Static Heat or Cooling Meter   2WR6...
ULTRAHEAT® XS

Configuration and composition

Meter for measurement of flow and energy in a heat or cold exchanger circuit with water using the ultrasonic principle. Important properties are

- **Non-wearing due to non-moving parts**
- **Measuring range of flow 1:100 acc. to EN1434, 1:500 total range**
- **Any mounting orientation, mounting in return or in flow**
- **No settling sections or flow straighteners**
- **Yearly set day**
- **15 monthly values**
- **Battery operated up to 11 years (24V AC/DC external supply as special version)**
- **Optical interface acc. to IEC870 (M-bus)**
- **Option: pulse output**
- **Option: M-bus**
- **Self-diagnostics**

Application

The 2WR6 is a ready to build in heat meter for heat consumption measurement in flats as well as for cooling applications. It is not appropriate for systems with water-glycol mixtures.

Heat meter design

The heat meter comprises a calculator, a flow measuring part and two temperature sensors. These components are affixed with each other by cables.

Method of operation

The quantity of thermal energy transferred from the heating water to the heat consumer over a defined period of time is proportional to the temperature difference between the flow and return and the volume of heating water that has flowed through.

The **heating water volume** is measured in the measuring tube by ultrasonic pulses which are transmitted in the direction of flow and against the direction of flow. Downstream, the delay between the transmitter and receiver is reduced, upstream it is increased. The heating water volume is then calculated using the measured values for the delay.

The **flow and return temperatures** are determined using platinum resistors.

The heating water volume and the difference in temperature between the flow and return are multiplied and its product integrated. The result which is the consumed **quantity of thermal energy or cold** is registered and displayed in the physical **units kWh / MWh, or MJ / GJ,** the quantity of volume in **m^3**.

Calculator

A standard calculator is used for all flow rate values with identical operation and an integrated service unit.

Interfaces of the Calculator

ULTRAHEAT 2WR6 ~~heat meters~~ are all equipped with an optical interface to IEC 870 as a standard, e.g. for connecting with our service software for parameter setting and diagnostics. Note: for the optical communication with the 2WR6 an optohead with echo suppression is necessary (e.g. 9956467001, see accessories).

In addition, one of the following **options** can be ordered for remote readout:

- **M-bus**, with 1.5m cable connected, with galvanic isolation

Voltage:	50V max.
Current:	1.3 M-Bus loads
Addressing:	primary or secondary
Permitted mean frequency of reading:	once within 3h @ 2400 bd, once within 24h @ 300 bd

Note: A higher frequency is not allowed and may result in meter malfunction!

Data transmission in the compatibility mode (= standard, one data frame) or in the full mode (3 data frames) possible.

For more details also regarding the protocol see our technical document TKB 3427

- **Pulse output for heat or volume**, with 2 m cable connected, with galvanic isolation

Pulse significance:	1 pulse per kWh or MJ respective 1 pulse per 100 litre
Pulse length:	100 ms
Heat / Volume:	specify in order or change with service-software
Voltage:	max. 30 V
Current:	max. 30 mA
Classification	OB (acc. to EN 1434-2)
Voltage drop:	ca. 1,3V at 20 mA
Dielectric strength:	500 V_{eff} against ground

Under these conditions the life time of the battery remains unchanged.

The heat meter display is subdivided into two levels and may differ from the standard shown below. The user loop display (level 1) is advanced cyclically each time the button is pressed briefly. (▼ shows the type of value displayed)

User loop

			▼
0054567	*kWh*	Cumulated heat quantity	
00065.43	*m³*	Cumulated volume	
888888	*kWh*	Segment test	**Info**
F - - -		Error message on fault with fault number	**Info**

If button is held pressed for 10 seconds, the display switches from the user loop to the service loop (level 2).
The service loop is exited by holding the button pressed for 3s or automatically after 30 minutes.

Service loop

			▼
0.534	*m³/h*	Current flow rate	
22.9	*kW*	Current heat power	
84 47	*°C*	Current supply-return temperature	
04.06.02	*D*	Date	
786	*Bh*	Operating hours	
56	*Fh*	Missing hours	
3792701	*G*	Device number, 7-digit	**Info**
PulSE	*CH*	Remote reading option (optional)	**Info**
123	*A*	Primary address when option M-Bus	**Info**
2345678	*K*	Customer number, 7-digit	**Info**
18.02.01	*F0*	Date stamp for F0 prewarning	**Info**
3- 01	*FW*	Firmware version	**Info**
31.12.01	*V*	Previous year's day of storage	**Prev. year**
0034321	*kWh*	Heat previous year on set day	**Prev. year**
00923.12	*m³*	Volume previous year on set day	**Prev. year**
12	*Fh*	Missing hours previous year	**Prev. year**
- -.- -.- -	*C*	Code entry for parameterization	**Info**
01.06.02	*M*	Previous month's 1-15 day of storage	**Prv. month**
		After pressing button for 3s:	⤸
0034321	*kWh*	Heat previous month on set day	**Prv. month**
00923.12	*m³*	Volume prev. month on set day	**Prv. month**
12	*Fh*	Missing hours previous month	**Prv. month**

The **monthly values** are displayed at the end of the service loop. One of the previous 15 monthly values can be selected by pressing the button briefly. The corresponding data are then opened by pressing the button for 3s. Each time the button is pressed briefly the next value for the selected month is displayed.
Afterwards the corresponding monthly set day is displayed again and the next month can be selected by pressing the button briefly.

