

# **WATER** meters

WZ-MNK

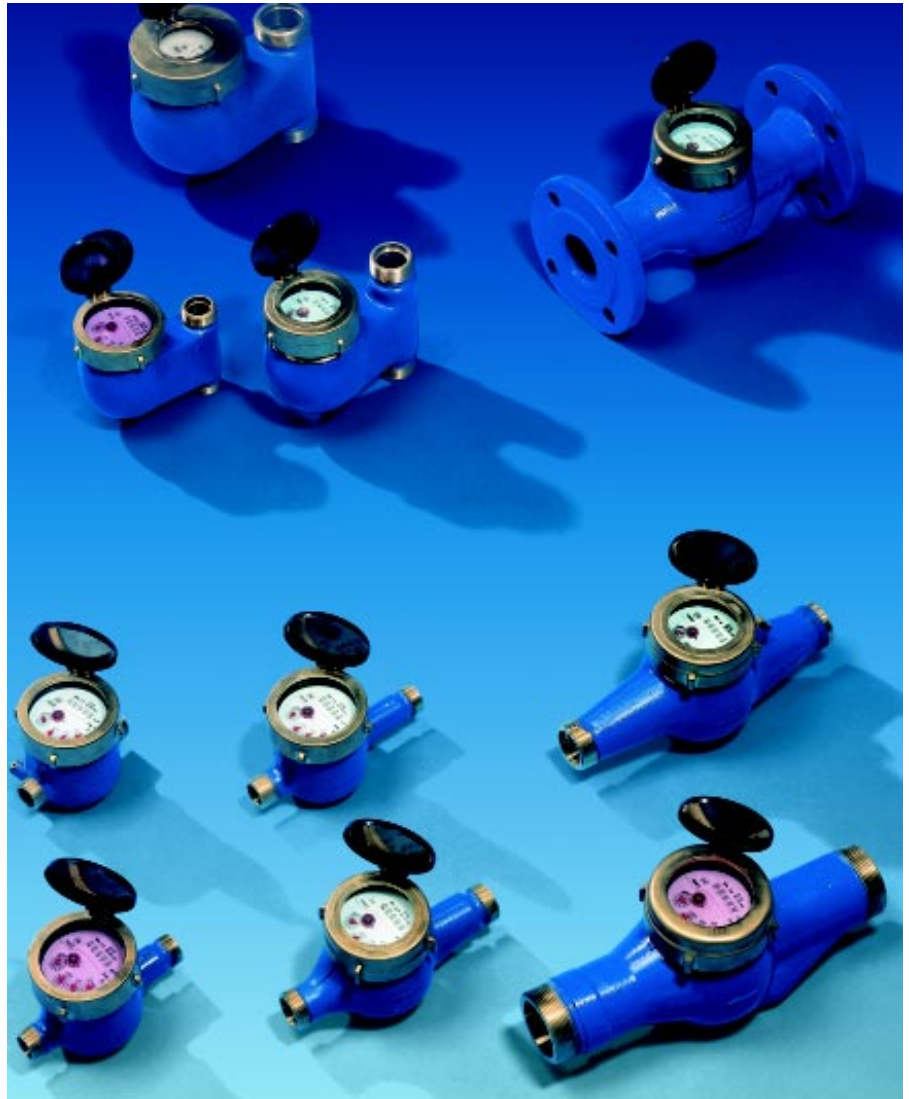


**Metering**

**RICCIUS + SOHN**  
INFORMATION

## Multi-jet meters

### General data



R+S domestic water meters are multi-jet turbine water meters. The construction and connection dimensions are in accordance with DIN ISO 4064 and DIN 19684, Section 3. Different types are available:

Series **MNK** is used as a **wet dial meter** for cold water up to 30°C (safe up to 50°C). For vertical pipes the models are available as ascending pipeline meters and as descending pipeline meters (MNK-ST / MNK-F).

The **MNK-RP** meter has a special characteristic. The **roller counters are completely encased** and are surrounded by a protective fluid.

Our multi-jet domestic water meters are also available as **dry dial meters** for cold and warm water (**MTK, MTW**), in a pulse version or for ascending and descending pipelines (MTKI, MTK-ST, MTK-F).

**R+S measuring inserts can be fitted into all standard water meter bodies.**

- **Meter classes either A, B or C**; reduced margins of error with an uncertified design possible
- communication interface for remote reading (M-Bus)
- low start-up flow
- easy to operate
- **new** multi-jet meter series: **pulse output meters** as a wet dial meter with replaceable pulser and additional sensing against external manipulation
- in the case of all pulse output, **connection to M-Bus counter modules** or radio wave modules is possible. The relevant documentation can be obtained from the factory.

The **bodies** consist of a brass alloy, are precision-cast and **highly accurately** machined on NC-machines. They are protected internally and externally by a special paint or an epoxy coating. All interior paints and materials have been tested and conform to the regulations of the German Federal Health Authority.

**Calibration** is carried out on the inlet side by regulating the bypass flow. Due to certain measuring techniques, the **strainer** has been installed in the inlet section in such a way as to prevent it from rotating. In contrast to a central strainer, this design does not cause false measurements when there is uneven contamination. The filter can be easily replaced without damaging the calibration seal. Meters with a central strainer will be delivered only if explicitly desired by the customer.

For over 30 years we have guaranteed **maximum precision** for the MNK series (and also MNK-RP), and due to further refinement almost all meters are now available in **class C**.

