EY-CM 731: Communication module with M-Bus and EIA-232 interfaces, modu731

EY-CM731F020

How energy efficiency is improved

SAUTER EY-modulo 5 technology: modular, fast and universal

Features

- Part of the SAUTER EY-modulo system family
- Plug-in element for extending the modu524/525 automation station (AS)
- One or two COM modules per AS
- EIA-232 interface for point-to-point connection with an M-Bus level converter
- Two-wire M-Bus network (as per EN 1434-3)
- Connection to M-Bus meter networks for up to 200 meters (heat meter, electricity meter, etc.)
- Recording counting values at automation level allows optimum control and regulation of systems and offers the option of using BACnet/IP communication at the management level
- Without external power supply: up to 10 M-Bus loads
- With external power supply: up to 50 M-Bus loads
- D-Sub plugs (9-pin, male, DTE) for connecting to external M-Bus level converter
- Direct labelling on the front

Technical data

Power supply		
	Power supply	From AS via I/O bus
	Current consumption	≤ 200 mA
	Dissipated power	≤ 3.28 W
External power supply	For 1...50 loads on the M-Bus network[1)]	24 V~ (±20%)/24 V= (±20%)
	Power consumption	5 W, 6 VA (for 11...50 loads on the M-Bus network)
	Screw terminals	2 (MM, LS)
Ambient conditions		
	Operating temperature	0...45 °C
	Storage and transport temperature	–25...70 °C
	Ambient humidity	10...85% rh, no condensation
Architecture		
	Protocol processor	FPGA
	COM port	UART
	Memory	Flash memory (user and protocol data)
	Number of data points	≤ 200
Interfaces, communication		
	COM port, EIA-232 (DTE)	D-Sub plug (9-pin, male)
	COM port, M-Bus (EN 1434-3)	4 screw terminals (2 × M+, 2 × M-)
	Baud rate	0.3...9.6 (38.4) kbit/second
	Connection, I/O bus	12-pin, integrated in base
	Protocol	M-Bus (master)
Construction		
	Fitting	On DIN rail
	Dimensions W x H x D	42 × 170 × 115 mm
	Weight	0.8 kg
Standards, directives		
	Type of protection	IP20 (EN 60529)
	Protection class	III (EN 60730-1)

1) *1 load = 1.5 mA. M-Bus meters currently correspond to 1...4 loads.*

	Environment class	3K3 (IEC 60721)
	Software class	EN 60730-1 Appendix H
CE conformity according to	EMC Directive 2014/30/EU[2)]	EN 61000-6-1, EN 61000-6-3, EN 61000-6-4

Overview of types	
Type	Features
EY-CM731F020	Communication module with M-Bus and EIA-232 interface, modu731

Accessories	
Type	Description
7010037001	Manual for moduCom communication modules, German
7010037002	Manual for moduCom communication modules, French
7010037003	Manual for moduCom communication modules, English
0386301001	Connection cable COM DB9(f)-DB9(f), 3 m (null modem)

Description of operation

The moduCom communication module (abbreviated as: COM module) modu731 is used to extend the modu524 and modu525 automation stations. It integrates third-party products on the automation level in operational systems, e.g. in HVAC engineering. modu731 serves as a Modbus or M-Bus master, which supports the reading of data from field devices and, for Modbus/RTU, also supports the sending of data points to field devices. The values are mapped to the present value of a BACnet I/O object in the AS.

Note
M-Bus meters can have 1...4 standard loads (1 unit load (UL) = max. 1.5 mA), so the number of M-Bus meters connected directly to the M-Bus module can be reduced accordingly.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the “Description of operation” section.
All related product regulations must also be adhered to. Changing or converting the product is not admissible.

