

Appendix to the operating manual

RMx621 /FML621

DP-slave module (“PROFIBUS-coupler”) from V2.01.00
Connecting the RMx621 /FML621 to PROFIBUS DP via the
RS485 serial interface using the external module
(HMS AnyBus Communicator for PROFIBUS)



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1 General

1.1 Transport damage

Please inform both your supplier and transport company.

1.2 Delivery

- These operating instructions
- The DP-slave module HMS AnyBus communicator for PROFIBUS
- Serial connection cable for the RMx621 / FML621
- CD-ROM containing the GSD-file and Bitmaps

Should anything be missing please inform your supplier immediately!

1.3 Notes on safety conventions and icons

The safety instructions in these Operating Instructions are labelled with the following safety icons and symbols:



Caution!

This symbol draws attention to activities or procedures that can lead to defective operation or to destruction of the device if not carried out properly.



Warning!

This symbol draws attention to activities or procedures that can lead to injuries to persons, to a safety risk or to destruction of the device if not carried out properly.



Note!

This symbol draws attention to activities or procedures that have an indirect effect on operation, or can trigger an unforeseen device reaction if not carried out properly.

1.4 Abbreviations/terminology explanation

PROFIBUS-coupler

In the following text the external DP-slave module HMS AnyBus communicator for PROFIBUS will be known as the PROFIBUS-coupler.

