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EU-Baumusterprüfbescheinigung

EU Type-examination Certificate

Ausgestellt für: *Issued to:*	Sensus GmbH Ludwigshafen Industriestr. 16 67063 Ludwigshafen am Rhein
gemäß: *In accordance with:*	Anhang II Modul B der Richtlinie 2014/32/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Messgeräten auf dem Markt. *Annex II Module B of the Directive 2014/32/EU 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.*
Geräteart: *Type of Instrument:*	Wasserzähler *Water meter* Einstrahl-Teiltrockenläufer für Kalt und Warmwasser *Single jet-semidry runner for cold and hot water*
Typbezeichnung: *Type designation:*	820
Nr. der Bescheinigung: *Certificate No.:*	DE-09-MI001-PTB002, Revision 1
Gültig bis: *Valid until:*	27.03.2029
Anzahl der Seiten: *Number of pages:*	11
Geschäftszeichen: *Reference No.:*	PTB-1.5-4095683
Notifizierte Stelle: *Notified Body:*	0102
Zertifizierung: *Certification:*	Braunschweig, 28.03.2019

Im Auftrag *On behalf of PTB*	Siegel *Seal*	Bewertung: *Evaluation:* Im Auftrag *On behalf of PTB*
[illegible signature] *Dr. Corinna Kroner*	*[official stamp: Physikalisch-Technische Bundesanstalt]*	*Dr. Michael Rinker* *[illegible signature]*

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Certificate History

Certificate edition	dated	Amendments
DE-09-MI001-PTB004	14.04.2009	initial certificate
DE-09-MI001-PTB004, revision 1	28.03.2019	- recertification according to Directive 2014/32/EU - editorial text revision

Examination results:

The instruments mentioned in this certificate are subject to the following fundamental requirements of the Directive **2014/32/EU** of the European Parliament and 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 (official journal L 96 page 149), last amended by amendment of 20.01.2016 (official journal L 13 page 57):

- Annex I "Fundamental Requirements"
- Annex III (MI-001) "Water Meters",

in conjunction with §6 of the Metering and Calibration Act of 25.07.2013 (Federal Law Gazette I page 2722), last amended by article 1 of the Act of 11.04.2016 (Federal Law Gazette I page 718), and §8 of the Measuring and Calibration Ordinance of 11.12.2014 (Federal Law Gazette I page 2010), last amended by article 10 of the Ordinance of 29.11.2018 (Federal Law Gazette I page 2034).

The measuring instrument's technical design specified below complies with the above mentioned fundamental requirements. This certificate entitles the holder to mark the instruments manufactured in conformity with this certificate with the number of this certificate.

The measuring instruments must comply with the following regulations:

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1 Type description

Single-jet impeller inline meter in semidry runner version for cold and hot water with threaded end connections suitable for horizontal or vertical pipelines.

1.1 Construction

The meters of the version 820 comprise a body with two pipe-shaped threaded end connections, a single-jet meter's metering element and a mechanical semi-dry runner pointer register tightly connected with the body. The metering element is fixed in the body by a threaded brass head ring. In the upper impeller bearing the bearing pin is in the register and the bearing jewel is in the impeller. In the lower impeller bearing the bearing pin is in the body and the bearing jewel is in the impeller.
The metering element and the register are tightly connected with each other by snap connection between register bonnet and metering element housing.

The body is made of brass and has male threads ≥ G ¾ B on both sides for the connection size DN20 and a body length of ≥ 130 mm.

- drawing no. MID 0160 dated 20.03.2019 (exploded view single-jet impeller meter 820, Q_3 4 m³/h in connection with semi-dry-runner-pointer register);
- drawing no. MID 0162 dated 20.03.2013 (sectional and perspective views single-jet impeller meter 820 Q_3 4 m³/h in connection with semi-dry-runner-pointer register);
- corresponding bill of material no. MID 0164 pages 1 and 2 dated 20.03.2019.

