kamstrup

Data Sheet

MULTICAL® 21 & flowIQ® 2101

- Pinpoint accuracy
- Drive-by', network or IoT
- Temperature measurement
- Low leakage limit
- Long range
- Long life
- Simple installation
- Environment-friendly
- GDPR ready





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Smart water meter – ultrasonic compact meter for measurement of cold and hot water consumption in households, apartment buildings and small commercial properties

Pinpoint accuracy
Ultrasonic flow measurement guarantees pinpoint measuring accuracy. The electronic meter has no moving parts, meaning that there is no wear and that MULTICAL® 21/flowIQ® 2101 is resistant to any impurities in the water.

Many possibilities for communication
The water meter comes with the newest radio technology to meet increasing market demands for smart metering, both for 'Drive-by', network or Sigfox installations. Radio packages are available with transmission intervals of 16 or 96 seconds for Wireless M-Bus and daily for Sigfox. Consumption data can be read manually directly from the display or using an optical eye. Furthermore, consumption data can be remotely read by means of Wireless M-Bus, which is built into the meter.

Temperature
The meter measures both water and ambient temperatures.

Low leakage limits
MULTICAL® 21/flowIQ® 2101 has built-in sensitive leak monitoring, as low as 0.1 % of Q_3, which means that even the smallest water losses are detected very quickly. The unique combination of pinpoint measuring accuracy, longevity and built-in radio communication reduces the operating costs for the water company continuously and contingencies, caused by any leakage, are minimized, as waste of water is discovered immediately.

Long range
MULTICAL® 21/flowIQ® 2101 is equipped with a long range antenna that transmits strong radio signals with intelligent coding to the network. The meter can also be read from a long distance with 'Drive-by'.

Installation
The water meter is easy to install in all operating environments, horizontally as well as vertically, independent of piping and installation conditions.

The meter is waterproof, IP68 type tested, so also suitable for installation in meter pits.

User-friendly
The meter comes with a large and easy to read display and the meter is constructed as a hermetically vacuum sealed unit, which prevents humidity from reaching the electronics. Therefore condensation water between the glass and the large display is avoided.

Environment-friendly meter
The compact water meter has been approved for drinking water in several countries. Meter housing and flow parts are made of the synthetic material PPS, which means that the meter does not contain lead or other heavy metals.
The environmental report for the water meter, documents that the meter has low environmental impact, and high recyclability of materials when the meter is taken out of service.

Hygiene
To protect the health of the consumers Kamstrup has a hygienic manufacturing process of the water meters. Kamstrup has a highly automated manufacturing process, and only uses materials which are approved for drinking water. Furthermore the products gets disinfected before dispatch. The hygiene is being controlled by external accredited laboratories and by frequent audits.

General description
MULTICAL® 21/flowIQ® 2101 is a hermetically closed compact static water meter intended for the registration of cold and hot water consumption. The water meter uses the ultrasonic principle and has been constructed on the basis of Kamstrup's experience since 1991 with the development and production of static ultrasonic meters.

MULTICAL® 21/flowIQ® 2101 has been subjected to a very comprehensive OIML R49 type test with a view to securing a long-term stable, accurate and reliable meter. One of the water meter's many advantages is the fact that it has no wearing parts, which entails longevity.
Furthermore, the meter has a low-flow cut-off (start flow) of only 2 l/h for Q_3 = 1.6 m^3/h and 2.5 m^3/h and 3.2 l/h for Q_3= 4.0 m^3/h, which provides accurate measurement also at low water flows.

This water meter is constructed as a vacuum chamber of moulded composite material. Thus, the electronics are fully protected against penetration of water. This means that the meter can without problems be placed in e.g. bathrooms where it is sprayed with water daily, and it is also suitable for mounting in meter pits, which are frequently filled with water.

The meter can and must only be opened by Kamstrup A/S. If the meter has been opened and the seals have thus been broken, the meter is no longer valid for billing purposes.

Furthermore, the factory guarantee no longer applies.

The volume is measured using ultrasonic technique which is proven as a long-term stable and accurate measuring principle. Two ultrasonic transducers are used to send sound signals both against and with the flow. The ultrasonic signal travelling with the flow reaches the opposite transducer first. The time difference between the two signals can be converted into flow velocity and subsequently volume.

The accumulated water consumption is displayed by the meter in cubic metres (m^3) with five digits and up to three decimals, i.e. the resolution has been extended to 1 liter only. The large and clear display has been specially designed to obtain long life and sharp contrast in a wide temperature range.

In addition to volume reading, a graphic indication of current flow and a number of information codes are displayed.

The meter measures continuously both water and ambient temperature, and stores minimum, mean and maximum temperatures daily. All registers are saved daily in the meter's memory for 460 days. Furthermore, monthly data for the latest 36 months and yearly data for the latest 10 years are saved.

