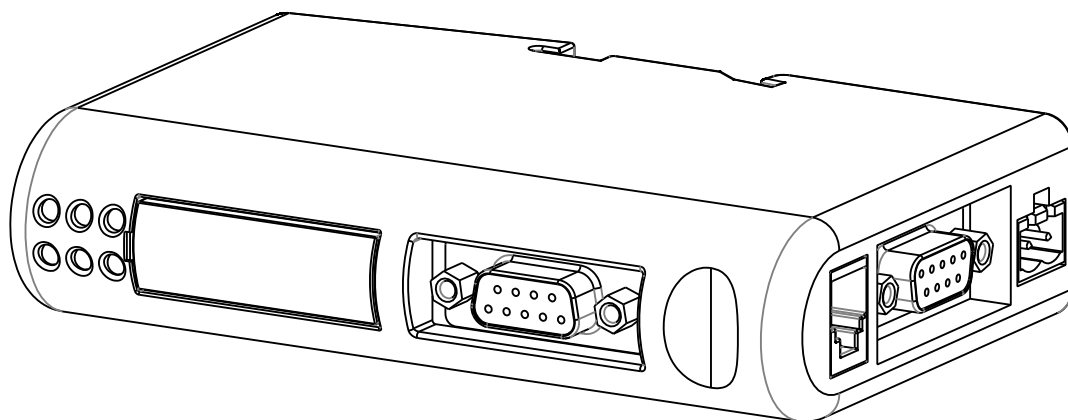# MultiCOM 411

User manual

INTRODUCTION

Thank you for choosing our product.

The accessories described in this manual are of the highest quality, carefully designed and built in order to ensure excellent performance.

This manual contains detailed instructions on how to install and use the product.

This manual must be stored in a safe place and <u>CONSULTED BEFORE USING THE DEVICE</u> for proper usage instructions as well as maximum performance from the device itself.

NOTE: Some images contained in this document are for informational purposes only and may not faithfully demonstrate the parts of the product they represent.

SAFETY

This part of the manual contains SAFETY precautions that must be followed scrupulously.

Ensure that the connectors subjected to high voltages are correctly isolated.

- The device has been designed for professional use and is therefore not suitable for use in the home.

- The device has been designed to operate only in closed environments. It should be installed in rooms where there are no inflammable liquids, gas or other harmful substances.

- Take care that no water or liquids and/or foreign bodies fall into the device.

- In the event of a fault and/or impaired operation of the device, do not attempt to repair it but contact the authorized service centre.

- The device must be used exclusively for the purpose for which it was designed. Any other use is to be considered improper and as such dangerous. The manufacturer declines all responsibility for damage caused by improper, wrong and unreasonable use.

ENVIRONMENTAL PROTECTION

Our company devotes abundant resources to analysing environmental aspects in the development of its products. All our products pursue the objectives defined in the environmental management system developed by the company in compliance with applicable standards.

Hazardous materials such as CFCs, HCFCs or asbestos have not been used in this product.

When evaluating packaging, the choice of material has been made favouring recyclable materials.
Please separate the different material of which the packaging is made and dispose of all material in compliance with applicable standards in the country in which the product is used.

DISPOSING OF THE PRODUCT

The device contains internal material which (in case of dismantling/disposal) are considered TOXIC, such as electronic circuit boards. Treat these materials according to the laws in force, contacting qualified centres. Proper disposal contributes to respect for the environment and human health.

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PRESENTATION

MultiCOM 411 is a complete PROFIBUS-DP slave according to IEC 61158. It allows to integrate the management and monitoring of the UPS into a PROFIBUS network. Baud rates from 9.6 kbit/s up to 12 Mbit/s are supported and automatically detected.

