APATOR



JS-07 Master+ (IP68)

JS-02 Master+ (IP65)

JS130-02
Master+ (IP65)

# JS Master+ IP68/IP65

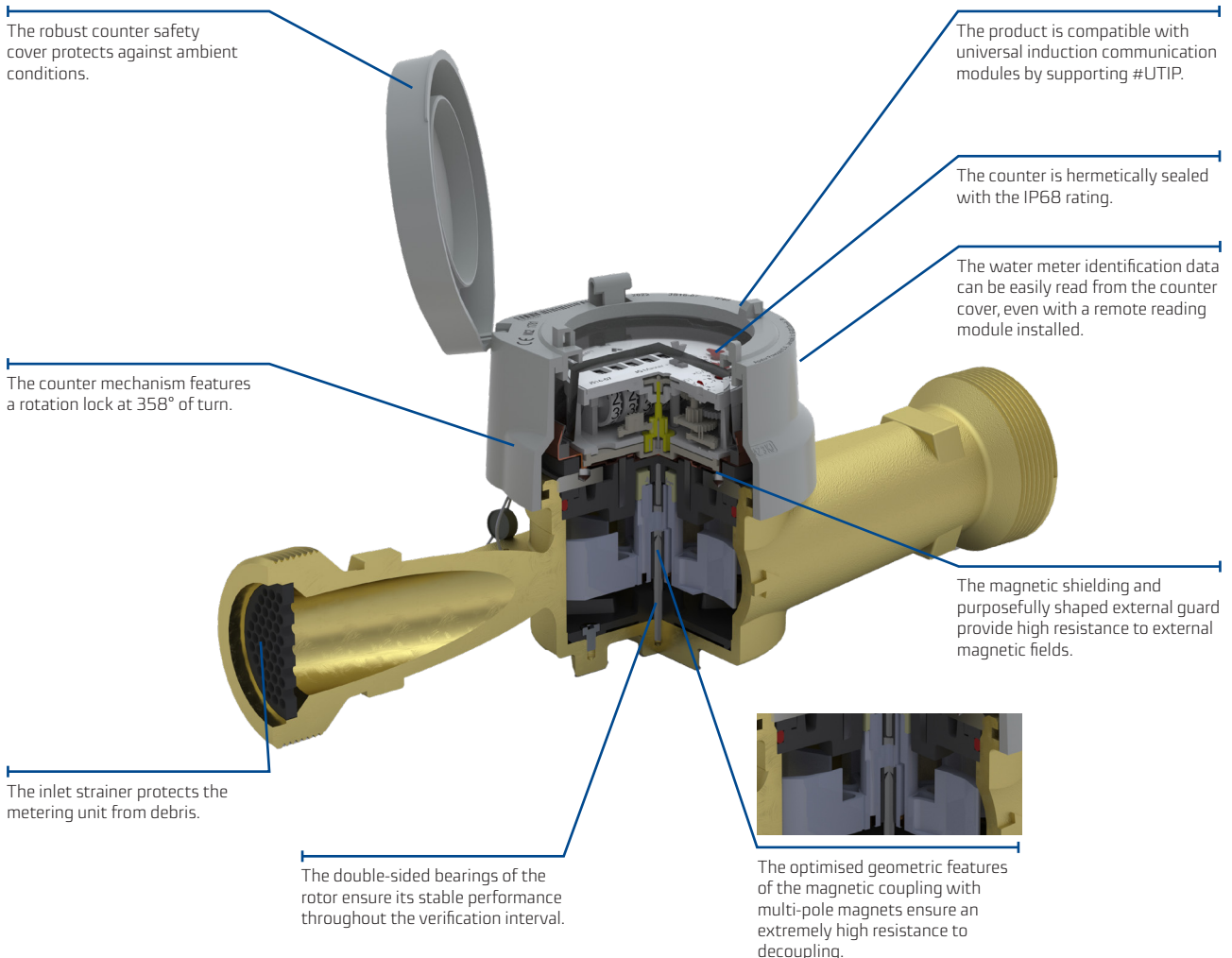DN25, DN32 & DN40 single-jet vane-wheel water meter

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# JS Master+ IP68/IP65

JS Master+ IP68/IP65 is a single-jet vane-wheel dry water meter for precise measurement of water supply consumption. The advanced design engineering ensures a high dynamic response to metering conditions and a high immunity to strong magnetic fields. The water meter is compatible with optical and induction data communication modules from Apator Powogaz S.A. for automatic wired or wireless meter reading. The water meter is designed and manufactured to the MID (Measuring Instruments Directive) and complies with EN14154, OIML R49 and ISO4064 for the maximum measurement range of R100.

