

# <u>User's Manual</u>

# <u>CLEAN ROOM DISPLAY UNIT</u> 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**

This indicates a danger that may result in death or serious injury if not avoided.
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
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
	1/4 x 163 x 26(W x H x D) in mm
Enclosure material	SS front with MS Powder Coated Body
Enclosure Mounting	BLICK AN AII MOUNT
Enclosure Protection	

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	125x 120 x 45	156 x 116 x 48	
W mm x H mm x D mm			
Stainless Steel Front Plate :	105 x 105	225 x 225	
W mm x H mm	195 X 195	225 X 225	
Conceal Box :	174 × 162 × 26	200 x 100 x 16	
W mm x H mm x D mm	174 x 103 x 20	200 x 190 x 46	
Enclosuro Matorial	M.S. Powder Coated Body with Stainless Steel		
	Front Flush		
Weight Approx.	<1kg.		
Enclosure Mounting	Brick wall mounting		
Terminal Cable Size	2.5mm <sup>2</sup>		
	Table 0		

Table 2





# 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.





# 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.





DI Symbol Error Code Communication Symbol Info Icon

Description of RUN mode Window is given below

Symbol	Function		
Time Window	Time widow displays time in 24 hour format.		
	Temperature u temperature u description is	window contains temperature value with 0.1° resolution, nit (°C) and temperature alarm symbol. Alarm symbol given in below table 4	
	Symbol	Description	
Temperature	L	Low alarm : Low set point process value violation	
window	Ť	High alarm : High set point process value violation	
		Table 4	
	Note: If Sens and value wil	or is not working properly temperature value will start blinking I be displayed according to sensor break.	
	Humidity wind	ow contains Humidity value with 1% resolution and Humidity	
Humidity	alarm symbol. Alarm symbol description is given in table 4		
Window	Note: If Sensor is not working properly humidity value will start blinking and value will be displayed according to sensor break.		
Differential Pressure Window	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 v	alue will be displayed according to sensor break.	
Acknowledge Button	Use to acknowledge the internal and external buzzer.		
AHU Status	Displays AHU	status if AHU is OFF, ON or TRIP.	
DI Symbol	Displays if door is closed or open		
	Displays error	code as below	
Error Code	Error Code 1 2 3 4 9	Description RHT Sensor malfunction Differential Pressure Sensor malfunction Data flash malfunction Memory full Multiple error	

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	Table 5		
	Communica	tion symbol description as below	
	Symbol	Description	
Communication	1	Device is receiving some Data.	
Symbol	1	Device is transmitting some Data.	
		Device is not receiving some Data.	
	1	Device is not transmitting some Data.	
		Table 6	
Info Icon	Clicking on info icon will display information of device.		



# 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.



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# 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.



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#### 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.



Parameters	Desc	cription	
Sr No	Device Serial No		
Source ID	Source ID for DNP3 protocol		
Destination ID	Destination ID for DNP3 protoc	col/ Slave ID for Modbus Protocol	
Baud Rate	Baud rate for	Communication	
Sensor	Availab	le Sensor	
Available			
	Internal Sensor : DP	Unit can be used for	
		measurement of Differential	
		Pressure	
	Internal Sensor : NA	Unit cannot be used for	
		measurement of Differential	
		Pressure	
	Remote Sensor : RH + T	Unit can be used for	
		measurement of Temperature	
		and Humidity	
	Remote Sensor : NA	Unit cannot be used for	
		measurement of Temperature	
		and Humidity	
DP Logs	Differential Pressure logs remains to retrieve from device		
RH + T Logs	RH + T logs remains to retrieve from device		

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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



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# 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**.