IN THE BOX
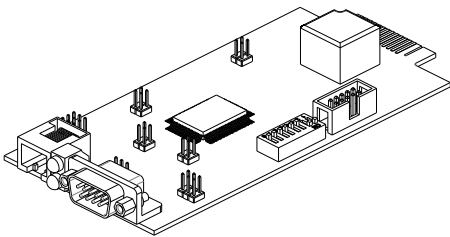
MultiCOM 302 board
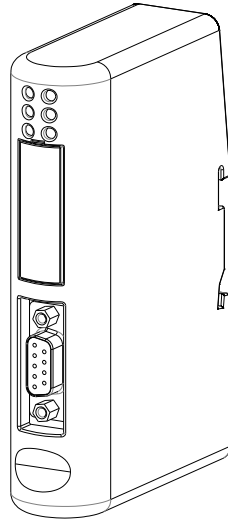
PROFIBUS DP Gateway

Connection cable between MultiCOM 302 and PROFIBUS DP Gateway

EXTERNAL VIEW

A PROFIBUS Connector

B Configuration Switches

C Status LEDs

D Reserved

E MultiCOM 302 Connector

F Power Connector

G DIN-rail Connector

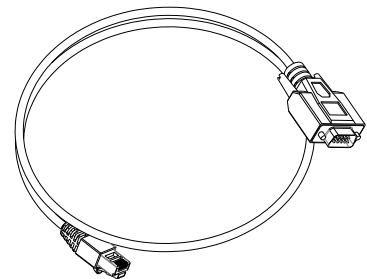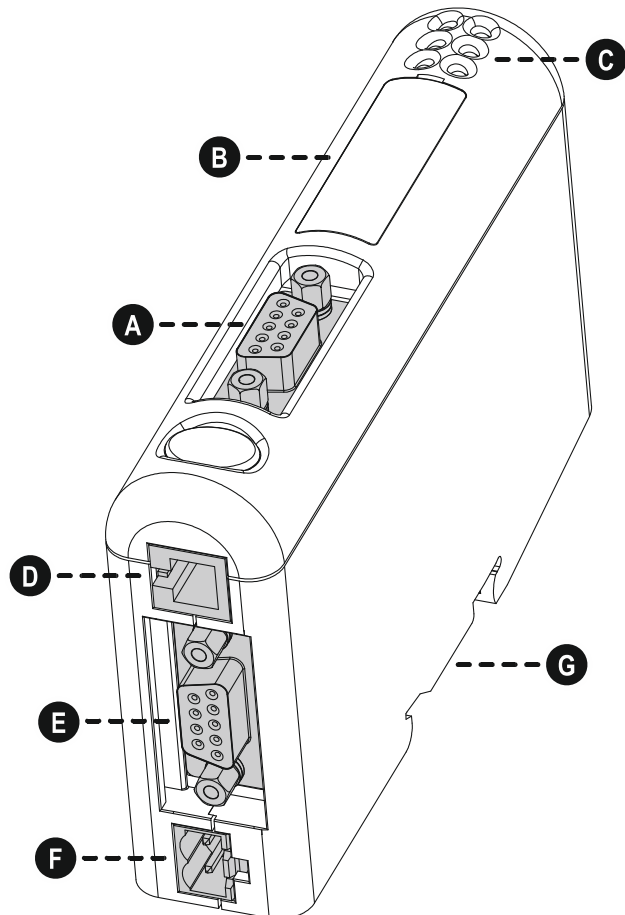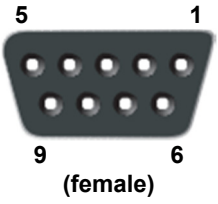# PROFIBUS DP GATEWAY CONNECTORS AND LEDS

PROFIBUS CONNECTOR

PIN	Signal	Description
Housing	Shield	Bus cable shield, connected to PE
1, 2, 7, 9	-	-
3	B-Line	Positive RxD/TxD (RS485)
4	RTS[1]	Request To Send
5	GNDBUS[2]	Isolated GND from RS-485 side
6	+5V BUS[2]	Isolated +5 V output from RS-485 side (80 mA max)
8	A-Line	Negative RxD/TxD (RS485)

[1] May be used by some devices to determine the direction of transmission
[2] Used for bus termination; may also be used to power optical transceivers (RS485 to fibre optics)
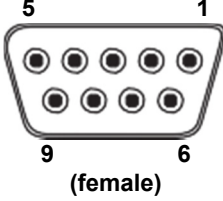
POWER CONNECTOR