The water meter is fitted with an optical eye which makes it possible to read saved consumption data and info codes, stored in the meter's data logger. Using a serial PC connection, the optical eye furthermore gives access to configure the water meter.

The water meter is powered by battery with up to 16 years' lifetime.

The meter comes with the newest radio technology to meet increasing market demands for smart metering. It has built-in data communication for Wireless M-Bus and the built-in radio can be configured for both 'Drive-by' reading and reading in 'Fixed network'. It is also possible to choose the meter with integrated Sigfox communication.

Wired M-Bus
The meter is also available in a version with Wired M-Bus, providing a comprehensive datagram acc. to EN 13757:2013 - used in applications using M-Bus protocol. MULTICAL® 21 with Wired M-Bus is ordered under the name flowIQ® 2101, see also section 'Ordering details'.

Characteristics in short:

- accurate and reliable
- ultrasonic metering
- low start flow
- measuring water and ambient temperatures
- remote reading
- no moving parts – no wear
- long-term stable – long life
- powered by a lithium battery
- multiple info codes
- large clear display
- hermetically sealed
- fully waterproof
- suitable for mounting in pits.

Approved meter data

MID classifications

Approval	DK-0200-MI001-015
Mechanical environment	Class M1
Electromagnetic environment	Class E1 and E2 for Wireless M-Bus version Class E1 for Wired M-Bus version
Climatic environment	5…55 °C, condensing humidity (indoors mounted in utility rooms and outdoors in meter pits – mounting in direct prolonged sunligt must be avoided)

OIML R49 designations

Accuracy class	2
Sensitivity class	U0/D0
Ambient class	Fulfils OIML R49 class B and O (building/outdoor)
Medium temperature, cold water	0.1…30 °C (T30) or 0.1…50 °C (T50)
Medium temperature, hot water	0.1…70 °C (T70) or T30/70
Meter types	Q_3 = 1.6 m³/h, 2.5 m³/h and 4.0 m³/h
Drinking water approvals	DVGW W 421, WRAS, ACS, Belgaqua, SCU, PZH

Material

Wetted parts

Meter housing and meter pipe	Polyphenylene sulfide PPS with 40 % fibreglass
Reflectors	Stainless steel
Strainer	Polyethersulfone PES

Technical data

Electrical data

Battery	3.65 VDC, 1 C-cell lithium or 2 A-cells lithium
Battery lifetime:	up to 16 years at tBAT < 30°C depending on selected module up to 8 years at tBAT < 55°C
EMC data	Fulfils MID class: - E1 and E2 for Wireless M-Bus and Sigfox version - E1 for Wired M-Bus version
Sigfox classification	Class zero
Sigfox radio zone	1.868 MHz, 14 dBm

Mechanical data

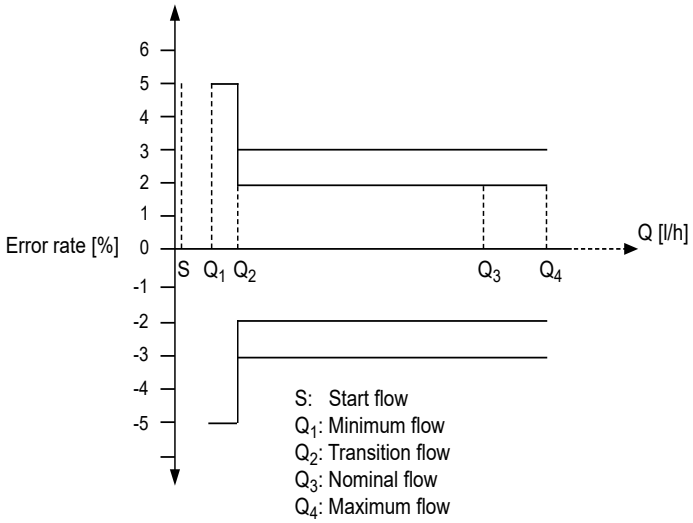
Metrological class	2
Ambient class	Fulfils OIML R49 class B and O (building/outdoor)
Ambient temperature	2…55 °C
Protection class	IP68
Medium temperature	0.1…30 °C (T30); 0.1…50 °C (T50); 0.1…70 °C (T70) or T30/70.
Storage temp. empty sensor	-25…60 °C
Pressure stage	PN16

Technical data

Accuracy
MPE (maximum permissible error)
MPE according to OIML R49

Meter approved 0.1...30 °C
± 5 % in range $Q_1 \leq Q < Q_2$
± 2 % in range $Q_2 \leq Q \leq Q_4$

At 30 °C < t < 70 °C
± 5 % in range $Q_1 \leq Q < Q_2$
± 3 % in range $Q_2 \leq Q \leq Q_4$



Meter sizes

MULTICAL® 21/flowIQ® 2101 is available in different combinations of overall length and nominal flow Q_3.

