Manual Version 1.0.1

AUTOMATION

WAGO *TO-PASS*® 761

Telecontrol Modules

761-xxx

System Description

WAGO®
INNOVATIVE CONNECTIONS

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

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1 Important Notes

This section provides a summary of the most important safety requirements and notes that will be mentioned in the individual sections. To protect your health and prevent damage to the devices, it is essential to read and carefully follow the safety guidelines.

1.1 Legal Principles

1.1.1 Copyright

1.1.2 Personnel Qualification

The use of the product described in this manual requires special qualifications, as shown in the following table:

Table 1: Personnel Qualification

Activity	Electrical specialist
Assembly	X
Commissioning	X
Programming	X
Maintenance	X
Troubleshooting	X
Disassembly	X

All personnel must be familiar with the applicable standards.
WAGO Kontakttechnik GmbH & Co. KG declines any liability resulting from improper action and damage to WAGO products and third-party products due to non-observance of the information contained in this manual.

1.1.3 Conforming Use of *TO-PASS*® Telecontrol Modules

The *TO-PASS*® telecontrol modules receive digital and analog signals from sensors, transmitting and outputting them to higher-ranking controllers. Additionally, it is possible to (pre-)process them.

The device is designed for the IP20 protection class. It is protected against the insertion of solid items (e.g., fingers) and solid impurities up to 12.5 mm in diameter, but not against water penetration. Unless otherwise specified, the device must not be operated in wet and dusty environments.

1.1.4 Technical Condition of the Devices

For each individual application, the components are supplied from the factory with a dedicated hardware and software configuration. Changes in hardware, software and firmware are only admitted within the boundaries highlighted in the product documentation. All changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on the part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Standards and Regulations for Operating the *TO-PASS*® Telecontrol Modules

Please observe the standards and regulations that are relevant to installation:

- The data and power lines must be connected and installed in compliance with the standards to avoid installation failures and substantially minimize any danger to personnel.
- For installation, startup, maintenance and repair, please observe the accident prevention regulations of your machine (e.g., BGV A 3, "Electrical Installations and Equipment").
- Emergency stop functions and equipment must not be deactivated or otherwise made ineffective. See relevant standards (e.g., DIN EN 418).
- Your installation must be equipped in accordance to the EMC guidelines so electromagnetic interferences can be eliminated.
- Please observe the safety measures against electrostatic discharge according to DIN EN 61340-5-1/-3. When handling the modules, ensure that environmental factors (persons, workplace and packing) are well grounded.
- The relevant valid and applicable standards and guidelines regarding the installation of switch cabinets must be observed.

1.3 Symbols

⚠ DANGER

Warning of physical injury
Indicates a direct hazard with a high level of risk, which may lead to death or severe physical injury if it is not avoided.

⚠ DANGER

Warning of physical injury due to electric current
Indicates a direct hazard with a high level of risk, which may lead to death or severe physical injury if it is not avoided.

⚠ WARNING

Warning of physical injury
Indicates possible hazard with a moderate level of risk, which may lead to death or (severe) physical injury if it is not avoided.

⚠ CAUTION

Warning of physical injury
Indicates possible hazards with a low level of risk, which will lead to minor or moderate physical injuries if it is not avoided.

NOTICE

Warning of damage to equipment
Indicates possible hazard that could lead to equipment damage if it is not avoided.

NOTICE

Warning of damage to equipment by electrostatic discharge
Indicates possible hazard that could lead to equipment damage if it is not avoided.

NOTE:

Please note
Indicates possible malfunction, which does not lead to equipment damage if it is not avoided.

Information

Notes on additional information
Indicates other informations, which are not an integral part of this documentation, such as Internet.

1.4 Safety Information

⚠ DANGER

Warning of physical injury
TO-PASS® telecontrol modules are exposed operating equipment. They may only be assembled in housings, cabinets or in electrical operation rooms. Access is only permitted via a key or tool to authorized qualified personnel.

⚠ DANGER

Warning of physical injury
All power sources to the device must always be switched off before performing any installation, repair or maintenance work..

NOTICE

Warning of damage to equipment
The components are not resistant against materials having seeping and insulating properties such as: aerosols, silicones, triglycerides (found in some hand creams). If it cannot be determined that these materials appear in the component environment, then the components must be installed in an enclosure that is resistant against the above mentioned materials. Clean tools and materials are generally required to operate the device/module.

