

# imc Modbus interface

## Field bus module for imc measurement systems

The imc Modbus interface is a fieldbus module that can be used to equip imc measurement devices. Modbus<sup>1</sup> is a communication protocol widely used in industrial automation devices.

The interface acts as Modbus client and can address and receive data from several Modbus server devices. It is used to integrate 3<sup>rd</sup> party devices equipped with Modbus as additional measurement data sources into imc measurement systems and data loggers.

Both protocols and interfaces (physical layer) that are standardized for Modbus are supported:

- Modbus TCP      Ethernet (100 Mbit)
- Modbus RTU      Serial interface (RS232, RS485 half duplex and full duplex)

Both hardware interfaces are provided on the module (RJ45 and DSUB-9) and can also be operated together, in parallel.

1: Modbus® is a registered Trademark of Schneider Automation, Inc.

### Typical applications:

- Integration of external devices and sensors with Modbus interface into an imc data acquisition system.
- Extension of the capabilities of an imc system to include specific special functions or sensors that can only be covered by 3<sup>rd</sup> party devices.
- Use of special instruments (e.g. power meters, power analyzers, laboratory instruments), sensors (e.g. humidity or ph sensors, pyrometers), sensor systems (e.g. weather station) or test infrastructure (measurement of current temperature of climatic chambers)
- Low-speed monitoring of environmental parameters and electrical power
- Use of standard equipment from the field of industrial test automation
- Using an imc system as a central platform and gateway, with recording, processing of data from a wide variety of sources (imc system, analog, Modbus, field buses) and exchange and networking with higher-level systems via CAN bus, EtherCAT or XCPoE.

### Features:

- Dedicated processor avoids use of resources of the main processor on the imc system and ensures performance and scalability
- Maximum flexibility: Both hardware interfaces are provided and can be operated simultaneously
- Device-based integration into the measurement system allows the use of all advanced capabilities and functionalities such as live data analysis with imc Online FAMOS, integration into real-time test automation (imc STUDIO Automation) etc.
- Acquisition of input data (measurement data) from Modbus devices, no output via Modbus (no control of e.g. actuators, controllers, etc.)
- Plug & Play solution with convenient configuration wizard in imc STUDIO.

### Functionalities:

Function codes available for selection are:

- 01 (0x01) Read Coils
- 02 (0x02) Read Discrete Inputs
- 03 (0x03) Read Holding Registers
- 04 (0x04) Read Input Registers

The imc measuring device processes the acquired Modbus data as:

- channels ("FIFO channels")
- pv-variables ("process vector")

### Software minimum requirements:

Operation of devices with Modbus interface requires software of the following group:  
imc STUDIO 2023 R1 in conjunction with firmware and driver package imc DEVICES 2.16 R1.

### Modularity:

Similar to the fieldbus interfaces, the imc Modbus interface is a modular equipment option for fixed configuration of a system upon order. Subsequent expansion or replacement by the user is not supported.

### Overview of available variants:

Standard version		ET Version *	
Order code:	article no.	article no.	properties
CRFX/MODBUS	11900272	11910xxx	for imc CRONOS <i>flex</i> base unit
CRC/MODBUS	11700286	11710xxx	for imc CRONOS <i>compact</i>
BUSFX/MODBUS	--	12400043	for imc BUSDAQ <i>flex</i> (ET as standard)
SPAR/MODBUS	11300xxx	11310xxx	for imc SPARTAN

\* ET: Version in extended temperature range (article no. upon request)

## Technical Specs

General		
Parameter	Value	Remarks
Interfaces	1x Ethernet (Modbus TCP) 1x serial port (Modbus RTU) service-jack	both interfaces simultaneously, parallel operable  3.5 mm jack, for service purposes, not to be used by the user
Module width	requires 1 slot	fixed installation, ex factory
Modularity	order option	upon request
Max. number of interfaces in one system	3 8 1 / 2 / 3 / 5	totally in one CRFX base unit totally in one CRC, SPAR system totally in one BUSFX-4/-6/-8/-12 system
Modbus Protocol		
Parameter	Value	Remarks
Supported function codes	01 (0x01) 02 (0x02) 03 (0x03) 04 (0x04)	Read Coils Read Discrete Inputs Read Holding Registers Read Input Registers
Supported operating mode	client - server	direct addressing of server devices read (receiving data) write (sending data): not supported
Ethernet Interface (Modbus TCP)		
Parameter	Value	Remarks
Terminals / Nodes	1	
Terminal connection	1x RJ45	
Topology	bus	
Transfer protocol	TCP / IP	IEEE Norm 802.3
Baud rate	100 MBit 10 MBit	100BaseT (Half- and Full-duplex) 10BaseT (Half- and Full-duplex) Auto-sensing
Isolation strength	60 V	to system ground (CHASSIS)

Serial interface variant		
Parameter	Value	Remarks
Terminals / Nodes	1	
Terminal connectors	1x DSUB-9	
Baud rate	300, 1200, 2400, 4800, 9600, <i>14400</i> , 19200, <i>28800</i> , 38400, 57600, 115200, 230400	special bit-rates: 14400 and 28800
Isolation Isolation strength	galvanically isolated 60 V	to system ground (CHASSIS) nominal working voltage
Operation modes	RS 232 RS 485 (half-/full duplex)	flexibly configurable: multi-protocol transceiver
RS232 mode		
Parameter	Value	Remarks
Topology	point-to-point	
Signal type	Tx, Rx, GND CTS, RTS	base signals handshake, flow control
Byte format	8 data bits, 2 stop bits (none parity) or 1 stop bit (odd/even parity)	
Flow control	XON/XOFF, RTS/CTS	
RS485/422 mode		
Topology	bus	
Operating mode	Half- and Full-duplex	activated via software
Signal type	2x Tx, 2x Rx, GND	basis signals, differential
Termination	120	activated via software