kamstrup

Technical Description

Kamstrup Valve

Content

1 General description

Kamstrup Valve uses smart technology to control the water supply to consumers or revenue protection. It can be used to close the water supply to households that have overdue water bills, in circumstances where water needs to be shut off for a period of time or where water supply must be controlled for other reasons. The valve has a 10 year lifespan if used under normal conditions, where the valve is operated one time per month and the battery temperature remains below 30 °C.

In some cases, the user will need to operate the valve more frequently, which will reduce the lifespan of the battery. The valve will send an alarm if the battery needs to be replaced.

1.1 How to control the valve

The utility can open or close the valve via Kamstrup´s READy App if they are near the unit. A consumer does not need to be at home for a water utility representative to operate the valve.

If the water supply to a consumer is closed and it is opened again without warning, there is a risk of unwanted water usage and possibly flooding. To mitigate this risk, a feature has been added where the consumer must press a touch button on the valve three times before it opens. This ensures that the water supply resumes only when the consumer is ready.

1.2 Throttling

Do you want to completely close off the water supply or just reduce it?

The user has the option to turn off the water supply to a consumer. However, there are also cases where the water supply only needs to be reduced, for example due to legislative requirements. Therefore, the valve can be "ajar", so a restricted amount of water flows through. Additionally, the water flow can be restricted to a certain period of the day, for example 10 minutes of water availability per day. In this case, the consumer must press a touch button on the valve three times for water to flow through. This is to ensure that the consumer is at home when water is available.

1.3 Mechanical

Kamstrup Valve is a ball valve driven by a battery-powered motor and gearbox. The valve has a display that provides the user with information about the valve position and state. There is also a touch button on the glass display to open the valve.

The valve is fitted with an optical eye that provides access to logged info codes and the possibility to change configuration settings.

The valve body is brass CW511L and is designed to mount directly on a Kamstrup water meter with 1" thread.

The ball valve has a chrome plated brass ball (brass W511) with a teflon gasket.

The valve has left hand thread on the inlet that connects to a socket with corresponding left hand thread, the outlet side of the valve has G1B thread.

A socket fits the meter outlet and the valve inlet without the need for coupling. Therefore, a short installation length is achieved. The valve is IP68 approved.

NB: The valve closes slowly, but forms a very strong seal. **NEVER** put a finger or any other foreign objects in the valve opening.

1.4 Electrical

The valve has a lithium battery pack. The battery can be replaced without removing the valve from the installation. An information code saying "Low battery" appears on the display and an info code is logged if the battery needs to be replaced.

The valve position is electronically controlled.

The valve has a built-in memory and several loggers that can be read via the optical eye. See the section 'Logger description' for further information. There is a real-time clock built into the valve.

The valve has built-in Wireless M-Bus radio with C1 and C2 modes, 868 Mhz.

NB: The valve cannot be controlled via a fixed network, only via "Drive-by".

The Wireless M-Bus data package is transmitted every 96 seconds.

The valve can be controlled with Wireless M-Bus radio via READy App and READy Converter.

READy Converter must communicate directly with the valve via "Drive-by", it cannot communicate through a fixed network or a repeater.

The valve measures ambient temperature every minute, and maximum and minimum values are calculated.

The calculated maximum and minimum temperatures are logged monthly and yearly, these are stored as an average value.

The current ambient temperature is sent via radio signal.

Two temperature limits are programmed into the valve, a minimum and maximum value. If the current ambient temperature is above the high limit or below the low limit, an info code is sent to indicate high or low temperature. See also the section 'Info codes'.

The two temperature limits must be entered in the order of minimum followed by maximum. The default settings: MIN. = 3 °C/ 37.4 °F, MAX = 45 °C/ 113 °F.

These limits can be reconfigured with METERTOOL and the optical eye.

The valve occasionally moves itself to avoid becoming stuck in place over time (antiscaling) if it has operated over a long period. This function is only active when the valve is in open state.

2 Technical data

2.1 Mechanical data

Connection	G1" water installation, 60 mm long
Water temperature	Cold water 0.1...50 °C
Climate	5...55 °C, condensation humidity (Mounted inside in utility room and outside in pit) Avoid mounting in direct or prolonged sunlight
Storage temperature	-25...60 °C (empty/drain valve)
Pressure rating	PN16
Protection class	IP68
Weight	0.9 kg

2.2 Electrical data

Battery	3,65 VDC 1 C cell with HLC
Battery lifetime	Depends on use, but up to 10 years with 1 operation per month (tBAT < 30 °C) or 5 years with 1 operation per month (tBAT < 30-55 °C)
EMC	RE-D compliance with EN 300 220-2
Ambient temperatures	-5...+55 °C ± 2 °C

2.3 Materials

Valve casing	Brass W511
Ball valve	Brass CW511L, coating Ni-Cr
Ball valve gasket	Teflon (PTFE)
Electronic casing	Polyphenylene sulfide (PPS)
Top ring	Polycarbonate (dyed)

