modu710: Communication module with EIA-232 interface

Areas of application

Automation-level integration of non-Sauter systems and products of other manufacturers on the basis of field bus protocols with EIA-232 such as Modbus/RTU and M-Bus; further integration of non-Sauter products with the AS modu525 for integrated control and optimised regulation; option to implement BACnet/IP communication at management level.

Features

- Communication module with EIA-232 interface
- Pluggable element for extending the modu525 automation station
- Connectable to non-Sauter systems (SPS, refrigerators, counters…)
- For point-to-point protocols
- Connection for field bus protocols with optional level converter (EIA-232 <> M-Bus, EIA-232 <> EIA-485)
- Direct inscription on front
- Part of the SAUTER EY-modulo system family

Technical description

- Power supply from modu525 automation station
- 1 COM module per AS modu525
- up to 512 non-Sauter system data points
- 0.3 to 57.6 kBit/s
- D-Sub plug (9-pole, male, DTE)
- Supported protocols: Modbus/RTU (Master) - F010; M-Bus (EIA-232) - F020; others on request

Products

Type	Description
EY-CM710F010	Communication module for Modbus/RTU (Master)
EY-CM710F020	Communication module for M-Bus (Master, EIA-232)

Technical data

Electrical supply

Power supply	from modu525
per AS on position 1	up to 1 COM module
Power consumption	up to 60 mA
Dissipated power	up to 0.84 W

Interfaces, communication

COM interface (DTE)	D-Sub plug (9-pole, male)
Baud rate	0.3…57.6 kBit/s
Data bits	5, 6, 7, 8
Stop bits	1, 1.5, 2
Parity	non, even, odd
Connection, I/O bus	12-pole, integrated in plinth
Protocols	
EY-CM710F010	Modbus/RTU (Master)
EY-CM710F020	M-Bus (EIA-232)

Architecture

Protocol processor	FPGA
COM processor	UART
Memory	Flash memory (user and protocol data)
Number of data points	up to 512

Permitted ambient conditions

Operating temperature	0…45 °C
Storage and transport temperature	-25…70 °C
Humidity	10…85% rh
	no condensation

1) EIA-232 Maximum cable length 15 metres

Installation

Fitting	on top-hat rail
Dimensions W x H x D (mm)	42 x 170 x 115
Weight (kg)	0.8

Standards, guidelines and directives

Type of protection	IP 20 (EN 60529)
Protection class	I (EN 60730-1)
Environmental class	3K3 (IEC 60721)
CE conformity as per	
Software class A	EN 60730-1 Annexe H
EMC Directive 2004/108/EC	EN 61000-6-1: 2007 1)
	EN 61000-6-2: 2005 1)
	EN 61000-6-3: 2007
	EN 61000-6-4: 2007

Additional information

Fitting instructions	P100002327
Product documentation	7010037
Material declaration	MD 97.016
Dimension drawing	M11418
Wiring diagram	A10578

Accessories

Type	Description
0386301001	Connection cable COM DB9(f)-DB9(f) 3 m (zero modem)

Engineering notes

General notes for moduCom

The COM modules, the protocol system parameters and user-specific data point parameters are configured using the SAUTER CASE Suite software tools. Details on exact configuration and functionality are described in the user manuals for CASE Suite and moduCom.

In general, reading and writing data pints is supported by field bus devices. In this case, the current values ("Present Value") are written by BACnet to the data values of the non-Sauter system or they are read from the data point values of the non-Sauter system. The following functions apply to "mapping" from the viewpoint of the automation station (BACnet object):

AS (BACnet object)	Function	CM (FS data point)
BI (PresentValue)	read	Bit data point
AI (PresentValue)	read	Float data point Unsigned data point Signed data point
MI (PresentValue)	read	Unsigned data point
BO (PresentValue) BO (FeedbackValue)	write (read)	Bit data point (Feedback)
AO (PresentValue)	write	Float data point Unsigned data point Signed data point
MO (PresentValue) MO (FeedbackValue)	write (read)	Unsigned data point (Feedback)
PC (Count)	read	Unsigned data point

Faulty reading or writing can be supported using the BACnet property "Reliability". Under certain circumstances, the value may lose a certain amount of accuracy and resolution when converting Unsigned/Signed values in or from analogue objects.