CDU-LCD	REAL MARK REAL PROPERTY.	X
Configuration Calibration Slave ID 💭 002	Baud Rate 🖶 9600 COM Port COM2 🗉 💿 STOP Communication Status - Good	TX RX
2 / / .4 PV V 1.01 18090001 SN	PRS Zero       PRS Span 1       1200       Image: PRS Span 2       2000       Image: PRS Span 2       2000	PRS Span P



# 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)			Default
Modbus Absolute Addresses	Name	Setting Name & Description	Value
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

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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	55
40022	Set Point Low	Adjust SET POINT Low value	30
		0 to 100 For %RH -1% Resolution	
40023	Alarm High	Set Alarm Type for Alarm HIGH	HIGH
		0 : HI(High)	
		1 : LOW(Low)	
		2 : DIS(Disable)	
40024	Alarm Low	Set Alarm Type for Alarm LOW	LOW
		0 : HI(High)	
		1 : LOW(Low)	
		2 : DIS(Disable)	
40028	Band	Set band for data logging	1
		0 to 10 For %RH – 1% Resolution	
40033	Sensor Break	Set Sensor Break Value	LAST
		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)	

Table 9

# 8.5 Differential Pressure

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



40044	Alarm Low	Low Set Alarm Type for Alarm LOW	
		0 : HI(High) 1 : LOW(Low) 2 : DIS(Disable)	
40048	Band	Set band for data logging	20
		0 to 100 For Pa - 0.1 Pascal Resolution	
40051	Differential Pressure High range	It is a Differential Pressure High range for display. 0 to 5000 For Pa – 0.1 Pascal Resolution	1250
40050	Differential	Cat Diaglass Dag to Ear Differential Dressure Insut	
40052	Pressure Display	Unidirectional/Bidirectional	UN.DR
	Range	0: UN.DR 1: BI.DR	
40053	Sensor Break	Set Sensor Break Value	LAST
	Diodik	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	
40054	Dragovina	Pressure range)	0.0
40054	Lower Limit	pressure will be displayed 0.	0.0
		0.0 to 10.0	

Table 10

# 8.6 OUT

40071	Source ID	Source ID		Source ID 1	
		1 to 9999			
40072	Destination / Slave	Destination ID DNP3 and Slave ID for modbus	2		
	ID	1 to 247			
40073	Baud Rate	Set Serial Communication Baud Rate	9.6K		
		0 : 9.6K (9600 bps) 1 : 19.2K (19200 bps) 2 : 38.4K (38400 bps)			
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		

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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	OVERLAP
		<ul> <li>Note:</li> <li>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</li> <li>2. In OVERLAP type CDU will reset counter after maximum limit is reached so old data will be lost if data is not retrieved.</li> </ul>	
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

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		2 : Disable	
40087	IIR Filter	IIR Filter	10
		0 to 120	
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



## 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

<sup>#</sup> 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 <sup>\$\$</sup>	13	Integer	R/W

Table 15

\*\* Buzzer Enable/Disable: 0 – Disable, 1 - Enable ## AHU Status: 1 – OFF, 2 – ON, 3 - TRIP

## AHU Status:1 – OFF, 2 – 0\$\$ 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

	Alarm	External/ Buzzer(Aud	Internal lio) Status	External LED(Visual) Status			
And Status	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.

