# Storm-01

## Terminal for monitoring and control of equipment and power stations

→ **universal use**
→ **automation functions**
→ **mobile communication**

The Storm-01 is the basic unit in the Storm line. It is a multi-functional terminal that meets all general standards for SCADA systems in the power sector, industry, transport, telecommunications, and other fields. It is equipped with communication modules and a number of communication interfaces through which it can be easily integrated into customers' SCADA systems. A typical use is as an RTU for distribution network monitoring and management.

### → Basic Characteristics

- broad range of inputs and outputs
- easy addition of Storm expansion modules with digital I/O or a measuring converter
- ability to add special custom functions
- communication interface for easy integration through a number of standard communication protocols
- local and remote update, configuration, parameter setting and diagnostics through supplied software
- reduced Storm-00 version of the terminal is also available, with a limited number of inputs and outputs

### → Typical Use

- monitoring, control and automation of electrical stations (substations, switching or distribution stations) and switching elements (breakers, reclosers, disconnectors) in HV, MV and LV distribution grids
- monitoring, control and regulation of power generating stations (renewable resources – solar power, wind farms, small hydro stations, biogas stations, cogeneration units, backup and mobile generators)
- universal RTU with PLC functions for monitoring and control of equipment in industry and transport
- terminals for on-line transmission of data from power and consumption meters for other utilities (gas, heat, water)
- monitoring and control of telecommunication infrastructure and the infrastructure of buildings, administrative and shopping centers.
- versatile as well as special communication converter for a broad range of communication interfaces and protocols
- specific functions and type configuration according to customer requirements for a broad range of uses, as OEM for manufacturers, suppliers and system integrators
- delivery for integration into technological components and facilities, from individual units to large series

### → Communication

- support for secure communication according IEC 62351
- GPRS/LTE mobile communication module (optional)
- GPS module (optional)
- serial and network communication, Ethernet
- large number of communication protocols
- ability to communicate in multiple directions simultaneously
- data storage when the communication link goes down
- time synchronization via communication protocol or from GPS (optional)

## Technical specification

| | |
|---|---|
| Digital inputs | 16x opto-element, passive input |
| Digital outputs | 4x switching contacts relay |
| Analog inputs | 4x 0-20 mA/10 V measurement |
| Communication interface | Ethernet LAN, RS-232, RS-485, mobile, according to GSM module installed – LTE/UMTS/EDGE/GPRS |
| GPS module | GPS/GLONASS module, installed by request |
| GSM/GPS antenna connectors | SMA/F |
| Physical build | 9M width plastic case |
| Installation | 35 mm DIN rail |
| Ingress protection | IP 20 |
| Power voltage | 24 V DC |
| Typical draw | 70 mA |
| Operating temperature | -25 ÷ 70 °C |
| Maximum ambient temperature | 95 % non-condensing |
| Weight | max. 250 g |
| Dimensions (w x h x d) | $158 \times 90 \times 60$ mm (9 modules) |
| EMC emission and resistance standards | IEC 61000-6-4, IEC 55024, IEC 55022, IEC 61000-6-2 |

## Digital inputs parameters

| | |
|---|---|
| Organization | 1 x 8 + 1 x 8, common minus |
| Logical level L 24V/110V | min. 0 V, max. 5 V / min. 0 V, max. 45 V |
| Logical level H 24V/110V | min. 16 V, max. 30 V / min. 65V, max. 120 V |
| Inputs current | typ. 6 mA |
| Peak input current | max. 30 mA |
| Maximum time resolution | 1 ms |
| Galvanic isolation | yes |
| Galvanic isolation strength | 300 V AC 300 V DC 2500 V DC 1 minute |
| Conductor connection | 2 x ten-pole WAGO 734-10 connector |
| Connecting conductors | max. 0.75 mm² cross-section |

| | |
|---|---|
| Input status indication | green LED |
| Basic digital input parameters settings | number of bits (1,2) input scan rate filters for suppression of interference and intermediate positions value inversion |

## Digital output parameters

| | |
|---|---|
| Organization | 1 x 4 DO, common point |
| Switched current | on: 4 A off: DC 24 V / 4 A, DC 110 V / 0,3 A |
| Galvanic isolation of DO outputs | 300 V AC/DC, 2500 V DC 1 minute |
| Connection points | six-pole WAGO 734-6 connector |
| Connecting conductors | max. 0.75 mm² cross-section |
| Outputs status indication | red LED |
| Basic digital outputs parameters settings | impulse/always on, engagement duration number of bits (1,2) persistence |

## Analog input parameters

| | |
|---|---|
| Number | 4 x AI |
| Organization | 1 x 4, common minus |
| Inputs range | 4x 20 mA DC current measurement, 10-bit AD conversion or 4x 10 V DC voltage measurement, 12-bit AD conversion other U/I ranges by request |
| Inputs headroom | current 4 %, voltage 3.5 % |
| Inputs resistance | U 40 kΩ / I 125 Ω |
| Overload | 150 V short-term, 1000 V DC peak |
| Accuracy | 0.5% of range |
| Basic analog inputs parameter settings | sampling period measured values linear conversion $y=Kx+Q$ |
| Typical use | measuring of analogue values from physical quantity sensors and converters |

## Communication protocols (by interface)

| | |
|---|---|
| RS-232, RS-485 | IEC 60870-5-101, Modbus (RTU) |
| Ethernet, GPRS | IEC 60870-5-104, Modbus TCP, DNP 3.0 TCP |