Type number	Nom. flow Q_3 [m³/h]	Min. flow Q_1 [l/h]	Max. flow Q_4 [m³/h]	Dynamic range Q_3/Q_1	Min. cutoff [l/h]	Max. cutoff [m³/h]	Pressure loss Δp at Q_3 [bar]	Connection on meter	Length [mm]
021-YY-C0A-8XX	1.6	10	2.0	160	2	4.6	0.18	G3/4B	110
021-YY-C0B-8XX	1.6	16	2.0	100	2	4.6	0.18	G3/4B	110
021-YY-C0D-8XX	2.5	10	3.1	250	2	4.6	0.43	G3/4B	110
021-YY-C0C-8XX	2.5	25	3.1	100	2	4.6	0.43	G3/4B	110
021-YY-C0G-8XX	2.5	10	3.1	250	2	4.6	0.49	G1B	105
021-YY-C0F-8XX	2.5	25	3.1	100	2	4.6	0.49	G1B	105
021-YY-C0H-8XX	2.5	10	3.1	250	2	4.6	0.49	G1B	130
021-YY-C0J-8XX	2.5	25	3.1	100	2	4.6	0.49	G1B	130
021-YY-C0E-8XX	2.5	10	3.1	250	2	4.6	0.49	G1B	190
021-YY-C0K-8XX	2.5	25	3.1	100	2	4.6	0.49	G1B	190
021-YY-C0L-8XX	4.0	16	5	250	3.2	8.5	0.45	G1B	130
021-YY-C0M-8XX	4.0	40	5	100	3.2	8.5	0.45	G1B	130
021-YY-C0N-8XX	4.0	16	5	250	3.2	8.5	0.45	G1B	190
021-YY-C0P-8XX	4.0	40	5	100	3.2	8.5	0.45	G1B	190

Meter sizes

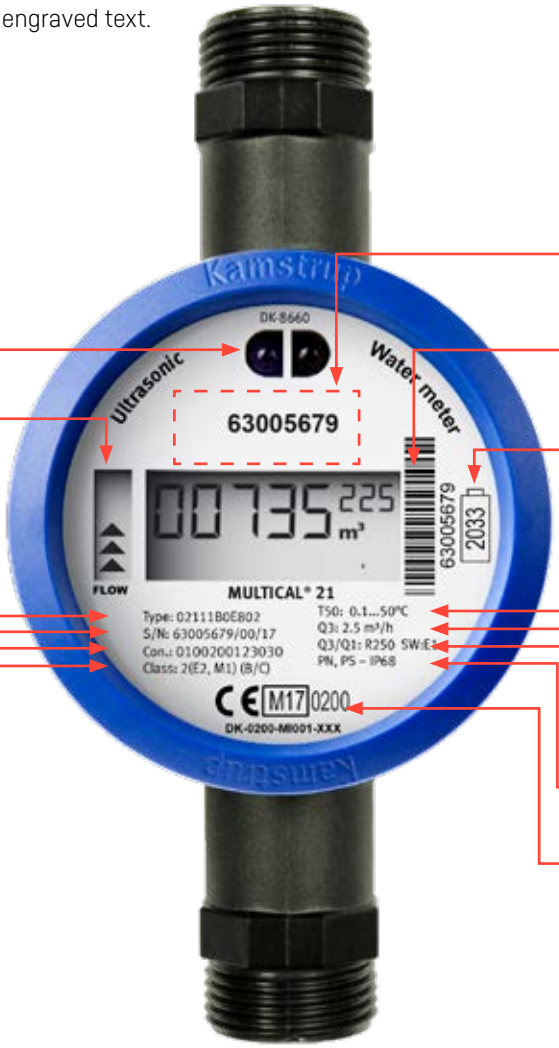
The meter is available in cold and hot water versions, controlled by the type number, which is:

8XX for cold water and 7XX for hot water.
XX = country code
YY = choice of communication
– also see section 'Ordering Details'.

Different extension pipes can be enclosed as accessories. These extension pipes make it possible to adjust the meter to most existing current overall lengths. (See Accessories for Water Meters: 58101270).

Meter details

Meter information in permanent laser engraved text.



Optical eye for reading and configuration

Graphic flow indicator

Type number (includes information on meter size, overall length etc.)

Serial number and production year

Configuration (with information on display resolution and encryption level etc.)

Accuracy class 2 according to OIML R49

Environment class: Electrical E1 or E2 and Mechanical M1 according to MID

Environment class B and O according to OIML R49 (building/outdoor)

Optional customer label, e.g. water company logo (15x38 mm)

Bar code with serial number

Expiry year of battery

Temperature class according to OIML R49

Meter size Q_3

Dynamic range
Software version

Pressure stage and protection class

CE-marking acc. to MID

Display and info codes



The water meter can be read from the large, easily readable, specially designed display. The five large figures indicate number of cubic meters. The three small figures are decimals.

The sign L (to the right of m^3) will always be off when the meter is in operation as it is solely used during factory control and verification of the meter.