The dry dial version has been implemented with a **magnetic coupling** in accordance with the latest state-of-the-art technology.

We use especially abrasion-resistant and corrosion-proof materials which are characterised by their **low susceptibility to deposits**. We can therefore also assure **high operational reliability**.

The high head ring and the use of mineral glass offer additional benefits:

Higher bursting pressure due to the thickness of the glass guarantees a **long service life**. A counter glass made of plastic is also available on request. This offers additional benefits compared to the real glass model: The surface of the glass is flush with the head ring and is therefore easy to



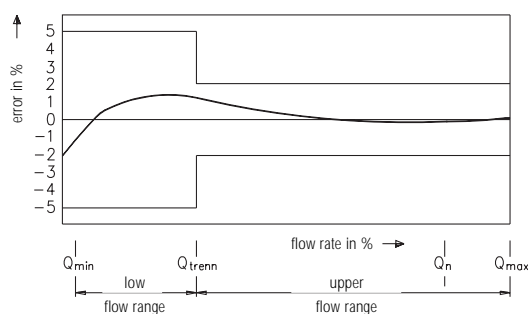
clean. The **convex inner shape** of the glass allows trapped air bubbles to drift to the edge of the glass and not to the star wheel. The formation of algae is almost completely prevented due to the UV filtration effect of the plastic face.

Type Class	MNK			MTK			MNK-RP		
	A	B	C	A	B	C	A	B	C
Qn 1.5	○	○	●	○	○		○	○	●
Qn 2.5	○	○	●	○	○	◆	○	○	●
Qn 3.5	○	○	●	○	○	◆	○	○	●
Qn 5	○	○	●	○	○	◆	○	○	●
Qn 6	○	○	●	○	○	●	○	○	●
Qn 10	○	○	●	○	○	◆	○	○	●
Qn 15	○	○	◆	○	○	◆	○	○	◆

- with EC type approval class A or B or other non-European approval
- with EC type approval class C and other non-European approval
- ◆ in the class C quality stated

Type MNK water meters can be used in accordance with DIN 2401 up to an operating pressure of 16 bar (ue). We have tested all certified meters with a test pressure of over 20 bar.

We keep an archive of the pressure test document and the certification values under the meter number for as long as the calibration remains valid.



## Multi-jet meters

### Characteristic features

## Metrology classes

## Quality assurance and approval

## Operating range / Limits of calibration and accuracy

## Multi-jet meters

### Meter inserts



R+S meter inserts are already used by more than 20 manufacturers and test sites. The development is based on the construction principle of WVG-body types introduced in 1934. With the use of adapter rings our inserts **can be fitted to almost all standard European water meter bodies**.

A further development of the WVG type is the fluidic innovative R+S body Qn 1.5 up to Qn 10. Special meter inserts, sizes Qn 6 to Qn 10, in R+S bodies exhibit a **particularly low starting flow**.

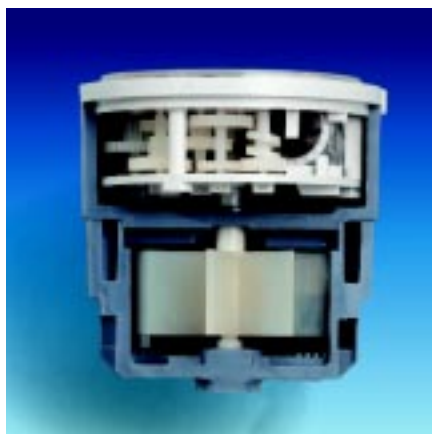
The **turbine, the bearing axis of which passes through its centre of gravity**, is made of an abrasion-resistant material with a specific gravity of less than  $1\text{g/cm}^3$ . This causes the turbine to float in the water and to put hardly any

load on the pin bearing of the turbine. Our modern precision-injection techniques **keep imbalance to a minimum**.

The **inlet and outlet channels** are arranged symmetrically and tangentially. This prevents the bearing pivot from being unilaterally loaded in contrast to other constructions. The large number of inlet and outlet channels causes **high measuring sensitivity** and guarantees a large measuring range, which is achieved in particular by the **stepped channels** introduced by R+S.

The meter insert has a reduced diameter in the proximity of the outlet channels. This creates a larger space between the counter and the body. This smaller diameter optimises the flow characteristics and thereby considerably reduces the head loss.

### Compensating meter insert



The compensating meter insert offers **automatic compensation** of the error. This compensation ensures that the accuracy curve does not creep when used for extended periods in contaminated water. It meets all requirements for extending the duration of the validity of calibration by 3 years in accordance with the weights and measures regulation. The turbine housing has been redesigned, resulting in an overall reduction of head loss.