PIN	Description
1	+24 VDC (300 mA required)
2	GND

Note: no power supply is provided with the device.
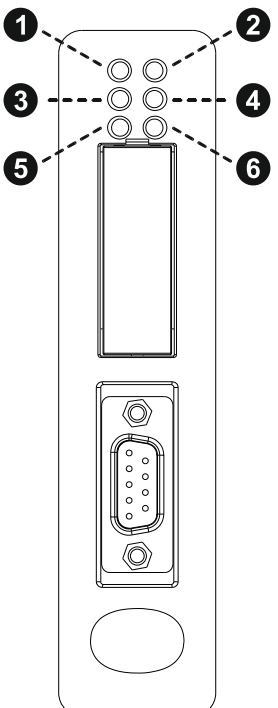
MultiCOM 302 CONNECTOR

PIN	Description
1, 2, 3, 4, 6, 7	-
5	Signal Ground
8	RS485+
9	RS485-

STATUS LEDs

#	State	Status
1 - PROFIBUS Online	Off	Not online
	Green	Online
2 - PROFIBUS Offline	Off	Not offline
	Red	Offline
3 - (Not used)	-	-
4 - PROFIBUS Diagnostic	Off	No diagnostics present
	Red, flashing 1Hz	Error in configuration
	Red, flashing 2Hz	Error in user parameter data
	Red, flashing 4Hz	Error in initialization
5 - Subnet Status	Off	Power off
	Green, flashing	Running correctly, but errors occurred
	Green	Running
	Red	Subnet error
6 - Device Status	Off	Power off
	Alternating Red/Green	Invalid or missing configuration
	Green	Initializing
	Green, flashing	Running
	Red	Bootloader mode
	Red, flashing	Contact support department

