

# Operating Manual

Flanged water meters, DN40-400 IP68/IP65-CE

Flanged flow meters, DN40-250 IP68/IP65



**MWN Nubis**



**MK**



**JS Impero**



**MH**



**MWN/JS-coupled**



**WI**

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## 1. Subject

Thank you for purchasing this product. This Operating Manual applies to the DN 40÷400 flanged water meters and DN 40÷250 irrigation flow meters manufactured by Apator Powogaz S.A. in Poznań according to the manufacturing procedures under the Integrated Environmental, Health and Safety Management System. Please read the entire Operating Manual carefully before installation of the flanged water meters for the measurement of volumetric consumption of piped potable water, household water, and industrial process water, or of the WI irrigation flow meters for the measurement of water consumption from surface bodies and the discharge water from sewage treatment plants.







*Table 1. Types and applications of water/flow meters*

Type – Version	Application
MWN (WPH-01) <i>Nubis</i> – horizontal rotor axis propeller MK-01 – chamber-mount, vertical rotor axis propeller MH-01 – fire hydrant, vertical rotor axis propeller JS <i>Impero</i> – single-jet vane-wheel	<ul style="list-style-type: none"> <li>• Cold water: min. 0.1°C – max. 50°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• IP68 – hermetic counter (new version from 2021 and complete with #UTIP connector, compatible with induction transmitter modules)</li> <li>• IP65 – hermetic counter, compatible with optical transmitter modules</li> </ul>
MWN/ JS – coupled, with spring-action valve	<ul style="list-style-type: none"> <li>• Cold water: min. 0.1°C – max. 50°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• IP68 – hermetic counter (new version from 2021 and complete with #UTIP connector, compatible with induction transmitter modules)</li> <li>• IP65 – hermetic counter, compatible with optical transmitter modules</li> </ul>
MWN NKOP (WPH-N-01) – propeller, compatible with transmitters MWN/JS-S NKP – coupled, compatible with NK transmitter modules MK-01 NKOP – propeller, compatible with NK and NO transmitter modules MH-01 NKOP – propeller, compatible with NK and NO transmitter modules JS Impero NKOP – propeller, compatible with NK and NO transmitter modules	<ul style="list-style-type: none"> <li>• Cold water: min. 0.1°C – max. 30°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• IP65 – hermetic counter, compatible with optical transmitter modules</li> <li>• IP68 – hermetic counter (new version from 2021 and complete with #UTIP connector, compatible with induction transmitter modules)</li> <li>• NKOP – version with an IP65 counter compatible with NK and NO transmitter modules               <ul style="list-style-type: none"> <li>○ NK – reed relay pulse transmitter</li> <li>○ NO – optoelectronic pulse</li> </ul> </li> </ul>

	<p>transmitter</p> <ul style="list-style-type: none"> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> </ul>
MWN130 (WPH130-01) – horizontal rotor axis propeller	<ul style="list-style-type: none"> <li>• Hot water: max. 130°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• IP65 – hermetic counter, compatible with optical transmitter modules</li> </ul>
MWN130 NKP (WPH130-N-01) – propeller, compatible with NK and NO transmitter modules	<ul style="list-style-type: none"> <li>• Hot water: max. 130°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• NKP – IP65 counter compatible with NK transmitter modules</li> <li>• NK – reed relay pulse transmitter</li> </ul>
WI	<ul style="list-style-type: none"> <li>• Cold water: min. 0.1°C – max. 30°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• IP65 – hermetic counter</li> <li>• IP68 – hermetic counter (new version from 2021 and complete with #UTIP connector, compatible with induction transmitter modules)</li> </ul>
WI-NKP	<ul style="list-style-type: none"> <li>• Cold water: min. 0.1°C – max. 30°C</li> <li>• Max operating pressure: 1.6 MPa (16 bar)</li> <li>• NKP – IP65 counter compatible with NK transmitter modules</li> <li>• NK – reed relay pulse transmitter</li> </ul>

