



# MSG-701\_v2

## 2G/3G/4G communication modules

MSG-701\_v2 communication modules are specialized devices with additional interfaces able to convert protocols, designed for establishing connections with any devices in GSM networks.

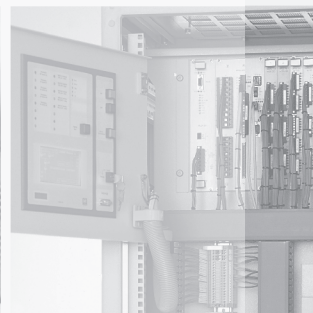
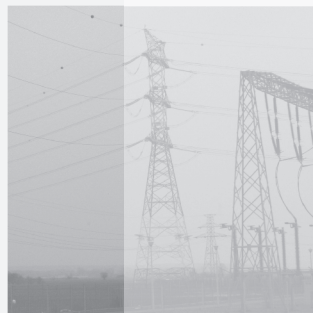
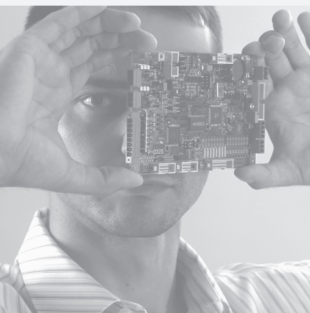
MSG-701\_v2 communication modules are advanced 2G/3G/4G communication devices which are able to function as modems, data concentrators and protocols converters simultaneously in appropriate applications in the power industry and other industry branches. The device may be applied in any SMART GRID networks for communication with devices which do not support 2G/3G/4G standards on their own.

MSG-701\_v2 modules successfully cooperate with digital protections, reclosers, controllers of biogas plants, wind and photovoltaic farms.

The devices perform advanced communication functions, such as parallel support of many transmission protocols in several communication channels with simultaneous protocol conversion.

Depending on the version, they are equipped with ETHERNET network connections, serial transmission channels and 1-Wire interfaces.

To ensure data privacy and protection, performed operation reliability and to protect against unauthorized operation and to prevent human errors, several „cyber security“ mechanisms have been implemented in modules to protect communication, remote and local access as well as sensitive information.



## Features

Depending on the version, MSG-701\_v2 devices are equipped with extended communication resources:

- Ethernet TP10/100 connections
- RS-232/485 universal channel
- RS-485 channel
- 1-Wire channel
- RS-232 channel for local diagnostic

Specific equipment is selected using product keys. MSG-701\_v2 modules have a built-in modem with two SIM card slots what makes it possible to operate in networks of two different providers. The devices may communicate with a SCADA system using the built-in 2G/3G/4G modem, Ethernet network or RS-485 and RS-232 serial connections, supporting various communication protocols. For communication with SCADA systems the DNP3.0 or PN-EN 60870-5-104 protocols are usually applied, other protocols also possible. For measurements systems SFTP mechanism can be applied - e.g. csv/xml file exchanging. MSG-701\_v2 can act as transparent gateway as well as data concentrator.

The device also has one binary input and one control output.

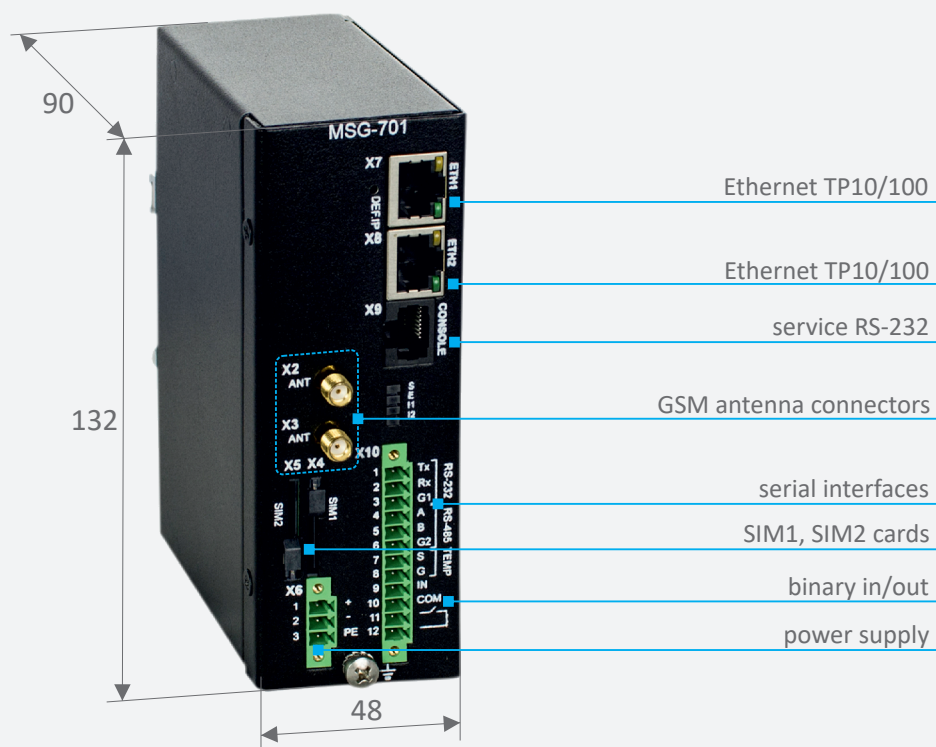
MSG-701\_v2 modules are designed also for cooperation with the TETRA system. An external radio TETRA system terminal may be connected to the module using a serial connection. The module ensures simultaneous, parallel communication with a SCADA system in TETRA and 3G/4G/5G connections.