Patent No.: EP 0 479 879

**Multi-jet meters**

**MNK**

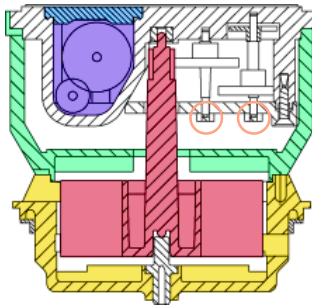
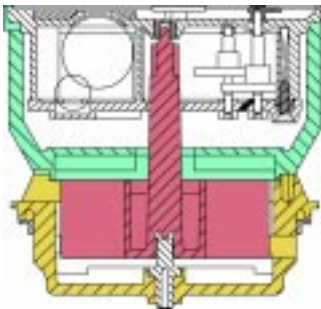
- Counter housing and counter with encapsulated rollers
- Turbine
- Turbine with evenly distributed inlet and outlet channels around the circumference

**MNK-RP**

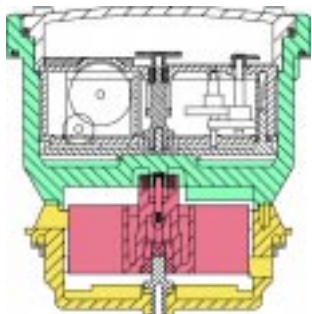
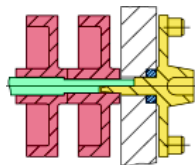
- Counter housing
- Viewing window
- Hermetically sealed roller chamber with protective fluid
- Turbine supported at its centre of gravity
- Flushed bearings of the gears
- Turbine housing with evenly distributed inlet and outlet channels
- Digit rollers
- Spindle
- Large driving wheel with interlocking coupling to the digit roller
- Sealing ring

**MTK**

- Counter housing with low-lying counter
  - Turbine with magnet
  - Turbine housing with evenly distributed inlet and outlet channels
- Option with anti-magnetic capsule



Construction principle of the driving wheel spindle through the roller chamber wall

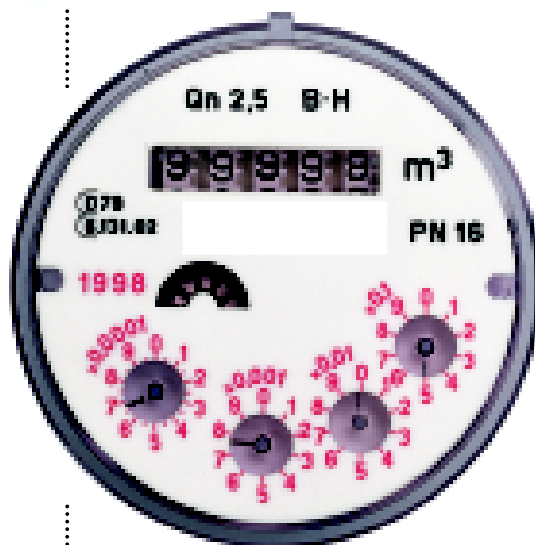


## Multi-jet meters

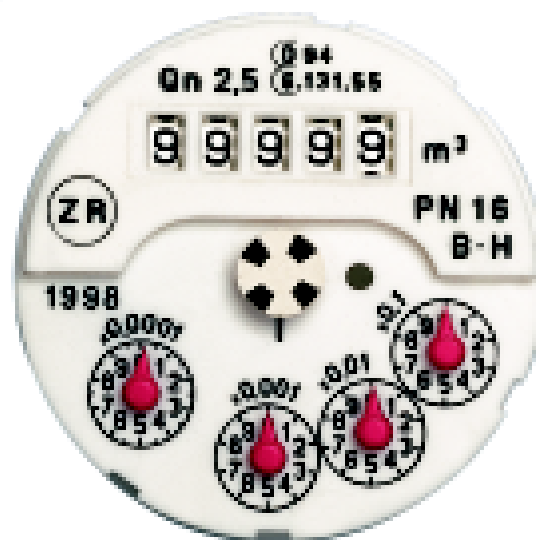
### Counters



MNK



MNK-RP



MTK

The **MNK-series** roller counters are **encased** which means that they can be read for a long time even if floating particles have become deposited with time.

We use particularly **large counter rollers** so that the numbers can be **easily read**.

In the case of conventional counters there is a risk of the axle sagging during long periods of disuse. In order to prevent this, we fit particularly **strong roller axles**.

We deliberately use relatively thin gear wheels. This removes the risk of dirt becoming deposited between the flanks and affecting the measurement result.

The **MNK-RP** series counters are a speciality. In spite of encased rollers, deposits can still settle in MNK series counters on the rollers and on the whole level of the digit face over the years.

We have developed an **absolutely hermetically sealed counter**. The digit rollers are accommodated in a chamber of their own which is filled with a special **protective fluid**. Similarly, no water, and therefore no floating particles, can settle on the level of the digit face. This ensures that the counter can always be read - irrespective of the water quality.

## Multi-jet wet dial meters

MNK



The most up-to-date injection moulding techniques and continuous checks carried out by our quality assurance departments guarantee **maximum precision and quality** in our multi-jet turbine meters.

Structural details, such as the design of the turbine wheels, result in considerably improved rotational accuracy compared to multi-piece turbines, which put load on the bearings. The benefit for you is **outstanding stability of measurement over many years**.

All moving parts have a low density. Combined with the careful arrangement of the bearings and turbine, this guarantees a **minimum moment of friction and a long service life**.

The meters have been designed for use in cold water up to 30°C (safe up to 50°C). They are available in sizes Qn 1.5 to Qn 15. Qn 1.5 to Qn 10 are **also available in class C**. Operating pressure PN 16.

Our multi-jet turbines have meanwhile **been tried and tested a million times over**, even under difficult conditions.

The continuous further development of this series guarantees that you can be sure of receiving a top-grade product which is always state-of-the-art. In the future too, the meters will be adapted to meet the demands required of them; for example the MNKI pulse-type multi-jet wet dial meter.