1.2 Measurement sensor

Single-jet impeller metering element with by-pass flow regulation

The water flows in through a strainer onto the impeller. By the tangential incident flow the impeller is set rotating. The motions of the impeller are transferred directly to the register by means of impeller axle and pinion. The water flows out through the opposite outlet passage. The parameters of the error curve can be adjusted by turning the regulation screw in the by-pass flow channel, whereby a partial-flow passage towards the outlet channel is opened to a greater or lesser extent.

- drawing no. MID 0162 dated 20.03.2013 (sectional and perspective views single-jet impeller meter 820, Q_3 4 m³/h in connection with semi-dry-runner-pointer register);
- drawing no. MID 0179 dated 20.03.2019 (sectional view by-pass flow regulation and impeller bearing 820 Q_3 4 m³/h).

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1.3 Measurement processing

The impeller's rotational movement is transferred directly into the register via a pinion on the impeller axle. A worm wheel transfers the rotational movement of the reduction gearing directly to the fastest continuously moving figure roller.

1.4 Measurement indication

The single-jet impeller meter is equipped with a wet-runner-pointer register, which is executed as wet runner register with encapsulated set of rollers. The register has 5 rollers before and 4 pointer scales after the decimal point and a reading star. The pointer with the circle value of 1 ℓ is allowed to be equipped with a modulator plate. (see no. 1.7). The fastest roller operates in a jumping manner. The indication is in m³. The smallest dividing value on the fastest counting element is 0,05 ℓ.
The register is encapsulated, watertight and filled with a mixture of glycerine/water or distilled water. Pressure compensation between the register and the meter's wet side is made possible by an elastic locking element.

- drawing no. MID 0161 dated 20.03.2019 (top and side views semi-dry-runner-pointer register with 820, Q_3 4 m³/h, with 5 rollers, 3 pointers and modulator plate [prepared for HRI] and reading star)

1.5 Optional equipment and features, which are subject to the Measuring Instruments Directive

- none –

1.6 Technical documents

The technical documents, which are part of this certificate, are on file at the PTB according to the corresponding set of certification documents. The table of contents of the set of certification documents has been sent to the certificate holder.

1.7 Integrated equipment and features, which are not subject to the Measuring Instruments Directive

1.7.1 Pulse emitter

The semi-dry-runner-pointer register is allowed to be also equipped with an inductive pulse emitter HRI. For this purpose a separate housing, holding an electronic evaluator, is screwed onto the register glass. The electronic evaluator detects forward or backward rotations of the scanned 1-ℓ-pointer with the modulator plate. The pulse rate is not less than 1 ℓ per pulse.
The pulse emitter is allowed to be retrofitted, on site of operation, if required.

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- drawing no. MID 0165 dated 20.03.2019 (top view single-jet impeller meter 820, Q_3 4 m³/h with semi-dry-runner-pointer register and mounted HRI).

1.7.2 Non-return valve

It is optionally allowed to equip the meter with a spring-loaded non-return valve.

2 Technical data

2.1 Rated operating conditions

Nominal size		**4** m³/h
Flow rate: [3]	Q_1	0,016 m³/h
	Q_2	0.025 m³/h
	Q_3	4,0 m³/h
	Q_4	5,0 m³/h
	Q_2 / Q_1	1,6
	Q_3 / Q_1	250*), 200, 160, 125, 100, 80, 63, 50, 40
Accuracy class:		± 2 % ($Q_2 \leq Q \leq Q_4$) for water temperature ≤ 30°C
		± 3 % ($Q_2 \leq Q \leq Q_4$) for water temperature > 30°C
		± 5 % ($Q_1 \leq Q < Q_2$)
Temperature range:		0,1 °C bis 50 °C
Pressure range:		0,3 bar (0,03 MPa) to 16 bar (1,6 MPa)
Pressure loss class ΔP:		0,63 bar (0,063 MPa)
Operating position:		horizontal[1] and vertical
Environmental class:		B
Mechanical environment conditions		M2
Climatic environment conditions:		5°C bis 55°C
Electromagnetic environment conditions:		E1[2]
Connection size:		DN20
Connection thread:		≥ G¾B
Body length:		≥ 130mm

[1] no overhead fitting (i.e. register showing downwards). Meters of flow range R250 are only allowed to be fitted horizontally.
[2] in connection with the communication module HRI.
[3] specified in each case is the flow of the largest measuring range with R250