Listening function for commissioning, monitoring, analysis etc.:
The AS has a TELNET interface (via a special TELNET/TCP port) for recording data. This enables the data monitored in readable text format to be recorded (TELNET client, etc.).

EY-CM710F010: modu710-Modbus/RTU (Master)

The following Modbus "Function Codes" (fc) are supported for implementation of the Modbus/RTU (Master) protocol:
(R/W: Read/Write = R/W: Read/Write)

fc 1: Read Coils (R/W)	Read 1-bit values (R/W)
fc 2: Read Discrete Inputs (R)	Read 1-bit values (R)
fc 3: Read Holding Registers (R/W)	Read 16-bit values (R/W)
fc 4: Read Input Registers (R)	Read 16-bit values (R)
fc 5: Write Single Coil (R/W)	Write 1-bit value
fc 6: Write Single Register (R/W)	Write 16-bit value
fc 15: Write Multiple Coils (R/W)	Write 1-bit values
fc 16: Write Multiple Registers (R/W)	Write 16-bit values

Telegram transmission is supported only with the RTU Frame (Remote Terminal Unit Frame).

Restrictions – the following functions are not supported:
Function codes other than those mentioned and telegram transmission via Modbus/ASCII are not supported. Exception Codes are not evaluated.

The following data types can be used for master functionality:
1-bit coil, 1-bit discrete input, 16-bit holding register, 16-bit input register, "32-bit formats" with 2x16-bit registers ("double register"), 1-bit of a 16-bit register. Data from the Modbus data model can be read and overwritten. The Modbus-Master's protocol implementation is able to interpret data in various data formats and connect it to BACnet data objects.

The following data types are supported on the Modbus-Master side:
- 1-bit Boolean
- (8-bit Signed / Unsigned Integer)
- 16-bit Signed / Unsigned Integer
- 32-bit Signed / Unsigned Integer
- 32-bit IEEE-Float

Special Modbus-Master functionality:
32-bit data formats can be interpreted in a reverse 16-bit register sequence using the data point parameter "byte order". This parameter can be defined individually for each data point.
Each individual bit of a 16-bit register can also be assigned to a binary data object (BACnet BI, BO) (data point parameter: "BitNo at BitField"). N.B.: When more than one BO is applied to a register, only the last bit that is written will affect the entire register.
The data point parameter "Function Code" can be used to force Single Write for coils with fc15, whilst Single Write for registers is executed using fc16
JBUS addressing (i.e. from 0 to 65535) is supported for all data model ranges (x, 1x, 3x, 4x) so that Modbus addresses are used with an offset of -1.

Further details can be referenced from the user manual for function components and the moduCom user manual.

EY-CM710F020: modu710-MBus (RS232)

The following functions are supported for M-Bus protocol implementation (pursuant to EN 1434 or EN 13757 (in part) specification):
- Only as Master
- Slave address range 1-250
- Max. number of M-Bus counters is defined by the level converter
- Max. 512 objects/data points
- Data point sequence defined via the manufacturer's description
- Response with fix data structure and response with variable data structure
- Transmission format Low Byte/High Byte (CI-Field = 0x72) only
- Query of values from multiple memory pages (multi-telegram counter)
- Initialisation telegram SND_NKE
- Only REQ_UD2
- Decoding of the DIF and VIF frame data fields part (Data/Value Information Field)
- Time or command-controlled counter readouts (battery conservation)
- 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)
- VIFE (Value Information Field (Extension)) frame parts

The following data types are used for master functionality:
- 8, 16, 24, 32, 48, 64 bit integer
- 32-bit IEEE float (real)
- 2, 4, 6, 8, 12 digit BCD

Counter readings can be converted into the 32-bit IEEE real float format for the present value of the BACnet object. Readings greater than 16,777,215 exceed the resolution of 1 and may not be displayed properly. Using the PulseConverter object with the Property Count as an Unsigned-32 value will increase the maximum counter reading (4,294,967,296).