Engineering notes

General information for moduCom

The configuration of the communication modules (abbreviated as: COM modules), the system protocol parameters and user-specific data point parameters is carried out with the software tools of SAUTER CASE Suite. Information regarding the exact configuration and function are described in CASE Suite (online help) and the moduCom manual (7010037).
Reading and writing data points is generally supported by field bus devices. The present values of BACnet are written into the data point values of the third-party system or are read from the data point values of the third-party system.
The following functions apply to “mapping” from the point of view of the AS (BACnet object):

BACnet alien systems – mapping

AS (BACnet object)	Function	CM (FS data point)
BI (Present Value)	Reading	Bit data point
AI (Present Value)	Reading	Float data point Unsigned data point Signed data point
MI (Present Value)	Reading	Unsigned data point
BO (Present Value) BO (Feedback Value)	Writing (reading)	Bit data point (feedback)
AO (Present Value)	Writing	Float data point Unsigned data point Signed data point

[2)] *EN 61000-6-1: EIA-232 cable max. 15 m in length. M-Bus cable: Two-core, twisted pair*

AS (BACnet object)	Function	CM (FS data point)
MO (Present Value) MO (Feedback Value)	Writing (reading)	Unsigned data point (feedback)
PC (count)	Reading	Unsigned data point

Erroneous reading or writing can be supported with the BACnet property “Reliability”. When unsigned/signed values are converted to or from analogue objects, the value may lose accuracy and resolution in some cases.
Listening function for commissioning, monitoring, analysis, etc.:
there is an AS TELNET interface (via special TELNET/TCP port) for data logging. This allows the listening data to be recorded in a legible text format (TELNET client, etc.).
More detailed information on the protocols and functions can be found in the function module description and the moduCom manual (7010037).

EY-CM731F020: modu731 M-Bus (master) (EIA-232 or M-Bus interface)

For M-Bus protocol implementation, the following M-Bus functions are supported (in accordance with EN 1434 or EN 13757 (partially)):

- As master only
- Range of primary addresses 1...250
- The max. number of M-Bus loads is:
  - 10 without external power supply,
  - 50 with external power supply
  - or is defined by the level converter (up to 200).
- Max. 200 objects/data points
- Data point sequence is defined by the manufacturer’s description (“M-Bus Records”)
- “Response with fixed data structure and response with variable data structure”
- Transmission format low byte/high byte only (CI field = 0x72)
- Initialisation telegram SND_NKE
- Query of values from several memory pages
  (Multi-telegram counter with “M-Bus Pages”)
- REQ_UD2 only
- Decoding of the data fields of the DIF and VIF frame part (data/value information field)
- Time- or command-controlled reading of meters
  (to protect the battery)
- Automatic detection of M-Bus units and adaptation to SI units

Restrictions – the following functions are not supported:

- Secondary addressing and network support
- Broadcast telegrams
- Manufacturer-specific frame parts (DIF 0x0F)
- Frame parts such as medium, DIFE (Data Inform. Field Extension)
- Frame parts VIFE (Value Information Field (Extension))

The following data types are used for the master functionality:

- 8-, 16-, 24-, 32-, 48-, 64-bit integer
- 32-bit IEEE float (real)
- 2-, 4-, 6-, 8-, 12-digit BCD

Counting values can be converted to the 32-bit IEEE real-float format for the present value of the BACnet object. Values larger than 16,777,215 exceed the resolution of 1 and may no longer be displayed correctly. The use of the pulse-converter object with the property count as an unsigned 32 value increases the maximum counting value (4,294,967,296).

Generally for modu731

COM module with the following 6 or 7 LED functions:

LED name I/O bus	Status[3)]	Indicator	Description
(No designation)	Green continuous		moduCom operation ok (‘running’)
	Green flashing		No channel configuration
	Green flashing rapidly		Device being configured
	Red flashing		No protocol loaded in device
	Red flashing rapidly		No communication to the automation station
	Red flashing slowly		Internal error
	Green – red – off alternating		Lamp test active (display type has priority)
LED no.			
1	Green continuous		Voltage 1 present at moduCom
2			Not used
3			Not used
4			Not used
5	Green flashing		Specific to protocol, in general Request (SEND)
	Red flashing twice or continuous	 … or	Specific to protocol, in general, erroneous request (Tg error)
6	Green flashing		Specific to protocol, in general Response (RECEIVE)
	Red flashing twice	 …	Specific to protocol, in general, erroneous response (timeout, Tg error)

COM module with a 12-bank terminal block and the following terminal assignment:

Terminals	Designation	Description
01-06	NC	Not connected
07	LS	Power supply (+)
08	MM	Ground wire (GND, -) of the power supply
09, 11	M+	M-Bus data line (+)
10, 12	M-	M-Bus data line (-)

The M-Bus network must be wired and installed according to the directives for M-Bus meter networks. The COM module has an integrated M-Bus interface as per EN 1434 3. M-Bus meters can be directly connected to the COM module on the M-Bus terminals provided (signal cables M+ and M-). It is recommended that the M-Bus networks be wired with twisted 2-wire data lines.
In the case of smaller M-Bus networks (up to 10 loads), the M-Bus network is supplied directly with the internal power supply of the AS and of the COM module. In the case of medium-sized M-Bus networks (up to 50 loads), the power supply must be supported by an additional supply of 24 V~ or 24 V= (terminals: LS and MM). In the case of large M-Bus networks (> 50 and up to 250 meters), a powerful external M-Bus level converter must be used.