# Application

Cold water supply systems (max. 50°C) and hot water supply systems (max. 130°C) in multifamily housing, industrial facilities, public facilities, and metering stations. The maximum operating pressure (MOP) is 16 bar. The water meter is designed for installation in a horizontal orientation with the counter upward (H ↑ ) or sideways (H→),   and   in a vertical orientation (V). The rotary counter provides easily readable indications directly from the front face and works well in different installation orientations. The standard IP68 version is compatible with directly installed induction data communication modules which feature #UTIP (Universal TI Plug), whereas the IP65 water meters support optical and induction data communication modules mounted using an interface ring.

## JS Master+ IP68



The robust counter safety cover protects against ambient conditions.

The product is compatible with universal induction communication modules by supporting #UTIP.

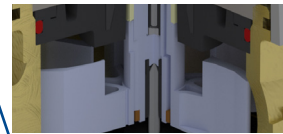The counter is hermetically sealed with the IP68 rating.

The water meter identification data can be easily read from the counter cover, even with a remote reading module installed.

The counter mechanism features a rotation lock at 358° of turn.

The magnetic shielding and purposefully shaped external guard provide high resistance to external magnetic fields.

The inlet strainer protects the metering unit from debris.

The double-sided bearings of the rotor ensure its stable performance throughout the verification interval.

The optimised geometric features of the magnetic coupling with multi-pole magnets ensure an extremely high resistance to decoupling.

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# JS Master+ IP65

The robust counter safety cover protects against ambient conditions.

Compatible with optical and induction data communication modules.

The counter is hermetically sealed with the IP65 rating.

The water meter identification data can be easily read from the counter cover, even with a remote reading module installed.

The counter mechanism features a rotation lock at 358° of turn.

The magnetic shielding and purposefully shaped external guard provide high resistance to external magnetic fields.

The inlet strainer protects the metering unit from debris.

The double-sided bearings of the rotor ensure its stable performance throughout the verification interval.
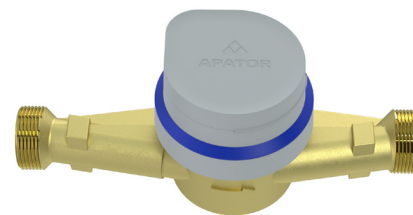
The optimised geometric features of the magnetic coupling with multi-pole magnets ensure an extremely high resistance to decoupling.

## JS Master+ IP65 hot water meter version
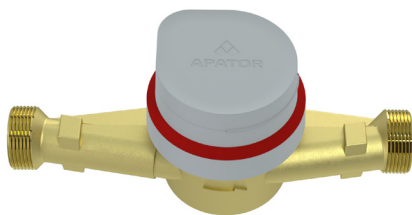
## JS Master+ IP 65 cold water meter version

## Advantages

### Economy:

- Precise measurements at R100 – H
- Remote meter reading via wired or wireless interfaces
- Protection against:
    - strong magnetic field effects (by magnetic shielding)
    - mechanical tampering (a robust, tamper-proof counter design)
    - multiple rotations of the counter by more than 358°

## Convenient use:

- The water meter is AMR (automatic meter reading) (MDMS)-capable and provided with #UTIP in the IP68 version for direct installation of induction data communication modules, while the IP65 version is compatible with optical and induction data communication modules which feature an interface ring
- Easily readable:
  - the counter can be oriented anywhere within 0 to 358°
  - hermetically sealed, non-fogging IP68 counter: the counter mechanism is sealed in a copper-glass enclosure with a copper guard
- Wireless reading-capable via:
  - Induction communication modules: IN-WMBUS, IN-GSM for the IP65 and IP68 versions
  - APT-03A-3 optical communication module for the IP65 version
- Wired reading-capable via:
  - Induction communication modules: IN-PULSE for the IP65 and IP68 versions
  - Optical communication modules: APT-MBUS-NA-2 and AT-MBUS-NE-03 for the IP65 version
  - NK reed relay pulse transmitter for the IP65 version