The flow arrows in the left side of the display indicate water flow through the meter. If there is no flow, all arrows will be off.

The info codes in the display have the following meaning and function:

Info code flashes in the display	**Meaning**
LEAK	The water in the meter has not been stagnant for one continuous hour during the latest 24 hours. This can be a sign of a leaky faucet or toilet cistern.
BURST	The water consumption has been consistently high for half an hour, which indicates a pipe burst.
TAMPER	Attempt of fraud. The meter is no longer valid for billing.
DRY	The meter is not water-filled. In this case nothing will be measured.
REVERSE	The water flows through the meter in the wrong direction.
RADIO OFF flashes	The meter is still in transport mode with the built-in radio transmitter turned off. The transmitter turns on automatically when the first liter of water has run through the meter.
RADIO OFF	RADIO OFF lights permanently. The radio is switched off permanently. Can be activated via DataTool (module 99 only).
■■ (two squared 'dots')	Two small squares flashing alternately indicate that the meter is active.
'A' followed by a number	Indicates the number of metrologic changes the meter has gone through after factory verification. If no adjustments have been made both the 'A' symbol and the digit are inactive.

Info codes 'LEAK', 'BURST', 'DRY' and 'REVERSE' switch off automatically, when the conditions that activated them no longer exist. In other words, LEAK disappears when the water has been stagnant for one hour, BURST disappears when the consumption falls to normal level, REVERSE disappears when the water no longer flows in the wrong direction, and DRY disappears when the meter is filled with water.

Measurement of temperatures

Temperature monitoring
MULTICAL® 21/flowIQ® 2101 measures water and ambient temperatures respectively.

The measurements can be used to monitor the installation and to give an indication of the quality of the water.

Both temperatures are logged in the daily, monthly and yearly records.

Minimum, mean and maximum values are being registered daily. The register contains the last 460 days.

The first day of each month minimum, maximum and mean temperatures are stored in the register. The first day of each year minimum and maximum temperatures are stored. The register contains the last 36 months, and the last 10 years.

Temperature values are referred to in °C and can be read via the optical eye and sent by the radio signal. Optional temperature combinations in the radio package are described in the section *'Data registers'.*

Ambient/meter temperatures
Monitoring the ambient/meter temperature of the installation can be used as a warning of freezing temperatures or unintended high temperatures. The measurement in the meter housing corresponds to the ambient temperature where the meter is installed. The temperature is measured every minute. The calculation of maximum and minimum values is based on a two-minute averaging value. The mean temperature is a time-weighted average value.

Water temperatures
Water temperature is measured as an indirect measurement of the water using the ultrasound signal. The water temperature is measured every 32 seconds.

The maximum and minimum values are calculated every 2 minutes based on an average since the latest calculation. Measurement of water temperature requires that the meter is filled with water. If there is no water in the meter a code will be saved, saying that the meter is not water filled.

During periods of very low water consumption the water temperature approaches the ambient temperature. To give a correct indication of average water temperature this value is a volume weigthed average. During periods without water flow the weighted average cannot be calculated and then a code 128 is stored.

Data registers

The water meter has a permanent memory, in which the values of various data loggers are saved.

The meter includes the following registers:

Data logging interval	Data logging depth	Logged value
Yearly logger	10 years	See table below
Monthly logger	36 months	See table below
Daily logger	460 days	See table below
Info logger	50 events	Info code, meter reading and date

It is always possible to read target volume and info codes for each of the latest 36 months as well as corresponding meter reading and possible info codes for each of the latest 460 days. The loggers can only be read via the meter's optical eye.

The following registers are logged:

The monthly/yearly logger is written on the first day of the month/year, the daily logger is written at midnight.

Register type	Description	Yearly logger. 10 years	Monthly logger. 36 months	Daily logger. 460 days
Date (YY.MM.DD)	Logging time, year, month and day	✓	✓	✓
Volume	Current meter reading (legal)	✓	✓	✓
Operating hour counter	Accumulated number of operating hours	✓	✓	✓
Info	Information code	–	✓	✓
Vol Reverse	Volume during reverse flow	✓	✓	–
Date of max. flow	Date stamp of max. flow during period	✓	✓	–
Max flow	Value of max. flow during period	✓	✓	✓
Date of min. flow	Date stamp of min. flow during period	✓	✓	–
Min. flow	Value of min. flow during period	✓	✓	✓
Min. temp water	Water temperature – minimum	✓	✓	✓
Max. temp. water	Water temperature – maximum	✓	✓	✓
Mean temp. water	Volume weighted mean water temp.	–	✓	✓
Min. temp.	Meter temperature – minimum	✓	✓	✓
Max. temp.	Meter temperature – maximum	✓	✓	✓
Mean temp.	Meter temp. – time weighted average	–	✓	✓

Every time the information code changes, date and info codes are logged. Thus, it is possible to data read the latest 50 changes of the information code as well as the date the change was made. Reading is only possible via the optical eye.