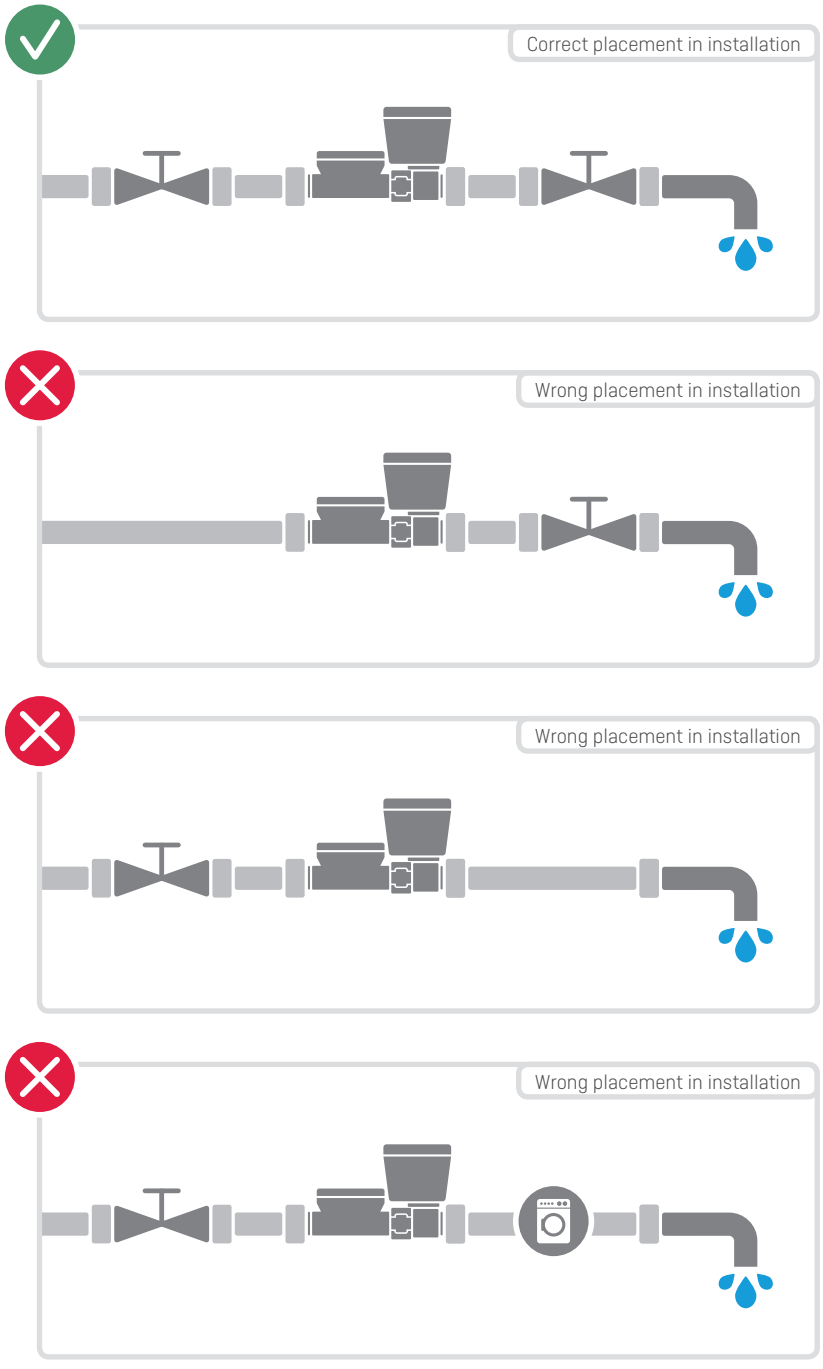
2.4 Frequency

Kamstrup Valve	868 MHz, mode C1 and C2
European standard for remote reading	EN13757-4

3 Valve sketch

Type	Size	Total installation length with valve	Weight
021-YY-C0H-8XX 021-YY-C0J-8XX 021-YY-C0L-8XX 021-YY-C0M-8XX	G1B 130 mm	G1B 190 mm	0.9 kg

4 Application



4.1 Disclaimer

Disturbances such as lost radio connection, flat battery and flooding may prevent functioning of the touch button. This could result in locking of the valve position, it could become stuck in open, closed or throttle mode. When the valve is not functional, it is the responsibility of the water supply company to undertake repair works. The consumer's rights, according to local regulations, must be respected in order to ensure that the consumer does not suffer any damages.

5 Data communication

5.1 Wireless M-Bus

The valve has built-in Wireless M-Bus data communication. It is delivered with module 90 which includes mode C1 and C2, 868 MHz, and can ONLY be controlled via 'Drive-by' and NOT via 'Fixed Network'.

A radio package with mode C1 is being transmitted every 96 seconds.

The valve comes with a data package containing valve status, valve info codes and valve ambient temperatures. The data package can be read via 'Drive-by' and 'Fixed Network'. The status of the valve can be read through 'Fixed Network'.

When in mode C2, the valve can be controlled via READy Converter and READy App. See also the section 'READy'.

NB: READy App has to receive a C1 radio package before it can activate the valve with C2.

NB: There is no communication between the meter and the valve.

Data package:	Valve status Valve info Valve ambient temperatures
Module:	90
Config:	00-101

Encryption is the same as for the Kamstrup water meters, see the documentation for water meters.

5.2 Optical read-out head

You can read out the valve settings and the logger with an optical read-out head and by using the Kamstrup software programs METERTOOL and LogView. You can also change the valve settings with METERTOOL, but only after permission from READy App. So before any re-programming of the settings, you need to 'Enable valve configuration via optical head' in READy App.

6 Throttle function

In order to limit the water supply to a household, there are two variants of the throttle function. One of these variants must be selected in the sales order. The throttle function can always be changed using the optical read-out head and METERTOOL.

Small permanent flow: Provides a limited water supply by setting the valve in a fixed position with a small valve opening.

Time limit throttle: A function that turns off the water supply except during a specified time period where the consumer receives a limited amount of water by pressing the touch button three times.

6.1 Small permanent flow

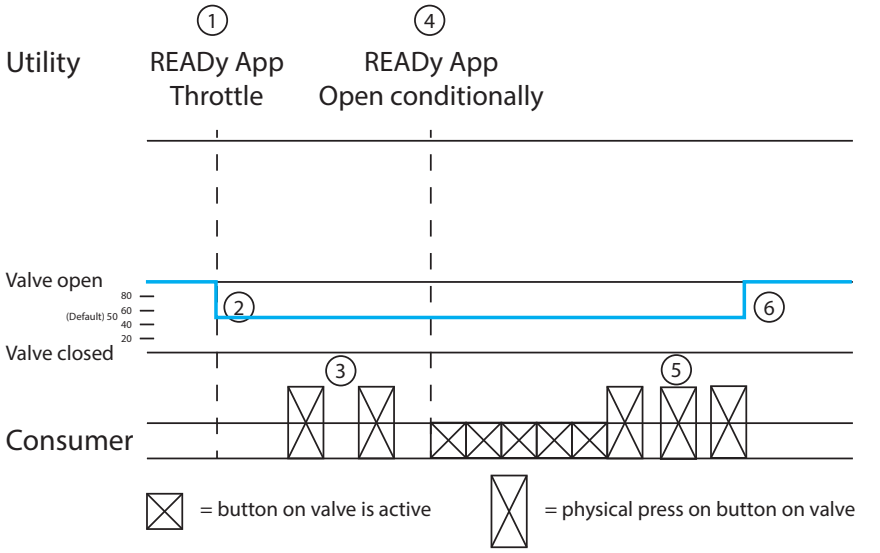
If the valve is configured for small permanent flow, the valve will be partially closed, and only a limited amount of water will be available.

This feature can be used to limit the consumer's water supply where there is a requirement for it such as water security or local regulations.