	Class		Class
D79 6.131.02	H: A+B+C	D82 6.131.39	H: A+B
D81 6.131.21	H: A+B V: A	D83 6.131.57	H: A+B+C V: A+B
		D96 6.131.88	H: A+B+C

## Approvals

## Multi-jet wet dial meters

**MNK-N**  
Pulser retrofittable  
**MNKI-N**  
Pulser retrofitted

- good value

- Class A, B and C



Now, at long last, multi-jet wet dial meters, with their outstanding metrological characteristics, are also available as **pulse-type models**. A pulser can be added on at any time while still allowing the meter to be easily read.

Meters prepared in this way are ideal for being connected at any time to central recording systems, such as **M-Bus systems or radio wave modules**. This allows you the possibility of combining traditional measuring technology with the most up-to-date data acquisition.

The pulsers can, of course, be sealed independently of each other and can be replaced on site without damaging the calibration seal.

To protect them against external magnetic interference, the pulsers can have an additional reed contact fitted to them if required by means of which any manipulation can be detected. Both versions are fitted with a protective resistor on the

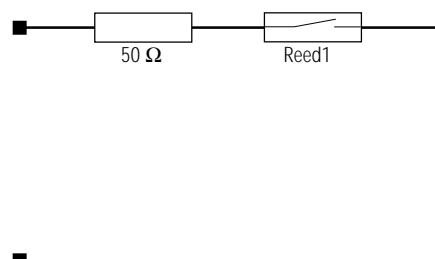
sides of the pulser as standard (see circuit diagrams).

EC type approval also in class C.  
Operating pressure PN 16

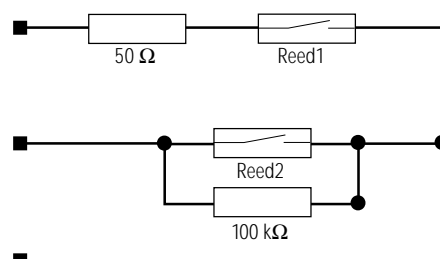
### Pulser:

- With protective resistor 50  $\Omega$ /¼ watt  
For greater conductor lengths also 1 k $\Omega$
- Switching voltage 24 V
- Max. current load 50 mA
- Pulser replaceable on site or upgradable
- Cable length 1.5 m  
(other lengths on request)
- Strain relief
- Pulse rate 100 I/pulse  
(others on request)
- Sealing possible

## Circuit diagrams



Version with 50  $\Omega$  protective resistor



Version with 50  $\Omega$  protective resistor and manipulation indicator for interfering magnet

## Multi-jet wet dial meter

MNK-RP  
with roller protection



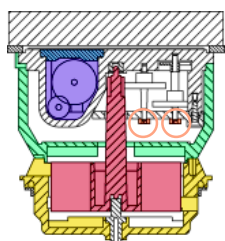
Modern multi-jet wet dial meters, such as our MNK series, all have **encased roller counters** today. However, over time floating particles still penetrate as deposits both on the counter face and on the digit rollers, and in the worst cases the meters can only be read with difficulty. A remedy is provided by the new MNK-RP meter series, a meter with a **hermetically sealed roller chamber** (see close-up). All moving parts are located within a transparent plastic cover which at the same time acts as the retainer for the digit rollers. The chamber is filled with a special **protective fluid**. Since the digit rollers can no longer come into contact with water or deposits, the meter can always be read, even if the water is heavily soiled

or contains a lot of iron. The series MNK-RP meters are therefore the ideal alternative in all cases where it was previously often impossible to take readings. Just as with series MNK, the meters are available both with a real glass cover and also with plastic glass. The plastic glass is available in two different versions:

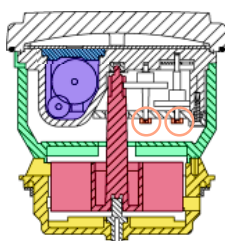
- offset meter glass with bonded viewing window (MNK-RP)
- bonded meter glass without viewing window (MNK-RP-LDE)

Meters Qn 1.5 to Qn 10 are **also available in class C**. Operating pressure PN 16.

- hermetically sealed roller chamber
- individually flushed bearings



Type MNK-RP with real glass



Type MNK-RP-LDE with bonded plastic glass

- Counter housing
- Viewing window
- Hermetically sealed roller chamber with protective fluid
- Flushed gear bearings
- Turbine supported at centre of gravity
- Turbine housing

### Class

D79  
6.131.02

H: A+B+C

### Class

D83  
6.131.57

H: A+B+C  
V: A+B

D96  
6.131.88

H: A+B+C

### Approvals

## Multi-jet wet dial meters

### MNK-RP-N

with roller protect, pulser can be fitted

### MNK-RPI-N

with roller protect, pulser fitted

- hermetically sealed roller chamber
- individually flushed bearings
- continuous reading guaranteed
- class A, B, C



Series MNK-RP (type LDE) now also includes a **pulse version**. This means that the complete range of multi-jet meters is available with pulsers which can be retrofitted or replaced. As is the case with all versions, the MNK-RPI series is also prepared with a ring-shaped magnetic pointer as standard for this task.

**Remote reading** or connection to our **M-Bus system radio-wave and counter modules** are no longer a problem for this series.