For module 99, the daily, monthly and yearly loggers are not accessible over the optical eye, which is why the values in the loggers will show 0.

Optional data packages Wireless M-Bus

Part of the data transmitted through the Wireless M-Bus radio signal are optional.

It is possible to choose between different protocols (C1, T1), and various reading intervals, by choosing a specific module. Each module contains the option of choosing between up to 10 different data packages. You MUST choose one data package.

868 MHz			
	C1	**T1 OMS**	**Radio disabled**
Modules with actual values	40/48	41	
Module – 'Radio disabled'			99

Note that the logger is reset whenever you change between the various modules.

Also note that the target date is always 31/12 when selecting 'yearly reading'.

DataTool

With DataTool, the water utility can itself make various settings on the water meters allocated to its customer number. After successful installation on the computer, the utility has the possibility of selecting between various modules and communication standards. If the meter, for example, is purchased with module 40, it can be reconfigured for one of the other modules. In addition, it is also possible to disable the radio, if necessary. The required preset is already taken into account in the ordering process. DataTool can be requested from Kamstrup by sending an email to service@kamstrup.com.

Module	**Battery lifetime**		
868	16 Years	12 Years	10 Years
40	✓		
41		✓	
48*			✓
99	✓		

*) Only for selected markets.

A Wireless M-Bus data package is transmitted every 16 or 96 seconds.

When sending a data package every 16 seconds the package is kept short and compressed to achieve a long battery life.

At 96 second intervals, a longer and intelligent radio package with built-in 'repair coding' is sent – the long battery life is still guaranteed since the transmission interval is increased.

'Drive-by' or 'Fixed network' need to be chosen when ordering, and can be re-programmed by METERTOOL or DataTool.

Optional data packages Sigfox

Part of the data transmitted through the Sigfox radio signal is optional.

It is also possible to choose between the different data so it changes from one data package to another. The target volume is mandatory for each transmission, but transmission 1 can have information on max flow and transmission 2 can have information on ambient and water temperature. It is called 'Sigfox sequence'.

It is possible with one daily Sigfox transmission for a 16 years lifetime.

It is possible with hourly transmissions but on behalf of the lifetime of the meter. The lifetime for hourly transmissions will be 5 years.

Module		Lifetime
11	Daily values	16 years
12	Hourly values	5 years
13	Daily values sequence	16 years
14	Hourly values sequence	5 years
97	Radio disabled	16 years

Data packages

R-package	0	1	2	3
Info codes	✓	✓	✓	✓
Target volume V1	✓	✓	✓	✓
Max. flow target*	✓			
Min. flow target*		✓		
Min. temp water			✓	✓
Max. temp ambient			✓	
Min. temp ambient				✓

*) If the module is with daily values target is max./min. flow daily and if the module is with hourly values target is max./ min. flow hourly.

Info codes are pushed one time as soon as they occur. If the info code disappears and appears once again a new info code is pushed.

The planned transmission will always hold information on active info codes.

Data packages in Wireless M-Bus modules

Module	40										41										48										99	
Values											Actual																					
Lifetime estimated						16						12				10				16					10						16	
Mode						C1										T1									C1							
Wireless M-Bus Freq. [MHz]	868																															
R-group	1										2										6										9	
R-package	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
INFO codes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Volume V1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
V1 Reverse	✓										✓	✓	✓		✓						✓	✓	✓		✓							
Target V1, month		✓		✓		✓		✓				✓	✓	✓		✓		✓				✓	✓	✓				✓				
Target V1, year																																
Target date																																
Max flow, year																																
Max flow, month	✓		✓		✓		✓										✓									✓		✓				
Max flow, day										✓										✓									✓			
Min. flow, month									✓										✓								✓					
Min. flow, day																													✓			
Date and time											✓				✓						✓				✓							
Battery, days left															✓									✓								
Min. T water, day				✓						✓				✓						✓									✓	✓		
Min. T water, month						✓	✓	✓	✓							✓	✓	✓	✓				✓			✓	✓	✓				
Min. Temp. water, year																																
Max Temp. water, month									✓															✓			✓					
Min. Temp. ambient day																													✓	✓		
Min. Temp. ambient, month						✓	✓		✓			✓				✓		✓				✓		✓			✓					
Max Temp. ambient, month							✓	✓	✓		✓		✓				✓	✓	✓		✓		✓	✓		✓	✓	✓				
Min. Temp. ambient, year																																
Average Temp. water day					✓																											
Average Temp. ambient day				✓	✓					✓				✓						✓									✓	✓		
Radio disabled																															✓	

Wired M-Bus version

For billing and analysis
- Fixed datagram
- Up to 9600 baud communication speed
- Primary/secondary/enhanced secondary addressing
- According to M-Bus standard EN 13757:2013

Introduction
flowIQ® 2101 is available with Wired M-Bus offering easy reading of the water meter via, for example, an M-Bus Master. Also electricity meters or heat/cool meter with a built-in M-Bus micro-master can be used.