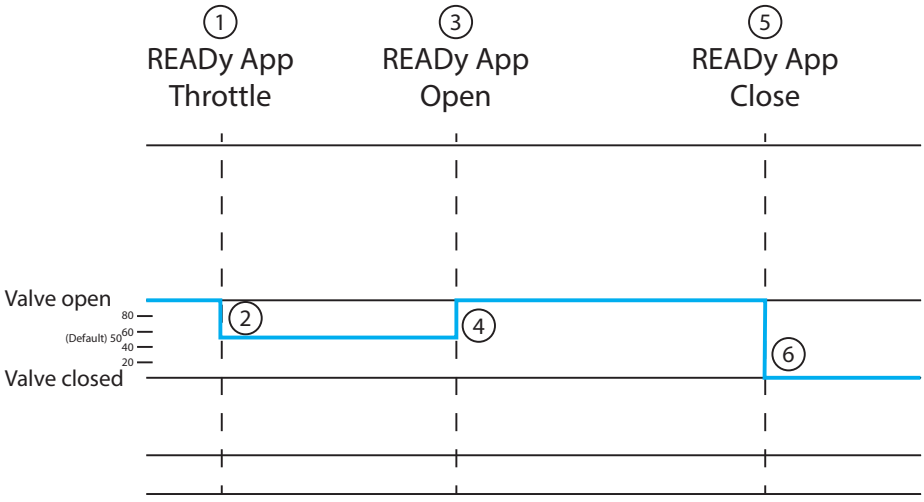
In this function, the valve will be partially open. The valve position (i.e. how much it opens) must be specified in the order entry form and programmed into the valve from Kamstrup. This setting can be reconfigured after installation with the optical read-out head and METERTOOL.

Throttle configuration is specified from 0-100 where 0 is closed and 100 is completely open. There is no linear relationship with water flow as flow is dependent on water pressure and the specific installation. The throttle configuration must always be adjusted according to the specific installation. The adjustments can easily be done in READy App. Default setting is 50 (nearly full flow).

Small permanent flow



1. The utility activates 'Throttle' in the READy app to limit the water consumption
2. The valve closes according to the chosen setting (default 50)
3. The consumer presses the button on the valve, but nothing happens since the valve isn't active
4. The utility activates 'Open conditionally' in the READy app in order to make the water available again
5. The consumer can now actively choose when they wish to open the valve, they just have to press 3 times on the button on the valve
6. The water flow rises to 100 again



1. The utility activates 'Throttle' in the READy app
2. The water flow falls according to the chosen setting (default 50)
3. The utility activates 'Open', without involving the consumer
4. The water flow rises to 100
5. The utility activates 'Close'
6. The water flow is fully closed

6.2 Time limit throttle

If the valve is configured to 'Time limit throttle', the valve is closed, but during a specified time period, the consumer has the option of opening the valve to receive an amount of water by pressing the touch button three times. This time period is configurable, and the valve position is also configurable (i.e. how much it opens). The opening time, valve position combined with the water pressure define the total quantity of water.

The time period when the valve is open is configurable from 1-1440 minutes, default is 10 minutes.

The default setting allows the consumer access to water once every 24 hours (1400 minutes) for the specified time period. This can be reconfigured via the optical read-out head and METERTOOL.

The valve position is indicated by the same parameter as with "Small permanent flow" that is configurable from 0-100.

6.3 Opening conditionally

If the valve is closed or in one of the throttle modes and the user wants to open the valve via READy App, there are two options.

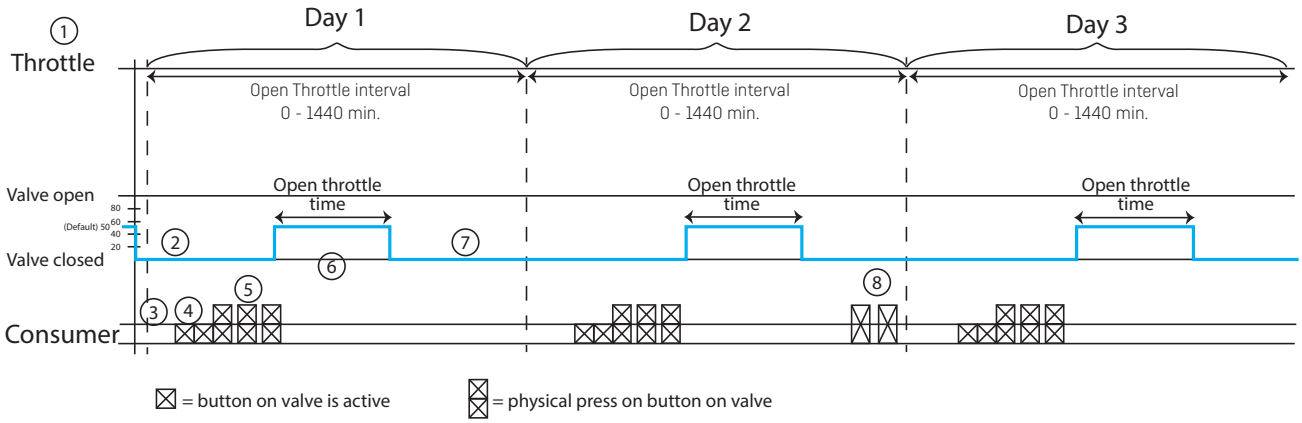
Pressing "Open" will open the valve immediately.

Pressing "Open conditionally" will not open the valve immediately, but the touch button on the valve will be activated. Pressing the button on the valve three times will open the valve.

This ensures that the valve cannot be opened by anyone else but the consumer. Kamstrup recommends always opening the valve in this way.