NOTICE

Warning of damage to equipment
Soiled contacts must be cleaned using oil-free compressed air or with ethyl alcohol and leather cloths.

NOTICE

Warning of damage to equipment
Do not use contact sprays, which could possibly impair contact area functionality.

NOTICE

Warning of damage to equipment
Avoid reverse polarity of data and power lines as this may damage the devices.

NOTICE

Warning of damage to equipment by electrostatic discharge
The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched.

1.5 Font Conventions

Table 2: Font Conventions

Font type	Indicates
italic	Names of paths and files are displayed in italics; e.g.: C:\Programme\WAGO-IO-CHECK
Menu	Menu options are displayed in bold; e.g.: **Save**
>	A greater-than sign between two names means the selection of a menu option from a menu; e.g.: **File** > **New**
Input	Designation of input or optional fields are displayed in bold; e.g.: **Start of measurement range**
"Value"	Input or selective values are displayed in inverted commas; e.g.: Enter the value “4 mA” under **Start of measurement range**.
[Button]	Button names in dialog boxes are displayed in bold in square brackets; e.g.: **[Input]**
[Key]	Names of keys on the keyboard are displayed in bold in square brackets; e.g.: **[F5]**

1.6 Number Notation

Table 3: Number Notation

Number code	Example	Note
Decimal	100	Normal notation
Binary	'100' '0110.0100'	Within ', nibble separated with dots (.)

2 Product Overview

2.1 Telecontrol Modules S

Table 4: Product Overview Telecontrol Modules S

Item number	Name
761-100	**Telecontrol Module S,** 4 digital inputs, 4 digital outputs
761-101	**Telecontrol Module S 8AI,** 4 digital inputs, 4 digital outputs, 2 analog inputs
761-102	**Telecontrol module S 8AI ESP,** 4 digital inputs, 4 digital outputs, Internet access via GPRS
761-103	**Telecontrol module S 8AI DSP,** 4 digital inputs, 4 digital outputs, 2 analog inputs Internet access via GPRS

2.2 Telecontrol Modules M

Table 5: Product Overview Telecontrol Modules M

Item number	Name
761-200	**Telecontrol Module M,** 8 digital inputs, 4 digital outputs
761-201	**Telecontrol Module M 8AI,** 8 digital inputs, 4 digital outputs, 8 analog inputs, 2 analog outputs
761-202	**Telecontrol module M 8AI ESP,** 8 digital inputs, 4 digital outputs, 8 analog inputs, 2 analog outputs, event memory
761-203	**Telecontrol module M 8AI DSP,** 8 digital inputs, 4 digital outputs, 8 analog inputs, 2 analog outputs, data memory
761-204	**Telecontrol Module M 8AI ESP, DSP,** 8 digital inputs, 4 digital outputs, 8 analog inputs, 2 analog outputs, event memory, data memory
761-205	**Telecontrol Module M WEB MODBUS,** 8 digital inputs, 4 digital outputs, Internet access via GPRS, Modbus
761-206	**Telecontrol Module M 8AI WEB MODBUS,** 8 digital inputs, 4 digital outputs, 8 analog inputs, 2 analog outputs, Internet access via GPRS, Modbus

2.3 Accessories

Table 6: Product Overview Accessories

Item number	Name
761-9001	**Dipole antenna** with 2.5 m cable
761-9002	**Theft-proof antenna** with 2.5 m cable
761-9003	**Rod antenna, long**
761-9004	**Connection cable for rod antenna** 6 m long
761-9005	**USB adapter** with 1 m connection cable
761-9006	**Dual-band GSM modem** including power supply unit
761-9007	**Power supply unit/charge regulator** 115 … 230 V AC to 24 V DC 1 A, also for battery operation
761-9008	**Battery** 12 V DC 1.2 Ah lead-acid
761-9009	**Outdoor enclosure**

3 Use

The *TO-PASS*® product family is designed for wireless communication of signals and messages.

This includes:

- compact modules for the connection of signals from installations
- transmission
- preparation of values for the operator.

The system is connected in wireless mode to PCs, handheld computers, Internet PCs, web servers, mobile telephones, fax, e-mail receivers or landline telephones. Acting upon the installation is also possible.

Communication occurs using the global mobile radio network “GSM” (Global System for Mobile Communication). A SIM card is required for the *TO-PASS*® telecontrol module to use this network. As in the case of a mobile telephone, the *TO-PASS*® telecontrol module requires the SIM card in order to be able to “log on” to the network.