Resolution of display

Heat	1	kWh
Heat	0,001	MWh
Volume	0,01	m³
Power	0,1	kW
Temperature	1	°C
Temperature difference	0,1	K

Monthly values	The calculator stores for 15 months at the set day the values of

- Heat (meter reading)
- Volume (reading)
- Missing hour counter (reading)

which can be read by using the service software via the optical interface.

Power supply	6 or 11 year **battery**

or

as special version with 1.5m cable for 24V AC/DC external supply, with galvanic insulation to the electronic:

Voltage range AC: 12V to 36V
Voltage range DC: 12V to 42V

Temperature sensor

Temperature sensors Pt500 in the following two-wire versions can be selected:

- Type DS / M10x1, direct immersion, immersion length 27.5 mm

- Type PS Ø 5.2x45 mm, direct immersion or for pocket

The sensors are available with different cable lengths.
The return sensor is always integrated into the measuring tube.

Approval

EN 1434 class 3, PTB and in many European countries. Class 2 on request, dependent from the country.

Technical data of calculator

Installation	In return, optional also in flow
Control cable length	1m between measuring tube and calculator
Temperature range	5 to 105 °C
Temperature difference range $\Delta\Theta$	3 to 80 K
Switch-off limit	0.2 K
Heat coefficient	Sliding compensation
Δ t measurement error without sensor (EN 1434)	$\pm$ (0,5 + $\Delta\Theta_{min}/\Delta\Theta$) %, max. 1,5% at $\Delta\Theta$=3K
Ambient temperature	5 to 55 °C
Storage temperature	-20 to 60°C
Protection class	IP54
Dimensions	112 x 88 mm^2

Volume measuring units	q_p m³/h	Length mm	Thread G	Pressure stage
	0.6	110	¾	PN16
	1.5	110	¾	PN16
	2.5	130	1	PN16
	0.6	190	1	PN16
	1.5	190	1	PN16
	2.5	190	1	PN16

The specified lengths correspond to the overall lengths of conventional vane-type meters.

Technical data for flow measurement

Nominal flow rate	q_p	**0.6**	**1.5**	**2.5**	m³/h
Metrological class		1:100*	1:100*	1:100*	
Maximum flow	q_s	1.2	3,0	5,0	m³/h
Minimum flow	q_i	6**	15**	25**	l/h
Operating limit ***		2,4	6,0	10	l/h
Pressure drop at q_p:					
110 mm	Δp	150	150	----	mbar
130 mm	Δp	----	160	200	mbar
190 mm	Δp	150	160	200	mbar
Flowrate at Δp = 1 bar					
110 mm	K_V	1,5	3,9	----	m³/h
130 mm	K_V	----	3,8	5,6	m³/h
190 mm	K_V	1,5	3,8	5,6	m³/h
Weight (110/190mm)		1 / 1,5		1 / 1,5 1,5	kg
Mounting orientation		any			
Straight pipe sections		not necessary			
Temperature range		5 to 105 °C ***			
Maximum flow rate		2,8 x q_p			
Nominal pressure	PN	1.6 MPa (PN 16)			
Admissible measuring error acc. to EN 1434 (class 3)		3 + 0.05 q_p/q max. 5%			%

*   in Germany 1:50
**   in Germany: multiply value by 2
*** national approvals may differ

Notes

- Regulations for the use of heat meters must be observed, in particular EN 1434, Part 6!
- Ensure by appropriate mounting of the meter that flooding the meter or water dripping is avoided.
- Heat meter safety marks relevant for calibration must not be damaged or removed! Doing so void the warranty and calibration validity of the device.
- The transport of the flow meter is permitted only in the original package.
- Installation and commissioning instructions are added to each meter

Preferred types of ULTRAHEAT 2WR6 heat meters

Ultrasonic heat meter ULTRAHEAT® in short design with thread connection
incl. temperature sensor Pt 500, M 10 x 27.5 mm, type DS to EN1434 for direct mounting, cable length 1.5 m (7B) or 5 m (7C), return sensor integrated in volume measuring unit. Removable calculator, with 1m control cable, Installation in return, plus a pair fittings and a mounting element for the sensor in flow.