COM module with 9-pin D-Sub plug and following pin assignment (in accordance with DTE):

PIN	Direction	Designation	Description
1	Input	DCD	Data Channel Detect
2	**Input**	**RxD**	**Receive Data**
3	**Output**	**TxD**	**Transmit Data**
4	Output	DTR	Data Terminal Ready
5	**-**	**GND**	**Ground**

[3)] *flashing: 100 ms / 10% duty cycle, flashing quickly: 100 ms / 50% d.c., flashing slowly: 500 ms / 50% d.c., alternating: every 1 second*

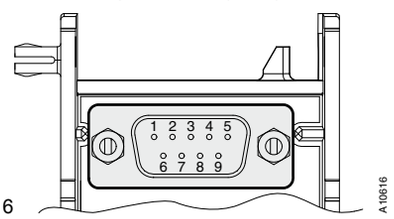
PIN	Direction	Designation	Description
6	Input	DSR	Data Set Ready
7	Output	RTS	Ready to Send
8	Input	CTS	Clear to Send
9	Input	RI	Ring Indicator
SH	-	GND	Ground (“shield” – cable screening)

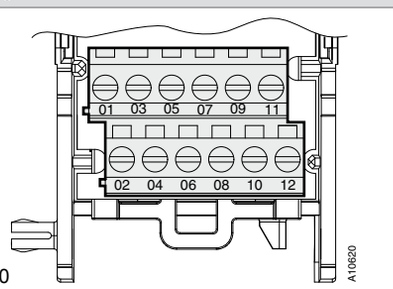
In the case of a large M-Bus network with a powerful, external M-Bus level converter, the EIA-232 interface is used. The correct connection of the EIA-232 interface to the M-Bus level converter must be taken from the documentation for the level converter. Connecting the data pins (pin 2 and 3) and the GND pin (pin 5) is usually sufficient.
The cable length of the EIA-232 supply line may not exceed 15 m. Burst interference greater than 1 kV may disrupt the communication of the EIA-232 supply line. Larger distances should be covered with the EIA-485<>M-Bus level converter and the modu721 COM module.

Disposal

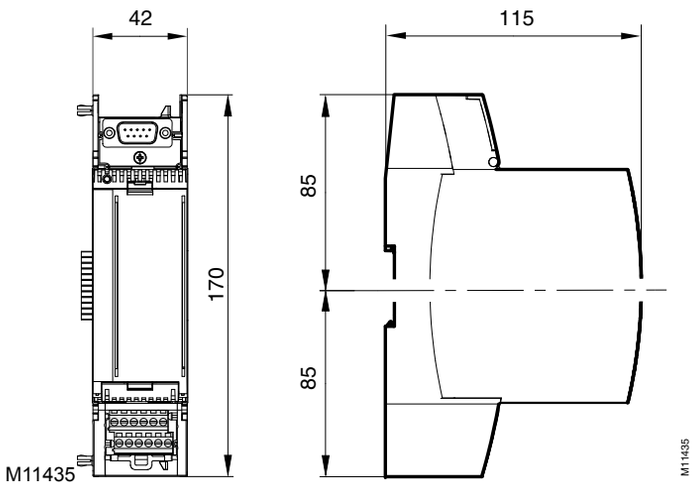
When disposing of the product, observe the currently applicable local laws.
More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagram

	Key	
EIA-232 9 pol. Sub-D (male)  A10616	**1**	DCD (IN)
	2	RxD (IN)
	3	TxD (OUT)
	4	DTR (OUT)
	5	GND
	6	DSR (IN)
	7	RTS (OUT)
	8	CTS (IN)
	9	RI (IN)

EIA-485	Key	
 A10620	**01 - 06**	NC
	07	LS
	08	MM
	09, 11	M+
	10, 12	M-

Dimension drawing



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