<u>File Edit View Go Capture Analyze Statistics Telephony</u> <u>Tools</u>	<u>I</u> nternals <u>H</u> elp									
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Filter: dnp3	Expression Clear Appl	ly Save Filter F	ilter							
No. Time Source 192,100,00,22	Destination	Protocol	Length Info							
500178 2018-01-29 10:44:57.365792000 192.168.0.1	192.168.0.22	DNP 3.0	78 from 1 to 2, Read, Class 123							
500180 2018-01-29 10:44:57.379855000 192.168.0.22	192.168.0.1	DNP 3.0	71 from 2 to 1, Response							
500183 2018-01-29 10:44:57.566023000 192.168.0.1	192.168.0.22	DNP 3.0	78 from 1 to 3, Read, Class 123							
500187 2018-01-29 10:44:57.766192000 192.168.0.1	192.168.0.22	DNP 3.0	81 from 1 to 4. Read. Class 0123							
500190 2018-01-29 10:44:57.796913000 192.168.0.22	192.168.0.1	DNP 3.0	131 from 4 to 1, Response							
500194 2018-01-29 10:44:58.366093000 192.168.0.1	192.168.0.22	DNP 3.0	81 from 1 to 2, Read, Class 0123							
500196 2018-01-29 10:44:58.388618000 192.168.0.22	192.168.0.1	DNP 3.0	99 from 2 to 1, Response							
500199 2018-01-29 10:44:58 506105000 192.168.0.1	192.168.0.22	DNP 3.0	131 from 3 to 1 Response							
500204 2018-01-29 10:44:59.366031000 192.168.0.1	192.168.0.22	DNP 3.0	78 from 1 to 4, Read, Class 123							
500206 2018-01-29 10:44:59.380072000 192.168.0.22	192.168.0.1	DNP 3.0	71 from 4 to 1, Response							
500208 2018-01-29 10:45:00.366203000 192.168.0.1	192.168.0.22	DNP 3.0	78 from 1 to 2, Read, Class 123							
500210 2018-01-29 10:45:00.379891000 192.168.0.22	192.168.0.1	DNP 3.0	71 from 2 to 1, Response							
500211 2018-01-29 10:45:00.500184000 192.108.0.1	192.168.0.22	DNP 3.0	78 FROM 1 LO 3, Read, Class 123 71 from 3 to 1 Response							
m Ename 500309: 78 bytes on wine (624 bits) 78 byt	es cantured (624 hits)	on interface	A A A A A A A A A A A A A A A A A A A							
H tame 500505. 70 bytes on whe (024 bits), 70 bytes     Ethernet II, Src: Micro-St_d0:cc:b6 (6c:62:6d:d0:	cc:b6), Dst: MoxaTech_	_65:ee:ca (00:	90:e8:65:ee:ca)							
Internet Protocol Version 4, Src: 192.168.0.1 (19	2.168.0.1), Dst: 192.1	68.0.22 (192.	168.0.22)							
⊞ Transmission Control Protocol, Src Port: 57570 (5	7570), Dst Port: dnp (	(20000), Seq:	2501782, Ack: 2491674, Len: 24							
Distributed Network Protocol 3.0	DBM Unconfirmed Uson	Data								
Transport Laver: 0xcd (ETR, ETN, Sequence 13)	PRM, Oncom milled oser	Data								
Application Layer: (FIR, FIN, Sequence 14, Read	)									
	Eiguro 1									
	Figure i									
<u>File Edit View Go Capture Analyze Statistics Telephony Tools</u>	Internals <u>H</u> elp									
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Filter: dnp3.src==3	Expression Clear Apply	Save Filter Filte	er							
Filter:     dnp3.src==3       No.     Time       Time     Time   Source	Expression Clear Apply     Destination	Save Filter Filter	er Length Info							
Filter:         dnp3.src==3           No.         500571         2018-01-29         10:45:42.596769000         192.168.0.22	Expression Clear Apply     Destination     192.168.0.1	Save Filter Filter Protocol DNP 3.0	er Length Info 71 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         12.5         10.45:42.596769000         192.168.0.22           500571         2018-01-29         10:45:43.605754000         192.168.0.22	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1	Save Filter Filte Protocol DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         125         10.45.42.596769000         192.168.0.22           500571         2018-01-29         10.45:43.605754000         192.168.0.22           500592         2018-01-29         10:45:45.596013000         192.168.0.22           500592         2018-01-29         10:45:45.596013000         192.168.0.22	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filte Protocol DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         125         10.45.142.596769000         192.168.0.22           500571         2018-01-29         10.45.143.605754000         192.168.0.22           500592         2018-01-29         10.45.143.605754000         192.168.0.22           500592         2018-01-29         10.45.145.596013000         192.168.0.22           500602         2018-01-29         10.45.146.603931000         192.168.0.22           500612         2018-01-29         10.45.148.600287000         192.168.0.22	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         12.5.5.5.6.5.7.5.6.6.7.5.5.6.6.7.5.5.6.6.7.5.5.6.6.7.5.5.5.6.7.5.5.5.5	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 97 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response							