Further details can be referenced from the user manual for function components and the moduCom user manual.

General notes for modu710

The COM module has 6 or 7 LEDs with the following functions.

LED name	Condition	Frequency [1]	Description
I/O bus			
(no name)	green continuous	————————	moduCom operation OK ('running')
	green pulsating	• • • •	no channel configuration
	green pulsating fast	••••••••••••••••	device in configuration
	red pulsating	• • • •	no protocol loaded in device
	red pulsating fast	••••••••••••••••	no communication with AS
	red flashing	— — — —	internal error
	green - red - alternating	—— ——	lamp test active (display type has priority)
LED No.			
1	green continuous	————————	voltage 1 available on moduCom
2			not used
3			not used
4			not used
5	green	•• •• •• ••	protocol-specific, in general request (SEND)
	red	• • or ————	protocol-specific, in general defective request (Tg error)
6	green	•• •• •• ••	protocol-specific, in general response (RECEIVE)
	red	• •	protocol-specific, in general defective response (timeout, Tg error)

1) pulsating: 0.1s / 10% duty cycle pulsating fast: 0.1s / 50% duty cycle 0.1s / 50% duty cycle every 1s

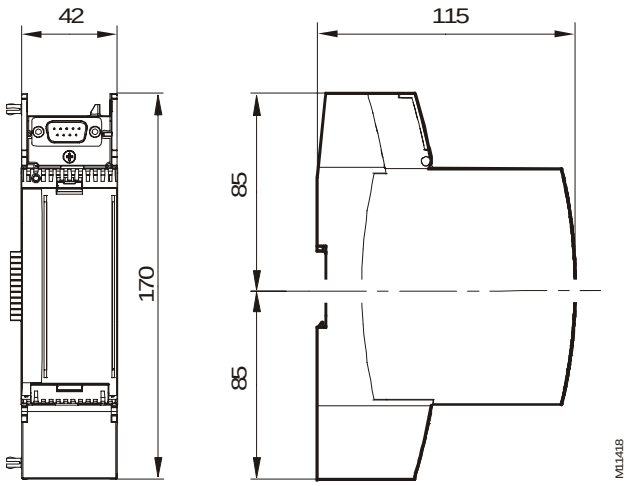
The COM module has the following pin assignment for the 9-pole D-Sub plug (pursuant to DTE):

PIN	Direction	Designation	Long name
1	Input	DCD	Data Channel Detect
2	**Input**	**RxD**	**Receive Data**
3	**Output**	**TxD**	**Transmit Data**
4	Output	DTR	Data Terminal Ready
5	-	GND	**Earth**
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	Earth ('Shield' – cable screening)

How to make the correct connection directly to the non-Sauter device or a bus coupler (EIA-232<>EIA-485/422) must be referenced from the documentation for the non-Sauter device or the bus coupler. It is usually sufficient to connect the two data pins (2/3), pin 8 (Clear to Send) and pin 5 (Earth).

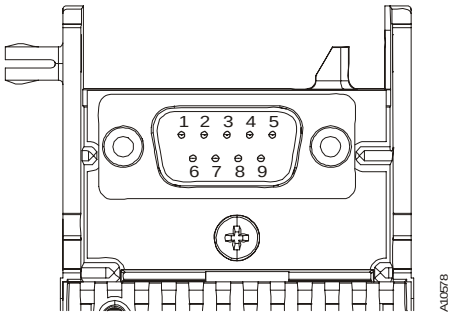
The maximum length of the EIA-232 cable must not exceed 15 metres. Burst disturbances greater than 1 kV can cause the EIA-232 cable to malfunction. Greater distances should be implemented using an EIA-232<>EIA-485 level converter or the COM module modu720.

Dimension drawing



Wiring diagram

EIA-232
9 pol. Sub-D (male)



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Printed in Switzerland