kamstrup

Data sheet

flowIQ® 3200

» **RF**
» **Encoded**
» **Cellular**

- Ultrasonic measurement
- Sustainable measurement accuracy
- Flow measurement in display
- Multiple radio options available
- IP68 Vacuum sealed construction
- Lead free and certified to NSF/ANSI 61
- Fire Service approved

Contents

Electronic ultrasonic cold water meter for measurement of cold water consumption in households, multi-unit buildings and industry

Sustainable accuracy
Ultrasonic flow measurement guarantees sustainable accuracy and longevity. Ultrasonic flow measurement is based on the transit time method, and all measurements, references, readings, calculations and data communication are controlled by an advanced, specially designed electronic circuit. Thus, the meter includes no moving parts, which makes flowIQ® 3200 less sensitive to wear and tear and impurities in the water.

Construction
The meter is hermetically closed and vacuum-sealed to prevent humidity from reaching the electronics and avoid condensation between the glass and display. The meter is IP68 (submersible) type tested and suitable for installation in meter pits.

Installation
flowIQ® 3200 is easy to install in all operating environments, horizontally as well as vertically, independent of piping and installation conditions. Consumption data can be read visually from the display, using an optical eye, and remotely read, by various integrated communication protocols.

Specific features
flowIQ® 3200 measures the water and environment temperatures and it includes leak detection, securing that water loss is discovered quickly.

The unique combination of all the flowIQ® 3200 features reduces current operating costs to measure water usage and minimizes unexpected expenses in connection with possible leakage.

Environmentally friendly
The meter has been approved according to Drinking Water Standards and is certified to NSF/ANSI 61. The meter housing and measuring part are made of the high performance thermoplastic material polyphenylene sulfide (PPS) with 40% fiberglass, which is free from lead and other heavy metals. The environmental report, Carbon Footprint, documents the meter's high reusability and low environmental impact, including recycling of materials.

Hygiene
To protect the health of the consumers Kamstrup has a hygienic manufacturing process of the water meters.

Kamstrup also has a highly automated manufacturing process and only uses materials 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
flowIQ® 3200 is a hermetically sealed water meter intended for measurement of cold and *reclaimed water consumption in residentials and multi-unit buildings and commercial applications.

flowIQ® 3200 employs the ultrasonic measurement principle, based on Kamstrup's experience since 1991, with the initial development and production of static ultrasonic meters.

flowIQ® 3200 is available in an Encoded Output version with 2 x A-cell battery supply and a RF and Cellular version with 1 x D-cell battery supply.

One of flowIQ® 3200's many advantages is the fact that it has no wearing parts, which ensures a high and stable accuracy throughout its lifetime. flowIQ® 3200 complies with all the AWWA C715-18 and CN1044 fire service guideline for Ultrasonic Water Meters.

In the flowIQ® 3200 series a composite housing is mounted on a stainless steel meter body. Thus, the electronics are fully protected against internal or external penetration of water.

flowIQ® 3200 is suitable for measurement in multi-unit apartments and light commercial premises. The meter is suitable for mounting in pump stations or wellheads, as it will also function in fully submerged conditions.

flowIQ® 3200 measures the water consumption electronically, as a volume, using a pair of ultrasonic signals. Through two ultrasonic transducers, an ultrasonic signal is sent with and against the flow direction. A transducer serves both as a 'speaker' when transmitting and as a 'microphone when a signal is received. The ultrasonic signal traveling with the flow will be the first to reach the opposite transducer, while the signal running against the flow will be received a little later. The time difference between the two signals can be converted into flow velocity, and thereby also into a volume. The measuring principle is a proven, long-term stable and accurate measuring principle.

In addition to volume reading, an indication of current flow and a number of other information codes are displayed. All registers are saved daily in the meter data logger (EEPROM) and are kept for 460 days. Furthermore, monthly data for the latest 36 months, hourly data for the latest 100 days and 50 info code events are saved.

flowIQ® 3200 is powered by an internal lithium battery which can provide up to 20 years operating life.

flowIQ® 3200 is available with a choice of integrated data communication options:

- 912.5, 915 or 918.5 MHz – RF
- 450-470 MHz - RF
- Cellular
- Encoded Output

The 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 an optical reading head, it is also possible to change the meter configuration e.g. data packages.

flowIQ® 3200 can and must only be opened by Kamstrup A/S. If the meter has been opened and the sealing has thus been broken, the meter is no longer valid for billing purposes and the warranty is void.