Symbol indicating activation of touch button to open or throttle the valve (see also the section 'Touch button'):

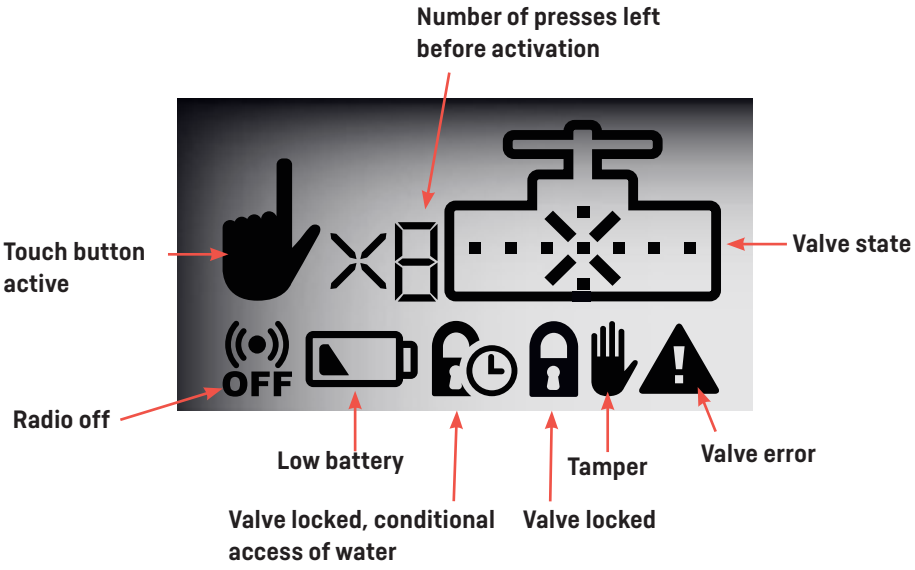
Time Limit Throttle



1. The utility activates 'Throttle' in the READy app to limit the water consumption
2. The valve closes
3. The consumer presses the button on the valve, but nothing happens since the valve isn't active
4. The button becomes active at a time pre-defined by the utility
5. It is now the consumers choice when they wish to open the valve, they just have to press 3 times on the button on the valve and will then receive water in a limitied period of time (in throttle mode)
6. The consumer has access to water
7. The valve closes again
8. The consumer wants water and presses the button, but since the button isn't active, nothing comes out

7 Display

The display on the valve shows information about the status of the valve and has a touch button to control the valve.



7.1 Touch button

On the valve display, there is a touch button that works through glass, i.e. a capacitive button. To avoid unwanted water supply, three presses on the touch button activates the valve. When pressing down the button, a countdown is displayed after each press. The valve symbol flashes when the valve is moving from one position to another, the symbol for the position the valve is moving to flashes.

The touch button is only active when the touch button symbol is active on the display. When the symbol is active, you always have to press the button three times. This is to avoid unwanted activation of the button, and therefore the pressing on the glass also has to be slow and with a few seconds between each press. Dirt and condensation on the glass can prevent the button from working, so it might be necessary to wipe the glass with a cloth before activation. If the valve is flooded, the button will not function since the water pressure on the glass will be registered as a constant pressing on the button.

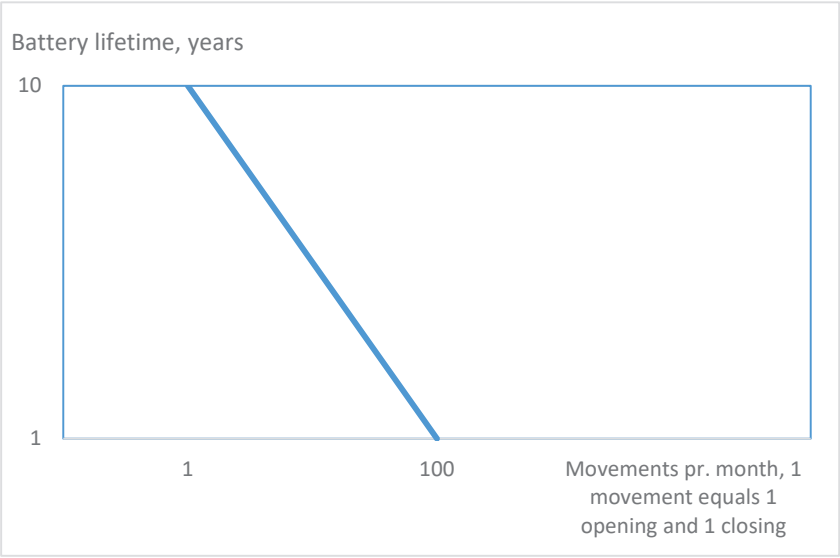
8 Battery lifetime

Kamstrup Valve is supplied with voltage internally from a lithium C-Cell battery with HLC-power backup and up to 10 years lifetime when used under normal conditions (i.e. operated once per month and ambient temperature maintained below 30 °C. Ambient temperatures above 30 °C reduce the battery lifetime.)

With higher operation frequency, the battery life will be reduced. For example, with one operation each day, the battery will have a lifetime of approximately four years.

When the battery needs to be replaced, a symbol indicating low battery appears on the display. An info code for battery replacement will be sent to the user via radio signal. See also the section 'Maintenance'.

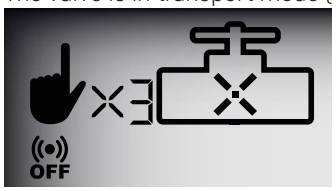
Symbol for battery replacement: 



9 Display symbol explanations

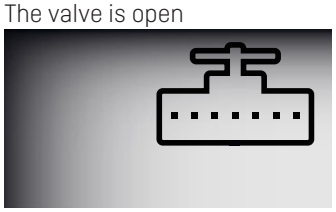
The valve can be in multiple operational "modes", these are indicated on the display with the following images (flashing when moving to a new position):

The valve is in transport mode (when it is delivered from Kamstrup)



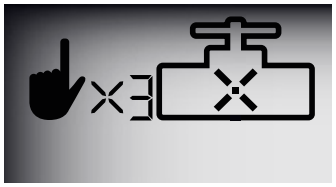
- The valve is CLOSED
- Radio is OFF
- The button is active for the user to press three times

The valve is open



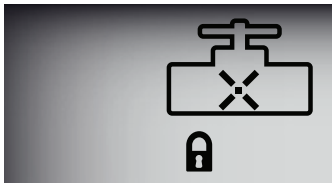
- The valve is open and in normal operation (flashes during opening)

The valve is closed, but the touch button is active for opening the valve



- The valve is closed
- The button is active
- Must be pressed three times to open, countdown displayed

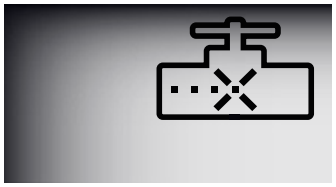
The valve is closed



The valve is closed

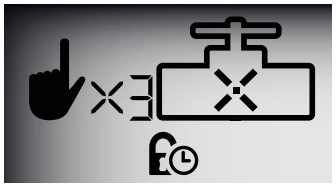
- There may be a reason why the water utility has decided to close the valve, e.g unpaid water bill (flashes when closing)