2.2 Further operating conditions

- none –

3 Interfaces and compatibility conditions

- none –

4 Requirements for production, first operation and use

4.1 Requirements for production

The metrological verification test for meters of the version T50 is carried out in accordance with OIML R 49-1, edition 2013, in conjunction with test instructions PA_2308B at a water temperature of 20 °C ± 10 °C at the following three flowrates:

$$Q_1 \leq Q \leq 1{,}1\ Q_1$$
$$Q_2 \leq Q \leq 1{,}1\ Q_2$$
$$0{,}9\ Q_3 \leq Q \leq Q_3$$

This test is also allowed to be carried out by row testing.

The measured errors of indication must not exceed the maximum permissible value for any of the a.m. flow rates.

4.2 Requirements for first operation

Installation of inlet and outlet pipe lengths is not required (U0D0).

It is recommended to secure the connection points to the pipeline by means of a user seal. The user seal (adhesive stamp, lead seal or the like) preventing dismounting the meter should be designed in such a way that it cannot be removed or detached without visible damage.

Each meter must be accompanied by descriptive mounting / operating instructions.

4.3 Requirements for use

Any retrofitting shall be in compliance with the requirements according to no. 4.2.

5 Verification of instruments in operation

5.1 Documents for the test

The type-examination certificate in hand and the technical documents listed under no. 1.6.

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5.2 Specific test equipment or software

a) The test can be carried out by volumetric or gravimetric methods or by using reference meters. The used test equipment must allow the adjustment of the flow rates specified under no. 4.1.

b) Opto scanning head converting the light pulses of the LED, which are proportional to the volume, into an electrical signal, which can be utilised by the test rig.

5.3 Identification

The meter must correspond to the technical documents under no. 1.6, the inscriptions to the specification under no. 7.2.

5.4 Calibrating and adjusting methods

The metrological test must be carried out within the rated operating conditions. Adjustment is achieved by turning the adjusting screw in the by-pass flow regulation device on the meter's outlet side, more or less releasing the partial flow passage towards the outlet channel.
- drawing no. MID 0179 dated 20.03.2019 (sectional view bypass flow regulation and impeller bearing 820 Q_3 4 m^3/h)

6 Security measures

6.1 Mechanical sealing

The meter's bonnet with its below register shall be snapped onto the meter body and/or the metering element housing in such a way that an intentional opening is only possible by force and leaving visible traces.
The borehole of the by-pass flow regulation must be closed by a sealing sleeve. The sealing sleeve is pressed into the borehole in such a way that an intentional opening is only possible by force and leaving visible traces.

- photo no. MID 0599 dated 20.03.2019 (user seal of locking screw and by-pass regulation)

To prevent any soiling or damage during the transport to the fitting site the inlet and outlet passages must be covered.
The inscriptions applied to the register and type plate/bonnet (metrological identification, CE-marking as well as meter data) must be permanent.

6.2 Electronic sealing

- not applicable - .

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7 Marking and inscriptions

7.1 Information to be added to the instrument

Operating / mounting instructions:
Each meter is to be accompanied by descriptive operating / mounting instructions. They have to include the following items for particular observation:

a) Check of the sealing surfaces and the seals before fitting. It must be ensured that, in case of need, particular measures prevent the seals at the meter from getting out of place, dropping out or being damaged during the transport from the manufacturer to the fitting site. If required, the seals are to be pasted in.
b) Check of the readability of the meter characteristics after fitting. The visual readability of the meter indication, all characteristics of the meter and the conformity and metrological marking must not be impaired.
c) Suitable measures must secure that any soiling or damage during transport to the fitting site is prevented.
d) The pulse emitter (HRI is allowed to be mounted later on, at the meter's fitting location if required. Retrofitting with pulse emitters is only allowed by fitters, who have been particularly trained for that purpose. The pulse emitter should be secured against removal by means of a user seal.

The instructions of the manual must strictly be obeyed.