No other components are required, other than the SIM card to connect to the GSM mobile radio network and a GSM antenna (available as an accessory). Modems and interfaces are already installed in the *TO-PASS*® telecontrol module.

TO-PASS® telecontrol modules may be used as:

- permanent online link
- fault detector
- remote data request system
- data memory
- telecontrol module

In doing so, the modules of the WAGO *TO-PASS*® series are classified as follows:

- WAGO *TO-PASS*® S - “S” = small, compact module,
- WAGO *TO-PASS*® M - “M” = medium, universal compact module.

3.1 Error Messages

As soon as a digital input is set or the limit value of an analog input is undershot or overshot, the *TO-PASS*® telecontrol module immediately transmits an alarm as an SMS. This can be sent simultaneously to up to four receivers. The receivers can be mobile telephones and the alarm can also be read as a message on a landline or received as a fax or an e-mail.

Since the message is transmitted with the date and time it can be used effectively for documentation purposes in the form of fax or e-mail.

3.2 Remote Data Polling

TO-PASS® telecontrol modules offer two options for remote polling of the analog process values.

If polled via SMS, the *TO-PASS*® telecontrol module responds to an SMS containing the text “State” with an SMS that contains the current process values pertaining to all the digital and analog inputs.

When polled with the *TO-PASS*® operator program, all current digital and analog process values are transmitted via direct RS-232 cable connection or with the help of an analog, ISDN or GSM modem link.

3.3 Data Storage

The *TO-PASS*® telecontrol module has a memory for data storage that can save up to 4200 complete “process images” in a ring memory. “Process image” means all voltage and current signals currently available at the terminals of the *TO-PASS*® telecontrol module. All signals are stored with a time stamp in the data memory of the *TO-PASS*® telecontrol module. The time interval between successive storage, that is, the storage cycle can be set between 1 and 99 minutes with the help of the graphical user interface system.

The contents of the data memory can be read out directly from the device using a PC via RS-232 interface or via remote data polling (refer to the section on “Remote Data Polling”). In both cases, polling is initiated using the *TO-PASS*® operator software.

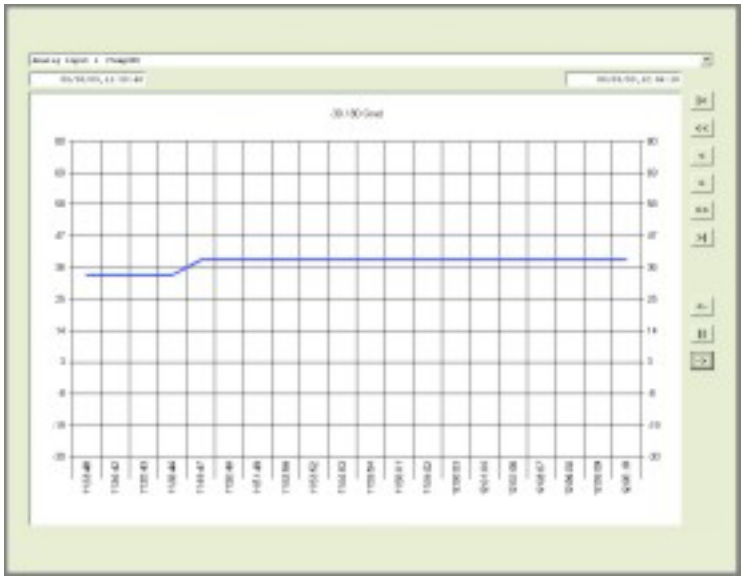

Figure 1: Trend Curve

The figure illustrates the trend curve displayed by the *TO-PASS*® operator software after reading out the values of analog output 1.
The values are also available as a table in ASCII format.

3.4 Telecontrol

For the purpose of telecontrol on the process, the *TO-PASS*® telecontrol module offers up to:

- 8 x digital outputs, with a switching capacity of 1 A
- 2 x analog outputs 0/4 … 20 mA.

The digital outputs can switch loads of up to 1 A, whereby the voltage can be fed separately as DC voltage. The analog outputs can be configured as 0 … 20 mA or 4 ... 20 mA output current. The equivalent of the current value can be configured independently. The outputs can be configured both with the help of the *TO-PASS*® operator software and also via mobile telephone as an SMS.