filter:         dnp3.src==3           No.         Time         10.45:42.596769000         192.168.0.22           500571         2018-01-29         10:45:43.605754000         192.168.0.22           500592         2018-01-29         10:45:45.596013000         192.168.0.22           500602         2018-01-29         10:45:45.596013000         192.168.0.22           500612         2018-01-29         10:45:46.603931000         192.168.0.22           500623         2018-01-29         10:45:49.617388000         192.168.0.22           500623         2018-01-29         10:45:49.617388000         192.168.0.22           500636         2018-01-29         10:45:51.600873000         192.168.0.22	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 97 from 3 to 1, Response 97 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 71 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time           500571         2018-01-29           500581         2018-01-29           500581         2018-01-29           500502         2018-01-29           500561         2018-01-29           500562         2018-01-29           500562         2018-01-29           500562         2018-01-29           500562         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500662         2018-01-29           500664         2018-01-29           500646         2018-01-29           500646         2018-01-29           500646         2018-01-29           500646         2018-01-29           501655         5006           501646         2018-01-29           501654         2018-01-29	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filt Protocol DNP 3.0 DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 97 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 99 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         Source           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500502         2018-01-29         10:45:44.596013000         192.168.0.22           500602         2018-01-29         10:45:44.603931000         192.168.0.22           500613         2018-01-29         10:45:44.600787000         192.168.0.22           500612         2018-01-29         10:45:51.600873000         192.168.0.22           500662         2018-01-29         10:45:52.609051000         192.168.0.22           500664         2018-01-29         10:45:54.60053000         192.168.0.22           500664         2018-01-29         10:45:54.60053000         192.168.0.22           500664         2018-01-29         10:45:54.60053000         192.168.0.22           500664         2018-01-29         10:45:54.60053000         192.168.0.22           500667         2018-01-29         10:45:55.600535000         192.168.0.22           500667         2018-01-29         10:45:55.600535000         192.168.0.22           500667         2018-01-29         10:45:55.600535000 <td< td=""><td>▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1</td><td>Save         Filter         Filter           Protocol         DNP 3.0           DNP 3.0         DNP 3.0</td><td>er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 97 from 3 to 1, Response 97 from 3 to 1, Response 131 from 3 to 1, Response 131 from 3 to 1, Response 99 from 3 to 1, Response 99 from 3 to 1, Response 131 from 3 to 1, Response</td></td<>	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save         Filter         Filter           Protocol         DNP 3.0           DNP 3.0         DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 97 from 3 to 1, Response 97 from 3 to 1, Response 131 from 3 to 1, Response 131 from 3 to 1, Response 99 from 3 to 1, Response 99 from 3 to 1, Response 131 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500502         2018-01-29         10:45:44.5596013000         192.168.0.22           500602         2018-01-29         10:45:44.603931000         192.168.0.22           500613         2018-01-29         10:45:44.600787000         192.168.0.22           500612         2018-01-29         10:45:49.617388000         192.168.0.22           500636         2018-01-29         10:45:51.600873000         192.168.0.22           500646         2018-01-29         10:45:54.60035000         192.168.0.22           500662         2018-01-29         10:45:54.60053000         192.168.0.22           500664         2018-01-29         10:45:54.60053000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500667         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000         192.168.0.22	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save         Filter         Filter           Protocol         DNP 3.0           DNP 3.0         DNP 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 131 from 3 to 1, Response							
Filter:         dnp3.src==3           No.         Time         10:45:42.596769000         192.168.0.22           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500602         2018-01-29         10:45:44.603931000         192.168.0.22           500602         2018-01-29         10:45:44.600787000         192.168.0.22           500613         2018-01-29         10:45:49.617388000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500662         2018-01-29         10:45:51.600873000         192.168.0.22           500662         2018-01-29         10:45:51.600873000         192.168.0.22           500662         2018-01-29         10:45:52.609051000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500667         2018-01-29         10:45:55.618158000         192.168.0.22           5006623         192.102.02	▼ Expression Clear Apply Destination 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1 192.168.0.1	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DN	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 7							