7.2 Marking and inscriptions

On the meter the following information must at least be available:

- manufacturer's name or company name or his trademark and his postal delivery address;
- Q_3 and the ratio Q_3/Q_1 (R);
- year of production and individual serial number of the meter;
- number of the type-examination certificate;
- the temperature class T50;
- the maximum operating pressure in „bar" or MPa, if >1 MPa or 10 bar;
- flow direction (e.g. on the body);
- unit of measurement m^3;
- operating position;
- flow profile sensitivity class.

Conformity and metrological marking is applied in accordance with article 20 of the Directive 2014/32/EU.
Additional inscriptions are allowed, as long as they cannot be mistaken for the above mentioned data.

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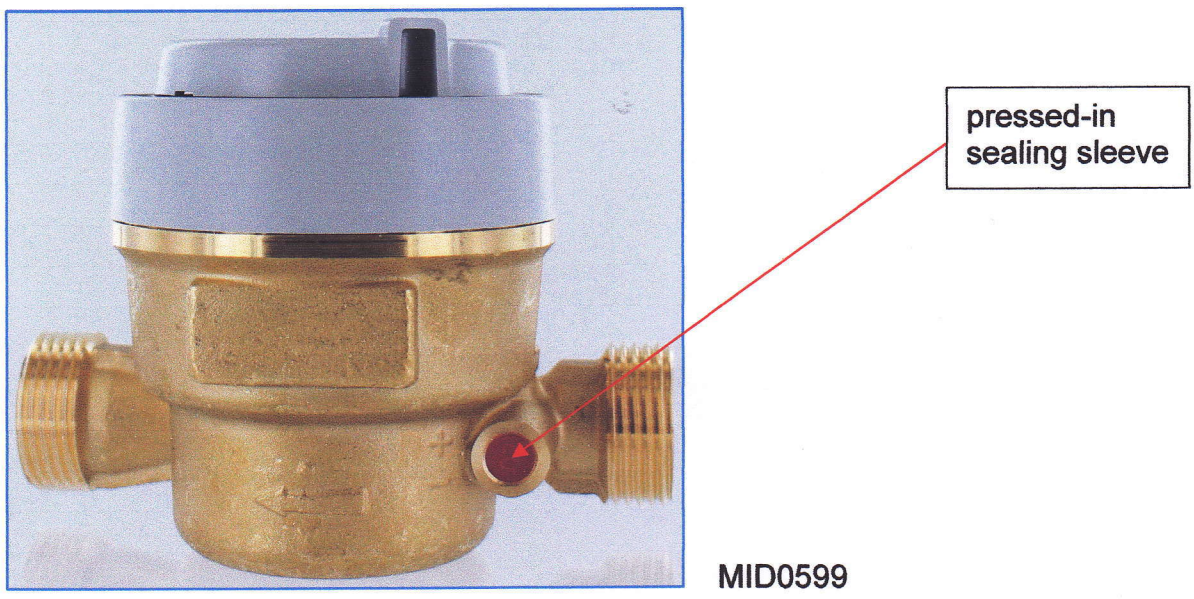
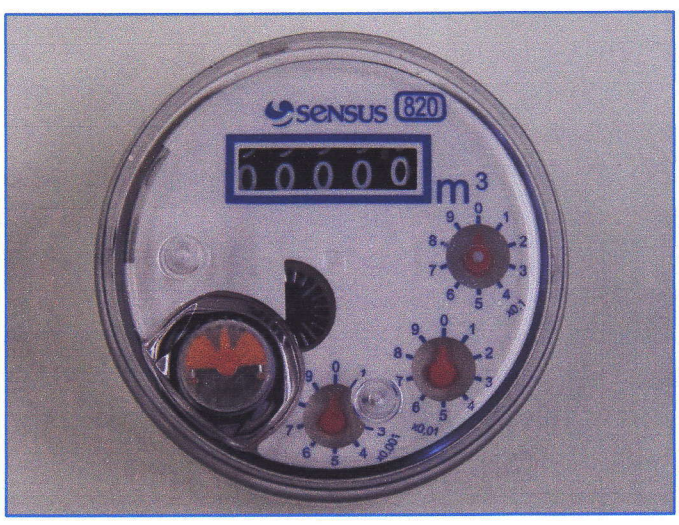
8 Illustration – photos (by way of example)