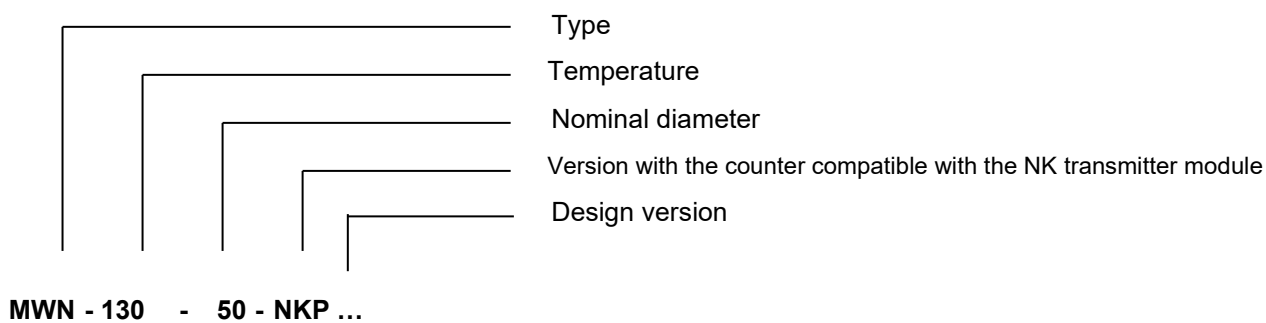
#UTIP – Universal TI Plug

Table 2. Installation orientation

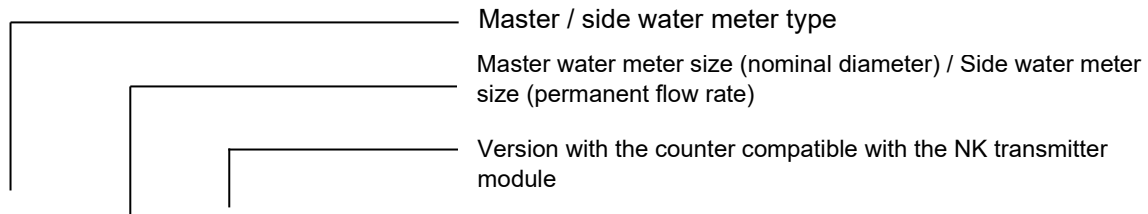
Water/flow meter type	Application		Counter position
	Horizontal $H \uparrow$	Vertical $V, H \rightarrow$	
MWN (WPH-01) Nubis MWN130 (WPH130-01)	x	x	
MWN/JS-S	x		
MK-01		x	
MH-01		x	
JS Impero	x		
WI	x	x	

\* Maximum installation orientation deviation from the vertical:  $\pm 3^\circ$

Example part designation marking of the MWN (WPH-01) Nubis water meter



Example part designation marking of a coupled water meter



**MWN/JS – 50/4.0 - NKP**

Table 3. Permanent flow rate Q<sub>3</sub> vs. water meter type

Water meter / flow meter type	MWN (WPH-01) <i>Nubis</i>	MWN130 (WPH130-01)	MK-01	MH-01	JS <i>Impero</i>	MWN/JS	WI
Size (mm)	Permanent flow rate, Q <sub>3</sub> (m <sup>3</sup> /h)						
40	25	25	-	-	-	-	25
50	40	25	25	25	25 (50*)	25	25
65	63	40	-	40	40 (60*)	40	40
80	100	63	63	-	63 (90*)	63	63
100	160	100	100	-	100 (135*)	100	100
125	250	160	-	-	-	-	160
150	400	250	250	-	-	250	250
200	630	400	-	-	-	-	400
250	1000	630	-	-	-	-	630
300	1600	1000	-	-	-	-	-
400**	1000	-	-	-	-	-	-

\* Maximum instantaneous flow rate in case of fire: < 2 h

\*\* Available by special order

## 2. Technical data: reference standards and regulations

The technical data is specified in the Technical Data Sheets issued for specific water meter types.

The water meters meet the following standards and regulations:

1. Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States related to the making available on the market of measuring instruments
2. OIML 49-1:2006 – Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements.
3. OIML R 49-2:2004 – Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods.
4. OIML R49:2013-1 – Water meters intended for the metering of cold potable water and hot water. Metrological and technical requirements.
5. OIML R 49-2:2013 – Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods.
6. OIML R 49-3:2013 – Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format.
7. EN 14154-1:2005+A2:2011 – Water meters. Part 1: General requirements
8. EN 14154-2:2005+A2:2011 – Water meters. Part 2: Installation and conditions of use
9. EN 14154-3:2005+A2:2011 – Water meters. Part 3: Test methods and equipment
10. EN ISO 4064-1:2014/2017 – Water meters for cold potable water and hot water. Part 1: Metrological and technical requirements.
11. EN ISO 4064-2:2014/2017 – Water meters for cold potable water and hot water. Part 2: Test methods.
12. EN ISO 4064-4:2014/2017 – Water meters for cold potable water and hot water. Part 4: Non-metrological requirements not covered in ISO 4064-1.
13. EN ISO 4064-5:2014/2017 – Water meters for cold potable water and hot water. Part 5: Installation requirements.
14. PZH National Institute of Hygiene certificate (all materials used in Apator water meters have Hygiene Certificates for use with potable water)
15. Polish Regulation of the Minister of Development dated 02/06/2016 and concerning requirements for measuring instruments
16. Polish Regulation of the Minister of Development and Finance dated 13/04/2017 ad concerning legal metrological inspection of measuring instruments

The water meters in production may vary from PN-EN 14154 in installation length. This depends on the specific needs of the end user.