Filter:         dnp3.src==3           No.         Time         Source           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500592         2018-01-29         10:45:44.603931000         192.168.0.22           500602         2018-01-29         10:45:44.600787000         192.168.0.22           500613         2018-01-29         10:45:49.617388000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500646         2018-01-29         10:45:55.609051000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000	▼ Expression Clear Apply Destination 192.168.0.100000000000000000000000000000000	Save         Filter         Filter           Protocol         DNP 3.0           DNP 3.0         DNP 3.0           DST 5.0         Citcit6 (6c:62)           168.0.1 (192.1         192.1	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 7							
Filter:         dnp3.src==3           No.         Time         Surce           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500502         2018-01-29         10:45:44.603931000         192.168.0.22           500602         2018-01-29         10:45:44.600787000         192.168.0.22           500613         2018-01-29         10:45:49.617388000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500636         2018-01-29         10:45:51.600873000         192.168.0.22           500662         2018-01-29         10:45:55.609051000         192.168.0.22           500662         2018-01-29         10:45:55.609051000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000	<pre>     Expression Clear Apply     Destination     192.168.0.1     192.16</pre>	Save         Filter         Filt           Protocol         DNP 3.0         DNP 3.0           DNP 3.0         Save 3.0         Save 3.0           DNP 3.0         Save 3.0         Save 3.0           DNP 3.0         Save 3.0         Save 3.0           Save 3.0	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 14 from 3 to 1, Response 15 from 3 to 1, Response 16 from 3 to 1, Response 17 from 3 to 1, Response 18 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 10 from 3 to 1, R							
Filter:         dnp3.src==3           No.         Time         Surce           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500502         2018-01-29         10:45:44.603931000         192.168.0.22           500602         2018-01-29         10:45:44.600787000         192.168.0.22           500613         2018-01-29         10:45:49.60787000         192.168.0.22           500623         2018-01-29         10:45:49.60787000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500623         2018-01-29         10:45:52.609051000         192.168.0.22           500662         2018-01-29         10:45:55.618053000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000 <t< td=""><td>▼ Expression Clear Apply Destination 192.168.0.100.00000000000000000000000000000</td><td>Save         Filter         Filt           Protocol         DNP 3.0         DNP 3.0           DNP 3.0         DNP 3.0         DNP 3.0           TSO         Crc:b6 (6c:66         168.0.1 (192.1           7570), Seq: 24         Crossing 24</td><td>er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 14 from 3 to 1, Response 15 from 3 to 1, Response 16 from 3 to 1, Response 17 from 3 to 1, Response 18 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 10 from 3 to 1, R</td></t<>	▼ Expression Clear Apply Destination 192.168.0.100.00000000000000000000000000000	Save         Filter         Filt           Protocol         DNP 3.0         DNP 3.0           DNP 3.0         DNP 3.0         DNP 3.0           TSO         Crc:b6 (6c:66         168.0.1 (192.1           7570), Seq: 24         Crossing 24	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 14 from 3 to 1, Response 15 from 3 to 1, Response 16 from 3 to 1, Response 17 from 3 to 1, Response 18 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 10 from 3 to 1, R							
Filter:         dnp3.src==3           No.         Time         Filter         Source           500571         2018-01-29         10:45:42.596769000         192.168.0.22           500581         2018-01-29         10:45:43.605754000         192.168.0.22           500502         2018-01-29         10:45:45.596013000         192.168.0.22           500602         2018-01-29         10:45:46.603931000         192.168.0.22           500613         2018-01-29         10:45:49.60787000         192.168.0.22           500623         2018-01-29         10:45:49.60787000         192.168.0.22           500623         2018-01-29         10:45:51.600873000         192.168.0.22           500623         2018-01-29         10:45:52.609051000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500662         2018-01-29         10:45:55.618158000         192.168.0.22           500674         2018-01-29         10:45:55.618158000         192.168.0.22           5006623:         131         bytes	<pre>     Expression Clear Apply     Destination     192.168.0.1     192.16</pre>	Save         Filter         Filt           Protocol         DNP 3.0         DNP 3.0           DNP 3.0         Example 1000000000000000000000000000000000000	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 97 from 3 to 1, Response 97 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 99 from 3 to 1, Response 99 from 3 to 1, Response 99 from 3 to 1, Response 131 from 3 to 1, Response 132 from 3 to 1, Response 133 from 3 to 1, Response 134 from 3 to 1, Response 135 from 3 to 1, Response 136 from 3 to 1, Response 137 form 3 to 1, Response 137 form 3 to 1, Response 138 from 3 to 1, Response 139 from 3 to 1, Response 139 from 3 to 1, Response 140 from 3 to 1, Response 150 from 3 to 1, Response 160 from 3 to 1, Response 171 from 3 t							