The M-Bus interface fulfills the requirements in the M-Bus standard EN 13757:2013 and can be used in a wide variety of applications using M-Bus protocol.

Applications
The M-Bus meter is designed with focus on high flexibility, to fulfill a wide pallet of applications.

Analysis
The water meter supports high quantities of data in a fixed datagram. This is valid for both actual meter data as well as for historical logger data.

Billing
All relevant data for billing purposes can be read out from flowIQ® 2101.

M-Bus Addressing
The M-Bus interface supports primary, secondary and enhanced secondary addressing.

Primary addressing – (000-250)
When nothing else is specified, the M-Bus interface will automatically use the last 2-3 digits of the water meter serial number as the primary address.

During the order process or by use of the METERTOOL HCW programming software, dedicated primary addresses can be selected. Further on, the primary address can be changed over the M-Bus network using standardized M-Bus commands.

Secondary addressing
– (M-Bus ID No. 00000000-99999999)

The last eight digits of the serial number are used as M-Bus ID number for secondary addressing.

Enhanced Secondary addressing
– (M-Bus ID No. 00000000-99999999)/(M-Bus fabrication No. 00000000-99999999)

Enhanced secondary addressing is supported by adding the meter's serial number as M-Bus Fabrication Number to the secondary address.

Installation
The meter is delivered with a 1.5 meter long standard polarity independent connection.

Communication
Communication is in accordance with the M-Bus standard EN 13757:2013

Communication speed
The meter supports 300, 2400 and 9600 baud communication speed and automatically detects the communication speed used by the M-Bus master.

Communication interval
Reading intervals ≥ one minute may not reduce the water meter battery lifetime, at any communication speed. Reading intervals ≥ 15 seconds are supported, but this will reduce battery lifetime and provide redundant information.

Communication via optical read-out head
Apart from the configurations in the flowIQ® 2101 itself, the primary M-Bus address can be configured via the optical readout head and METERTOOL HCW.

Communication from M-Bus master
The following parameters can be configured with M-Bus commands via the connected M-Bus master:
- Primary address
- Meter clock synchronization.



Wired M-Bus version

Communication from flowIQ® 2101 M-Bus

Available data (fixed datagram)

flowIQ® 2101			
M-Bus data header	**Actual data**	**Monthly data**	**Meter data**
M-Bus ID Manufacturer ID Version ID Device type Access counter Status (info codes) Configuration (not used)	Water meter reading (volume) Volume reverse Hour counter Actual flow Actual water temperature Actual ambient temperature Min. flow day[1)] Max. flow day[1)] Min. water temp. day[1)] Avg. water temp. day[1)] Min. ambient temp. day[1)] Max. ambient temp. day[1)] Avg. ambient temp. day[1)] Date/time	Monthly target meter reading Min. flow last full month Max. flow last full month Min. water temp. last full mo. Avg. water temp. last full mo. Min. ambient temp. last full mo. Max. ambient temp. last full mo. Avg. ambient temp.last full mo. Target date	Information codes Config number Meter type (main / sub type) Meter SW Revision

[1)] The daily flow and temperatures are the actual daily minimum, average or maximum values, logged from midnight until the present reading time.

Technical specifications

Physical	Fully integrated M-Bus interface

Communication

Readout speed	300/2400/9600 baud with automatical speed detection
Communication interval	Longer than 1 minute (recommended)
Protocol	EN 13757:2013
Configuration	METERTOOL HCW via optical read-out head (see page 12)

Supply

Power consumption	1 unit load (1.5 mA) per M-Bus slave
Rin / Cin	422 Ω/0.5 nF
Max cable resistance	29 Ω/180 nF per pair
Operational temperature	5 - 55 °C

Markings/approvals

- EN 13757CE approval
- MID

Ordering

See sections: 'Type overview' and 'Configuration'.

Pressure loss

According to OIML R49 the maximum pressure loss must not exceed 0.63 bar (0.063 MPa) in the range Q_1 to Q_3.
The pressure loss in a meter increases with the square of the flow and can be stated as:

$Q=k_v \times \sqrt{\Delta p}$

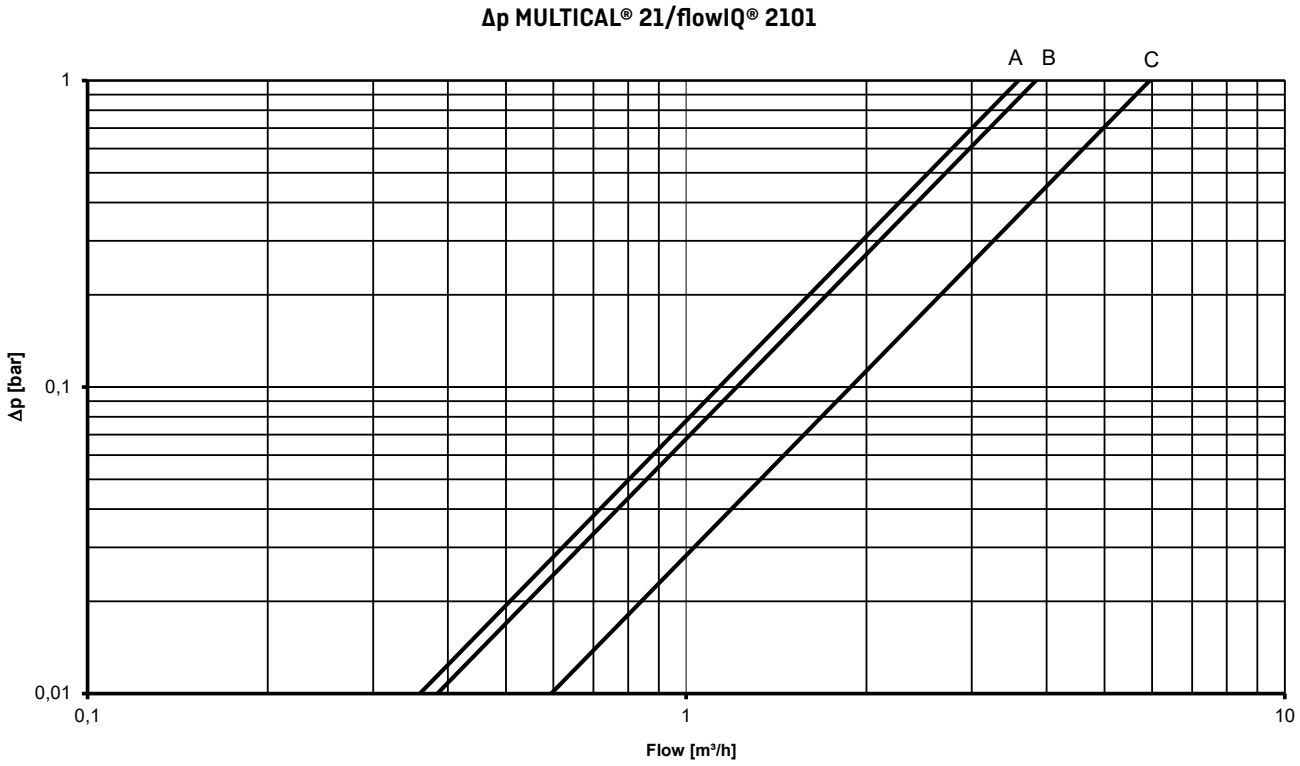
where:

Q = volume flow rate [m³/h]

k_v = volume flow rate at 1 bar pressure loss

Δp = pressure loss [bar]

Graph	Q_3 [m³/h]	Nom. diameter [mm]	k_v	Q at 0.63 bar [m³/h]
B	1.6 & 2.5	DN15	3.8	3.0
A	2.5	DN20	3.6	2.8
C	4.0	DN20	6.0	4.7



Ordering details

An order is initiated by stating the type number of the selected model of MULTICAL® 21/flowIQ® 2101.
The type number includes information on meter type - cold or hot water, meter size, overall length, battery supply, country code etc. Some of the features included in the type number cannot be changed.

Subsequently, the meter configuration, which determines customer specific requirements, such as number of digits in display etc., is selected. The configuration is completed during programming of the finished meter.

Finally, required accessories, if any, in the form of gaskets, different extension pipes, non-return valve and standard couplings are selected.

Accessories are enclosed separately to be mounted by the installer.

Ordering details

MULTICAL® 21 /flowIQ® 2101	Type 021	☐☐	☐	0	☐	☐	☐☐
Communication							
Wireless M-Bus. 868 MHz. mode C1		40					
Wireless M-Bus. 868 MHz. mode T1 - OMS [1]		41					
Wireless M-Bus. 868 MHz. mode C1 [1]		48					
Wired M-Bus [2]		30					
Module with disabled radio communication		99					
Sigfox daily values		11					
Sigfox hourly values		12					
Sigfox daily sequence		13					
Sigfox hourly sequence		14					
Module with disabled radio communication (Sigfox)		97					
[1] *only for selected markets* [2] *only for flowIQ® 2101*							
Supply							
16 years' battery supply, 2 A-cells [1]			B				
16 years' battery supply, 1 C-cell [1]			C				
[1] *only for selected markets*							
Meter size							
Q_3 [m³/h]	**Connection**	**Length [mm]**	**Dynamic range**				
1.6	G¾B (R½)	110	160		A		
1.6	G¾B (R½)	110	100		B		
2.5	G¾B (R½)	110	250		D		
2.5	G¾B (R½)	110	100		C		
2.5	G1B (R¾)	105	250		G		
2.5	G1B (R¾)	105	100		F		
2.5	G1B (R¾)	130	250		H		
2.5	G1B (R¾)	130	100		J		
4.0	G1B (R¾)	130	250		L		
4.0	G1B (R¾)	130	100		M		
2.5	G1B (R¾)	190	250		E		
2.5	G1B (R¾)	190	100		K		
4.0	G1B (R¾)	190	250		N		
4.0	G1B (R¾)	190	100		P		
Meter type							
Hot water meter						7	
Cold water meter						8	
Country code (language on label etc.)							XX