The following standards specify the basic requirements for installation of the water/flow meters:

- PN-B-10720 – Water pipelines. Installation of water meter sets in water supply systems. Acceptance requirements and tests.
- PN-EN 14154-2: Installation and conditions of use.

The flow meters meet the following standards and regulations:

1. PN-EN 14268 – Meters for irrigation water
2. PN ISO 4064 as applicable to technical characteristics
3. PN-ISO 4064-3 of Feb. 1997, Section 10.1.3.2
4. Hygiene Certificate

### 3. Operating principle of water/flow meters

The MWN (WPH-01) Nubis water meter comprises a body, metering unit, and counter mechanism. The flow of water passing through the water meter drives the propeller installed in the metering unit. The propeller is co-axial to the body bore and rotates a magnet on an axle via a worm and wheel transmission. The magnet in the wet section of the water meter is coupled to the counter magnet installed in the dry section of the water meter. A system of gears drives the pointers and barrels of the water meter, which then indicates the measured flow of water.

The MWN/JS coupled water meter comprises a type MWN master water meter as specified above and a side water meter. The installed side water meter can be a type JS single-jet vane-wheel dry water meter. A spring-action switchover valve governs the flow path of the metered water, so that if the water flow is low the water is diverted to the side water meter and if the water flow is high the water is diverted to the master water meter. The spring-action switchover valve operates automatically and requires no external source of power. Operation of the spring-action switchover valve means that the measurement ranges of the master and side water meters overlap. In this way the coupled water meter has a wide measurement range, which starts from the minimum volumetric flow of the side water meter and completes with the maximum volumetric flow of the master water meter.

The MK-01 water meter comprises a body, metering unit, and counter mechanism. The inlet duct by which the water enters the body is vertical and the outlet duct for the water is horizontal. The flow of water passing through the water meter drives the propeller installed in the metering unit. The propeller is oriented vertically. The magnet in the wet section of the water meter is coupled to the counter magnet installed in the dry section of the water meter. A system of gears drives the pointers and barrels of the water meter, which then indicates the measured flow of water.

The MH-01 water meter comprises a body, metering unit, and counter mechanism, and optionally, may feature a fire hydrant standpipe. The inlet duct by which the water enters the body is vertical and the outlet duct for the water is horizontal. The flow of water passing through the water meter drives the propeller installed in the metering unit. The propeller is oriented vertically. The magnet in the wet section of the water meter is coupled to the counter magnet installed in the dry section of the water meter. A system of gears drives the pointers and barrels of the water meter, which then indicates the measured flow of water.

The JS Impero water meter comprises a metering unit and counter mechanism. The flow of water passing through the water meter drives the propeller installed in the metering unit. The propeller axis is perpendicular (vertically oriented) to the body bore centreline. The magnet in the wet section of the water meter is coupled to the counter magnet installed in the dry section of the water meter. A system of gears drives the pointers and barrels of the water meter, which then indicates the measured flow of water.

The WI irrigation flow meter comprises the metering unit and the counter mechanism. The flow of water passing through the water meter drives the vane wheel installed in the metering unit. The vane wheel has the axis perpendicular to the body bore centreline and operates like an undershot water wheel. A worm and wheel transmission with a magnetic coupling allow the vane wheel to propel the set of gears for the counter mechanism in the dry section. The motion of the gears is translated into the meter's pointers and barrels, which then indicate the measured flow of water.

### 4. Selecting the correct size of the water meter

The proper selection of the size criterion (for DN, the nominal diameter) of the water meters should always be based on the operating conditions, i.e. the mean and maximum operating volumetric flow of water.

A water meter that is too large not only increases the purchase costs, but also reduces the water measurement indication accuracy when the water flow is low.



A water meter that is too small overstresses the mechanism, resulting in premature wear of the moving components.

For your water meter to perform properly within its measurement range limits and maximum indication error limits, its operating range must be precisely determined, which can also be achieved based on monthly water demand, considering the minimum and maximum volumetric flow values (for existing installations, it is recommended to monitor the water supply).

It is recommended to choose a water meter size where the maximum foreseen volumetric flow of the system is equal to the following:

- 0.5 to 0.7 of permanent flow rate  $Q_3$  for type MWN (*WPH-01*) *Nubis* water meters;
- 0.3 to 0.4 of permanent flow rate  $Q_3$  for type MWN130 (*WPH130-01*) water meters;
- $Q_3$  for the coupled water meters;
- 0.6 to 0.8 of permanent flow rate  $Q_3$  for type MK-01 water meters;
- 0.6 to 0.8 of permanent flow rate  $Q_3$  for type MH-01 water meters;
- 0.5 to 0.7 of permanent flow rate  $Q_3$  for type JS *Impero* water meters;

The permanent flow rate  $Q_3$  values for specific water meter types are listed in Table 3.