Valve is in throttle mode

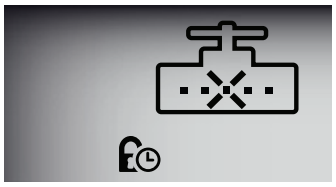


- The valve is throttling, therefore only partially open
- Flow through the valve is configurable from 0-100, the default setting is 50
- The three first dots flash

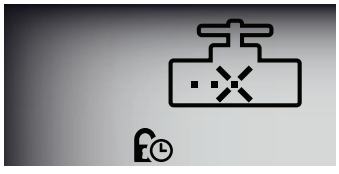
Time limit throttle



- The valve is closed
- Can be opened with touch button
- The valve can only be opened during a specified period. The period is configurable, however the default is 10 minutes (open throttle time)
- The interval is also configurable, default is 1400 minutes (open throttle interval)



- The valve is open for a limited time in "Time limit throttle" mode
- The valve will close again after a specified time period. The amount of flow through the valve is configurable (0-100) based on the same parameter as for "Small permanent flow". Default is 50
- The three first dots flash



- The valve is closed

10 Safety

Kamstrup Valve is a ball valve driven by a battery-powered motor. It is manually controlled via READy App which sends radio signals to the valve through READy Converter. The valve cannot be automatically controlled through Fixed Network.

NB: The valve closes slowly, but forms a very strong seal. **NEVER** put a finger or any other foreign objects in the valve opening.

When the valve is delivered from Kamstrup, it is closed and in 'radio off' mode. The valve is activated by pressing the touch button three times, the valve then opens slowly and is no longer in transport mode. Following installation, the valve can be closed with READy App.

Important: Do not press the button before the protective seals are removed and the valve is installed.

Important: Before dismounting an installed valve, the battery should be disconnected. When the valve is dismounted from an installation, the valve shall always be maintained by a Kamstrup educated installer before re-installation.

10.1 Tamper function

The valve has two tamper functions.

If someone tries to tamper with the valve using a magnet, an info code will be sent to the user via radio signal. The tamper symbol will also flash on the display.

Attempts to dismantle the valve will also trigger an info code to be sent to the user. The tamper symbol will be flashing on the display.

See the section 'Info codes'.

Both attempts of tampering can be reset via READy App.

The valve case is screwed together with four screws. One screw is sealed and must be broken in order to separate the two units.

10.2 Excessive use

The valve gives the warning 'Excessive use' if used more than expected in order to maintain a 10 year battery lifetime. This warning is shown on the display and will also be transmitted via the radio package and read in READy App.

If the battery is to last for 10 years, only a certain amount of power must be used every week. If the valve uses more than this amount, 'Excessive use' is activated. If the power consumption in the following week decreases, 'Excessive use' will be deactivated again.

This way the valve constantly informs you whether the power consumption is above or under a battery lifetime of 10 years. The function is calculated at a battery ambient temperature of MAX 30 °C.

11 Info codes

The valve can send several info codes to indicate the valve status.

Info code	Description	Symbol		Datalogger
Tamper mechanical	Someone tried to dismantle the valve. NB: This info code will also be triggered by changing the battery (see the section 'Maintenance')		Flashes	Valve logger Info logger Config logger Service logger M Service logger Y
Tamper magnetic	Someone tried to tamper with the valve with a magnet		Flashes	Valve logger Info logger Config logger Service logger M Service logger Y
Battery low	The battery is low and should be exchanged as soon as possible		Flashes	Valve logger Info logger Config logger Service logger M Service logger Y
Temperature high	Ambient temperature is above the specified max level (default 55 °C)		Lights constantly	Service logger M Service logger Y
Temperature low	Ambient temperature is below the specified min. level (default 5 °C)		Lights constantly	Service logger M Service logger Y
Valve error	The valve is defective Valve must be repaired or replaced		Flashes	Valve logger
Excessive use	Frequent valve movements decrease the lifetime of battery		Flashes	Valve logger

12 Logger description

The valve has several loggers that can be read via the optical read-out head and the software program LogView.
They cannot be read via radio communication.

Data logging interval	Data logging events
Configuration logger	26 events
Valve event logger	200 events
Info logger	50 events
Service logger M	24
Service logger Y	10

13 Logger register

Register	Description	Valve logger	Info logger	Config logger	Service logger M	Service logger Y
Hour Counter	Hour counter	✓	✓	✓		
Valve Status	Open, closed (opening, closing)	✓				
Valve Mode	Throttle, open, open conditionally	✓				
Valve pos	Angle valve ball	✓				
Valve Active Time	Valve motor operation (s)	✓				
Valve Error Code	Valve error code	✓				
Config Number	Configuration number			✓		
Last Configuration source	Optical eye, RF.			✓		
Valve Current Avg	Motor power consumption, average	✓				
Valve Current Max	Motor power consumption, max	✓				
Magnet Tamper Counter	Total amount of magnetic influences	✓				
Valve Consumed Energy	Consumed energy	✓				
Valve Excessive Use Value	Valve usage is above average use	✓				
Ambient temperature instant	Current temperature	✓				
Ambient temperature average	Temperature average month/year				✓	✓
Ambient temperature max	Temperature max month/year				✓	✓
Ambient temperature min.	Temperature min. month/year				✓	✓
Info	Info code	✓	✓	✓		
Info Bits Hour Counter	30 day hour counter on single info code		✓	✓		
Info Hour Counter	Total hours for all info codes		✓	✓		
Valve Battery Voltage Min.	Min. battery voltage					
Valve Number Of Events	Total amount of valve events					
Config Change Counter	Total amount of changes in the config.			✓		
ButtonPressCounter	Total amount of activation of button					

14 Installation and operation

Kamstrup Valve is built to be mounted on a MULTICAL® 21/flowIQ® 2101 1" (G1B) meter.

The valve should always be mounted downstream of the meter, i.e. on the meter outlet.

The valve can be installed inside, outside or in a pit that can contain water.

The valve comes with a socket type: 3026940 that has normal thread on one side and left hand thread on the other side. Therefore, the valve can be connected directly to the water meter to make the length of the installation as small as possible.

See the section 'Valve sketch'.

* Always use a new gasket between the meter and the valve.

When the meter and valve are assembled together, the unit can be installed according to general conditions for installation of a Kamstrup water meter.

Just as the Kamstrup water meters can be installed in different angles and positions, so can the valve. Kamstrup recommends installing it in a position where the display screen is legible.