MID0599

View showing security stamp/user seal of the bypass regulation for **820**



MID0600

820 Q_3 4 plastic, encapsulated semi-dry runner register

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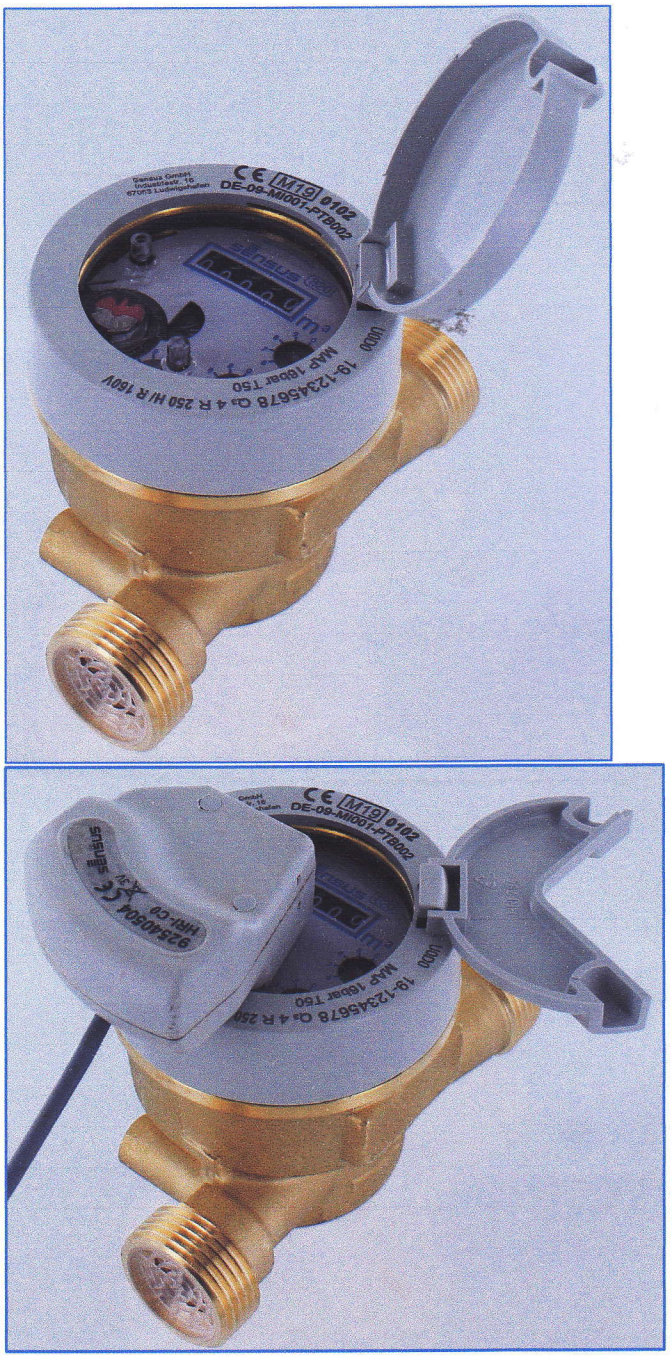
Single-jet impeller water meter 820 Q_3 4 executed with semi-dry-runner-pointer register with encapsulated set of rollers



820 Q_3 4 with partially encapsulated register – perspective view without and with HRI

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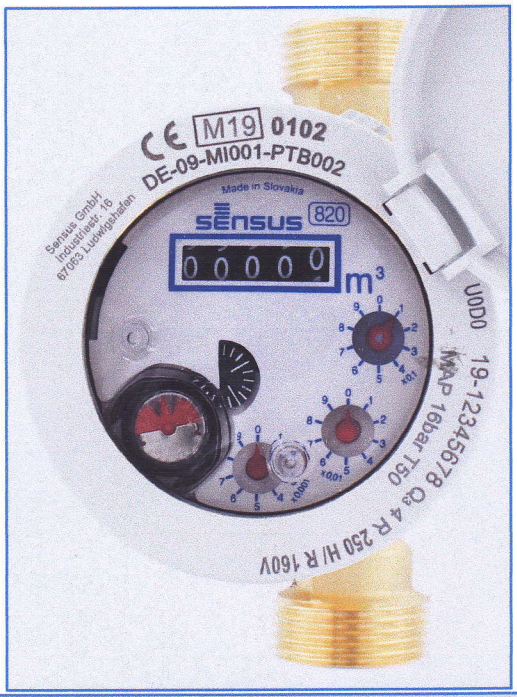