The application of the optimum water meter type also depends on the water temperature and pressure, the conditions for water meter installation in the water supply pipe, and whether the indications and the volumetric flow measurement values need to be output remotely or not. Another criterion for selection of the water meter size is the pressure loss in the system caused by installation of the water meter.

Select a water meter such that frequent or prolonged flow rates are not within the operating range of the spring-action switchover valve. The switchover operating ranges are shown in the specific Technical Data Sheet.

## 5. Selecting the correct size of the irrigation flow meter

The proper selection of the size criterion (for DN, the nominal diameter) of the irrigation flow meters should always depend on the operating conditions, i.e. the mean and maximum operating volumetric flow of water in the pipe system to which the flow meter is to be connected rather than the diameter of the pipe. An irrigation flow meter that is too large under actual operating conditions not only increases the purchase costs, but it also reduces the water measurement indication accuracy when the water flow is low. An irrigation flow meter that is too small overstresses the mechanism, resulting in premature wear of the moving components. For your irrigation flow meter to perform properly within its measurement range and maximum indication error limits, its 24-hour operating range must be precisely determined, although this can also be achieved based on monthly water demand, considering the maximum volumetric flow values. The maximum permitted loads of the irrigation flow meters are listed in Table 4.

Table 4. Maximum permitted loads for irrigation flow meters

Type (irrigation flow meter size)	Maximum operating flow rate	Maximum monthly load limit
DN (mm)	m <sup>3</sup> /h	m <sup>3</sup> /month
40	25	10,800
50	30	12,960
65	50	21,600
80	80	34,400
100	125	54,000
125	175	75,600
150	250	108,000
200	450	194,000
250	70	302,000

## 6. Delivery inspection

The measurement device as supplied by the manufacturer requires inspection to verify that no external shipping damage is present, especially on the body, the body flanged ends, the counter guard, and the wiring (if the version includes a transmitter module).

Verify that the tamper seals match the verification or security markings, that the seals are securely installed, and that the water/flow meter part designation markings are present.

The following markings are affixed to the counter dial, nameplate, or body of each water meter:

- Manufacturer's name/logo and full address details;
- MID type examination marking;
- Type trademark;
- Serial number;
- Production year;
- The metrological marking comprises the capital letter M and the two last digits of the production year in which the marking was applied to the measurement device;
- Direction of flow, shown with an arrow (on the body);
- The V mark for vertical piping, where the water meter is to be installed in the vertical orientation;
- The H ↑ mark for horizontal piping, where H ↑ denotes that the water meter is to be installed in the horizontal orientation with its counter pointing upward;
- The H → mark for horizontal piping, where H → denotes that the water meter is to be installed in the horizontal orientation with its counter pointing sideways;
- The HV mark for horizontal and vertical piping water meters;

- Volumetric flow value,  $Q_3$  (m<sup>3</sup>/h);
- Measurement unit designation, m<sup>3</sup> (see the counter scale);
- Maximum pressure loss,  $\Delta p$ ;
- For cold water meters: the maximum temperature limit, e.g. T50 (50°C),
- For hot water meters: the maximum temperature limit, e.g. T130 (130°C);
- Maximum pressure limit: MAP16 (PN 16).

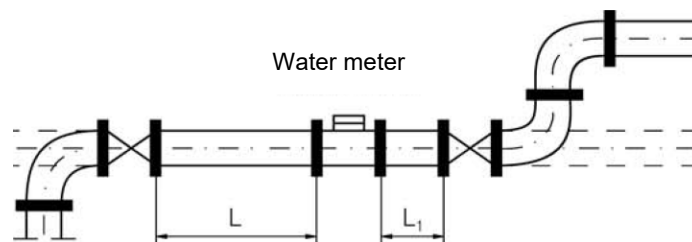
## 7. Water meter installation requirements

7.1 The installation location should provide easy access for the process of installation, removal, servicing, and reading, and be separated from rooms in use or for storage. The installation location should be sheltered from the weather, including sub-zero temperatures, high humidity levels, dust, and the effects of electrical power and gas systems. If there is no installation location suitable according to these criteria, the water meter can be installed in a dedicated chamber, but the installation location inside it must be sufficiently high above the chamber bottom. The chamber must have a sediment trap or a water drain discharging to the outside.

7.2 The water meter must not be exposed to shocks or vibration while installed due to nearby equipment or to excessively high ambient air temperatures, contaminants, flooding with water, or corrosive agents. The installation location temperature must be between +5°C and +55°C. Protect the water meter from hydraulic turbulence, including cavitation and water rams.