* *For information concerning reclaimed water we refer to document no.: FILE100003532*

Technical data

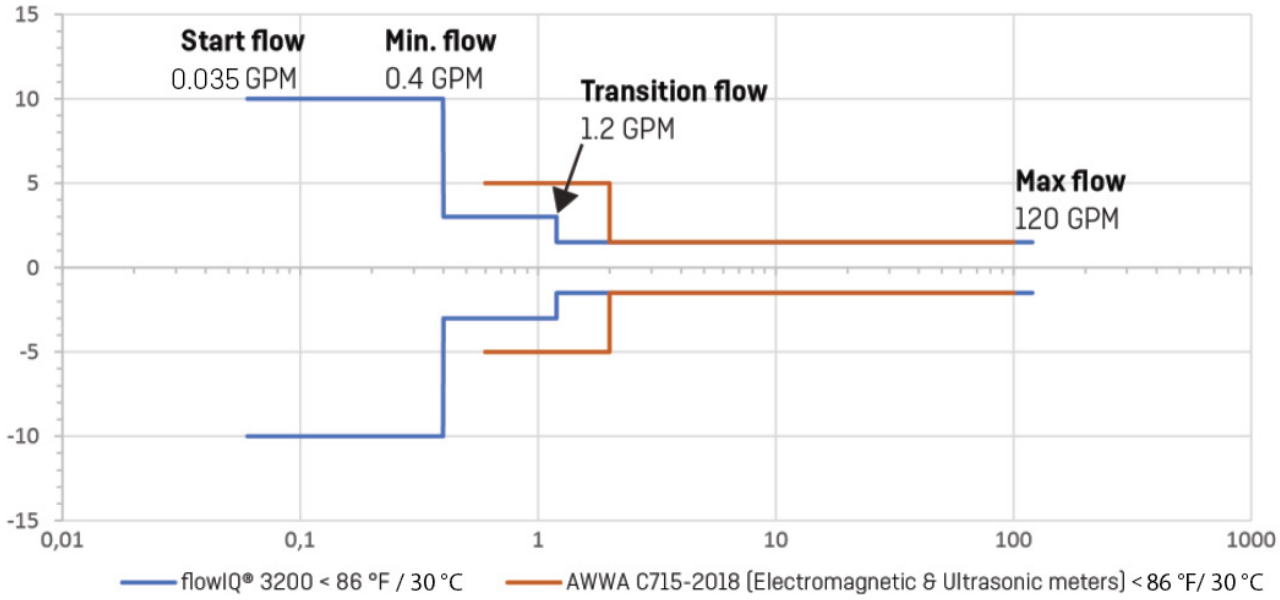
Electrical data

Battery (flowIQ® 3200 RF and Cellular)	D-cell battery, 3.6V, 19Ah. The battery warranty does not apply at meter temperatures above t_{BAT} > 95 °F / 35 °C
Battery (flowIQ® 3200 E0)	2 x A-Cell battery, 3.6V, 3.6Ah. The battery warranty does not apply at meter temperatures above tBAT > 95 °F / 35 °C

Mechanical data

Protection class	IP68-rated (waterproof/submersible)
Mechanical environment	Class M1 (Measuring Instruments Directive classification)
Maximum operating pressure	Oval flange mounted, 300 PSI / (20.7 bar)
	Round flange mounted, 275 PSI (19 bar)
Ambient/meter temperature	35...130 °F / 0.5...55 °C
Water temperature	33...120 °F / 0.5...50 °C
Storage temp. empty sensor	-10...140 °F / -20...60 °C

Accuracy



Note: At flows between 'Start flow' and 'Maximum flow' measurement occurs – however the accuracy is only guaranteed in the range from minimum flow to maximum flow

Approved meter data

Certified to NSF/ANSI 61.
Complies to part 15 of the FCC rules, ISED, IFT and with AWWA C715-18 and CN1044.

Material

Wetted parts

Flow part, threaded/flanged	Stainless Steel 316L
O-ring/gasket	EPDM
Measuring tube	PPS with fiberglass
Reflectors	Stainless steel

External meter parts

Meter housing	Polyphenylene sulfide (PPS) – 40% fiberglass
Cover	Glass
Spring ring	Stainless steel
Top ring (sealing)	Polycarbonate (gray)

Meter sizes

flowIQ® 3200 is available in the sizes shown in table below:

XX = Communication module Y = Battery suply ZZ = Country code

Type number	Meter size Inches	Start flow (S) [GPM]/ [L/h]	Min. flow [GPM]/ [L/h]	Transi-tion flow[1)] [GPM]/ [m³/h]	Max flow [GPM]/ [m³/h]	Sat. flow rate [GPM]/ [m³/h]	Pressure loss SMOC [PSI]/ [bar]	Connection on meter	Lay length [Inches]/ [mm]	Strainer	Temp. measurement of water
02-L-XX-Y-1-8F-8ZZ	1½"	0.035/ 8	0.4/ 90.8	1.2/ 0.27	120/ 27.25	168/ 38.16	5.5/ 0.38	1½"[2)]	13"/ 330	No	Yes
02-L-XX-Y-1-8H-8ZZ	2"	0.088/ 20	0.5/ 113.6	1.5/ 0.34	160/ 36.34	224/ 50.88	1.8/ 0.12	2"	17"/ 432	No	Yes
02-L-XX-Y-1-8M-8ZZ	2"	0.088/ 20	0.5/ 113.6	1.5/ 0.34	160/ 36.34	224/ 50.88	1.8/ 0.12	2"	15¼"/ 387	No	Yes
02-L-XX-Y-1-8K-8ZZ	3"	0.22/ 50	2.5/ 567.8	7.5/ 1.70	350/ 79.49	490/ 111.29	3.5/ 0.24	3"	12"/ 305	No	Yes
02-L-XX-Y-1-8P-8ZZ	4"	0.35/ 80	3.5/ 794.9	5/ 1.14	700/ 158.99	980/ 222.58	4/ 0.27	4"	14"/ 356	No	Yes

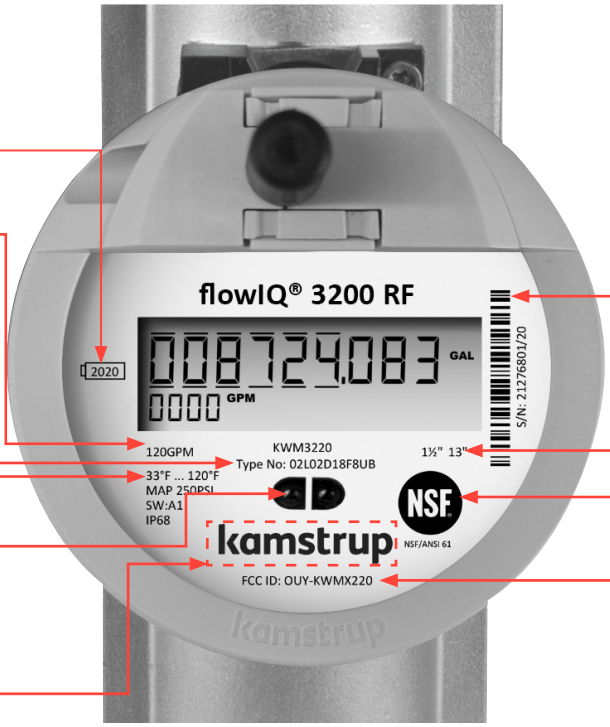
[1)] At flows between 'Start flow' and 'Maximum flow' measurement occurs – however the accuracy is only guaranteed in the range from minimum flow to maximum flow.

[2)] Only >1½"meters are recognized by the CN1044 approval standard for fire service meters.

Meter face details

Meter information in permanent laser engraved text. Note: Only FM fire service meters will be stamped with the FM approval mark.

RF top label



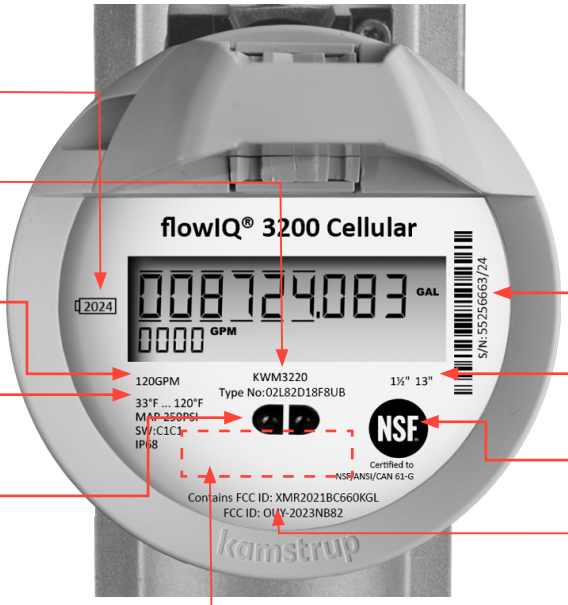
- Year of meter production
- Nominal meter size
  Max flow for continuous operation
- Type number (includes information on meter size, overall length, etc.)
- Water temp. range
- Optical eye for reading and configuration
- Optional customer label,e.g. water company logo (7x25 mm)
- Bar code with serial number
- Size and meter length
- NSF / ANSI 61 applicable
- IC / FCC identification

Encoded Output top label

- NSF / ANSI 61 applicable
- Water temp. range
- Year of meter production
- Nominal meter size
  Max flow for continuous operation
- Size and meter length
- Bar code with serial number
- Type number (includes information on meter size, overall length, etc.)
- Optical eye for reading and configuration
- Optional customer label, e.g. water company logo (7x25 mm)

Meter face details

Cellular top label



Year of meter production

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

Nominal meter size
Max flow for continuous operation

Water temp. range

Optical eye for reading and configuration

Bar code with serial number

Size and meter length

NSF / ANSI 61 applicable

IC / FCC identification

Optional customer label, e.g. water company logo (7x25 mm)

Core features

Water meters placed throughout the network make it possible to gather information that can be of vital importance for an effective water supply, asset management and improved customer service.