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<pre>Filter: dnp3.src==3 No. Time 0 10:45:42.596769000 192.168.0.22 500551 2018-01-29 10:45:42.596769000 192.168.0.22 500581 2018-01-29 10:45:43.605754000 192.168.0.22 500602 2018-01-29 10:45:45.596013000 192.168.0.22 500613 2018-01-29 10:45:44.600787000 192.168.0.22 500636 2018-01-29 10:45:51.600873000 192.168.0.22 500646 2018-01-29 10:45:51.600873000 192.168.0.22 500646 2018-01-29 10:45:54.60335000 192.168.0.22 500662 2018-01-29 10:45:54.60355000 192.168.0.22 500662 2018-01-29 10:45:54.60135000 192.168.0.22 500662 2018-01-29 10:45:54.60135000 192.168.0.22 500662 2018-01-29 10:45:54.60153000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:54.60158000 192.168.0.22 500662 2018-01-29 10:45:55.618000 192.168.0.22 500662 2018-01-29 10:45:55.618.60158000 192.168.0.22 500674 2018-01-29 10:45:55.618.60158 □ Distributed Network Protocol 3.0 □ Fansport Layer: (FIR, FIN, Sequence 56) □ Application Layer: (FIR, FIN, Sequence 9.88pone □ Control: 0xc9 (FIR, FIN, Sequence 9.88pone □ Control: 0xc9 (FIR, FIN, Sequence 9.88pone □ Control: 0xc9 (FIR, FIN, Sequence 9.98pone □ Control: 0xc9 (FIR, FIN, Sequence 9.98pone □ Control: 0xc9 (FIR, FIN, Sequence 9.98pone □ Control: 0xc9 (FIR, FIN, Seque</pre>	<pre> • Expression Clear Apply Destination 192.168.0.1 192.168.0 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.1 100.</pre>	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DN	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 14 from 3 to 1, Response 15 from 3 to 1, Response 16 from 3 to 1, Response 17 from 3 to 1, Response 18 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 19 from 3 to 1, Response 10 from 3 to 1,							
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<pre>Filter: dnp3.src==3 No. Time 0 10:45:42.596769000 192.168.0.22 500551 2018-01-29 10:45:42.596769000 192.168.0.22 500581 2018-01-29 10:45:43.605754000 192.168.0.22 500602 2018-01-29 10:45:45.59601300 192.168.0.22 500613 2018-01-29 10:45:44.600787000 192.168.0.22 500636 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:52.609051000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.518158000 192.168.0.22 500674 2018-01-29 10:45:55.518158000 192.168.0.22 500502 30 50001 B RESPONSE 0at 0bjects</pre>	<pre> • Expression Clear Apply Destination 192.168.0.1 192.168.0 192.170.1 192.168.0 192.170.1 192.170.1 192.170.1 192.170.1 192.170.1 192.170.1 192.170.1 192.170.1 192.10</pre>	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DN	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 131 from 3 to 1, Response 131 from 3 to 1, Response 132 from 3 to 1, Response 134 from 3 to 1, Response 135 from 3 to 1, Response 136 from 3 to 1, Response 137 from 3 to 1, Response 138 from 3 to 1, Response 139 from 3 to 1, Response 139 from 3 to 1, Response 149 from 3 to 1, Response 150 from 3 to 1, Response 16 from 3 to 1, Response 17 from 3 to 1, Response 18 from 3 to 1, Response 19 from 3 to 1, Response 10 from 3 to 1							
<pre>Filter: dnp3.src==3 No. Time 0 10:45:42.596769000 192.168.0.22 500551 2018-01-29 10:45:43.605754000 192.168.0.22 500592 2018-01-29 10:45:45.59601300 192.168.0.22 500602 2018-01-29 10:45:45.59601300 192.168.0.22 500633 2018-01-29 10:45:48.60787000 192.168.0.22 500632 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.518158000 192.168.0.22 500674 2018-01-29 10:45:55.518158000 192.168.0.22 50058 2018 2019 6 Transport Layer: (FIR, FIN, Sequence 9) Function Code: Response (0x81)  B Internal Indications: (0x0000) E RESPONSE Data Objects S 0 Object(s): 16-Bit Analog Chan</pre>	<pre> • Expression Clear Apply Destination 192.168.0.1 192.168.0 192.168.0 192.168.0 192.168.0 192.170.1 192.17</pre>	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DN	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 131 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 79 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response							
<pre>Filter: dnp3.src=3 No. Time 0 10:45:42.596769000 192.168.0.22 500551 2018-01-29 10:45:43.605754000 192.168.0.22 500592 2018-01-29 10:45:45.59601300 192.168.0.22 500602 2018-01-29 10:45:45.59601300 192.168.0.22 500633 2018-01-29 10:45:44.600787000 192.168.0.22 500636 2018-01-29 10:45:51.600873000 192.168.0.22 500662 2018-01-29 10:45:52.60905100 192.168.0.22 500662 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.618158000 192.168.0.22 500674 2018-01-29 10:45:55.5 5</pre>	<pre> • Expression Clear Apply Destination 192.168.0.1 192.17 192.17 192.17 192.17 192.17 192.17 192.17 192.17</pre>	Save Filter Filt Protocol DNP 3.0 DNP 3.0 DN	er Length Info 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 97 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 99 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 79 from 3 to 1, Response 71 from 3 to 1, Response 72 from 3 to 1, Response 73 from 3 to 1, Response 74 from 3 to 1, Response 75 from 3 to 1, Response 76 from 3 to 1, Response 77 from 3 to 1, Response 77 from 3 to 1, Response 78 from 3 to 1, Response 79 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 70 from 3 to 1, Response 71 from 3 to 1, Response 7							