14.1 Commissioning

When delivered from the factory, the valve is closed and in "Radio off" mode.

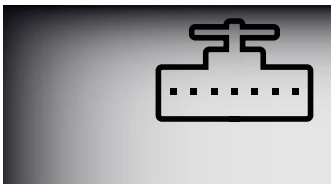
The valve should only be activated after it is installed.

To deactivate the "Radio off" mode, the touch button must be pressed three times.

*NB: Never press the touch button before the valve is installed.

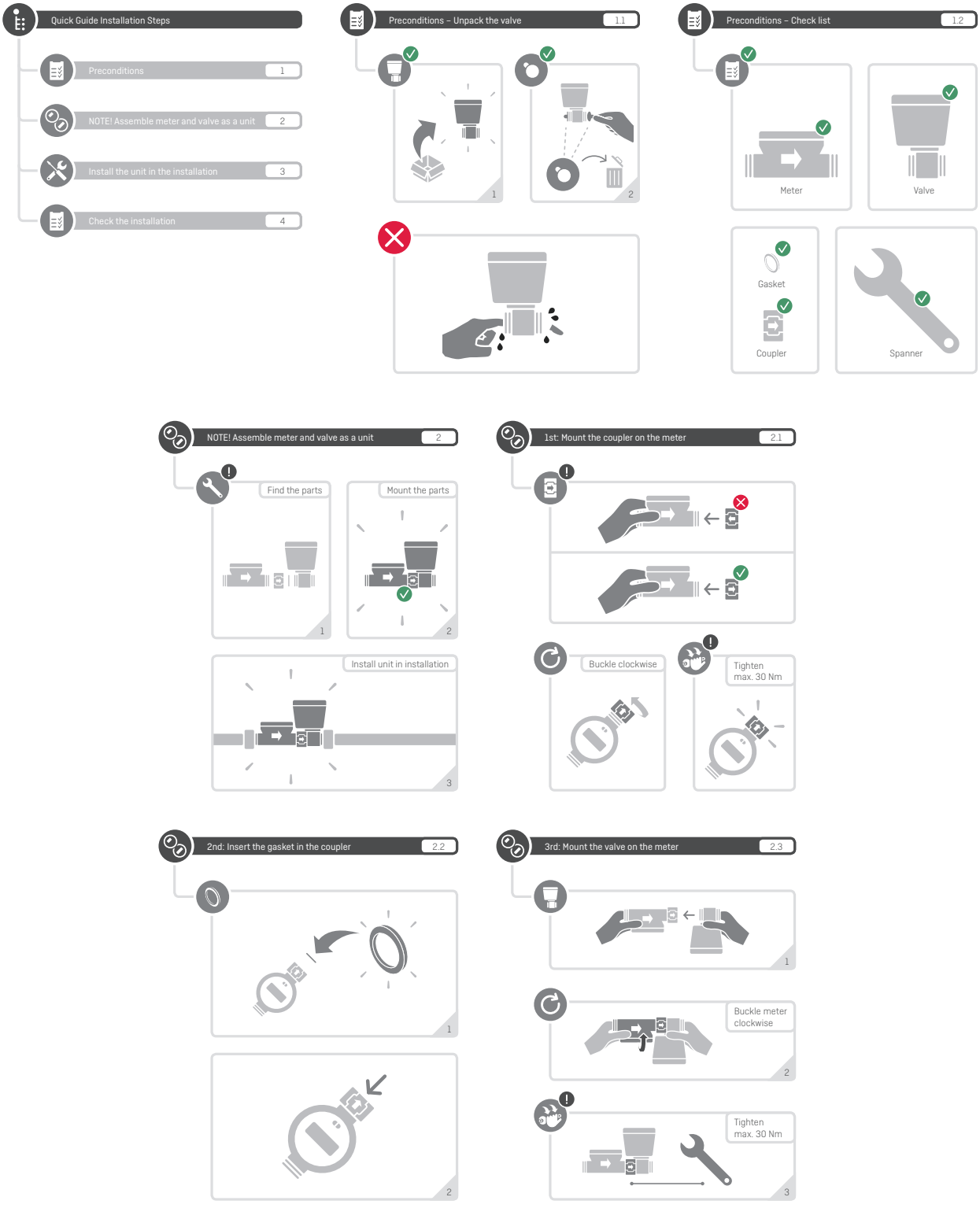
The valve then opens slowly and the display will indicate that the radio is no longer turned off.

When the radio is turned on and the valve is completely open (indicated by symbols on the display), the valve is in operation and can be controlled with READy App via radio signal.