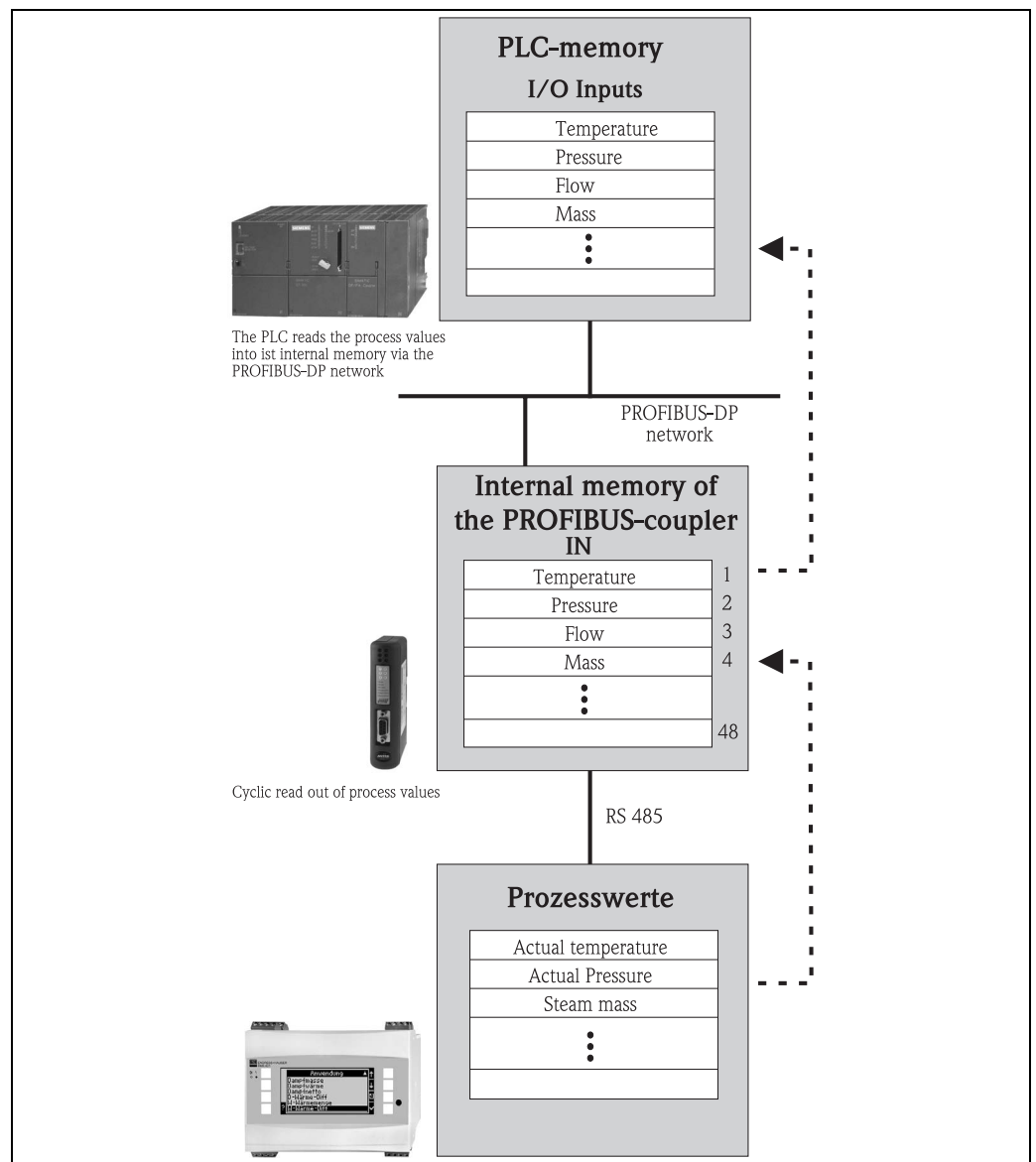
PROFIBUS-master

All units such as DCS, PLC, PC-plug in boards, that operate as a PROFIBUS-DP master, will be known as the PROFIBUS-master.

2 Installation

2.1 Function description

The Profibus-DP connection is made using an external PROFIBUS-coupler. This module is connected to the RMx621 / FML621 using the RS485-serial interface (RxTx1). The PROFIBUS-coupler operates as a master in the direction of the RMx621 / FML621 and reads out and the process values in every second and then places these into its buffer memory. In the direction of the Profibus DP system the PROFIBUS-coupler operates with the function of a DP-slave for cyclic data transfer and on request makes the buffer stored process values available to the Bus. Architecture, see the diagram below.



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2.2 Conditions

This option is available in the RMC621, RMM621 and FML621 from Firmware-Version V 1.00.00 and in the RMS621 from Firmware-Version V 2.00.04.

2.3 Connections and operating elements

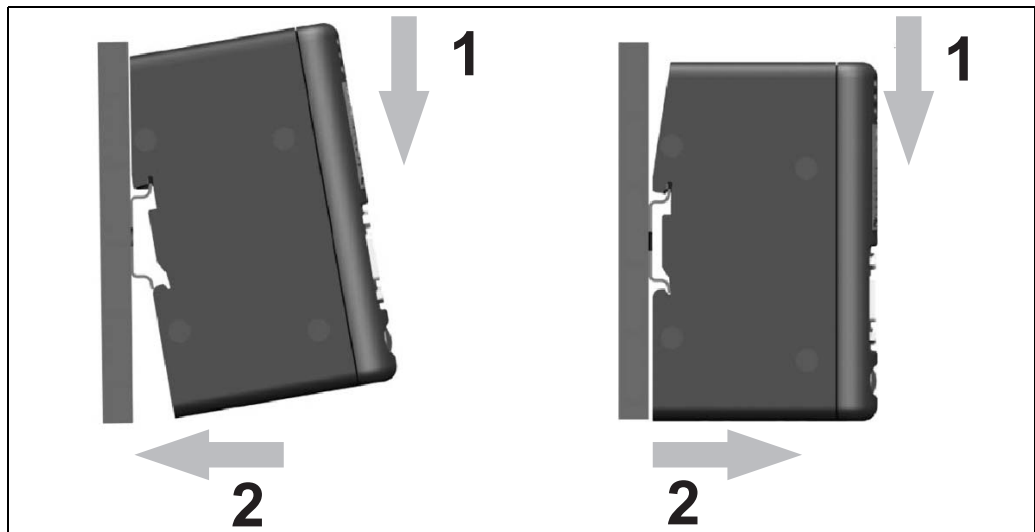


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2.4 Installation on DIN rail