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.

<u>F</u> ile	<u>E</u> dit <u>V</u> i	ew <u>G</u> o	<u>C</u> apture	<u>A</u> naly	ze <u>S</u> tatistic	s Telephon <u>y</u>	<u>T</u> ools	<u>I</u> nternals <u>H</u> elp							
0 (		• 🧕		*	2   9, •	🗢 🛸 😜 🕯	7 L		ର୍ଷ୍	11 📈	¥ 🐔	× 🖬			
Filter:	dnp3.si	rc==4						<ul> <li>Expression</li> </ul>	Clear A	pply Save	Filter	Filter			
No.	Time					Source		Destination		Proto	col	Length	Info		
5218	45 201	8-01-2	29 11:34	:54.9	11879000	192.168.0	).22	192.168.	0.1	DNP	3.0	99	from 4	to 1,	Response
5218	56 201	8-01-2	29 11:34	:56.9	06552000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5218	67 201	8-01-2	29 11:34	:58.9	24048000	192.168.0	).22	192.168.	0.1	DNP	3.0	131	from 4	to 1,	Response
5218	78 201	8-01-2	29 11:35	:00.9	06186000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5219	08 201	8-01-2	29 11:35	:02.9	14867000	192.168.0	).22	192.168.	0.1	DNP	3.0	99	from 4	to 1,	Response
5219	23 201	8-01-2	9 11:35	:04.9	11325000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5219	34 201	8-01-2	9 11:35	:06.9	28503000	192.168.0	).22	192.168.	0.1	DNP	3.0	131	from 4	to 1,	Response
5219	45 201	8-01-2	29 11:35	:08.9	11713000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5219	56 201	8-01-2	29 11:35	:10.9	20190000	192.168.0	).22	192.168.	0.1	DNP	3.0	99	from 4	to 1,	Response
5219	67 201	8-01-2	29 11:35	:12.9	11677000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5219	78 201	8-01-2	29 11:35	:14.9	17351000	192.168.0	).22	192.168.	0.1	DNP	3.0	87	from 4	to 1,	Response
5219	93 201	8-01-2	29 11:35	:16.9	11667000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5220	07 201	8-01-2	29 11:35	:18.9	26347000	192.168.0	).22	192.168.	0.1	DNP	3.0	121	from 4	to 1,	Response
5220	18 201	8-01-2	9 11:35	:20.9	12151000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5220	29 201	8-01-2	29 11:35	:22.9	30613000	192.168.0	).22	192.168.	0.1	DNP	3.0	131	from 4	to 1,	Response
5220	40 201	8-01-2	29 11:35	:24.9	13895000	192.168.0	).22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
5220	64 201	8-01-2	9 11:35	:26.9	21849000	192.168.0	).22	192.168.	0.1	DNP	3.0	99	from 4	to 1,	Response
5220	76 201	8-01-2	9 11:35	:28.9	20613000	192.168.0	). 22	192.168.	0.1	DNP	3.0	71	from 4	to 1,	Response
171	n anop			14 15		JEQUENCE									