The country code is used for:

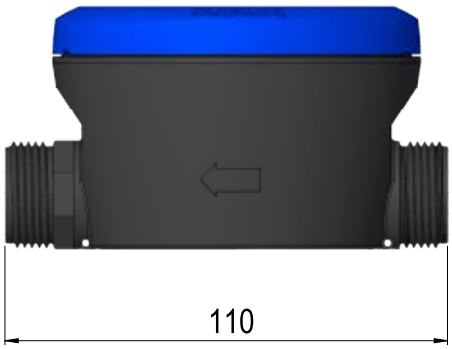
- Language and approval on type label
- Temperature class of water meter. cold water (T30 and T50) or hot water (T70 and T30/70)

Configuration

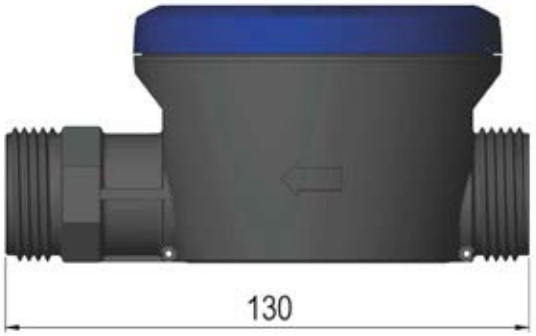
	KK	LLL	MMM	N	P	R	S	T
Target date (fixed)	01							
Average time of max. values								
2 minutes		002						
Customer label 2005-MMM			MMM					
Leakage message limit								
OFF				0				
Flow continuously > 0.5 % of Q_3				1				
Flow continuously > 1.0 % of Q_3				2				
Flow continuously > 2.0 % of Q_3				3				
Flow continuously > 0.25 % of Q_3				4				
Flow continuously > 0.1 % of Q_3				5				
Pipe burst limit								
OFF					0			
Flow > 5 % of Q_3 for 30 minutes					1			
Flow > 10 % of Q_3 for 30 minutes					2			
Flow > 20 % of Q_3 for 30 minutes					3			
Optional register in data logger								
Depending on the selected communication type, it is possible to select between up to 10 data packages. For further information see page 11.								
Display resolution								
00001 m^3							0	
00000.1 m^3							1	
00000.01 m^3							2	
00000.001 m^3							3	
Encryption level								
No encryption								0
Utility encryption (only available for selected markets)								2
Encryption with separately forwarded key								3
Unless otherwise stated in the order, Kamstrup supplies the following:	***01***	***002***	***000***	***2***	***3***	***5***	***3***	***3***

Dimensioned sketches

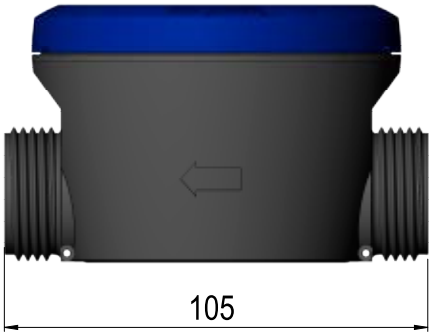
Type A and D – G3/4B x 110 mm



Type H – G1B x 130 mm



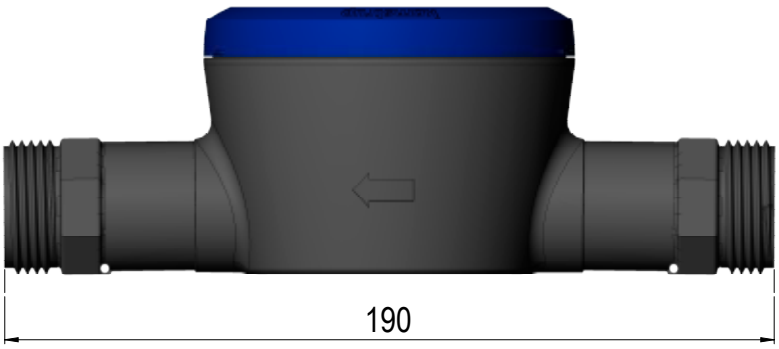
Type G – G1B x 105 mm



Type L – G1B x 130 mm



Type E and N – G1B x 190 mm



Accessories

See Accessories for Water Meters: 58101270-GB.

For further information about READy, USB Meter Reader and Wireless M-Bus please see the technical description and the installation guide.

Information about Kamstrups hygiene concept can be found on products.kamstrup.com.

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