MULTICOM 302 JUMPER AND DIP SWITCHES SETTINGS
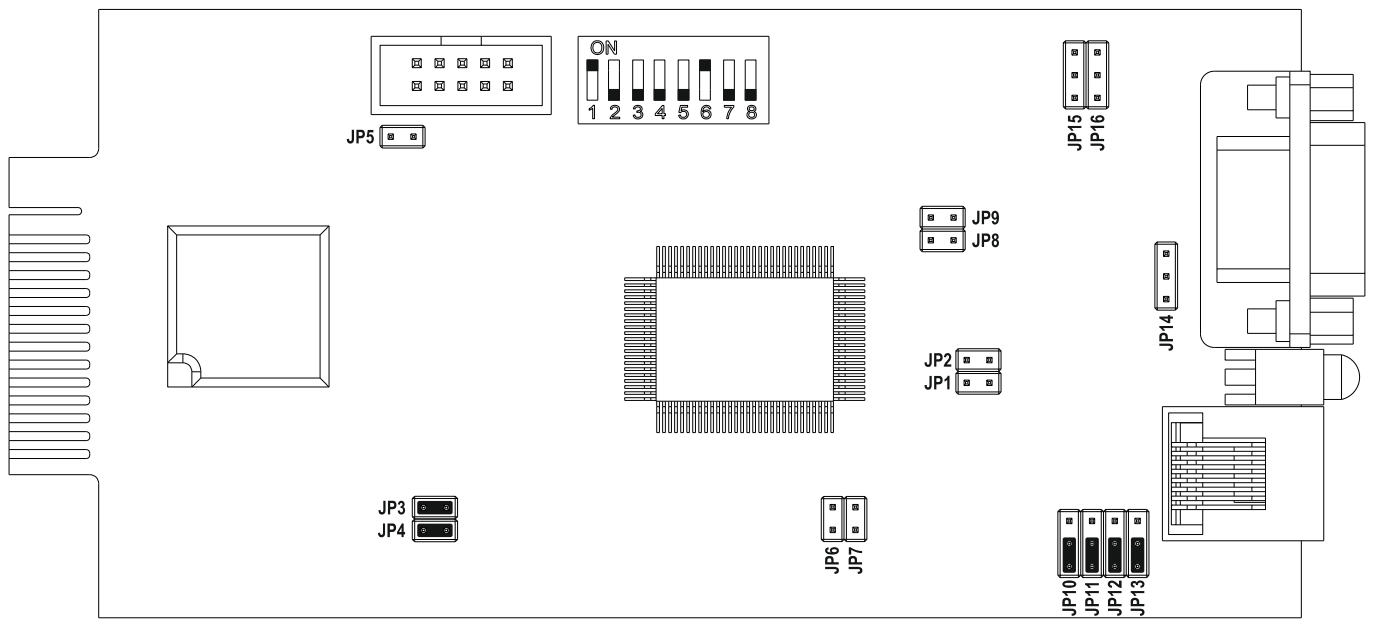
INSTALLATION

1. Remove the cover of the UPS expansion slot by removing the two retaining screws.

2. Insert MultiCOM 302 in the slot.

3. Fix the cover provided using the screws previously removed.

4. Connect the PROFIBUS DP Gateway to the MultiCOM 302 using the cable provided with the device.

    NOTE: if necessary, you can also use another cable realized in accordance with the specifications (see *Connection cable MultiCOM 302 ↔ PROFIBUS DP Gateway*).
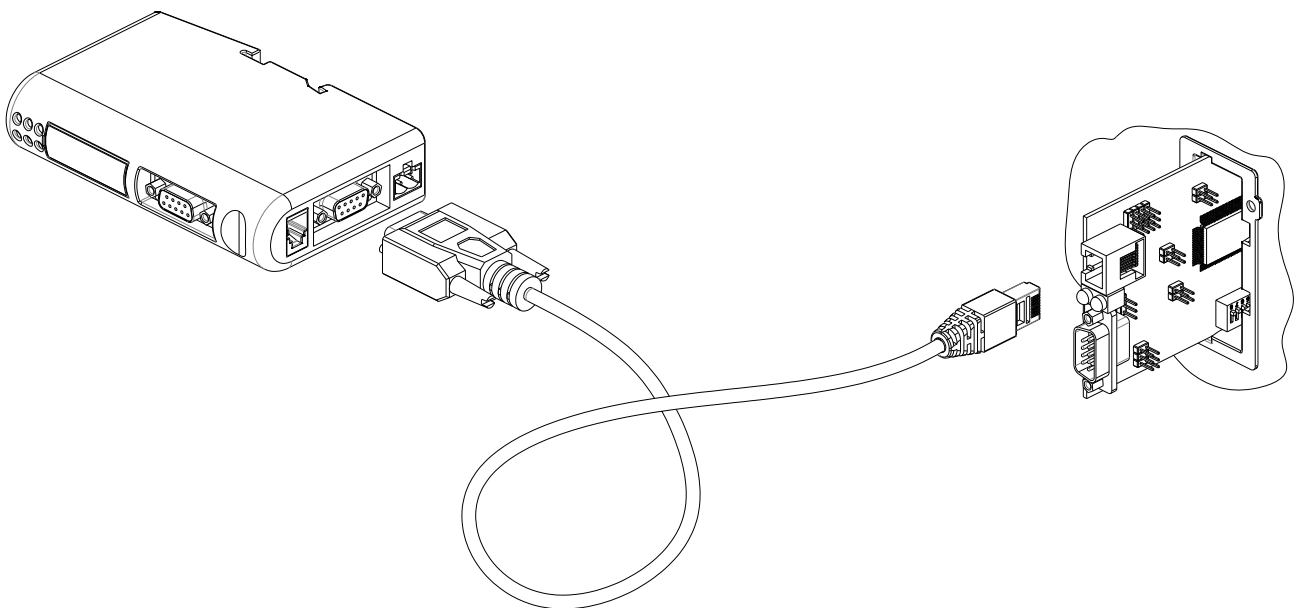
5. Set the PROFIBUS node ID (see *Configuration Switches*).

6. Connect the PROFIBUS DP Gateway to the PROFIBUS DP Network.

7. Connect the power cable and apply power.

PROFIBUS CONFIGURATION SWITCHES

The configuration switches are used to set the PROFIBUS node address. Remove the plastic hatch to configure the switches (see image below). Note that the node address cannot be changed during runtime, i.e. the gateway requires a reset for changes to have effect.