A - Snap ON

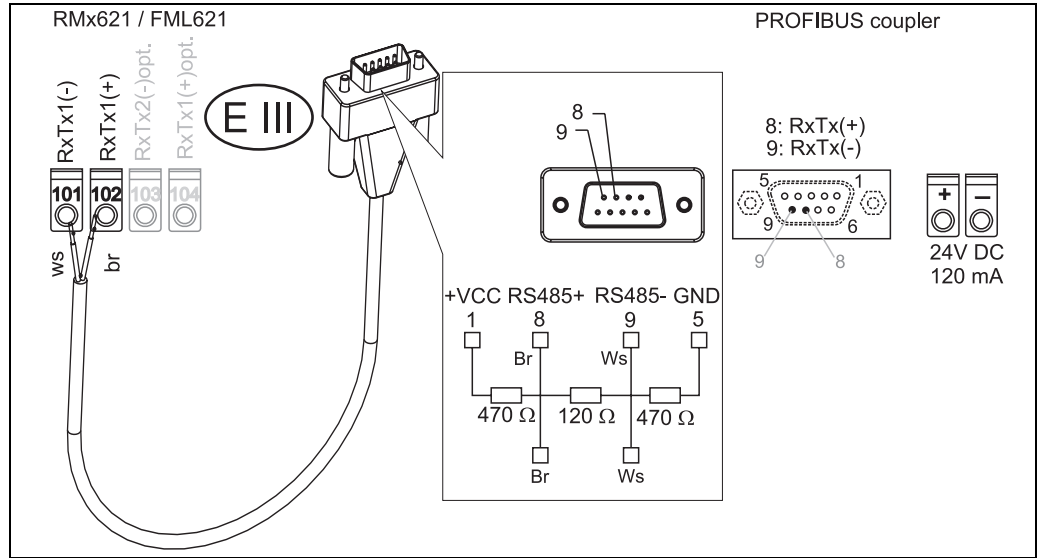
B - Snap OFF



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2.5 Connections and terminal layout

Connecting the RMx621 / FML621 with the PROFIBUS-coupler



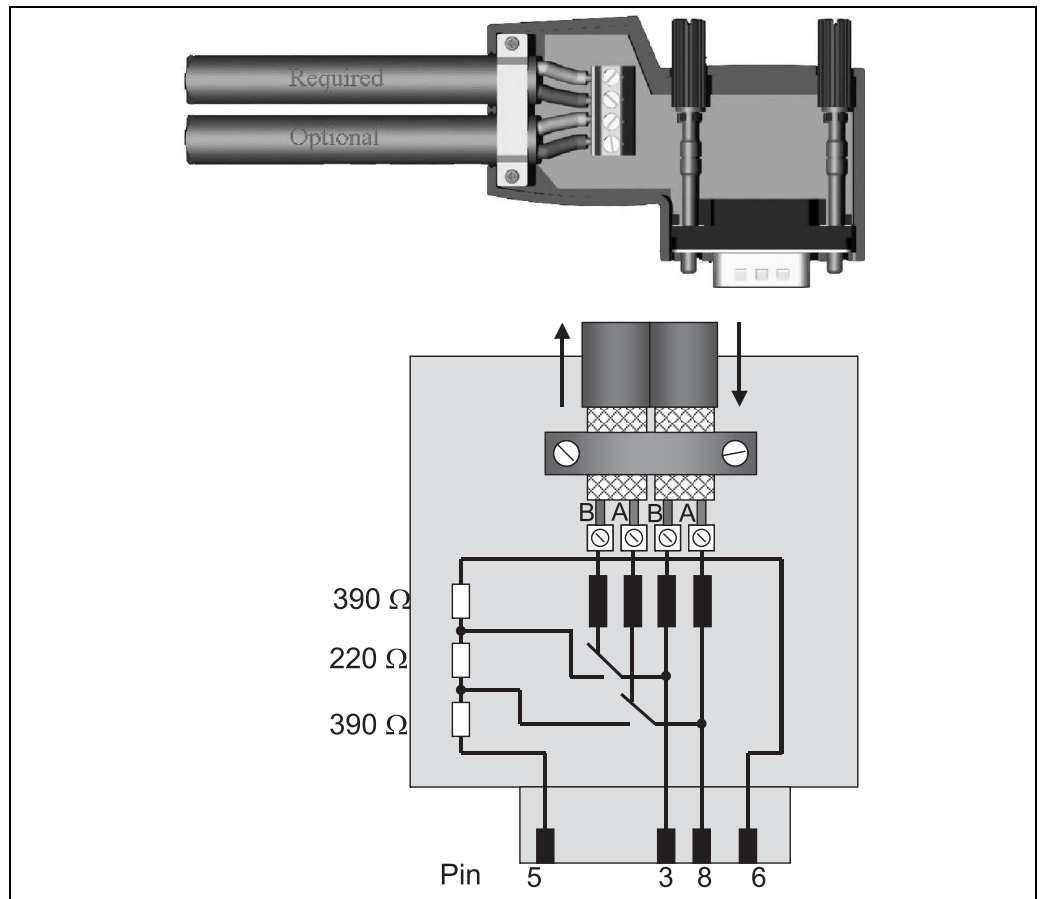
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Note!
The color indication is valid for the cable supplied.