Temperature monitoring
flowIQ® 3200 measures ambient temperatures.

Information on temperatures above or below the configured temperature in the meter will warn the utility on potential frost damages or quality issues.

These measurements can be used to monitor the installation and will indicate the water's quality.

Consumption above max flow
The meter logs information on consumption above max flow. This information can be used to indicate if the meter size for a given installation is correct.

Consumption histogram
The meter tracks consumptions in different flow intervals for further analysis of the consumption patterns for the specific installation.

Current flow display
Besides the consumed volume, flowIQ® 3200 also shows the current flow in the display. The flow display has been designed with user experience in mind, where it can be advantageous, for example during installation, to be able to see the current consumption. In this context, it is important to stress that the metrological approval of the water meter is only related to the volume reading. Due to the meter's update time, the flow display, in case of rapidly increasing/decreasing flow, may turn out to be slower than the real flow and not a one-to-one correlation between the flow display and the volume growth.

In general, one would expect the flow display to stabilize after about half a minute of constant flow and thereafter to be consistent with volume growth.

Meter modes

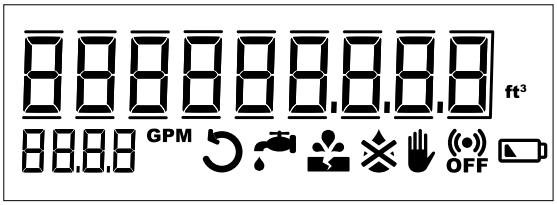
flowIQ® 3200 can operate in two modes, Normal and Verification mode.

Verification mode is only used by authorized laboratories during verification.

flowIQ® 3200 RF and flowIQ® 3200 Cellular	Normal mode	Verification mode
Flow measurement and flow display update	1 s	0.125 s
Volume integration and volume display update	8 s	1 s

flowIQ® 3200 EO	Normal mode	Verification mode
Flow measurement and flow display update	2 s	0.125 s
Volume integration and volume display update	16 s	1 s

Display and info codes



The large display with totalized volume, flow rate and intuitive info codes on flowIQ® 3200 makes it easy for end users to understand their own consumption data.

flowIQ® 3200 includes a large number of intelligent info codes and alarms. An info code indicates a special condition in the meter. If the info code is available in the display, the related symbol is on when it has been activated. If the 'condition' is not active, the sign is OFF. The info codes provide you with the exact knowledge you need to target your efforts within operations optimization, customer information, water loss and tampering. The info codes in the display have the following meaning and function:

Info code	Meaning
	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 or indicate a leakage after the meter.
	The water consumption has been consistently high for half an hour, which indicates a pipe burst.
	Attempt of fraud. The meter is no longer valid for billing.
	The meter is dry. In this case nothing will be measured.
	The water flows through the meter in the wrong direction.
OFF	RADIO OFF flashes. The meter is still in transport mode with the built-in radio transmitter turned off. The transmitter turns on automatically on the first time water runs though the meter.*
OFF	RADIO OFF lights permanently. The radio is switched off permanently. Can be activated via METERTOOL..*
	The symbol appears when the expected capacity left is 6 months or less.

	Switch off automatically when the condition that activated them no longer exists.
	Disappears when the water has been stagnant for one hour.
	Disappears when the consumption falls to normal level.
	Disappears when the water no longer flows in the wrong direction.
	Disappears when the meter is filled with water.

*RADIO OFF *is not available for Encoded Output meters*

Data registers

The water meter has a permanent memory, in which the values of various data loggers are saved. The loggers can be read via the meter's optical eye and from communications protocols.

The following registers are logged:

Description	Yearly logger	Monthly logger	Daily logger	Hourly logger
Logger depth	20 years	36 months	460 days	2400 hours
Operating hours	✓	✓	✓	✓
Info codes incl. hour counter	✓	✓	✓	✓
Volume	✓	✓	✓	✓
Volume reverse	✓	✓	✓	✓
Volume net	✓	✓	✓	✓
Flow max incl. date	✓	✓		
Flow min. incl. date	✓	✓		
Flow max day incl. timestamp			✓	
Flow min. day incl. timestamp			✓	
Water temp. max	✓	✓	✓	
Water temp. min.	✓	✓	✓	
Water temp. avg.	✓	✓	✓	
Ambient temp. max	✓	✓	✓	
Ambient temp. min.	✓	✓	✓	
Ambient temp. avg.	✓	✓	✓	

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.