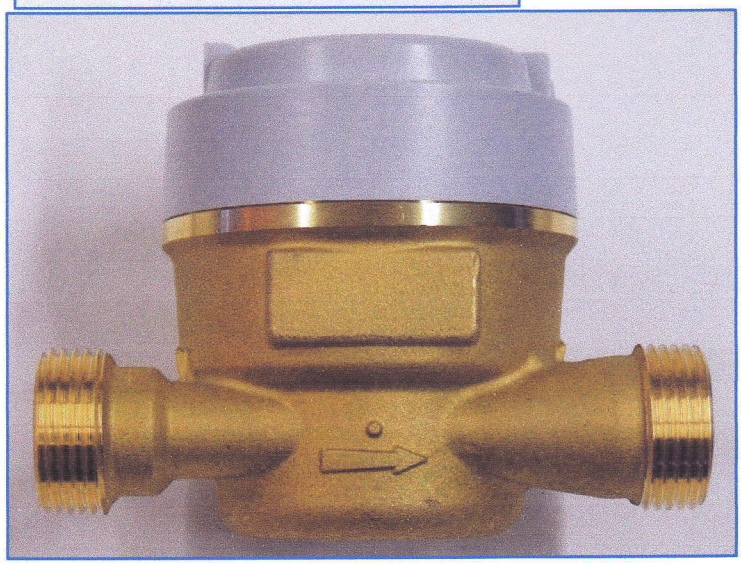

820 Q_3 4 with partially encapsulated register – top and side views with protective lid (MID0589)

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Zertifizierungsdokumentensatz

Set of Certification Documents (ZDS)

Nr.: *No.:*	ZDS-DE-09-MI001-PTB002
Ausgestellt für: *Issued to:*	Sensus GmbH Ludwigshafen Industriestr. 16 67063 Ludwigshafen am Rhein
Geräteart: *Type of instrument:*	Wasserzähler *Water meter* Einstrahl-Teiltrockenläufer für Kalt und Warmwasser *Single jet-semidry runner for cold and hot water*
Typenbezeichnung: *Type designation:*	820
Anzahl der Seiten *Number of pages:*	2
Bewerter: *Evaluator:*	Braunschweig, 28.03.2019
Im Auftrag *On behalf of PTB*	Siegel *Seal* [official stamp PTB]

[illegible signature]
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Pages 2 of the Set of Certification Documents ZDS-DE-09-MI001-PTB002 dated 28.03.2019

Technical documentation relating to the Certificate				
Certifiate no. DE-09-MI001-PTB002		Reference no. PTB-1.5-4095683		
		Date of issue:	28.03.2019	
No.	Type, description and name of the document	Identification	Pages	Date
1	820 Q_3 4; single-jet water meter – exploded view	MID 0160	1	20.03.2019
2	820 Q_3 4; register with encapsulated set of rollers	MID 0161	1	20.03.2019
3	820 Q_3 4; perspective, top and side views	MID 0162	1	20.03.2019
4	bill of material – 820 Q_3 4; single-jet impeller water meter	MID 0164	1	20.03.2019
5	820 Q_3 4; single-jet meter with communication module	MID 0165	1	20.03.2019
6	820 Q_3 4; details regulation and impeller bearing	MID 0179	1	20.03.2019
7	photos - 820 user sealing	MID 0599	1	20.03.2019
8	photos - 820 Q_3 4; (perspective, top and side views)	MID 0598	1	20.03.2019
9	photos - 820 semi-dry runner register Q_3 4	MID 0600	1	20.03.2019
10	mounting instructions for impeller water meters	MD1770_DE	1	25.09.2018

Any Changes made to these documents have to be reported.

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