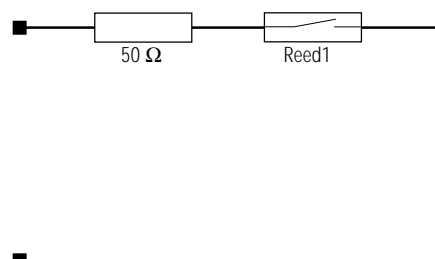
In the same way as with the single-jet and multi-jet dry dial meters, the same pulsers are used in the MNK and MNK-RP series. In the case of all generators, it is possible to register any attempt at manipulation by means of a secondary switch system (see circuit diagrams).

EC type approval also in class C.  
Operating pressure PN 16

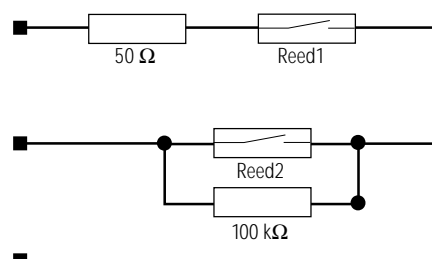
#### Pulser:

- with 50  $\Omega$ /¼ watt protective resistor; also 1 k $\Omega$  for longer cable lengths
- switching voltage 24 V
- max. current load 50 mA
- pulser can be added or replaced on site
- control line, cable length 1.5 m (others on request)
- strain relief
- pulse rate 100 l/pulse (others by request)
- sealing possible

## Circuit diagrams



Version with 50  $\Omega$  protective resistor



Version with 50  $\Omega$  protective resistor and manipulation indicator for interfering magnet

## Multi-jet meters

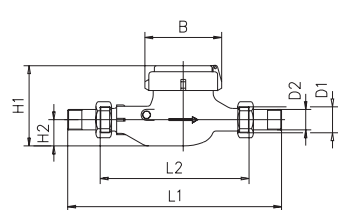
### Technical data

Nominal flow	Qn	m <sup>3</sup> /h	1.5	2.5	3.5	6	10	15					
Maximum flow	Qmax	m <sup>3</sup> /h	3	5	7	12	20	30					
Connecting thread	D1	meter	¾"	1"	¾"	1"	1¼"	1½"	2"	2"	2½"	FL50	
	D2	connector	½"	¾"	½"	¾"	1"	1"	1¼"	1½"	2"	-	
Nominal diameter	DN	mm	15	20	15	20	25	25	32	40	40	50	-
Display range	-	-	0.05 l, 99.999 m <sup>3</sup>										
Overall length MNK	L1	mm	195/225/245 250/288	-	288	288 318	378	378	408	408 438	438	-	
	L2	mm	110/145/165 170/190	-	190	190 220	260	260	300	270 300	300	FL270 FL300	
Overall length MNK-ST	L1	mm	-	205	-	205	268	268*	290	-	-	-	
	L2	mm	-	105	-	105	150	150*	150	-	-	-	
Overall length MNK-F	L1	mm	-	205	-	205 288	-	378	438	-	-	-	
	L2	mm	-	105	-	105 190	-	260	300	-	-	-	
Overall length MTK/MTW	L1	mm	195/225 245/250	288	288	288 318	378	378	438	438	-	-	
	L2	mm	110/145 165/170	190	190	190 220	260	260	300	300	-	-	
Overall length MTK-ST/MTW-ST	L1	mm	-	205	-	205	268	268*	290	-	-	-	
	L2	mm	-	105	-	105	150	150*	150	-	-	-	
Overall length MTK-F/MTW-F	L1	mm	-	205	-	205	-	268*	290	-	-	-	
	L2	mm	-	105	-	105	-	150*	150	-	-	-	
Height	H1	mm	120			130		145		200			
	H2	mm	34			40		50		83			
Width	B	mm	100					110					
Weight	-	kg	1.5	2.0		3.0		5.0		9.0			

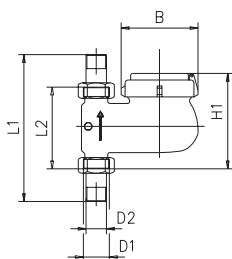
For transitional flow Qt and minimum flow Qmin see table on last page of this product group

\* = only available with 1" connecting thread on connector

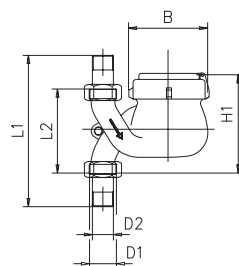
### Dimensions



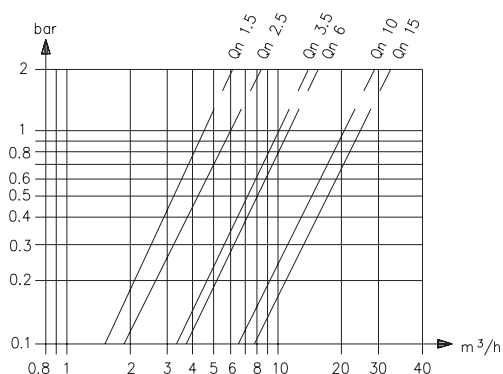
MNK  
MNK-F, Qn 2.5, Qn 6 and Qn 10  
(fitted vertically)  
MTK/MTW