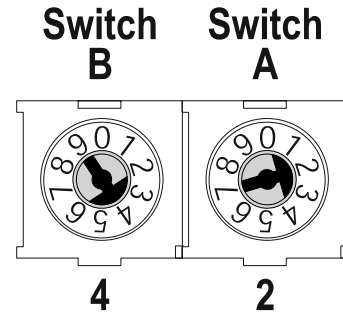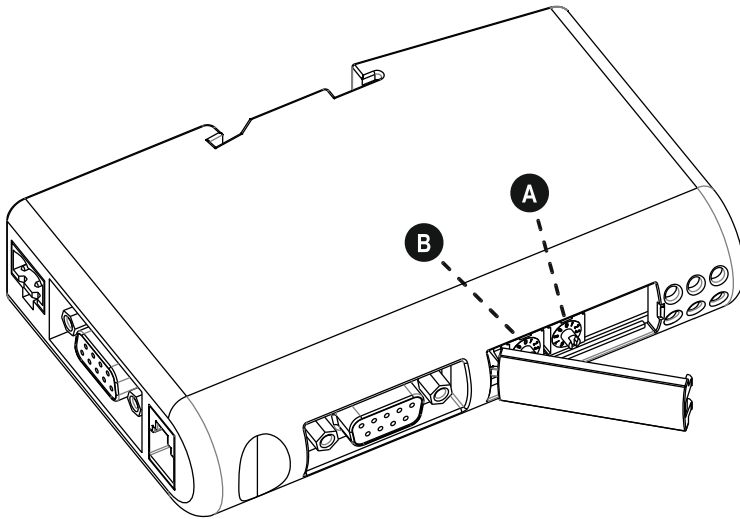The configuration is done using two rotary switches as follows: Node Address = (Switch B x 10) + (Switch A x 1)

Note: When removing the hatch and configuring the switches, avoid touching the circuit boards and components.

Example:
If the node address should be 42:
set switch A to "2" and switch B to "4".

CONNECTION CABLE MULTICOM 302 ↔ PROFIBUS DP GATEWAY

DB9 male PIN	connect to	RJ-45 PIN
5	↔	2
9	↔	3
8	↔	4
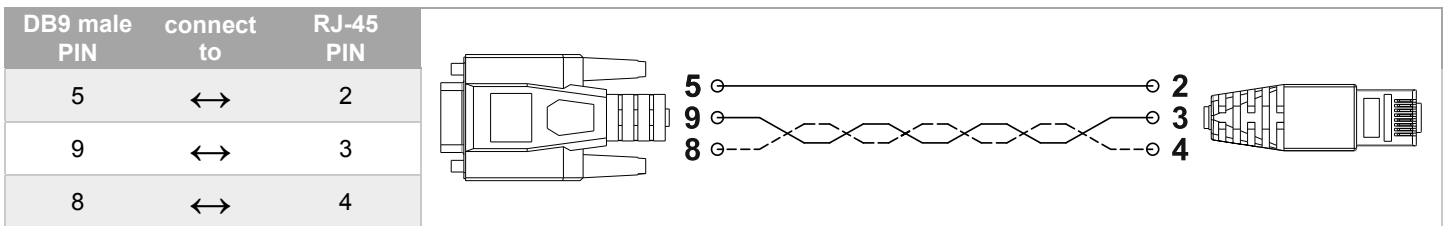
NOTE: Use a twisted pair to connect PIN #9 and #8 of DB9 to PIN #3 and #4 of RJ-45

DIN-RAIL MOUNTING
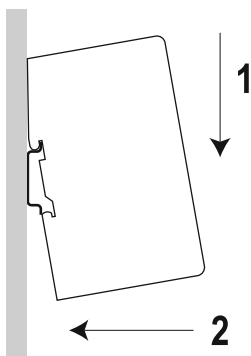
To snap the gateway *on*, first press it downwards (1) to compress the spring in the DIN-rail mechanism, then push it against the DIN-rail as to make it snap on (2).

To snap the gateway *off*, push it downwards (1) and pull it out from the DIN-rail (2), as to make it snap off from the DIN-rail.

PROFIBUS I/O DATA

The UPS's values are presented to the Master PLC/Controller as easily processed I/O data.