## Reliability:

- Tested and robust design
- Long operating life thanks to advanced materials:
  - with high resistance to wearing (in the bearings and pivots)
  - with a surface texture which minimises flow resistance (on the rotor and sealing disc)
- The inlet strainer (which protects the metering unit from debris)
- The counter mechanism is protected against mechanical damage

# Key features

- Output of event alarms: when equipped with an RF communication module, the water meter can indicate removal or breaking off of the module, module operating disturbance, reverse flow, leaks, etc.
- The rotor bearings, other solutions and materials used ensure stable metrology over the service life
- IP68 rating: the water meter is capable of operation in extremely difficult ambient conditions (even when fully immersed in water), including with a data communication module installed
- Highly aesthetic water drop-shaped design of the counter safety guards and covers
- Stable flow rate inlet bore design
- Double-sided rotor bearings
- Available in the IP65 version with a reed relay pulse transmitter

## New design of the cover and the face, exemplified by the IP65 counter (for hot and cold water)

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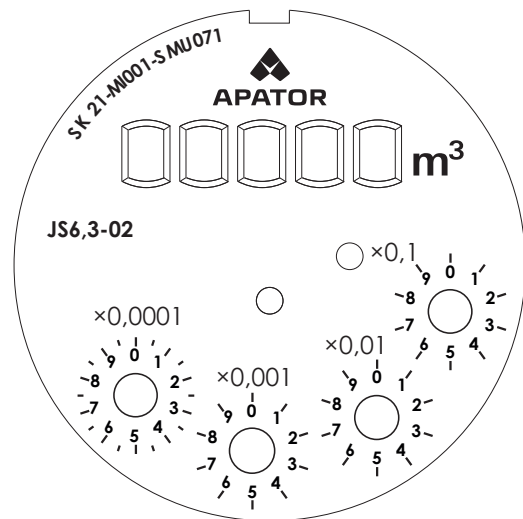
## Regulatory and standards compliance

- Directive 2014/32/EC of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments
- OIML R 49-1:2006 – Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements
- OIML R 49-2:2013 – Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
- OIML R 49-3:2013 – Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format
- EN 14154-1:2005+A2:2011 – Water meters. Part 1: General requirements
- EN 14154-2:2005+A2:2011 – Water meters. Part 2: Installation and conditions of use
- EN 14154-3:2005+A2:2011 – Water meters. Part 3: Test methods and equipment
- EN ISO 4064-1:2017 – Water meters for cold potable water and hot water. Part 1: Metrological and technical requirements
- EN ISO 4064-2:2017 – Water meters for cold potable water and hot water. Part 2: Test methods
- EN ISO 4064-5:2017 – Water meters for cold potable water and hot water. Part 5: Installation requirements
- EC type examination certificate no. SK 21-MI001-SMUU071
- Classification of environmental climate and mechanical conditions: Class B (ref. PN-ISO 4064-1:2014 (E)
- Classification of mechanical environment conditions: Class M1 (ref. Polish Regulation Dz.U. 2007.3.27)
- Classification of electromagnetic environment conditions: Class E1 (ref. Polish Regulation Dz.U. 2007.3.27)