MNK-ST  
MTK-ST/MTW-ST



MNK-F, Qn 1.5 and Qn 2.5  
MTK-F/MTW-F



### Head loss curves

## Meter ordering data

**MNK**  
Standard version

Model	Nominal size m <sup>3</sup> /h	Connection at threaded fitting	Overall length	l / p.	Type	Order no.
MNK	Qn 1.5	1/2"	110 mm		MNK0311015	10M 001
		1/2"	145 mm		MNK0314515	10M 002
		1/2"	165 mm		MNK0316515	10M 003
		1/2"	170 mm		MNK0317015	10M 004
	Qn 2.5	3/4"	190 mm		MNK0519020	10M 005
	Qn 3.5	1"	260 mm		MNK0726025	10M 006
	Qn 6	1"	260 mm		MNK1226025	10M 007
		1 1/4"	260 mm		MNK1226030	10M 008
	Qn 10	1 1/2"	300 mm		MNK2030040	10M 009
	Qn 15	1 1/2"	270 mm		MNK3027040	10M 010
		1 1/2"	300 mm		MNK3030040	10M 011
		2"	300 mm		MNK3030050	10M 012
		Flange	270 mm		MNK30270FL	10M 013
		Flange	300 mm		MNK30300FL	10M 014

**MNKI**  
Pulse version, available from Qn 1.5 to Qn 6

MNKI	Qn 2.5	3/4"	190 mm	100	MNKI0519020	11M 001
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**MNK-ST**  
Ascending pipeline version

MNK-ST	Qn 1.5	3/4"	105 mm		MNK03105ST	10M 015
	Qn 2.5	3/4"	105 mm		MNK05105ST	10M 016
	Qn 6	1"	150 mm		MNK12150ST	10M 017
	Qn 10	1 1/2"	150 mm		MNK20150ST	10M 018

**MNKI-ST**  
Ascending pipeline pulse version

MNKI-ST	Qn 2.5	3/4"	105 mm	100	MNKI05105ST	11M 002
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**MNK-F**  
Descending pipeline version

MNK-F	Qn 2.5	3/4"	105 mm		MNK05105FA	10M 019
		3/4"	190 mm		MNK05190FA	10M 020
	Qn 6	1"	260 mm		MNK12260FA	10M 021
	Qn 10	1 1/2"	300 mm		MNK20300FA	10M 022

**MNKI-F**  
Descending pipeline pulse version

MNKI-F	Qn 2.5	3/4"	105 mm	100	MNKI05105FA	11M 003
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**MNK-RP**  
Encased counter

MNK-RP	Qn 1.5	1/2"	110 mm		MRP0311015	12M 001
		1/2"	145 mm		MRP0314515	12M 002
		1/2"	165 mm		MRP0316515	12M 003
		1/2"	170 mm		MRP0317015	12M 004
	Qn 2.5	3/4"	190 mm		MRP0519020	12M 005
	Qn 3.5	1"	260 mm		MRP0726025	12M 006
	Qn 6	1"	260 mm		MRP1226025	12M 007
		1 1/4"	260 mm		MRP1226030	12M 008
	Qn 10	1 1/2"	300 mm		MRP2030040	12M 009
	Qn 15	1 1/2"	270 mm		MRP3027040	12M 010
		1 1/2"	300 mm		MRP3030040	12M 011
		2"	300 mm		MRP3030050	12M 012
		Flange	270 mm		MRP30270FL	12M 013
		Flange	300 mm		MRP30300FL	12M 014

**MNK-RPI**  
Pulse version, available from Qn 1.5 to Qn 6

MNK-RPI	Qn 2.5	3/4"	190 mm	100	MRPI0519020	13M 001
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**MNKP, with back flow valve**  
**MNKP, without back flow valve**  
**MNKP-ST, with back flow valve**  
**MNKP-ST, without back flow valve**

MNKP	Qn 2.5	3/4"	190 mm		PATROL-MR	14M 001
		3/4"	190 mm		PATROL-OR	14M 002
MNKP-ST	Qn 2.5	3/4"	190 mm		PATROL-MR-ST	14M 003
		3/4"	190 mm		PATROL-OR-ST	14M 004

Other sizes on request, but in factor-tested version  
For matching water meter connection kits, see chapter Mechanical Accessories

## Meter ordering data

Model	Nominal size m <sup>3</sup> /h	Connection at threaded fitting	Overall length	l / p.	Type	Order no.
MTK	Qn 1.5	½"	145 mm		MTK0314515	18M 001
		½"	165 mm		MTK0316515	18M 002
		½"	170 mm		MTK0317015	18M 003
	Qn 2.5	¾"	190 mm		MTK0519020	18M 004
	Qn 3.5	1"	260 mm		MTK0726025	18M 005
	Qn 6	1"	260 mm		MTK1226025	18M 006
		1¼"	260 mm		MTK1226030	18M 007
	Qn 10	1½"	300 mm		MTK2030040	18M 008
	Qn 15	1½"	300 mm		MTK3030040	18M 009
		2"	300 mm		MTK3030050	18M 010
		Flange	270 mm		MTK30270FL	18M 011
		Flange	300 mm		MTK30300FL	18M 012
MTKI	Qn 2.5	¾"	190 mm	10	MTKI0519020	19M 001
		¾"	190 mm	100	MTKI0519020	19M 002
MTK-N	Qn 2.5	¾"	190 mm	10	MTKN0519020	18M 017
		¾"	190 mm	100	MTKN0519020	18M 018
MTKI-N	Qn 2.5	¾"	190 mm	10	MTKIN0519020	19M 003
		¾"	190 mm	100	MTKIN0519020	19M 004
MTK-ST	Qn 1.5	¾"	105 mm		MTK03105ST	18M 013
	Qn 2.5	¾"	105 mm		MTK05105ST	18M 014
	Qn 6	1"	150 mm		MTK12150ST	18M 015
	Qn 10	1½"	150 mm		MTK20150ST	18M 016
MTKI-ST	Qn 2.5	¾"	105 mm	10	MTKI05105ST	19M 005
		¾"	105 mm	100	MTKI05105ST	19M 008
MTK-ST-N	Qn 2.5	¾"	105 mm	10	MTKN05105ST	18M 019
		¾"	105 mm	100	MTKN05105ST	18M 020
MTKI-ST-N	Qn 2.5	¾"	105 mm	10	MTKIN05105ST	19M 006
		¾"	105 mm	100	MTKIN05105ST	19M 007