3.5 Permanent Online Connection

The *TO-PASS*® telecontrol module can be used with Web functionality in order to implement a permanent online link to your system. In this configuration, the *TO-PASS*® telecontrol module transmits all current process values automatically to a web server at configurable cyclic intervals. This web server, which is a standard PC having a permanent Internet connection, collects the data and stores the current values or saves them in the “MySQL” database for archiving purposes.

Please refer to WAGO Kontakttechnik GmbH & Co. KG for assistance with web server, database and web visualization pertaining to this design and configuration of the *TO-PASS*®.

3.5.1 Process Value Archiving

With the help of web functionality, the data can also be stored optionally in a database in “MySQL” format. This database is located on the server and thus saves on investments for commercially available data loggers at site. The database is adapted to the *TO-PASS*® process image and can hold an unlimited amount of data that is limited only by the server memory capacity. The database can be adapted to meet your requirements.

3.5.2 Visualization via Internet

Web visualization is a very comfortable form of visualizing the *TO-PASS*® process data. HTML pages can be saved for visualization on the web server directly, to which the *TO-PASS*® telecontrol module transmits its measured values. A standard PC with Internet connection can be used to access them. The pages are accessed with the help of a user name and password.

The display can be configured by the user to meet his requirements. Standard solutions available are:

- selection map
- process value display
- strip-chart recorder.

All modules can be configured to meet the client's specifications.

Using the selection map, individual stations can be selected using the mouse when a large number of *TO-PASS*® telecontrol modules are used. The name of the station appears automatically with each selection. The detailed picture pertaining to the station appears by clicking on the station.

Figure 2: Selection Map

In the bar chart display, the current values are displayed in the adjacent picture. Digital inputs and outputs are shown as colored buttons. The analog values are displayed as bars with the corresponding numeric values.

Figure 3: Bar Chart Display

The stored values are displayed as a trend curve in the strip-chart recorder. Time is displayed on the X-axis and can be selected by entering the start and end dates.

The scaling of the Y-axis can be selected as follows:

- automatic scaling with respect to the values displayed,
- fixed scaling.

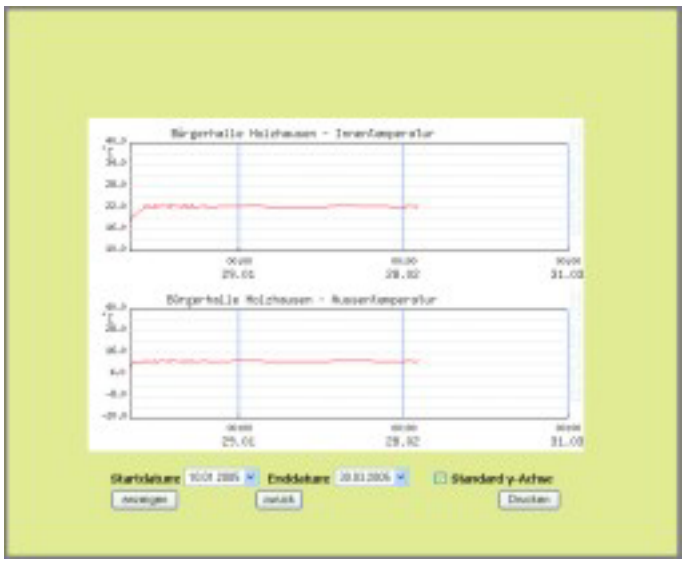

Figure 4: Trend Curve

3.5.3 Visualization via PC or Control System

A PC must be installed on site as a web PC connected to an available PC in order to visualize displays on an existing PC or control system without using web visualization. The link can be configured as a standard computer network using ETHERNET.