Internal Indications: (0x0000)

RESPONSE Data Objects

Object(s): 16-Bit Analog Change Event with Time (obj:32, Var:04) (0x2004), 5 points
 Qualifier Field, Prefix: 1-Octet Indexing, Code: 8-bit Single Field Quantity
 Number of Items: 5

B Point Number 2 (Quality: Online), Value: 276, Timestamp: Dec 13, 1981 16:54:30.656000000

⊞ Point Number 3 (Quality: Online), Value: 454, Timestamp: Dec 13, 1981 16:54:30.656000000

Beoint Number 1 (Quality: Online), Value: 32, Timestamp: Jan 29, 2018 11:35:45.000000000
 Deint Number 4 (Quality: Online), Value: 128 Timestamp: Jan 29, 2018 11:25:22 000000000
 Deint Number 4 (Quality: Online), Value: 128
 Timestamp: Jan 29, 2018 11:25:22 000000000
 Deint Number 4 (Quality: Online), Value: 128
 Timestamp: Jan 29, 2018 11:25:22 000000000
 Deint Number 4 (Quality: Online), Value: 128
 Timestamp: Jan 29, 2018 11:25:22 000000000
 Deint Number 4 (Quality: Online), Value: 128
 Timestamp: Jan 29, 2018 11:25:22 000000000
 Deint Number 4 (Quality: Online), Value: 128
 Timestamp: Jan 29, 2018 11:25:22
 Deint Number 4 (Quality: Online)
 Deint Number

B Point Number 4 (Quality: Online), Value: 128, Timestamp: Jan 29, 2018 11:35:33.000000000
 B Point Number 5 (Quality: Online), Value: 0, Timestamp: Jan 29, 2018 11:27:44.000000000

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.

# masibus

#### 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