7.3 Provide stop valves upstream and downstream of the water meter connections to enable isolation from the water for removal or repair of the water meter. The stop valves must expose the entire water supply pipe bore.

7.4 If the water flow is expected to be contaminated during operation of the water meter, install a suitable filter or trap between a straight upstream section of the piping and the upstream stop valve.



*Fig. 1. Installation of the water meter*

7.5 To prevent the installation fastening from stressing the water meter body, it is recommended to use expansion (deflection) couplings installed on the meter's discharge side. The coupling must permit the reduction of the length by telescopic sliding of its sleeve.

7.6 The piping route geometry at the installation location must prevent air blocks from forming within the installation length of the water meter. The water meter must remain completely filled with water, so the water supply piping downstream of it must not have a drop in the downstream direction (see Fig. 1).

7.7 Prevent overstressing of the water meter due to the attached piping or other equipment. If necessary, install the water meter on a pedestal or a bracket. The upstream and downstream piping must be properly fastened so that no component of the system shifts by the action of water when the water meter is removed or detached on one of its ends.

7.8 The operating pressure at the inlet of the water meter's measurement chamber must be  $\leq$  the maximum allowed pressure (MAP) for which the water meter is rated. The minimum allowed pressure (MAP) at the water meter's outlet must be 30 kPa (0.3 bar).

7.9 The installation of the water meter in the system must conform to the intended operating orientation (horizontal or vertical, as applicable by specification) (see Table 2).

7.10 The MWN (*WPH-01*) *Nubis* and JS *Impero* water meters can be installed without straight piping sections upstream (U0) and downstream (D0).

#### 7.10.1 Special installation requirements for the water meters

The piping can feature straight sections upstream and downstream for protection against the negative effects of water flow turbulence due to bends, valves, and other system components, the upstream side can use a straight piping section with a length of  $L=3DN$  (the DN of the water meter).

If the water meter is to be installed downstream of a double bend, a check valve, a pump, or any other component which generates significant flow turbulence, double the specified upstream straight piping section length as follows:  $2L$ ; if the turbulence-generating component is a piston pump, triple the length:  $3L$ . To avoid an upstream straight section this long, a flow vane can be installed upstream of the water meter. The turbulence forming downstream of the water meter is generally inconsequential to reading accuracy. However, if backflows occur then there is a risk of failure of the propeller/vane wheel bearings. It is recommended to counter this by installing (if feasible) a short straight section downstream of the water meter, and the section length must be:  $L_1 = 2DN$ .

**CAUTION!** Never attempt to weld a system in which a water meter is installed, as it this may cause a failure!

7.11 The upstream and downstream pipe sections must be concentric to one another. Install all seals concentric to the pipe bore centreline. It is not permitted to install the water meter offset (eccentrically) from the pipe centreline, and especially to have the piping-to-water meter seals offset and obstructing the pipeline bore, as this may cause a flow turbulence.

7.12 The water flow through the water meter must be in the direction shown by the flow arrow affixed to both sides of the water meter body.

7.13 The water meters are intended for connection by flanged ends. The flanges are fabricated as per PN-ISO-7005-2 and PN10 in the standard version. Other fabrication reference standards are available on request. The system pipe connections with the water meter must have flanges with the same bolt hole pattern as the water meter flanges.

7.14 The water meters must be secured to the pipes with bolts and washers in a size compatible with the flange bolt holes.

## 8. Irrigation flow meter installation requirements

8.1 The installation location should provide easy access for the processes of installation, removal, servicing and easy reading, as well as protecting the irrigation flow meter from sub-zero temperatures.

8.2 Install stop valves upstream and downstream of the irrigation flow meter connections to enable isolation from the water for removal of the irrigation flow meter or its measuring insert for inspection or repairs.

8.3 The piping route geometry at the installation location must prevent air blocks from forming within the installation length of the irrigation flow meter. The irrigation flow meter must remain completely filled with water, so there must not be a drop in the downstream direction of the pipework (see Fig. 2).

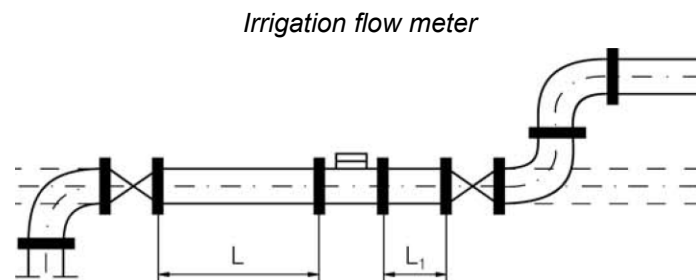


Fig. 2. Flow meter installation

8.4 For protection against the negative effects of water flow turbulence due to bends, valves, and other system components, the upstream side can have a straight section with a length of  $L=5DN$  (the DN of the flow meter). If the flow meter is to be installed downstream of a double bend, a check valve, or a pump, double the specified upstream straight piping section length as follows:  $2L$ ; if the turbulence-generating component is a piston pump, triple the length:  $3L$ . To avoid an upstream straight piping section this long, a flow vane can be installed upstream of the irrigation flow meter. The downstream straight piping section length for the irrigation flow meter must be:  $L_1 = 3DN$ .