All materials of the JS Master+ IP68/IP65 water meters have PZH-NIH Hygiene Certificates for use with potable water.
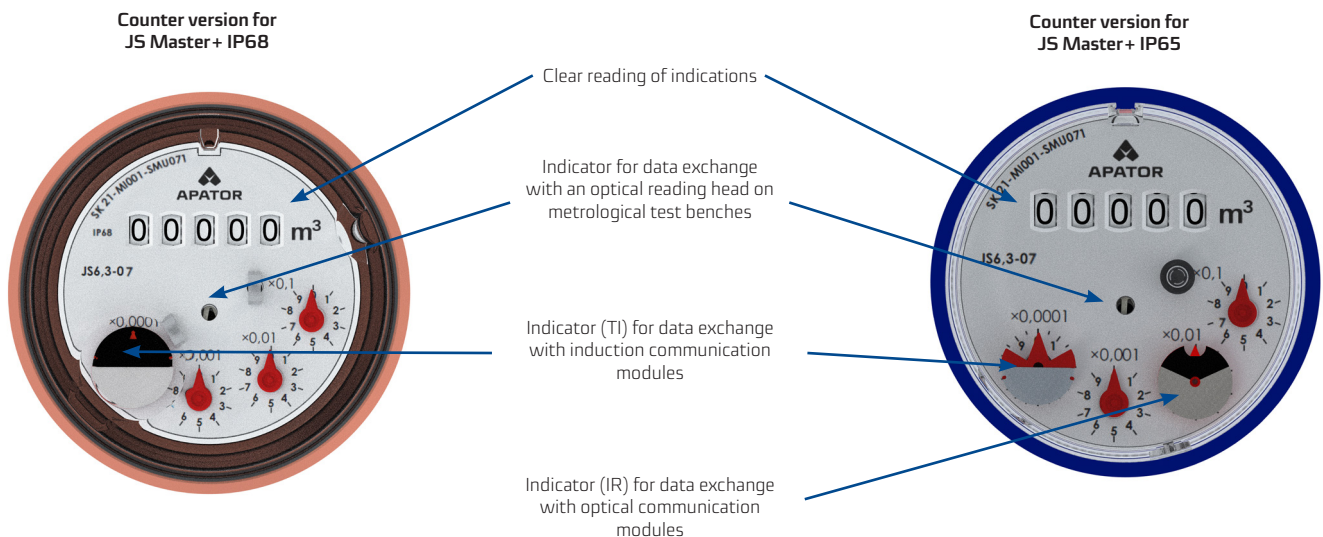


**Counter version for JS Master+ IP68**

**Counter version for JS Master+ IP65**

Clear reading of indications

Indicator for data exchange with an optical reading head on metrological test benches

Indicator (TI) for data exchange with induction communication modules

Indicator (IR) for data exchange with optical communication modules

#### Table 1. Technical data

| Parameter | | | | | JS Master+ IP68/IP65 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | JS6,3-02*<br>JS6,3-02-XX***<br>JS130-6,3-02*<br>JS130-6,3-02-XX***<br>JS6,3-07** | JS10-G11/4-02*<br>JS10-G1¼-02-XX***<br>JS130-10-G11/4-02*<br>JS130-10-G1¼-02-XX***<br>JS10-G1¼-07** | JS10-02*<br>JS10-02-XX***<br>JS130-10-02*<br>JS130-10-02-XX***<br>JS10-07** | JS16-02*<br>JS16-02-XX***<br>JS130-16-02*<br>JS130-16-02-XX***<br>JS16-07** |
| Nominal diameter | | | DN | mm | 25 | 25 | 32 | 40 |
| Permanent flow rate | | | $Q_3$ | m³/h | 6.3 | 10 | 10 | 16 |
| Maximum flow rate | | | $Q_4$ | m³/h | 7.875 | 12.5 | 12.5 | 20 |
| Transitional flow rate | cold water | H↑R100<br>V, H→R50 | $Q_2$ | dm³/h | 101<br>202 | 160<br>320 | 160<br>320 | 256<br>512 |
| | hot water | H↑R100<br>V, H→R40 | | | 126<br>252 | 200<br>400 | 200<br>400 | 320<br>640 |
| Minimum flow rate | cold water | H↑R100<br>V, H→R50 | $Q_1$ | dm³/h | 63<br>126 | 100<br>200 | 100<br>200 | 160<br>320 |
| | hot water | H↑R100<br>V, H→R40 | | | 79<br>158 | 125<br>250 | 125<br>250 | 200<br>400 |
| Starting flow | | | – | dm³/h | 21 | 33 | 33 | 53 |
| $Q_2/Q_1$ ratio | | | – | – | 1.6 | | | |
| Temperature class (rated operating temperature) | | | – | – | T30 / T50 / T130 | | | |
| Flow profile sensitivity class | | | – | – | U0, D0 | | | |
| Indicating range | | | – | m³ | 99,999 | | | |
| Reading resolution | | | – | m³ | 0.00005 | | | |
| Maximum pressure | | | $P_{max}$ | MPa | 1.6 | | | |
| Maximum pressure loss | | | Δp | kPa | 63 | | | |
| Maximum permissible error range: $Q_2 \le Q \le Q_4$ | | | ε | % | ±2 for 0.1 to 30ºC cold water<br>±3 for > 30ºC water | | | |
| Maximum permissible error range: $Q_1 \le Q < Q_2$ | | | ε | % | ±5 | | | |
| NK reed relay pulse transmitter | | | – | dm³/pulse | 10 (standard pulse rate); 100 | | | 100 (standard pulse rate); 10 |
| Inlet and outlet pipe end threads | | | G | Inch | G1¼ | G1¼ | G1½ | G2 |
| Height | | | h | mm | 36 | | | |
| | | | H | mm | 115 | | | |
| | | | H1 | mm | 123 | | | |
| | | | H2 | mm | 200 | | | |
| Length | | | L | mm | 165****/ 260 | 260 | 260 | 300 |
| | | | l | mm | 380 | | | 440 |
| Diameter | | | D | mm | 111 | | | |
| Weight (w/o connection fittings) | W/o NK transmitter | | – | kg | 2.0 | 2.2 | 2.2 | 2.5 |
| | With NK transmitter | | – | kg | 2.2 | 2.4 | 2.4 | 2.7 |