**MTK**  
standard version

**MTKI**  
pulse version, available from Qn 1.5 to Qn 15

**MTK-N**  
prepared as standard for subsequent fitting  
with pulser (see page after next)

**MTKI-N**  
with pulser as standard (see page after next)

**MTK-ST**  
Ascending pipeline version

**MTKI-ST**  
Pulse version, available from Qn 1.5 to Qn 10

**MTK-ST-N**  
prepared as standard for subsequent fitting  
with pulser (see page after next)

**MTKI-ST-N**  
with pulser as standard  
(see page after next)

All pulse versions also available in other sizes and pulse rates  
Other sizes on request, but in factory-tested version  
For matching water meter connection kits, see chapter Mechanical Accessories

## Meter ordering data

### MTW Standard version

Model	Nominal size m <sup>3</sup> /h	Connection at threaded fitting	Overall length	l / p.	Type	Order no.
MTW	Qn 1.5	1/2"	110 mm		MTW0311015	22M 001
		1/2"	165 mm		MTW0316515	22M 002
		1/2"	170 mm		MTW0317015	22M 003
	Qn 2.5	3/4"	190 mm		MTW0519020	22M 004
	Qn 3.5	1"	260 mm		MTW0726025	22M 005
	Qn 6	1"	260 mm		MTW1226025	22M 006
		1 1/4"	260 mm		MTW1226030	22M 007
	Qn 10	1 1/2"	300 mm		MTW2030040	22M 008
Qn 15	2"	270 mm		MTW3027050	22M 009	

### MTWI Pulse version, available from Qn 1.5 to Qn 10

MTWI	Qn 2.5	3/4"	190 mm	10	MTWI0519020	23M 001
		3/4"	190 mm	100	MTWI0519020	23M 002

### MTW-ST Ascending pipeline version

MTW-ST	Qn 1.5	3/4"	105 mm		MTW03105ST	22M 010
	Qn 2.5	3/4"	105 mm		MTW05105ST	22M 011
	Qn 6	1"	150 mm		MTW12150ST	22M 012
	Qn 10	1 1/2"	150 mm		MTW20150ST	22M 013

### MTWI-ST Pulse version, available from Qn 1.5 to Qn 10

MTWI-ST	Qn 2.5	3/4"	105 mm	10	MTWI05105ST	23M 003
		3/4"	105 mm	100	MTWI05105ST	23M 004

### MTW-F Descending pipeline version

MTW-F	Qn 2.5	3/4"	105 mm		MTW05105FA	22M 014
	Qn 6	1"	150 mm		MTW12150FA	22M 015
	Qn 10	1 1/2"	150 mm		MTW20150FA	22M 016

### MTWI-F Pulse version, available from Qn 1.5 to Qn 10

MTWI-F	Qn 2.5	3/4"	105 mm	10	MTWI05105FA	23M 005
		3/4"	105 mm	100	MTWI05105FA	23M 006

### RTK Standard version Qn 1.5 also overall length 110, 115 and 165 mm

RTK	Qn 1.0	1/2"	170 mm		RTK0217015	32M 001
	Qn 1.5	1/2"	170 mm		RTK0317015	32M 002
	Qn 2.5	3/4"	170 mm		RTK0517020	32M 003

### RTKI-N Pulse version

RTKI-N	Qn 1.5	1/2"	170 mm	10	RTKIN0317015	32M 004
		1/2"	170 mm	100	RTKIN0317015	32M 005

### Assembly key

Assembly key for MTK				M-Schl-MTK	65M 049
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### Connectors



Connector, brass with seal	1/2"			VME1/2	65A 003
	3/4"			VME3/4	65A 004
	1"			VME4/4	65A 045
	1 1/4"			VME5/4	65A 046
	1 1/2"			VME6/4	65A 047
	2"			VME8/4	65A 048