PROFIBUS DP connections (to the PROFIBUS-coupler)

For connection to the PROFIBUS we recommend the use of an EN 50170 compliant 9-pole Sub-D plug with an integrated Bus termination resistance.



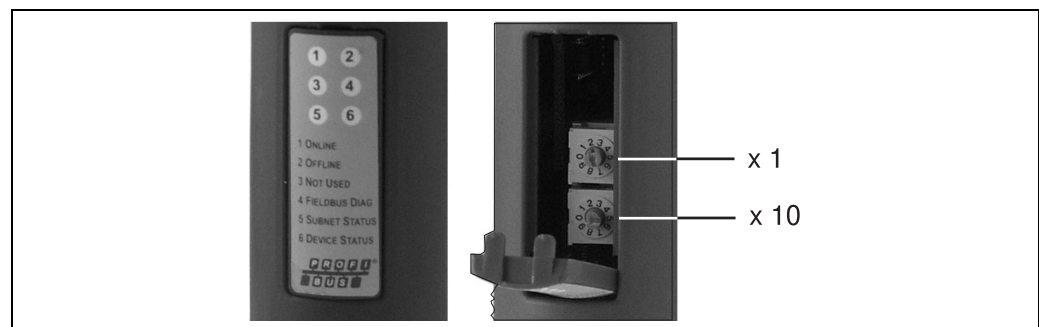
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2.6 PROFIBUS-DP terminal layout

Pin No.	Signal	Description
Housing	Screen	Functional ground
3	B-cable	RxTx (+)
5	GND	Operational ground
6	VP	Supply for the termination resistors
8	A-cable	RxTx (-)

2.7 Bus address set-up

The two selector switches used for the set up of the Bus address are available after carefully opening the front cover.



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Using these selector switches Bus addresses within a range of 00 to 99 can freely set up.



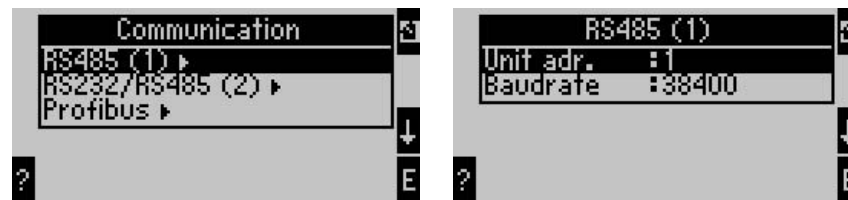
Note!

Only use valid addresses.

3 Commissioning

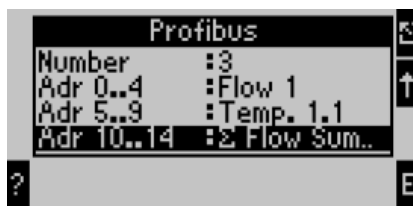
3.1 Set-up for the RMx621 / FML621

In the main menu **Communication** → **RS485 (1)** of the RMx621 / FML621 the parameters for the RS485 (1) interface should be set up as **Unit address** to 1 and **Baudrate** to 38400.



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How many process values are to be transmitted can be set up in the main menu **Communication** → **PROFIBUS** → **Number**, whereby the maximum number is limited to 48. In further steps each offset address can be allocated to the required process value using selection lists.