Versions:
* Version **-02** – IP65-rated counter mechanism; supports readout with induction communication modules (Ti) and optical communication modules (IR)
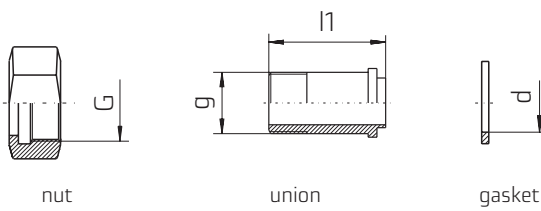** Version **-07** – IP68-rated counter mechanism sealed with mineral glass enclosure with a copper guard; supports readout with induction communication modules (Ti)
*** Version **XX-NK** or NKP reed relay transmitter; supports reed relay pulse transmitters
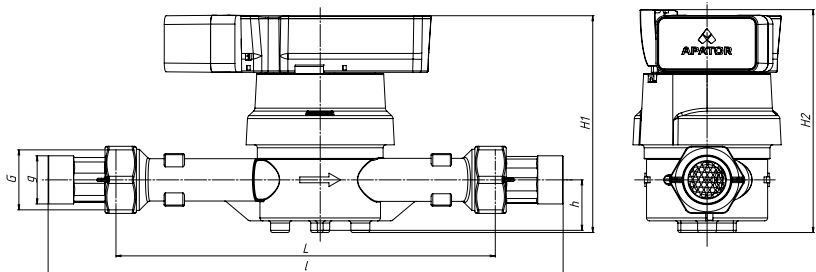**** For cold water versions only

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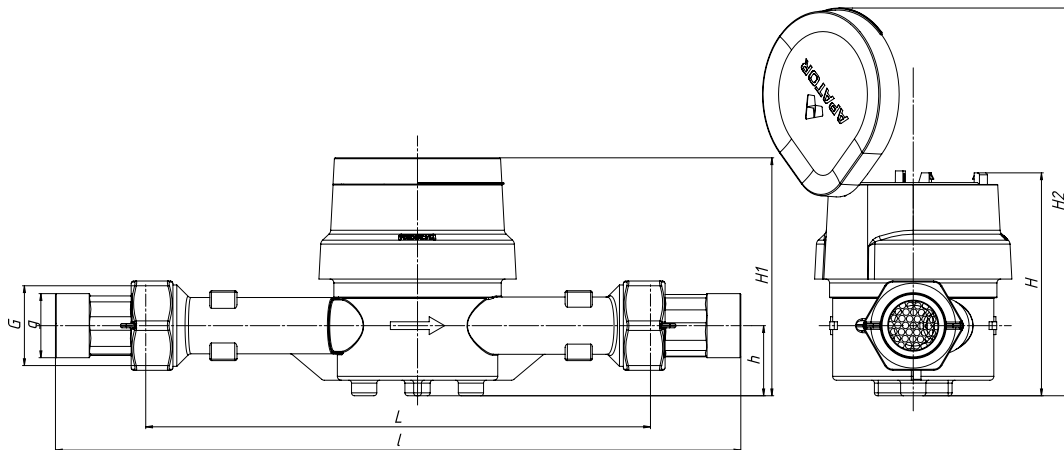
## Connection fittings