All pulse versions also available in other sizes and pulse rates

Other sizes on request, but in factory-tested version

For matching water meter connection kits, see chapter Mechanical Accessories

## Accessories ordering data

Model	Sales unit pce.	Connection at threaded fitting	Size	Type	Order no.
Rubber seal	100		1/2"	GTW1/2	65A 008
			3/4"	GTW3/4	65A 009
			1"	GTW4/4	65A 049
			1 1/4"	GTW5/4	65A 050
			1 1/2"	GTW6/4	65A 051
Fibre seal	100		2"	GTW8/4	65A 052
			1/2"	FTW1/2	65A 010
			3/4"	FTW3/4	65A 011
			1"	FTW4/4	65A 053
Plastic seal HD-PE	100		1 1/4"	FTW5/4	65A 054
			1 1/2"	FTW6/4	65A 055
			1/2"	KD1/2	65A 012
Hot water seal asbestos-free	100		3/4"	KD3/4	65A 013
			1"	KD4/4	65A 057
			1/2"	KTH1/2	65A 014
Back flow valve	1		3/4"	KTH3/4	65A 015
			1"	KTH4/4	65A 058
			1 1/4"	KTH5/4	65A 059
			1 1/2"	KTH6/4	65A 060
			2"	KTH8/4	65A 061
Locking wire brass / plastic	1 Roll (100 m)		1/2"	WM15	65A 062
			3/4"	WM20	65A 063
			1"	WM25	65A 064
			1 1/2"	WM40	65A 065
Locking wire copper / copper	1 Roll (100 m)			PB-CU	60A 002
Lead seal	1000			PB9	60A 003
Sealing pliers, with engraving	1			PBZ-G	60A 004
Sealing pliers, without engraving	1			PBZ	60A 005
Lead sealing clip, two-part	1		1/2"	PS15	65A 025
			3/4"	PS20	65A 026
			1"	PS25	65A 066
			1 1/2"	PS40	65A 067
Lead sealing clip, single-part	1		3/4"	PSE20	65A 028
Replacement cartridge for PATROL	1			MP-PATROL	65M 001
Back pressure valve for PATROL	1	3/4"		WM20-P	65M 002
Assembly key for PATROL	1			RS-PATROL	65M 003
Pulser ETK-N and MTK-N	1			IG-T2R	65E 041
Pulser for MNK & MNK-RPI-N	1			IG-RP2R	50M 002
Adaptor piece, plastic	1		170-1/2"	PSTK17015	65A 068
			190-3/4"	PSTK19020	65A 069



## Load limits

### Table of load limits in accordance with the German calibration regulations

#### Cold water meters

Range	Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>max</sub> = 2 x Q <sub>n</sub> in m <sup>3</sup> /h	Class A		Class B		Class C		Nominal diameter DN
			Q <sub>min</sub> = 0.04 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.1 x Q <sub>n</sub> in l/h	Q <sub>min</sub> = 0.02 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.08 x Q <sub>n</sub> in l/h	Q <sub>min</sub> = 0.01 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.015 x Q <sub>n</sub> in l/h	
Q <sub>n</sub> < 15m <sup>3</sup> /h	1.5	3	60	150	30	120	15	22.5	15
	2.5	5	100	250	50	200	25	37.5	20
	3.5	7	140	350	70	280	35	52.5	25
	6	12	240	600	120	480	60	90	32
	10	20	400	1000	200	800	100	150	40
Range	Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>max</sub> = 2 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.08 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.3 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.03 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.2 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.006 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.015 x Q <sub>n</sub> in m <sup>3</sup> /h	
Q <sub>n</sub> ≥ 15m <sup>3</sup> /h	15	30	1.2	4.5	0.45	3	0.09	0.225	50
	25	50	2	7.5	0.75	5	0.15	0.375	65
	40	80	3.2	12	1.2	8	0.24	0.6	80
	60	120	4.8	18	1.8	12	0.36	0.9	100
	150	300	12	45	4.5	30	0.9	2.25	150
	250	500	20	75	7.5	50	1.5	3.75	200
	400	800	32	120	12	80	2.4	6	250
	600	1200	48	180	18	120	3.6	9	300
	1000	2000	80	300	30	200	6	15	400
1500	3000	120	450	45	300	9	22.5	500	

#### Warm water meters

Range	Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>max</sub> = 2 x Q <sub>n</sub> in m <sup>3</sup> /h	Class A		Class B		Class C		Class D	
			Q <sub>min</sub> = 0.04 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.1 x Q <sub>n</sub> in l/h	Q <sub>min</sub> = 0.02 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.08 x Q <sub>n</sub> in l/h	Q <sub>min</sub> = 0.01 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.06 x Q <sub>n</sub> in l/h	Q <sub>min</sub> = 0.01 x Q <sub>n</sub> in l/h	Q <sub>t</sub> = 0.015 x Q <sub>n</sub> in l/h
Q <sub>n</sub> < 15m <sup>3</sup> /h	1.5	3	60	150	30	120	15	90	15	22.5
	2.5	5	100	250	50	200	25	150	25	37.5
	3.5	7	140	350	70	280	35	210	35	52.5
	6	12	240	600	120	480	60	360	60	90
	10	20	400	1000	200	800	100	600	100	150
Range	Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>max</sub> = 2 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.08 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.2 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.04 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.15 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>min</sub> = 0.02 x Q <sub>n</sub> in m <sup>3</sup> /h	Q <sub>t</sub> = 0.01 x Q <sub>n</sub> in m <sup>3</sup> /h		
Q <sub>n</sub> ≥ 15m <sup>3</sup> /h	15	30	1.2	3	0.6	2.25	0.3	1.5		
	25	50	2	5	1	3.75	0.5	2.5		
	40	80	3.2	8	1.6	6	0.8	4		
	60	120	4.8	12	2.4	9	1.2	6		
	150	300	12	30	6	22.5	3	15		
	250	500	20	50	10	37.5	5	25		
	400	800	32	80	16	60	8	40		
	600	1200	48	120	24	90	12	60		
	1000	2000	80	200	40	150	20	100		
1500	3000	120	300	60	225	30	150			