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For simple and easy further evaluation of the process values the list of offset addresses can be printed out using the ReadWin® 2000 operating software..



Note!

When specifying the process values displayed with PROFIBUS DP, please note that the same process value can be set to more than one address.

If a PROFIBUS coupler labeled "Rev.B" is used, device software version V03.02.03 should be used for RMC621 and device software version V02.02.16 for RMS621.

PROFIBUS couplers labeled "Rev.B" have a fixed baudrate of 38,400 baud.

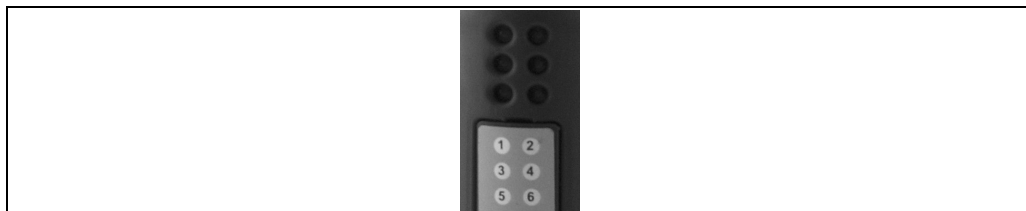
Set the baudrate to 57,600 for devices before "Rev.B".

3.2 Set-up for the PROFIBUS-coupler

The PROFIBUS-coupler is already set-up by the factory. Apart from the Bus addresses no further set-up is required. A match to the Profibus-DP data transmission rate is done automatically.

3.3 Status display

The 6 LEDs display the actual unit status and data exchange.



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LED	Description	Display	Status	Actions
1	ONLINE	Green Off	PROFIBUS-coupler ready for operation	
2	OFFLINE	Red Off	PROFIBUS-coupler not ready for operation	Check connector Check Profibus network
3	NOT USED			
4	FIELD BUS DIAG	Red flashing	Configuration error	Check PLC set-up
		Off	No Bus error detected	
5	SUBNET STATUS	Green	Data exchange running	
		Green flashing	Data exchange halted	Check connection between PROFIBUS-coupler and the RMx621 / FML621;
		Red	Data exchange not possible	Check communication parameter in the RMx621 / FML621
		Off	Power supply failure	Check the power supply

LED	Description	Display	Status	Actions
6	DEVICE STATUS	Green	Initialisation running	
		Green flashing	PROFIBUS-coupler operating	
		Red/Green flashing	Faulty set-up	Unit defective
		Off	Power supply failure	Check the power supply

4 Data transmission

4.1 General

In the RMx621 / FML621 various process values are calculated dependent on the preset applications and are then made available for read out.

In addition to the calculated values the input values can also be read out from the RMx621 / FML621.

4.2 Usable data construction

Each process value takes up 5 Bytes in the process picture.

The first 4 Bytes are compliant to an IEEE-754 (MSB first) 32-Bit floating point number

32-Bit floating point number (IEEE-754)

Octet	8	7	6	5	4	3	2	1
1	VZ	(E) 2^7	(E) 2^6					(E) 2^1
2	(E) 2^0	(M) 2^{-1}	(M) 2^{-2}					(M) 2^{-7}
3	(M) 2^{-8}							(M) 2^{-15}
4	(M) 2^{-16}							(M) 2^{-23}

VZ = 0: Positive number

VZ = 1: Negative number

$$Number = -1^{VZ} \cdot (1 + M) \cdot 2^{E-127}$$

E = Exponent; M = Mantissa

Example: 40 F0 00 00 h = 0100 0000 1111 0000 0000 0000 0000 0000 b
 Value = $-1^0 \cdot 2^{129-127} \cdot (1 + 2^{-1} + 2^{-2} + 2^{-3})$
 $= 1 \cdot 2^2 \cdot (1 + 0.5 + 0.25 + 0.125)$
 $= 1 \cdot 4 \cdot 1.875 = 7.5$

The last Byte transmits the value's status:

80h = Valid value

81h = Valid value with alarm set point violation (linked to relay output)

10h = Faulty value (e.g. Cable open circuit)

00h = No value available (e.g. due to communication error in the sub-net)

For calculated values (e.g. mass flow), the alarm condition of all the inputs deployed and the application are checked. If a "fault" is displayed for one of these variables, the calculated value is given the status "10h", i.e. invalid value.