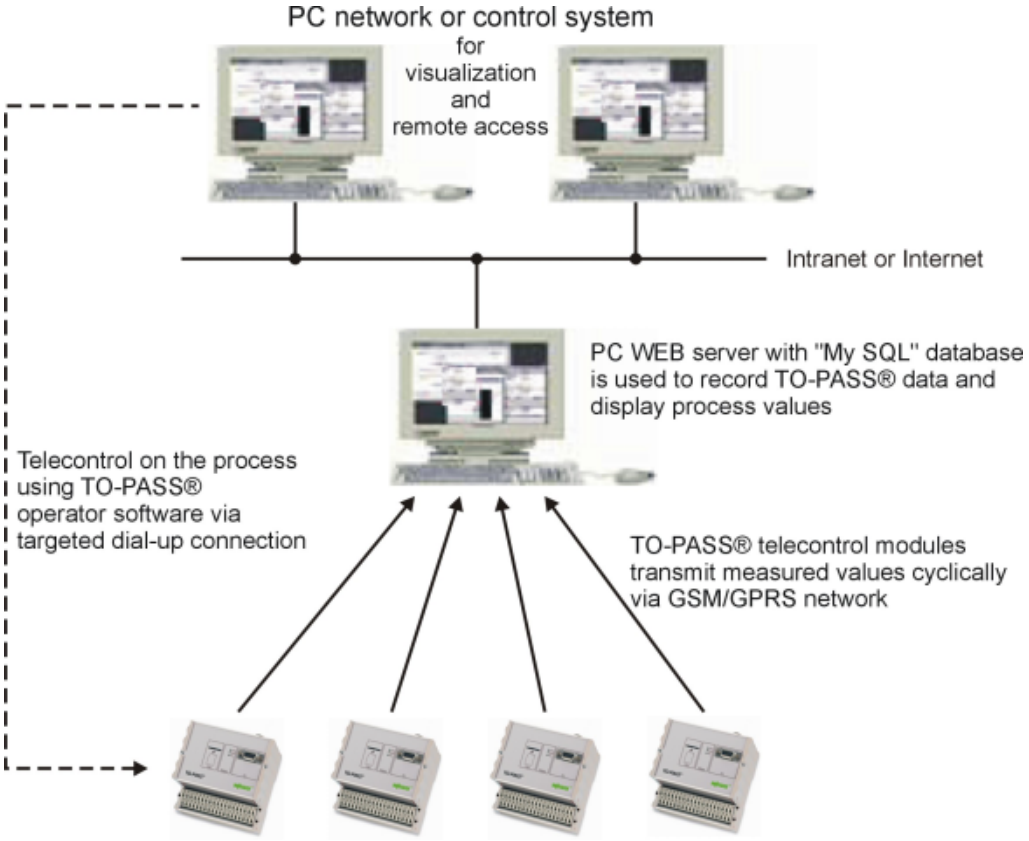

Figure 5: Visualization via PC or Control System

Please contact WAGO Kontakttechnik GmbH & Co. KG with questions regarding configuration and networking of the web PC.

4 Connection to the GSM Mobile Radio Network

4.1 SIM Cards

The *TO-PASS*® telecontrol module communicates in a manner similar to that of a mobile telephone, using the mobile radio network GSM (Global System for Mobile Communication). Using the GSM network enables the *TO-PASS*® telecontrol module to be self-sufficient (used without cable connections) and located anywhere that the GSM network is available. The GSM network is available in more than 190 countries.

Essentially, the *TO-PASS*® telecontrol module communicates at any location where it is possible to place a call via mobile telephone. If the reception is weak, then amplifying antennas can be used. As an additional test, WAGO Kontakttechnik GmbH & Co. KG can check the reception level with the help of the *TO-PASS*® operator software or check the network availability with the respective service provider worldwide by specifying the location. For matters pertaining to this, please contact WAGO Kontakttechnik GmbH & Co. KG.

The *TO-PASS*® telecontrol module requires a SIM card to connect to the GSM network. The SIM card can be optimized for use depending on the application. Different services are used within the GSM network. The services describe the mode of communication that is used by the mobile subscriber. The most popular service is “Voice” as mobile telephones communicate in this mode. “SMS” (Short Message Service) is another popular service within the GSM network.

As described in the section on “Application,” the *TO-PASS*® telecontrol module uses the following services for communication:

- SMS (Short Message Service)
- CSD (Circuit Switch Data)
- GPRS (General Packed Radio Service)

For applications having only fault messages, a SIM card offered by SMS service, is adequate (and is offered by every standard mobile telephone card). Some providers such as T-Mobile Germany however, also offer SIM cards having only SMS communication. Depending on the framework contract, this alternative may be more cost-effective.

The *TO-PASS*® telecontrol module requires the CSD service for remote polling, telecontrol and remote customization.

The *TO-PASS*® telecontrol module uses the GPRS service for permanent on-line connection. Please consult your service provider in this case particularly with respect to the chargeable block size for transmission. The block size charged describes the rounding that the GSM service provider performs when terminating the GPRS transmission. If, for example, 76 kB have been transmitted and the block size is 10 kB, then the service provider rounds this up to 80 kB. The optimal block size for the *TO-PASS*® telecontrol module is 1 kB.