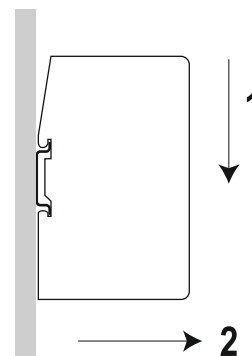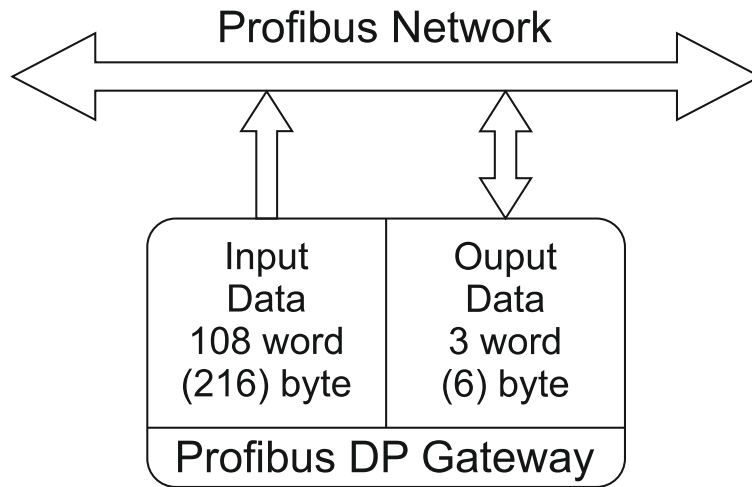| | BYTE # | | | | |
|:---:|:---:|:---:|:---|:---:|
| REGISTER # | High | Low | DESCRIPTION | UNIT |
| 1 | 1 | 2 | States / alarms 1 | |
| 2 | 3 | 4 | States / alarms 2 | |
| 3 | 5 | 6 | Charge% | % |
| 4 | 7 | 8 | Autonomy | Minutes |
| 5 | 9 | 10 | RESERVED | |
| 6 | 11 | 12 | Load phase L1 | % |
| 7 | 13 | 14 | Load phase L2 | % |
| 8 | 15 | 16 | Load phase L3 | % |
| 9 | 17 | 18 | Input voltage (Ph-N) V1 | V |
| 10 | 19 | 20 | Input voltage (Ph-N) V2 | V |
| 11 | 21 | 22 | Input voltage (Ph-N) V3 | V |
| 12 | 23 | 24 | Input frequency | Hz/10 |
| 13 | 25 | 26 | Output voltage (Ph-N) V1 | V |
| 14 | 27 | 28 | Output voltage (Ph-N) V2 | V |
| 15 | 29 | 30 | Output voltage (Ph-N) V3 | V |
| 16 | 31 | 32 | Output frequency | Hz/10 |
| 17 | 33 | 34 | Output current phase L1 | A/10 |
| 18 | 35 | 36 | Output current phase L2 | A/10 |
| 19 | 37 | 38 | Output current phase L3 | A/10 |
| 20 | 39 | 40 | Output peak current phase L1 | A/10 |
| 21 | 41 | 42 | Output peak current phase L1 | A/10 |
| 22 | 43 | 44 | Output peak current phase L1 | A/10 |
| 23 | 45 | 46 | Battery current of positive bench | A/10 |
| 24 | 47 | 48 | Battery current of negative bench | A/10 |
| 25 | 49 | 50 | Battery voltage of positive bench | V/10 |
| 26 | 51 | 52 | Battery voltage of negative bench | V/10 |
| 27 | 53 | 54 | Output active power phase L1 | kW/10 |
| 28 | 55 | 56 | Output active power phase L2 | kW/10 |
| 29 | 57 | 58 | Output active power phase L3 | kW/10 |
| 30 | 59 | 60 | Output apparent power phase L1 | kVA/10 |
| 31 | 61 | 62 | Output apparent power phase L2 | kVA/10 |
| 32 | 63 | 64 | Output apparent power phase L3 | kVA/10 |
| 33 | 65 | 66 | Bypass voltage (Ph-N) V1 | V |
| 34 | 67 | 68 | Bypass voltage (Ph-N) V2 | V |
| 35 | 69 | 70 | Bypass voltage (Ph-N) V3 | V |
| 36 | 71 | 72 | Bypass frequency | Hz/10 |
| 37 | 73 | 74 | System temperature | °C |