Integrated communication

The meter supports a variety of different communication options depending on meter type. All radio supported meters can be used with Kamstrup's external antenna. Transmission properties and data packages are defined in the configuration number YY-ZZZ. These can be changed with METERTOOL, MeterToolX or READy App through the optical IR interface or with a READy Converter.*

**Depending on communication protocol*

RF

Kamstrup RF is based on Wireless M-Bus which is a mature and proven technology for remote reading of smart meters. Wireless M-Bus provides a robust, simple and secure reading of meters and requires a low initial investment, but is flexible enough to be expanded whenever desired. Wireless M-Bus is based on an European standard (EN 13757-4) applicable to devices for reading consumption of water, electricity, or energy. The data encryption consists of a 128-bit AES counter mode encryption. Both AMR 912.5, 915 and 918.5 MHz and AMI 450-470 MHz are available.

For additional information about the Kamstrup RF communication module, please refer to the RF module data sheet, document no.: FILE100003480.

Cellular

NB-IoT (Narrowband Internet of Things) is one of the most popular LPWA (Low-Power, Wide-Area) technologies offered by most mobile network operators worldwide via the established 4G and 5G network infrastructures, meaning that no network ownership is required. Unlike 2G and 3G, which are designed for mobile broadband communication at the expense of high-power consumption, NB-IoT offers affordable data communication for power constrained IoT devices. Most 4G and 5G networks support NB-IoT technology.

For additional information about the Kamstrup Cellular communication module, please refer to the Cellular module data sheet, document no.: FILE100003864.

Encoded Output

The Sensus Encoded Output and TouchRead are implemented based on Sensus specification UI-1203 and UI1204. Encoded

Output is compatible with several 3rd party RF network systems. Kamstrup encoded output supports Sensus Encoded Output systems and Sensus TouchRead systems. In addition, Neptune ProRead, Neptune E-coder systems and others are supported.

For additional information about the Kamstrup Encoded Output communication module, please refer to the Encoded Output module data sheet, document no.: FILE100003729.

State of the art meter reading system (READy)

Standardized and open communication

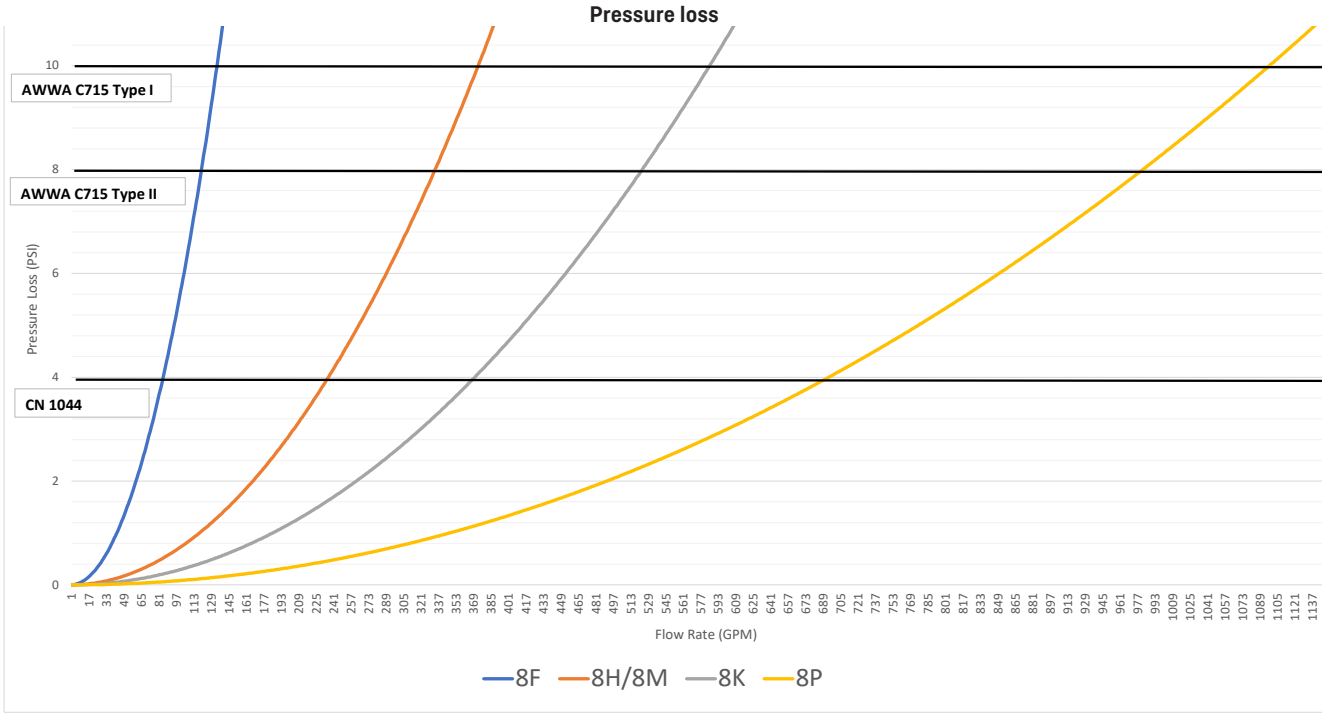
902-928 MHz band RF is an open standard, following EN13757-4:2010, which means that while the flowIQ® 3200 can be configured with or without encryption of the transmitted signal, encryption is required in the United States.