Example:

Temp1 cable open circuit; Alarm type: fault => calculated mass flow (10h)

Temp1 cable open circuit; Alarm type: notice => calculated mass flow (80h)



Note!

All values are transmitted in individual physical basic units with the RMC/RMS621 flow and energy computers. These units cannot be changed and are independent of the units of the display values!

Example: The volume flow is always output in l/s (e.g. 10 l/s) at the bus output even if the display value is shown on the display in m³/h (e.g. 36 m³/h).

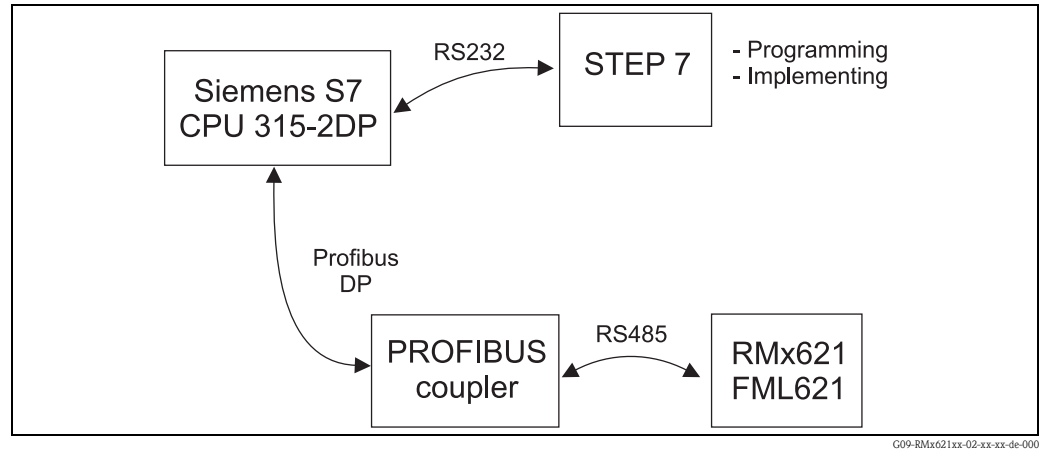
Process values are always transmitted in the following basic units:

Volume flow	l/s
Temperature	°C
Pressure	bar
Heat quantity	kJ
Heat flow (power)	kW (kJ/s)
Mass flow	kg/s
Corrected volume	(N)l/s
Flow sum	l
Mass sum	kg
Corrected flow sum	(N)l
Density	kg/m ³
Enthalpy	kJ/kg

The number of process values transmitted is laid down in the energy manager set-up, see Section 3.1. The minimum number is 1 process value (5 Byte), the maximum is 48 process values (240 Byte).

5 Installation in a Simatic S7

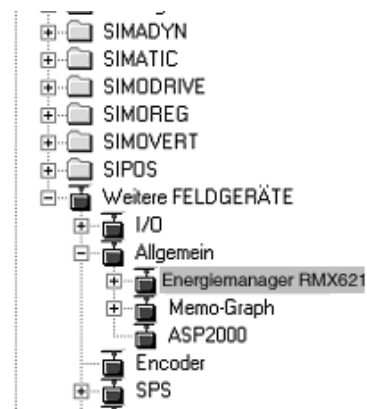
5.1 Network overview



5.2 GSD file EH_x153F.gsd

- Either install using Extras/install new GSD
- or copy the GSD- and BMP- files into the required directory of the Software STEP 7.
e.g.: c:\...\Siemens\Step7\S7data\GSD
c:\...\Siemens\Step7\S7data\NSBMP