REGISTER #	BYTE # High	BYTE # Low	DESCRIPTION	UNIT
			INPUT DATA	
38	75	76	RESERVED	
39	77	78	Battery temperature	°C
40	79	80	Power 1 temperature	°C
41	81	82	Power 2 temperature	°C
42	83	84	Power 3 temperature	°C
43	85	86	Input current phase L1	A/10
44	87	88	Input current phase L2	A/10
45	89	90	Input current phase L3	A/10
46	91	92	RESERVED	
47	93	94	RESERVED	
48	95	96	RESERVED	
49	97	98	Output nominal voltage	V
50	99	100	Output nominal frequency	Hz/10
51	101	102	Output nominal power	kW/10
52	103	104	Output nominal power	kVA/10
53	105	106	Battery nominal voltage	V
54	107	108	Battery nominal capacity	Ah
55	109	110	RESERVED	
56	111	112	Time from last valid UPS data processed	Seconds
57	113	114	Echo of command code	Integer
58	115	116	Echo of shutdown delay time	Seconds
59	117	118	Echo of restore delay time	Minutes
60	119	120	Command result: 0x0F00 → Ready to receive command 0x0100+Command Code → Command code is wrong 0x0200+Command Code → Command is not handled 0x0300+Command Code → Parameter out of range (Reg. 116) 0x0E00+Command Code → Command sent to the UPS	Integer
61	121	122	RESERVED	
62	123	124	RESERVED	
63	125	126	RESERVED	
64	127	128	RESERVED	
65 ÷ 108	129	130	RESERVED	

i   *Some measures may not be available for all the UPS. In this case, the relative register remains at 0xFFFF value.*

BIT #	DESCRIPTION	
	STATES / ALARMS 1	
15 (MSB)	Output powered	[0=NO / 1=YES]
14	UPS locked	[0=NO / 1=YES]
13	Battery working	[0=NO / 1=YES]
12	Battery low	[0=NO / 1=YES]
11	On bypass	[0=NO / 1=YES]
10		
9	Normal operation	[0=NO / 1=YES]
8		
7	Bypass bad	[0=NO / 1=YES]
6	Battery charging	[0=NO / 1=YES]
5	Battery charged	[0=NO / 1=YES]
4		
3	Shutdown active	[0=NO / 1=YES]
2		
1	Test in progress	[0=NO / 1=YES]
0 (LSB)		

STATES / ALARMS 2	
BIT #	**DESCRIPTION**
15 (MSB)	UPS failure [0=NO / 1=YES]
14	Alarm overload [0=NO / 1=YES]
13	Alarm temperature [0=NO / 1=YES]
12	Input mains present [0=NO / 1=YES]
11	
10	
9	
8	
7	
6	
5	
4	
3	
2	
1	
0 (LSB)	

| OUTPUT DATA				
REGISTER #	**BYTE #**		**DESCRIPTION**	**UNIT**
	High	**Low**		
1	1	2	Command Code: 0 (0x0000) → Get ready to receive a new command 1 (0x0001) → System Shutdown (see also register 2) 2 (0x0002) → System Shutdown & Restore (see also register 2-3) 3 (0x0003) → Delete Commands 1 & 2 12 (0x000C)→ UPS on Bypass 20 (0x0014)→ Test Battery	Integer
2	3	4	Shutdown delay time	Seconds
3	5	6	Restore delay time	Minutes

NOTE 1: write always 0x0000 in "Command Code" after executing a command in order to get ready the device to accept the next command.

NOTE 2: before executing a new command, you can check if the device is ready to accept it by verifying that Command Result = 0x0F00 (INPUT DATA register 60)

NOTE 3: write in register 2 and 3 ("Shutdown delay time" and "Restore delay time") before writing in register 1 for executing a system shutdown or a system shutdown & restore otherwise, writing in register 2 and 3 will have no effect.