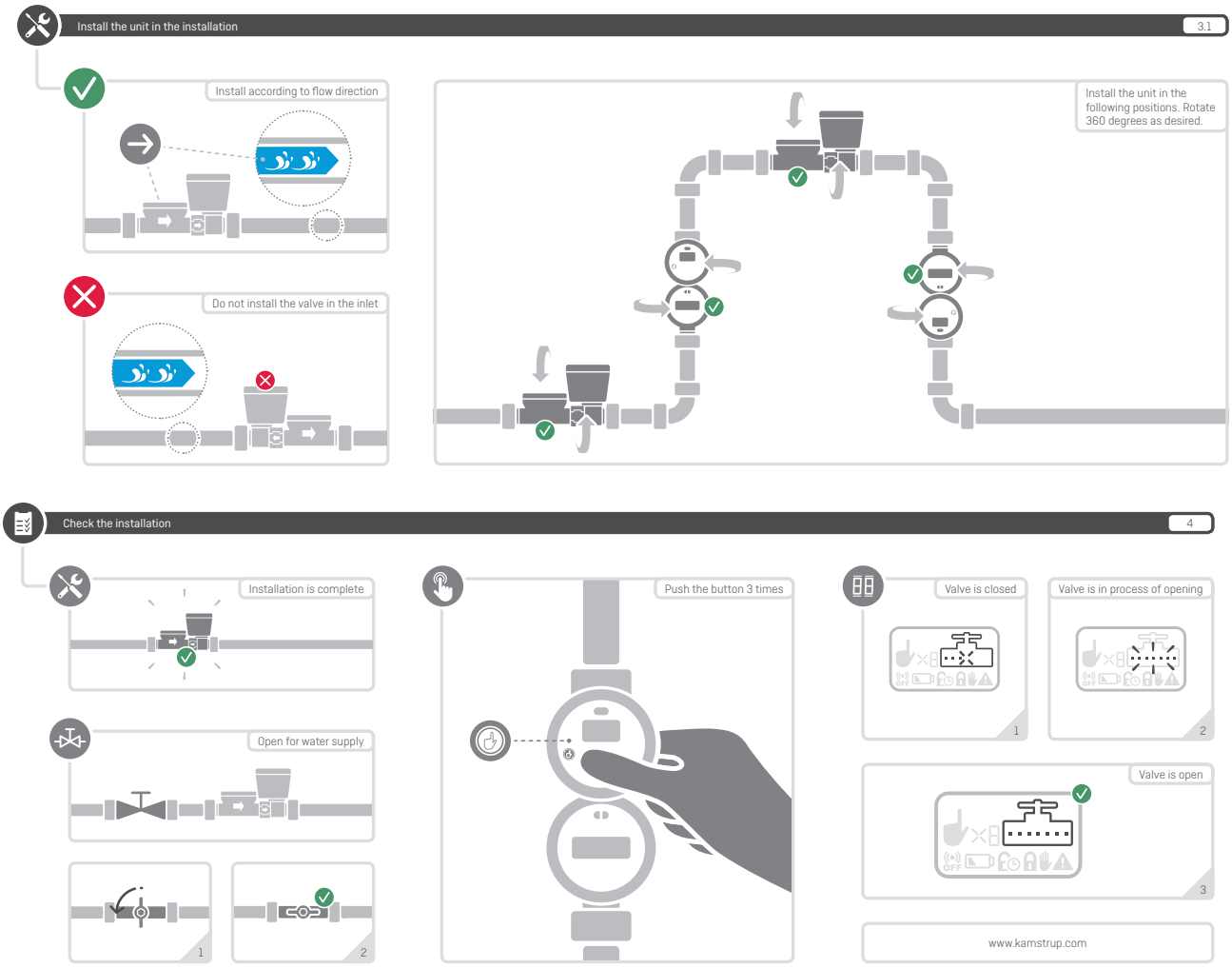


The valve is open and the radio is active.

15 Quick installation guide



Quick installation guide



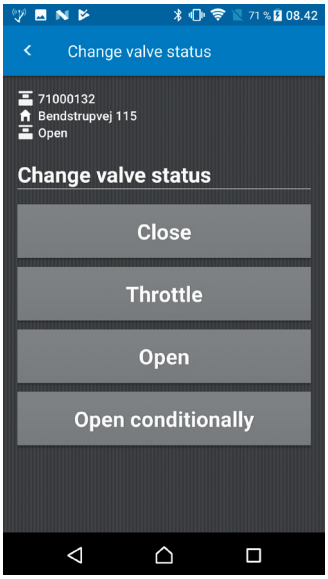
16 READy

The valve can easily be controlled with READy App.

NB: See the user guide for READy for further information.

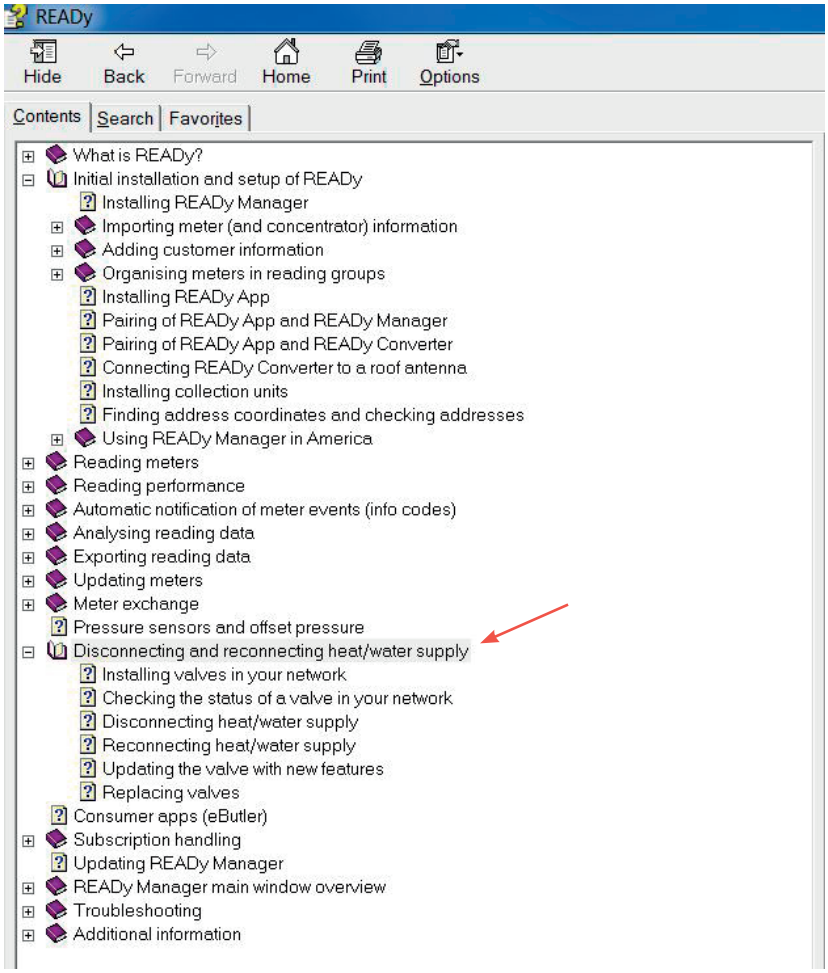
There are four options to control the valve:

- Close: Immediately closes the valve
- Throttle: Puts the valve in either of the two throttle modes, depending on how the valve has been configured
- Open: Immediately opens the valve (WARNING: Only use this option when there is no risk of flooding)
- Open conditionally: Activates the button on the valve, but does not open the valve until the touch button has been pressed three times



NB: When changing the valve status, always wait until you can press DONE in READy App, or always read the valve status after you have changed valve status. Otherwise, you cannot be sure that the valve is in the right status.

Information about using READy: All information can be found under the help function in READy Manager.