8.5 All connections with the installed irrigation flow meter must be in accordance with good practice. Install all seals concentric to the piping bore centreline. It is not permitted to install the irrigation flow meter offset (eccentrically) from the pipe centreline, and especially to have the pipe-to-flow meter seals offset and obstructing the pipe bore, as this may cause turbulent flow.

8.6 The water flow through the irrigation flow meter must be in the direction shown by the flow arrow affixed to both sides of the guard. The stop gate valves, if installed upstream and downstream of the irrigation flow meter, must be fully open while the water is flowing.

8.7 When commissioning a new water supply system or repairing pipework before installation of an irrigation flow meter, the pipework to be connected to the meter must be thoroughly flushed to remove all debris and contamination which could damage the flow meter.

8.8 The irrigation flow meters must be secured to the pipework with bolts and washers in a size compatible with the flange bolt holes.

## 9. Priming with water, commissioning, and operation of the water/flow meter

9.1 Before installing a water/flow meter in the piping, flush the piping to remove all debris and contamination. If a filter is to be used, it must be cleaned before the installation process. For the flushing process, the water/flow meter must be replaced with a straight pipe spool.

9.2 Prior to its installation, perform a functional test of the water/flow meter: spin the propeller/vane wheel and check it for the correct direction of rotation. Verify the condition of the tamper seals.

9.3 With the water/flow meter installed in the piping, open the water flow starting at a small rate with all vents open so that the air bled from the system does not cause the propeller/vane wheel to overspeed, which may result in bearing failure during a dry run.

9.4 During operation, the stop valves upstream and downstream of the water/flow meter must be fully open.

9.5 Having completed the commissioning tasks, verify that the measurement device is operational: its reading should increase as the water flow increases. Specifically inspect that **the measurement device and/or its connections do not leak water**.

9.6 During operation of the measurement device periodically verify that the actual operating conditions are within the limits of intended use, especially the limits of pressure, temperature, and flow rate, **and that the measurement device and/or its connections do not leak water**.

## 10. Storage and transport

The brand-new or removed existing water/flow meter must be kept with the counter upwards or to the side, indoors, away from corrosive vapours, odours, and other agents which might be detrimental to the meter. The indoor storage temperature must be between +5°C and +50°C at a relative air humidity not exceeding 90%. Protect the measurement device during storage and transport from vibration and shock which may damage the enclosure or internal components. Transport the meter in sheltered vehicles, in its original packaging or its substitute, whichever fully protects the meter from damage. If transported in low-temperature weather conditions, it is best to keep the product dry.

## 11. Troubleshooting

If the counter fails to indicate despite the water flowing through the water/flow meter, check that the propeller/vane wheel is not jammed by dirt. If the meter fails to operate, even if clean and unclogged, or whenever other damage is evident, return the meter for repairs with an appended claim for the discovered defects. If the pulse transmitter module fails, report this to the manufacturer. If the troubleshooting is ineffective despite any instructions received from the manufacturer, return the meter for repairs.

## 12. Safety and environmental requirements

12.1 The water/flow meter is a measuring instrument which is safe to use, provided it is installed properly and operated according to this Operating Manual.

12.2 Hazards exist during installation, servicing and operation of the product:

a) Mechanical hazards (applicable to water/flow meters):

- Fall during improper handling;
- Water leaks, leading to flooding of the product due to improper installation or a water pressure exceeding the rated MAP;

b) Thermal hazards (applicable to water meters):

- Burns from touching the water meter while it is in operation or a leak of hot water.

12.3 The mechanical hazards are reduced by the external shape of the measuring device, which facilitates handling. Large devices have fixtures for attachment to lifting equipment. The thermal hazards can be prevented by application of dedicated guards.

12.4 The installation and servicing of the water/flow meter requires a suitable location with firm ground that will not cause a hazard of falling.

12.5 The water/flow meter components are not harmful to human health or the environment. All measurement devices are delivered with hygiene certificates indicating their suitability for use with drinking water.

12.6 The applied ingress protection rating of the counters (which can be IP65 or IP68) and other design solutions protect the water/flow meter against the negative effects of water vapour condensation interfering with the correct reading and operation of transmitter/data modules.

