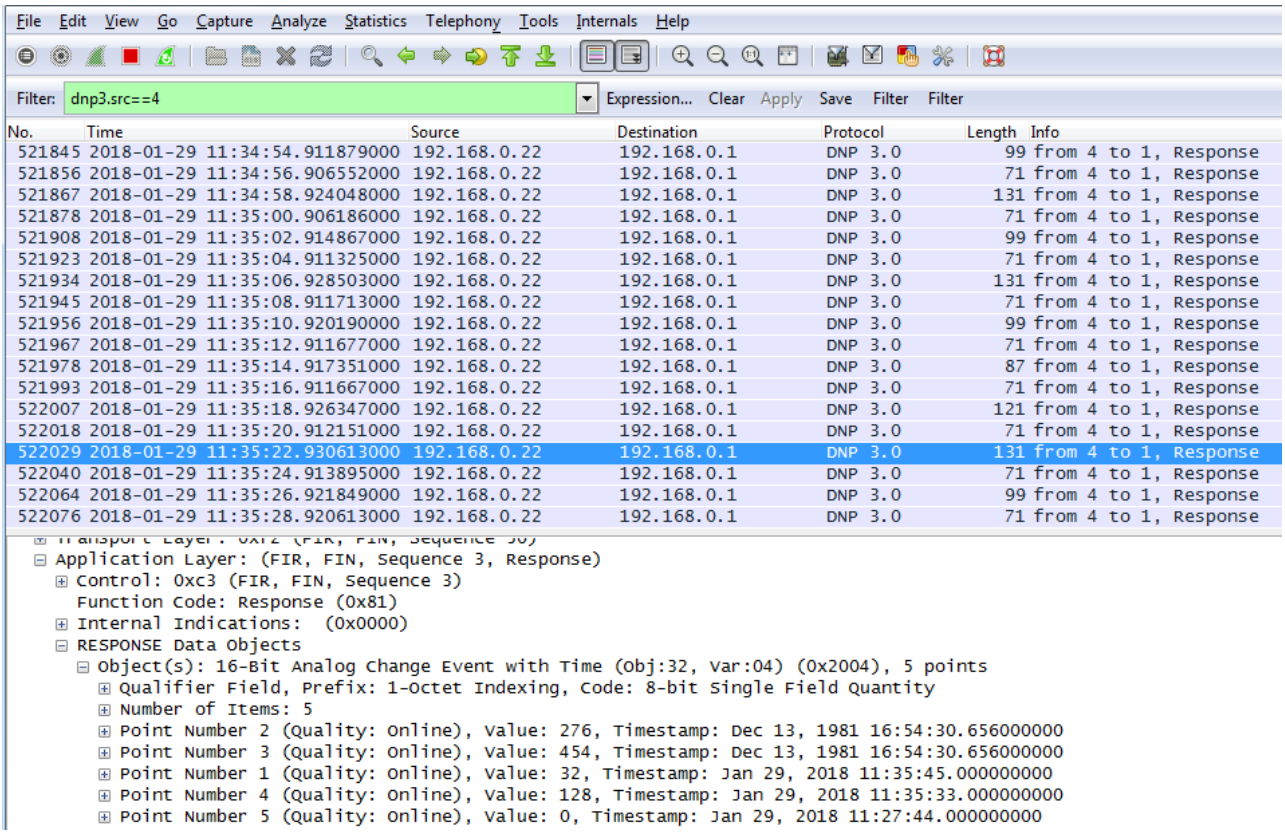


Figure 3

9. What will happen when the communication is lost and it gets healthy after few hours or Days.?

Communication failed between CDU & SCADA.

In this case all the run time data will be stored in CDU device itself and it will be transferred to SCADA system as soon as the communication re-established between SCADA server and CDU. The real time value such as error code/ DI status will be displayed only after all the data logs transferred to SCADA system from CDU.

10. How to get Power off time of CDU?

When CDU will power on it will log one sample with
DATA: high display range of sensor + 1.
TIME: last logged data time + periodic time saved in memory.

Ex. Step-1: HT last log with timestamp 17:24:31
Step-2: CDU power off at 17:24:45
Step-3: CDU power on at 17:26:38

CDU power on it will punch high value of log (for HT and DP) with time 17:26:31.

11. Why does the maximum sensor value not punch at power on?

If the Time stamp (last log time + periodic time) is greater than the power on time of CDU, it will not punch the future time stamp.

Ex. Step-1: Set CDU periodic Time = 2 minute.
Step-2: CDU power off at 17:30:16.
Step-3: CDU power on at 17:30:19.

Last periodic log punch with time 17:29:00, CDU power on it will not punch high value