Encryption protects personal data against unauthorized monitoring. Furthermore, the encryption file provides easy access to import meter data for reading programs.

Pressure loss

According to AWWA C715-18 Type I the maximum pressure loss must not exceed 10 PSI (0.69 bar) for ½"-2"meters and 8 PSI (0.55 bar) for 3"-4" at SMOC.

According to CN1044 the maximum pressure loss must not exceed 4 PSI (0.27 bar) at SMOC for FM fire service meters.
The following graph shows pressure loss with respect to flow rate:



See document no.: FILE100000199 for more information about pressure loss.

Ordering details

Start your order by stating the type number of the selected model of flowIQ® 3200. The type number includes information on meter type - meter version, size, lay length, service connection and time zone.

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 final meter.

Meter type - flowIQ® 3200

Type	☐☐	☐	☐	☐	☐	☐☐	☐	☐☐
Meter generation								
Second generation	02							
Mechanical design								
Stainless steel		L						
Communication								
RF			02					
Encoded Output			41					
Cellular			82					
Power supply								
D-cell				D				
2 x A-cell				A				
Dynamic range								
AWWA C715-18 and CN1044					1			
Meter size								
1½" (120GPM); 1½" Flange; 13"						8F		
2" (160 GPM); 2" Flange; 17"						8H		
2" (160 GPM); 2" Flange; 15¼"						8M		
3" (350 GPM); 3" Flange; 12"						8K		
4" (700 GPM); 4" Flange; 14"						8P		
Meter type								
Cold water							8	
Reclaimed water							9	
Country code								
North America, FCC and NSF approved								UB
Canada, ISED and NSF approved								CA
FM fire service approved								FM
Mexico, IFT and NSF approved								MX

Fiber gaskets can be ordered with flowIQ® metal meters.

The features included in the type number cannot be changed once the meter has been produced.

Configuration - flowIQ® 3200

Config	DDD □□□	JJ □□	LLL □□□	MMMM □□□□	N □	P □	S □	U □	RR □□	CCC □□□	V □	T □	YY □□	ZZZ □□□
Display views [1]														
Standard	810													
GMT offset (time zone)														
USA Eastern (GMT-5)		28												
USA Central (GMT-6)		24												
USA Mountain (GMT-7)		20												
USA Pacific (GMT-8)		16												
Target date (handled as order data)														
Max values averaged over time (1..120 min.)														
2 minutes			002											
Customer label														
Alphanumeric (2060-MMMM)				0000										
Leakage message limit														
OFF					9									
Flow continuously > 0.1% of max flow (not recommended)					1									
Flow continuously > 0.25% of max flow					2									
Flow continuously > 0.5% of max flow					3									
Flow continuously > 1.0% of max flow					4									
Flow continuously > 2.0% of max flow					5									
Pipe burst limit														
OFF						0								
Flow > 5% of max flow for 30 minutes						1								
Flow > 10% of max flow for 30 minutes						2								
Flow > 20% of max flow for 30 minutes						3								
Ambient Temperature low limit														
OFF							0							
Ambient temperature < 2 °C / 36 °F							2							
Ambient temperature < 3 °C / 37 °F							3							
Ambient temperature < 6 °C / 43 °F							6							
Ambient Temperature high limit														
OFF								0						
Ambient temperature > 35 °C / 95 °F								3						
Ambient temperature > 45 °C / 113 °F								6						
Data logger profile														
Standard (default)									04					
Standard Encoded Output									15					
Standard Cellular									16					

To be continued on next page...