The integrated modem is used to establish connections in GSM/GPRS/EDGE/UMTS/HSPA+ networks and also LTE in 900/1800/1900/2100 MHz bands, class 10. Connection from wireless networks is realized in TCP/IP or UDP network protocols.

## Structure

The module has a rugged casing, resistant to environmental conditions. Depending on the version, it may be made of metal covered by highly-resistant powder coating or coppered plastic. Module power supply is galvanically isolated from communication interfaces and logic systems. Multi-sided galvanic isolation ensures high reliability of operation, resistance to overvoltage-caused damage and transmission insensitivity to interferences.

MSG-701\_v2 are designed for installation on DIN 35 mm rails. Access to electronic components is possible in the service mode. All interfaces are available on the front. A view of modules with a description of interfaces and device dimensions are presented below.





## Cooperation with communication devices

The modules enable simultaneous support for at least two any other communication modules. Optionally, it is possible to connect e.g. a PSTN modem or a specialized transmission converter. To MSG-701\_v2 external interfaces any external modem may be also connected, supporting transmission in 2G/3G/4G standard. It is also possible to connect a radio modem operating in dedicated standards, e.g. TETRA or DMR or a radio modem applying dedicated ranges or open frequencies.

## „Cyber security” features

„Cyber security” solutions applied in MSG-701\_v2 have been based on ENISE, NIST, BDEW and BlueCrypt recommendations. The implementation of security mechanisms is compliant with PN-EN 62351, IEEE P1686, PN-ISO/IEC 27001 standards and BDEW White Paper “Requirements for Secure Control and Telecommunication Systems”. They include:

- communication protection
- access control
- sensitive information protection
- user activity logging/monitoring

Specific functionalities are configured using the pConfig software (e.g. AES-128 encryption).

## Technical data

MSG-701\_v2 modules meet requirements for class 2 device regarding security according to the PN-EN 60950 standard. It is possible to manufacture MSG-701\_v2 in a version for on-table installation with additional handles and in a higher protection class. Such requirements should be consulted with the manufacturer.

PARAMETER	RANGE
casing	for installation on DIN35 or TS35 rail according to PN-EN 60715:2007
moving parts	none
weight	545 g
dimensions (W x H x D)	48x132x90 (without DIN rail holder 35 mm)

## Power supply

PARAMETER	RANGE
nominal supply voltage	12÷24V DC
supply voltage range	9÷36V DC
maximal peak power consumption	6W
average power consumption	5W

## Communication

PARAMETER	NETWORK TRANSMISSION	RADIO TRANSMISSION	SERIAL TRANSMISSION
protocol	standard version PN-EN 60870-5-104 DNP 3.0 TCP/UDP MODBUS-TCP SFTP	standard version PN-EN 60870-5-104 DNP 3.0 TCP/UDP MODBUS-TCP SFTP	PN-EN 60870-5-101 PN-EN 60870-5-103 DNP3.0, MODBUS-RTU DMLS /COSEM MBUS (MSG-701-1)
physical aspect	ETHERNET TP10/100 channel	radio channels in GSM 2G/3G/4G network	RS-232/485, RS-485, 1-WIRE
connector type	RJ45	SMA	713-1430/107-000/ 713-1110/107-000, WAGO

## Environmental conditions

PARAMETER	STANDARD AND CLASS	RANGE
operation temperature	PN-EN 60870-2-2 class C1	from -25°C to 55°C from -25°C to 70°C *)
relative humidity	PN-EN 60870-2-2 class C1	5÷95%
atmospheric pressure	PN-EN 60870-2-2 class C1	86÷106kPa, 0÷2000m
protection level, without additional protections	PN-EN 60529	IP50

\*) for „B” type construction

## Insulation

PARAMETER	STANDARD	RANGE
voltage withstand	PN-EN 60870-2-1	1kV; RMS for 1min
surge immunity	PN-EN 60664-1	2kV

## Mechanical resistance

PARAMETER	STANDARD AND RANGE	RANGE
transfers for sinusoidal vibrations	PN-EN 60255-21 class 1	0.035mm
accelerations for sinusoidal vibrations		0.5g ( $g=9.81 \text{ m/s}^2$ )
maximal acceleration in case of single surges		5g/11ms

## Configuration and diagnostics

Configuration and diagnostics of communication module may be performed using the pConfig configuration software. It is possible to preview module operation on-line on a WWW page and configure it in a limited range. Events connected with module operation, transmission state and diagnostic functions are stored in the device internal event log.