12.7 Classification of environmental conditions

- Classification of mechanical environmental conditions – class M1, as per the Polish Regulation of the Minister of Development of 02/06/2016 and Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014.
- Classification of climatic environmental conditions – Class B, as per PN-EN ISO 4064-2:2014 and Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014.
- Classification of electromagnetic environment conditions – Class E1 and E2, as per EN ISO 4064:2014 and Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014.

## 13. Pulse output value and installation diagrams for water/flow meters

### 13.1 Standard water meter version pulse value for the NK transmitter module

Nominal diameter, DN (mm)	Cold water	Hot water
	Pulse value (m <sup>3</sup> )	Pulse value (m <sup>3</sup> )
40	0.01	0.01
50; 65; 80; 100; 125	0.1	0.1
150; 200; 250; 300;	1	1
400	10	-

### 13.2 Standard water meter version pulse value for the NO transmitter module

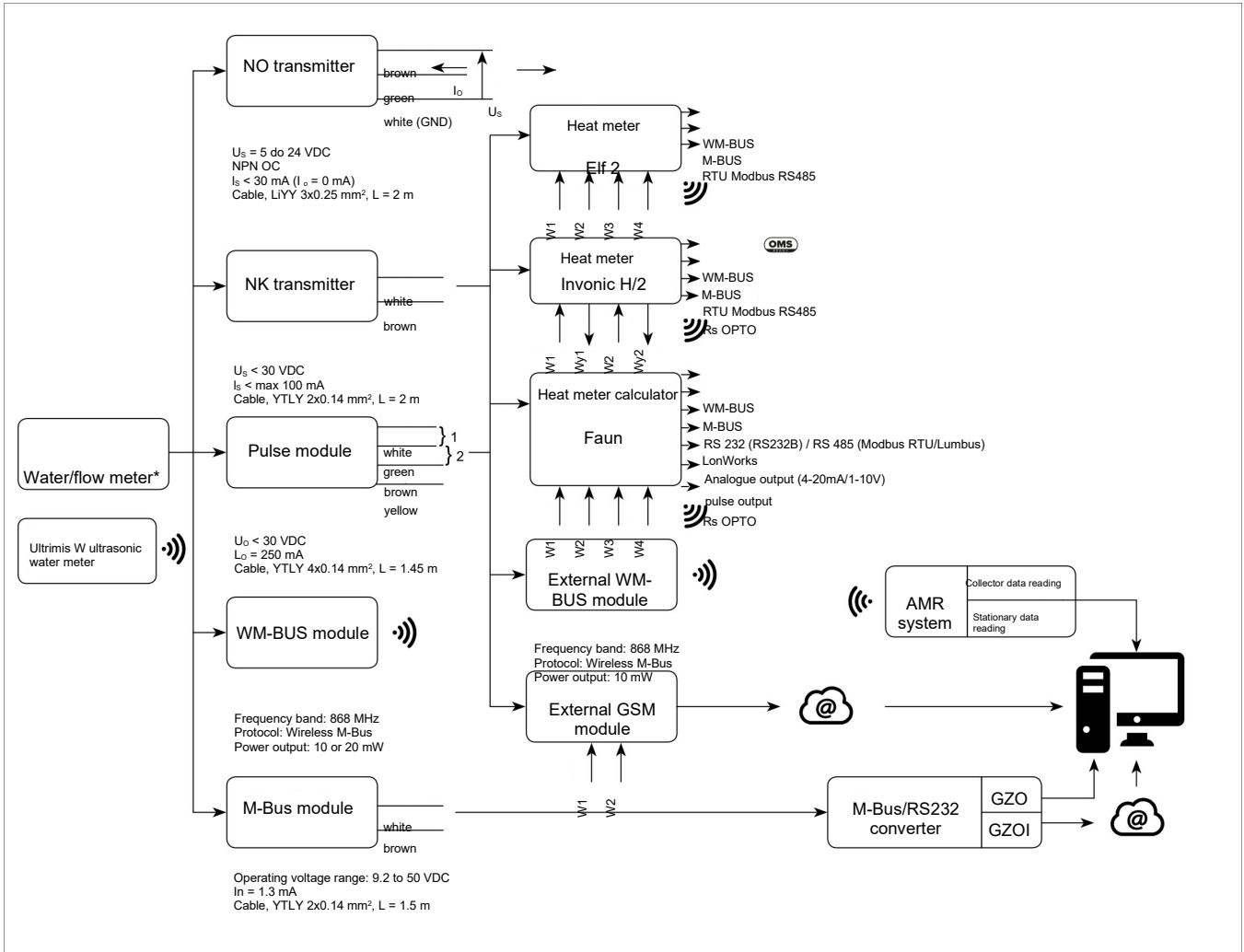
Nominal diameter, DN (mm)	Pulse value (litres)
40; 50; 65; 80; 100; 125	1
150; 200; 250	10
300; 400	105.2632

### 13.3 Irrigation flow meter pulse value for the NK transmitter module

Nominal diameter, DN (mm)	Pulse value (m <sup>3</sup> ) (WI-NKP-03; WI-NKP-04)
40; 50; 65; 80; 100; 125 150; 200; 250; 250	1 or 0.1



Fig. 3. Example connections for remote transmission of readings and volumetric flow measurements



\* Consult your nearest Apator Powogaz representative for the actual data communication options of WI irrigation flow meters.