17 Order form

Kamstrup Valve	**Type 66-95**	**XX**	**B**	**C**	**DD**	**E**	**FF**
Communication							
Wireless M-Bus 868 MHz Valve		90					
Supply							
Battery, C cell			C				
Reserved							
				0			
Coupling							
1"					DD		
Meter type							
Valve cold						8	
Country code							XX

18 Configuration

	JJ	MMMM	Q	V	T	YY	ZZZ
Kamstrup Valve							
Time zone							
GMT +1	52						
GMT +2	56						
Customer label		0000					
Throttle mode							
Small permanent flow			1				
Time limit throttle			2				
Temperature units							
Celsius				0			
Fahrenheit				1			
Encryption level							
Encryption with separate key					3		
System configuration							
C1+C2, Fixed (C1)/Walk-by/Drive-by						00	
Datagram							
Info, status, temp.							101
Unless otherwise stated in the customer order, Kamstrup delivers the following:	**52**	**0000**	**2**	**0**	**3**	**00**	**101**

19 Service

19.1 Troubleshooting

Kamstrup Valve has been constructed with a view to quick and simple installation as well as long and reliable operation at the consumer 's premises. However, if operating problems are experienced, the table below is for troubleshooting.

Symptom	Possible cause	Suggestions for correction
No display function (empty display)	Battery flat	Replace the battery
Touch button not working	Water, humidity or dirt on glass	Clean the glass
Info code 'RADIO OFF' flashes on the display	The meter is still in transport mode with the built-in radio transmitter turned off	Press the touch button three times to activate the valve. With the software METERTOOL and an optical read-out head, you can also turn the radio on/off
'Error' symbol flashes	Excessive use or valve error	Read out the error code: - Excessive use, the battery will not last for 10 years (restrict the use of valve) - Valve error, replace the valve and follow the service manual
No communication with the optical eye	The optical eye is not activated	The optical eye must to be activated in READy App
No water through valve/not open even though it is in throttle mode	The throttle mode is too low	Readjust the throttle position
'Error' symbol lights constantly	Temperature alarm active	The ambient temperature is above or below the programmed levels
'Battery low' symbol flashes	Battery voltage below limits	If the symbol does not turn off after 24 hours, the battery must be replaced
'Tamper' symbol flashes	Someone has tampered with the valve magnetically or mechanically	Visible inspection of the valve. 'Tamper' symbol can be reset with READy App

19.2 Accessories

Optical read-out head (interface to optical eye)	6699-099
Holder for optical read-out head	3026-503
Socket	3026-940
Battery replacement kit	6699-641
Sticker with printed warning	2008-780

Further information on READy or Kamstrup´s hygiene protocol can be found at: products.kamstrup.com.

19.3 Battery replacement and maintenance

The valve does not need maintenance and is designed for several years of usage without problems. However, the battery may need to be replaced if the valve is activated often.

The valve is designed so the battery can be replaced. Kamstrup has a complete battery replacement kit (Kamstrup battery replacement kit: 6699-641).

Kamstrup recommends only to replace the battery if you have received the necessary training/guidance from Kamstrup.

A guide for how to replace the battery comes with the battery replacement kit, the guide document number is 5512-2259.

The symbol for low battery is active if the battery voltage goes down to under 2.9 V for more than 24 hours.

If the battery voltage goes under 2.9 V after the valve has been activated, the low battery symbol will also be active. If the voltage goes up again, the low battery symbol will turn off within 24 hours.

The valve has an descaling function. If the valve has not been activated for a while, this function will shortly move the valve ball to make sure it does not get stuck. This will have no influence on the amount of water going through the valve.

This function is only active when the valve is completely open. The descaling is adaptive so if the valve has been completely open for 3 months, the valve will turn slightly and go back to being completely open. The frequency of valve movements for descaling is automatically responsive to the force required for the valve to open and close. For example, after three months if the force required is more than the pre-programmed value, the freqency will go down to two months. If the force is less, the frequency will increase to 4 months.

By doing so, this adaptive function makes sure that the valve does not get stuck.

Dismounting

NB: If the valve has to be dismounted or replaced, it is important to always dismount the battery BEFORE the valve is dismounted. This is to avoid the risk of injuries to fingers.

After dismounting, the valve must not be remounted before it has been maintained by a person approved or educated by Kamstrup.

The guidelines in the service manual must always be followed.

19.4 Disposal

Kamstrup A/S holds an environmental certification according to ISO 14001 and as part of our environmental policy, we use materials, which recover environmentally correctly, to the greatest possible extent.

Disposal by Kamstrup A/S
Kamstrup A/S accepts worn-out meters and valves for environmentally correct disposal according to previous agreement. The disposal is free of charge to the customer, except for the cost of transportation to Kamstrup A/S.

The customer sends for disposal
The valve must not be disassembled prior to dispatch, only the battery shall always be disconnected. Hand in the complete valve for approved national/local disposal. Enclose a copy of this page in order to inform the recipient of the contents.

Disposal by the customer himself
NB: By disposal of a Kamstrup product, it is always the customer who has the responsibility for correct disposal in compliance with the instructions of local authorities.

Disassemble the valve as described below, and hand in the separate parts for approved destruction. Do not expose batteries to mechanical impact. Also avoid short-circuit of lead-in wires during transport.

Also, see table below:

Topic	Material information	Recommended disposal
Lithium cells+HLC	Lithium-thionylchloride	Approved deposit of lithium cells
Printed circuits (remove LCD display)	Coppered epoxy laminate, components soldered on	PCB scrap for metal recovery
LCD display	Glass and liquid crystals	Approved processing of LCD displays
Valve casing, socket	PPS	Plastic recovery
Valve body	Brass W511	Metal recovery
Sight glass	Soda lime glass	Glass recovery
Top cover (type label)	ABS, (copper, can be stripped)	Plastic recovery (copper metal recovery)
Other plastic parts, casted	PC + 10 % glass	Plastic recovery
Moisture-absorbent materials	98 % Bentonite, 2 % Quartz	Ordinary disposal
Packing	Environmental cardboard	Cardboard recycling (Resy)
E-motor with gearbox Other plastic parts, casted	Metal 95 %, copper 2 %, plastic 3 %	Metal recovery

Please send any questions you may have regarding environmental matters to:

Kamstrup A/S
Att.: Miljø- og kvalitetsafd.
Fax.: +45 89 93 10 01
info@kamstrup.dk

20 Documents

Current documents related to Kamstrup Valve:

Language	Data sheet	Installation guide	Technical description	Leaflet
English	5810-1598	5512-2215	55122248	5811-5224
Danish	5810-1597		5512-2247	5811-5809
German			5512-2249	5811-5810
Spanish	5810-1642			5811-5811
Hungarian				5811-5812
Polish	5810-1613			5811-5865
Swedish	5810-1629			5811-5872

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