Please contact WAGO Kontakttechnik GmbH & Co. KG for selecting the optimal contract with the service provider.

4.2 GSM Antennas

The *TO-PASS*® telecontrol module requires a GSM antenna to communicate with the GSM network. Suitable antennas are available as accessories — depending on the application other antennas can also be used. Similarly, the cable to the antenna can be extended.

5 View

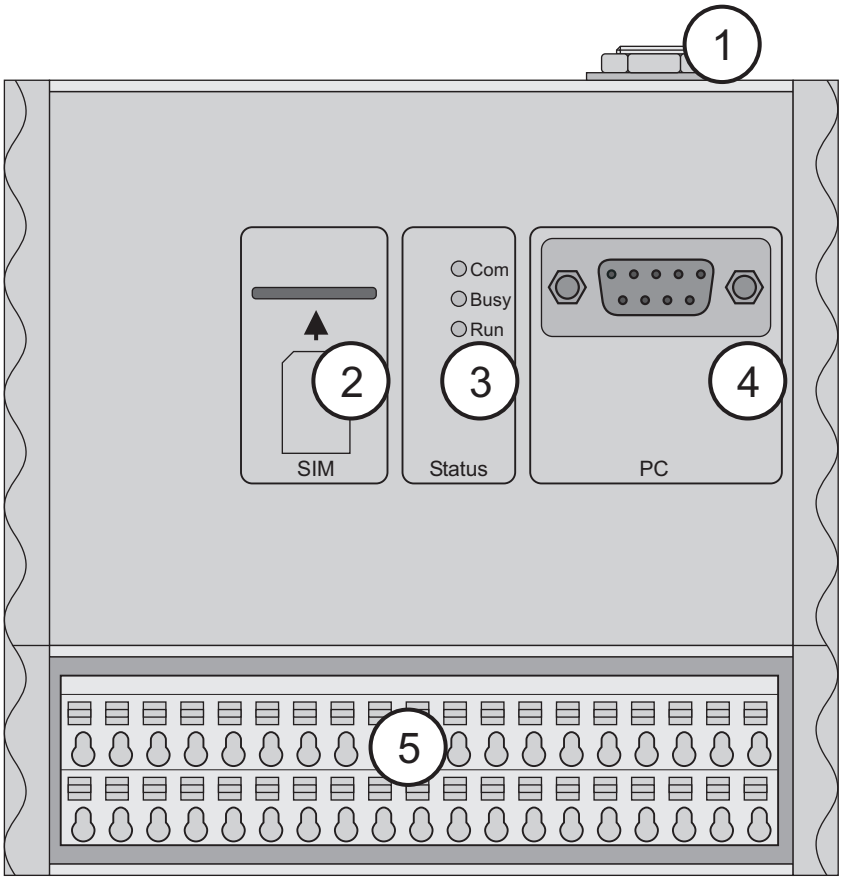

Figure 6: Front View

Position	Description
1	Antenna connection
2	SIM card insert
3	Status indication
4	PC Interface
5	Connectors for supply, inputs and outputs

6 Disclaimer

The *TO-PASS*® telecontrol modules communicate via GSM network (Global System for Mobile Communication). Please note that the GSM services used by the *TO-PASS*® telecontrol modules may be affected by failures in the service provider's network. WAGO Kontakttechnik GmbH & Co. KG has no involvement with these types of problems.

Therefore, WAGO Kontakttechnik GmbH & Co. KG disclaims any guarantee for the implementation of commands transmitted from and received by the *TO-PASS*® telecontrol modules.

7 Technical Data

Table 7: General Technical Data

Number of recipients	4 (PC, SMS, e-mail, phone, fax)
Communication	GSM quad band
Communication types	SMS (bidirectional), DFÜ selection connection (CSD), GPRS connection to Internet
Operating voltage	DC 8 V ... 36 V
Closed current	35 mA
Current during transmission	< 600 mA
Type of mounting	TS 32 DIN rail
Wire connection	Spring type connection
Dimensions (W x H x D)	109 mm x 105 mm x 78 mm
Weight approx.	426 g
Operating temperature	-20 °C ... +70°C
Storage temperature	-20 °C ... +70°C
Degree of protection	IP 20
EMC 1 Immunity to interference	acc. to EN 61000-4-6 (2001)

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