| nut | union | gasket |

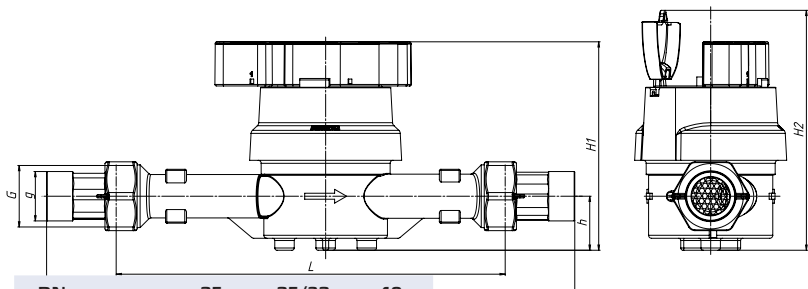| DN | G | g | d | l1 |
|----|-----|------|----|------|
| 25 | 1¼" | 1" | 29 | 46.5 |
| 32 | 1½" | 1¼" | 36 | 56 |
| 40 | 2" | 1½" | 43 | 66 |

## Example of the Master+ IP68 water meters with compatible data communication modules:

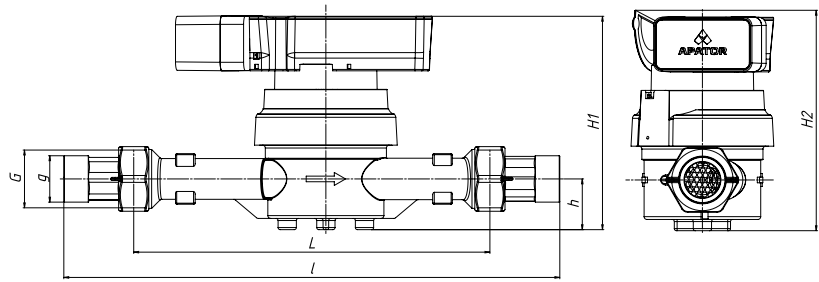**IN-GSM clip-on module,** #UTIP (Universal TI Plug)



| DN | | 25 | 25/32 | 40 |
|----|----|----|-------|----|
| H1 | mm | | 149 | |
| H2 | mm | | 153 | |

**IN-WMBUS clip-on module,** #UTIP (Universal TI Plug)



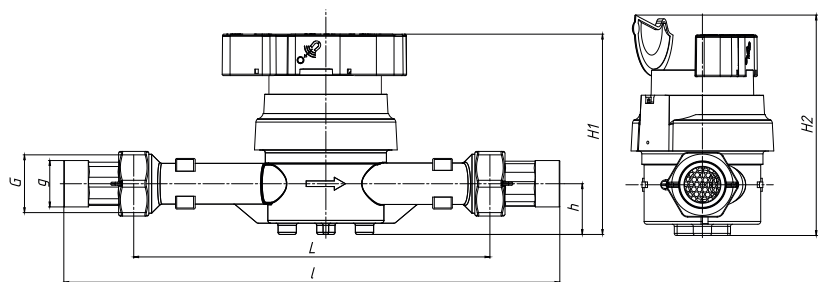| DN | | 25 | 25/32 | 40 |
|----|----|----|-------|----|
| H1 | mm | | 140 | |
| H2 | mm | | 160.5 | |

# Example of the Master+ IP65 water meters with compatible data communication modules:
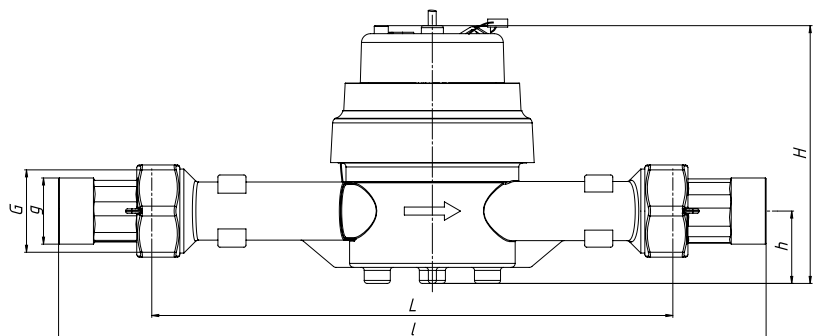
## IN-GSM clip-on module with the interface ring



| DN | | 25 | 25/32 | 40 |
|---|---|---|---|---|
| H1 | mm | | 151.85 | |
| H2 | mm | | 156.84 | |

## IN-WMBUS & IN-PULSE clip-on modules with the interface ring



| DN | | 25 | 25/32 | 40 |
|---|---|---|---|---|
| H1 | mm | | 142.55 | |
| H2 | mm | | 156.84 | |