Example of Power OFF the UPS in 3 minutes and Power ON after 8 hours (System Shutdown & Restore):

- Check that "Command Result" (INPUT DATA register 60) is equal to 0x0F00.
- Write 0x00B4 in Shutdown delay time (output data / register 2)
- Verify that "Echo of shutdown delay time" (INPUT DATA register 58) is equal to the value sent.
- Write 0x01E0 in Restore delay time (output data / register 3)
- Verify that "Echo of restore delay time" (INPUT DATA register 59) is equal to the value sent.
- Write 0x0002 in Command Code (output data / register 1)
- Verify that command result is 0x0E02 (input data / register 60)
- Write 0x0000 in Command Code (output data / register 1)
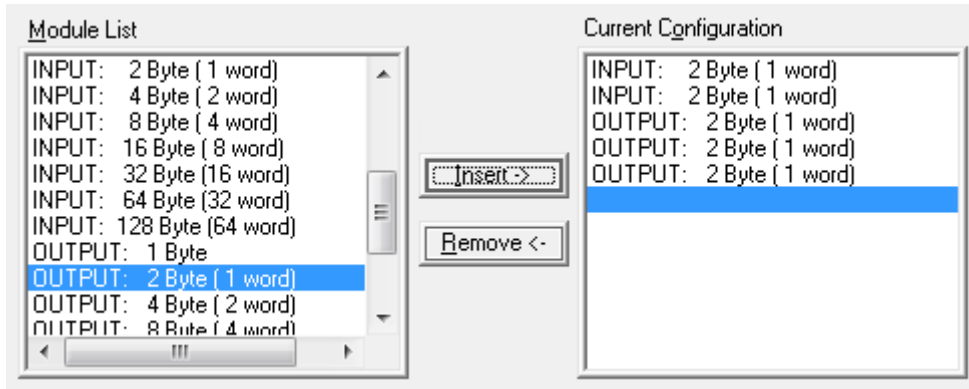
Example of master configuration to have accesso to UPS state and commands
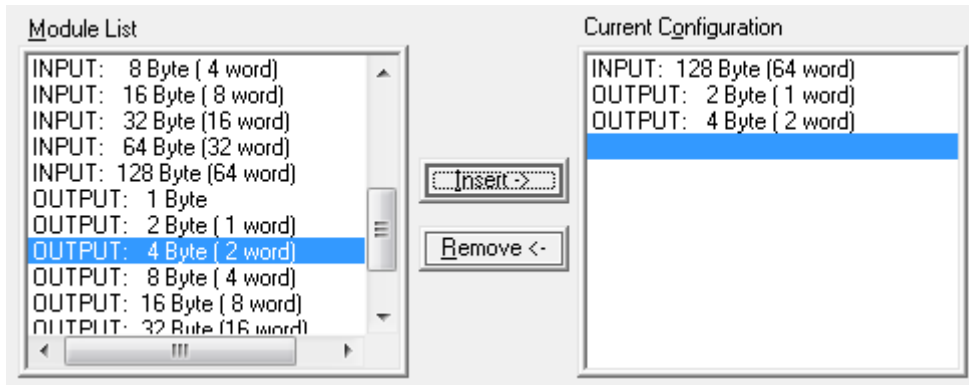
Example of master configuration to have accesso to all UPS measurements and commands
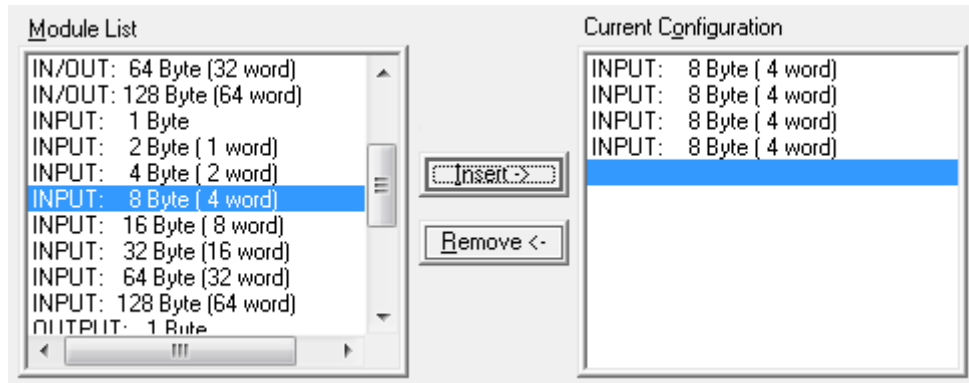
Example of master configuration to have access to the UPS input data register from n°1 to n°16