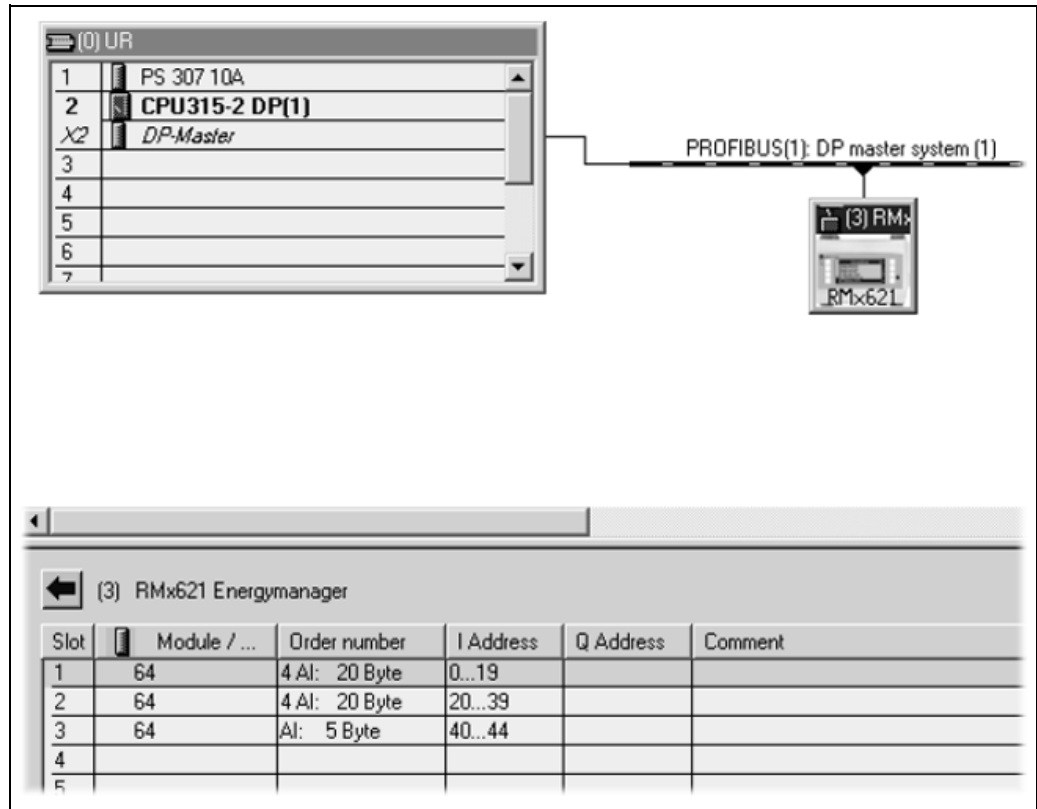
Example for Energy Manager



5.3 Projecting the RMx621 / FML621 as a slave

Hardware configuration (e.g. Energy Manager RMS/RMC621):

- Pull out the Energy manager RMX621 unit from the hardware catalogue -> PROFIBUS DP -> further field units -> General in the PROFIBUS DP network
- Set the user addresses



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The GSD-File has two modules defined:

Input (SPS)	RMx621 → PROFIBUS master	Config string
AI: 5 bytes	One numeric value + status	0x40, 0x84
4 AI: 20 bytes	Four numeric values with status each	0x40, 0x93

Assign as many modules to the individual slots as is necessary for the number of process values to match the number set in the energy manager. A maximum of 12 modules can be used here. The "4 AI: 20 Byte" module can be used instead of four individual "AI: 5 Byte" modules.



Note!

The projected unit address must correspond with the actual set up hardware addresses. The address range of the process values must be uninterrupted.

6 Technical data

Dimensions:	120mm x 75mm x 27mm (height, depth, width)
Power supply:	24V DC +/-10%
Power consumption:	Typ. 120mA, Max. 280mA
PROFIBUS-DP Baud rate:	9.600, 19.200, 45.450, 93.750, 187.500, 500.000, 1.5M, 3M, 6M, 12M
RS485 interface parameters:	Baud rate 38400, 8 data bits, 1 stop bit, unit address 01
Ambient temperature:	+5 ... +55 °C
Storage temperature:	-55 ... +85 °C
Air humidity:	5 .. 95%, no condensation
Ingress protection:	IP 20
Ground cable connection:	Grounded internally via the DIN rail
Approvals:	UL - E214107

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