## Water meter with the reed relay transmitter (NK) installed



| DN | | |
|---|---|---|
| h | mm | 36.1 |
| H | mm | 128.6 |

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## Pressure loss chart

Pressure loss



JS6,3  JS10  JS16

mbar | kPa

1000 — 100
500 — 50
100 — 10
50 — 5
10 — 1
5 — 0,5
1 — 0,1

1    10    100 [m³/h]

## Typical error chart

Error [%]



5%
3%
2%
-2%
-3%
-5%

$Q_1$  $Q_2$  $Q_3$  $Q_4$

Volumetric flow [m³/h]
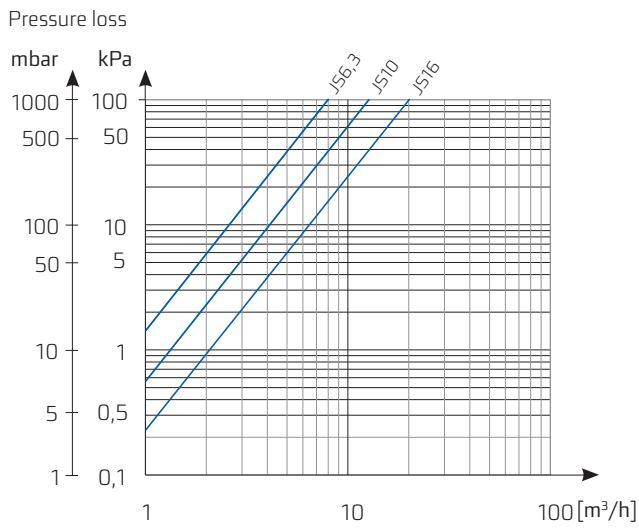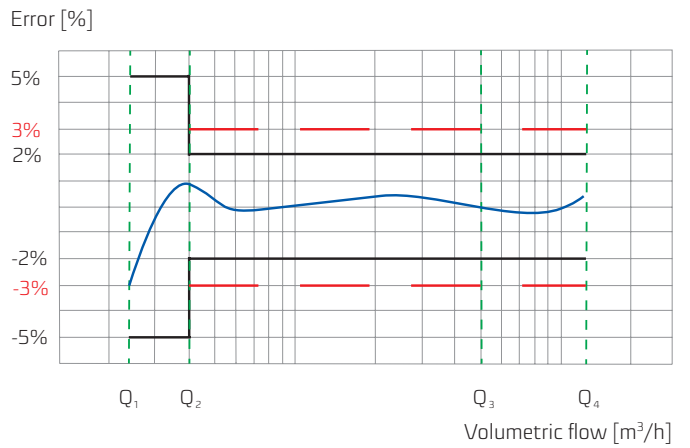
# Remote indication relay & flow rate measurement for IP68/IP65; flow rate measurement



Heat meter
**Elf 2**
- M-Bus + 4 pulse inputs
- M-Bus + 2 pulse inputs + 1 pulse output
- RS485 Modbus enabled
- USB (service access)
- Wireless M-Bus T1 + 2 pulse inputs

In1 In2 In3 In4

Heat meter
**Invonic 2M**
- WM-BUS
- M-BUS
- Modbus RTU RS485
- RS OPTO

In1 Out1 In2 Out2

Heat meter calculator
**Faun**
- WM-BUS
- M-BUS
- Modbus RTU/Lumbus RS232/ RS485
- LonWorks
- RS OPTO
- Analog outputs (4–20 mA/1–10 V)
- Pulse outputs
- Optical interfaces

In1 In2 In3 In4

**NK transmitter (for IP65)**
white
brown

$U_S$ < 30 VDC
$I_S$ < 100 mA
Cable, YTLY 2x0.14 mm², L = 2 m

**Water meter**

**IN-Pulse**

**APT-WMBUS-NA-1 module**

Frequency band: 868 MHz
Protocol: Wireless M-Bus
Power output: 20 mW

**M-Bus module (IP65)**

$U_S$ < 30 VDC
$I_S$ < 100 mA
Cable, YTLY 2x0.14 mm², L = 2 m

**IN-GSM**

**Converter M-BUS / RS232**
Eth1
Eth2

**AMR system (MDMS)**
Collector data reading
Stationary data reading

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