Configuration - flowIQ® 3200

Config	DDD □□□	JJ □□	LLL □□□	MMMM □□□□	N □	P □	S □	U □	RR □□	CCC □□□	V □	T □	YY □□	ZZZ □□□
...continued from previous page														
Display resolution (alphanumeric)														
0000000.00 USgal - 0.01 GPM - Billing in 1,000s (recommended for residential meters)										220				
000000000 ft³ - 0000 GPM - Billing in 1,000s (recommended for district meters)										154				
For additional options please refer to FILE100002712														
Temperature units of measure														
Fahrenheit											1			
Celsius											0			
Encryption level														
Encryption with separately forwarded key												3		
Communication														
For communication protocols please refer to the specific module data sheets														

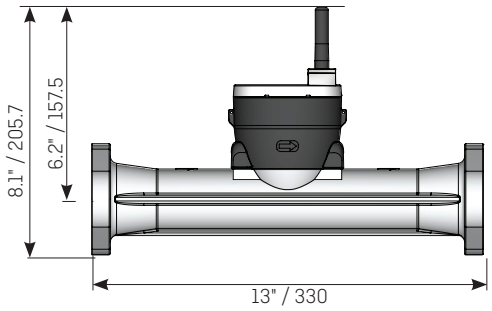
	DDD	JJ	LLL	MMMM	N	P	S	U	RR	CCC	V	T	YY	ZZZ
Unless otherwise stated in the order, Kamstrup supplies the following:	810	□□	002	0000	4	3	3	3	04	154	1	3	yy	ZZZ

Note: JJ (timezone) and target date are not predefined and has to be chosen in the ordering system.

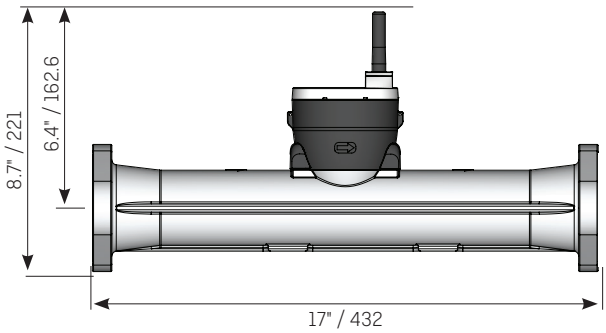
Dimensional sketches – flowIQ® 3200

NOTE! Same flanges for in- and outlet.

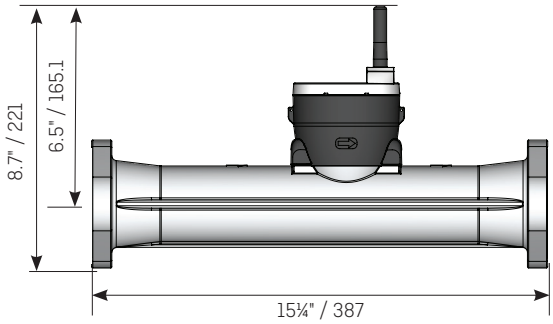
Type: 8F – Size: 120 GPM 1½" x 1½" x 13"



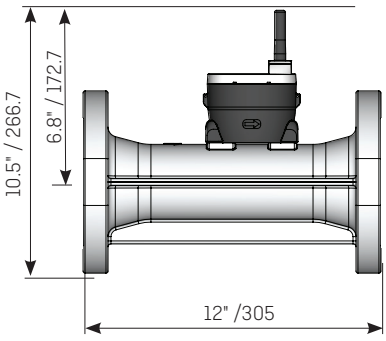
Type: 8H – Size: 160 GPM 2" x 2" x 17"



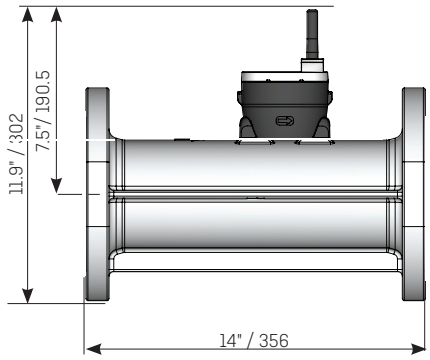
Type: 8M – Size: 160 GPM 2" x 2" x 15¼"



Type: 8K – Size: 350 GPM 3" x 3" x 12" **T**



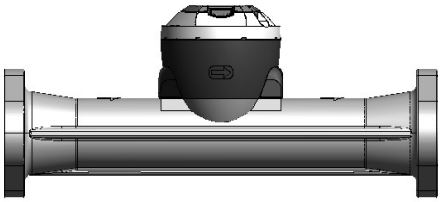
Type: 8P – Size: 700 GPM 4" x 4" x 14"



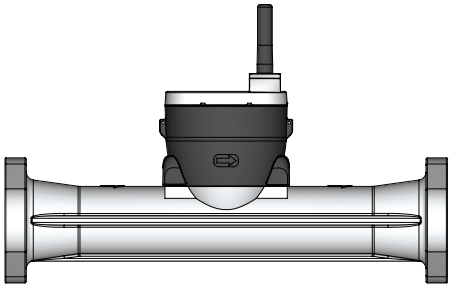
Dimensional sketches – flowIQ® 3200

Encoded Output, RF and Cellular have the exact same dimensions apart from the meter cup height.