### 13.4 Transmitter cable extension

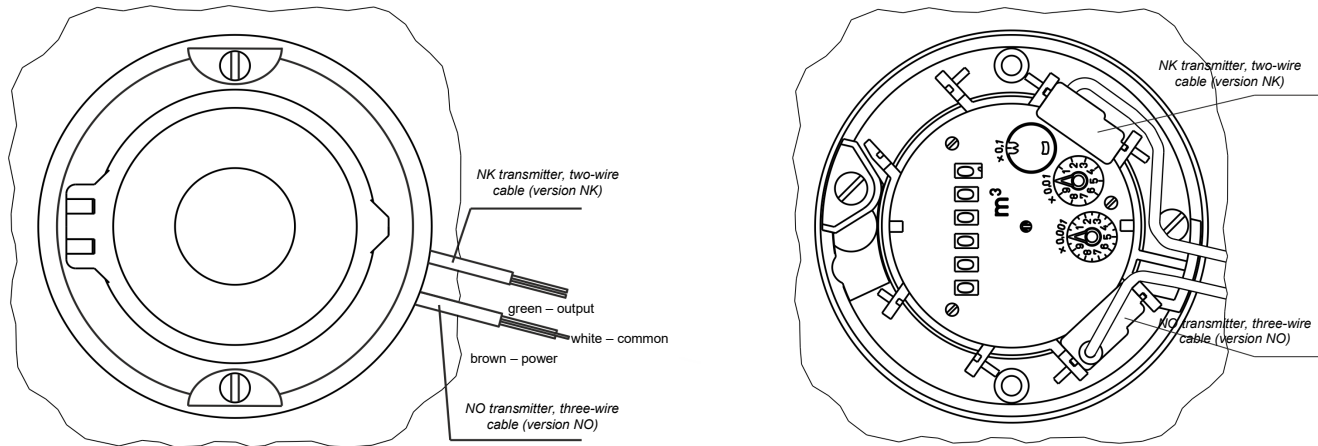
To extend the standard cable of the transmitter module, use a shielded cable with the single core minimum size of 0.75 mm<sup>2</sup> and a total extension line impedance not higher than 500 Ω. Note that the transmission cable extension line must not intersect the existing power and data lines.

Note: Make the extension line as short as possible.

### 13.5 Example overview of the counter in an industrial flanged water meter, version NKOP (IP65), with the NK and NO transmitter modules installed

View of the counter with the guard and the IP65 flap shield (for cold water operation)

View of the counter with an example pulse output configuration and the IP65 guard assembly removed (for cold water operation)



See the detailed installation of the NK and NO transmitters on industrial water meters and the NK transmitter on irrigation flow meters on <http://www.apator.com/pl> – go to the measurement device product page of interest and see the Download column.

## 14. Disposal of waste products and packaging

Dispose of waste packaging at a paper recycling collection point or in compliance with the waste segregation requirements, using a dedicated waste paper bin.

If damaged or at the end of its life, remove the product from the system and overhaul it or have it recycled with the component materials recovered. The product to be disposed of must be disassembled and processed in compliance with the environmental protection laws and regulations prevailing in the country in which the product has been marketed. Never dispose of the product with household waste. If the packaging features plastic parts, dispose of them in compliance with the waste plastic disposal requirements.



## 15. Declaration of conformity

This product was produced in compliance with all reference standards and regulations prevailing on the date of production. The relevant declaration of conformity is appended to each delivered product.

## 16. Your feedback

The Operating Manuals for our products are subject to continuous updating. Your suggestions for improvement are most welcome and will help us to optimise the Operating Manuals according to your needs. Please communicate all your feedback about this Operating Manual to the manufacturer by e-mail at [handel.powogaz@apator.com](mailto:handel.powogaz@apator.com).

**CAUTION!**

Due to continuous development, the manufacturer has the right to modify its products in ways not reflected in the Operating Manuals without altering the primary type characteristics. Our Spare Parts Catalogue is available on request.

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Aparator Powogaz S.A. has the right to modify and improve its products without prior notice.