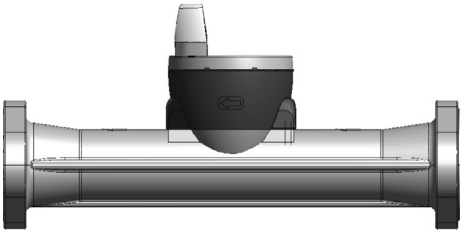
Example:
Type: 8F – Size: 120 GPM 1½" x 1½" x 13"



Size: 120 GPM 1½" x 1½" x 13"



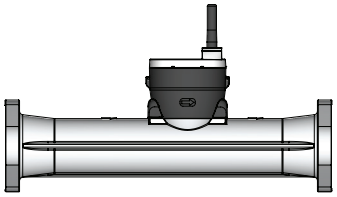
Size: 120 GPM 1½" x 1½" x 13"

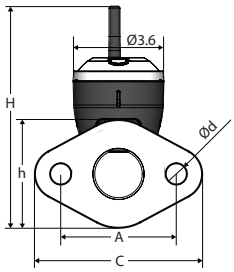


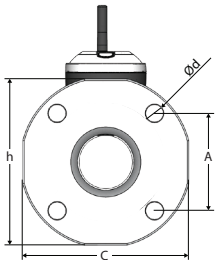
Dimensions

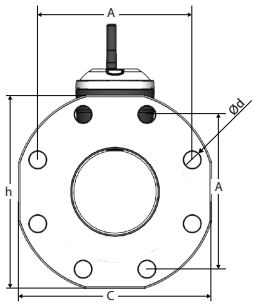
flowIQ® 3200 RF and Cellular

Meter type	Meter size GPM	Connection	L	H	h	A	C	d	Weight approx. [Lbs / Kg]
			[Inch / mm]						
8F	120	1½" flange	13"/ 330	RF 8.07"/205 Cellular 7.2"/184	3.6"/ 91.4	4.0"/ 101.6	5.7"/ 144.8	0.79"/ 20.07	13/ 5.9
8H	160	2" flange	17"/ 432	RF 8.66"/220 Cellular 7.8"/199	4.13"/ 104.9	4.49"/ 114	6.54"/ 166.1	0.79"/ 20.07	19/ 8.6
8M	160	2" flange	15¼"/ 387	RF 8.66"/220 Cellular 7.8"/199	4.13"/ 104.9	4.49"/ 114	6.54"/ 166.1	0.79"/ 20.07	17/ 7.7
8K	350	3" flange	12"/ 305	RF 10.47"/265.9 Cellular 9.6"/245	7.24"/ 183.9	4.24"/ 107.7	7.24"/ 183.9	0.75"/ 19.05	31/ 14.1
8P	700	4" flange	14"/ 356	RF 11.85"/301 Cellular 11"/280	8.66"/ 220	6.93"/ 176	8.66"/ 220	0.75"/ 19.05	43/ 19.5









flowIQ® 3200 E0

Meter type	Meter size GPM	Connection	L	H	h	A	C	d	Weight approx. [Lbs / Kg]
			[Inch / mm]						
8F	120	1½" flange	13"/ 330	5.39"/ 137	3.6"/ 91.4	4.0"/ 101.6	5.7"/ 144.8	0.79"/ 20.07	9.3/ 4.2
8H	160	2" flange	17"/ 432	5.98"/ 152	4.13"/ 104.9	4.49"/ 114	6.54"/ 166.1	0.79"/ 20.07	14.2/ 6.5
8M	160	2" flange	15¼"/ 387	5.98"/ 152	4.13"/ 104.9	4.49"/ 114	6.54"/ 166.1	0.79"/ 20.07	16.2/ 7.4
8K	350	3" flange	12"/ 305	7.7"/ 198	7.24"/ 183.9	4.24"/ 107.7	7.24"/ 183.9	0.75"/ 19.05	34.1/ 15.5
8P	700	4" flange	14"/ 356	9.17"/ 233	8.66"/ 220	6.93"/ 176	8.66"/ 220	0.75"/ 19.05	44.5/ 20.2

Accessories

See Accessories for Water Meters: document no.: FILE100000644.
(Accessories are ordered separately in CPQ (Kamstrup ordering system) and will be delivered as single parts in the packaging.)

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