Nominal size q_p (Qn)	Overall length mm	Connection	Nominal Pressure PN	Order No.
q_p 0,6	110	G ¾	16	2WR6051-7BBxx-xxxx
q_p 1,5	110	G ¾	16	2WR6211-7BBxx-xxxx
q_p 0,6	110	G ¾	16	2WR6051-7CBxx-xxxx
q_p 1,5	110	G ¾	16	2WR6211-7CBxx-xxxx
Mounting element for temperature sensor DS, M10 x 1 mm ½" with Cu seal				WZT–A12
Fitting R ½" with seals			pair	WZM–E34

Ultrasonic heat meter ULTRAHEAT® in short design with thread connection
incl. temperature sensor Pt 500, $\varnothing$ 5,2x45 mm for protection pocket, cable length 1.5 m (7H) or 5 m (7J), return sensor integrated in volume measuring unit. Removable calculator, with 1m control cable, Installation in return, plus a pair fittings and a protection pocket.

Nominal size q_p (Qn)	Overall length mm	Connection	Nominal Pressure PN	Order No.
q_p 0,6	110	G ¾	16	2WR6051-7HBxx-xxxx
q_p 1,5	110	G ¾	16	2WR6211-7HBxx-xxxx
q_p 0,6	110	G ¾	16	2WR6051-7JBxx-xxxx
q_p 1,5	110	G ¾	16	2WR6211-7JBxx-xxxx
Protection pocket G ½B MS, Ø 5.2 x 35 mm for temperature sensors Ø 5 x 45 mm				WZT–M35
Fitting R ½" with seals			pair	WZM–E34

Ultrasonic heat meter ULTRAHEAT® in short design with thread connection
incl. temperature sensor Pt 500, M 10 x 27.5 mm, type DS to EN1434 for direct mounting, cable length 1.5 m (7B) or 5 m (7C), return sensor integrated in volume measuring unit. Removable calculator, with 1m control cable, Installation in return, plus a pair fittings and a mounting element for the sensor in flow.

Nominal size q_p (Qn)	Overall length mm	Connection	Nominal Pressure PN	Order No.
q_p 0,6	190	G 1	16	2WR6071-7BBxx-xxxx
q_p 1,5	190	G 1	16	2WR6231-7BBxx-xxxx
q_p 2,5	130	G 1	16	2WR6361-7BBxx-xxxx
q_p 2,5	190	G 1	16	2WR6381-7BBxx-xxxx
q_p 0,6	190	G 1	16	2WR6071-7CBxx-xxxx
q_p 1,5	190	G 1	16	2WR6231-7CBxx-xxxx
q_p 2,5	130	G 1	16	2WR6361-7CBxx-xxxx
q_p 2,5	190	G 1	16	2WR6381-7CBxx-xxxx
Mounting element for temperature sensor DS, M10 x 1 mm ½", with Cu seal				WZT–A12
Fitting R ¾" with seals			pair	WZM–E1

Ultrasonic heat meter ULTRAHEAT® in short design with thread connection
incl. temperature sensor Pt 500, $\varnothing$ 5,2x45 mm for protection pocket, cable length 1.5 m (7H) or 5 m (7J), return sensor integrated in volume measuring unit. Removable calculator, with 1m control cable, Installation in return, plus a pair fittings and a protection pocket.

Nominal size q_p (Qn)	Overall length mm	Connection	Nominal Pressure PN	Order No.
q_p 0,6	190	G 1	16	2WR6071-7HBxx-xxxx
q_p 1,5	190	G 1	16	2WR6231-7HBxx-xxxx
q_p 2,5	130	G 1	16	2WR6361-7HBxx-xxxx
q_p 2,5	190	G 1	16	2WR6381-7HBxx-xxxx
q_p 0,6	190	G 1	16	2WR6071-7JBxx-xxxx
q_p 1,5	190	G 1	16	2WR6231-7JBxx-xxxx
q_p 2,5	130	G 1	16	2WR6361-7JBxx-xxxx
q_p 2,5	190	G 1	16	2WR6381-7JBxx-xxxx
Protection pocket G ½B MS, Ø 5.2 x 35 mm for temperature sensors Ø 5 x 45 mm				WZT–M35
Fitting R ¾" with seals			pair	WZM–E1

Ordering data:

Description	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16
	2	W	R	6														
Nominal flowrate 0.6 m³/h, length 110mm, nominal pressure PN16, connection threaded ¾";					0	5												
Nominal flowrate 0.6 m³/h, length 190mm, nominal pressure PN16, connection threaded 1";					0	7												
Nominal flowrate 1.5 m³/h, length 110mm, nominal pressure PN16, connection threaded ¾";					2	1												
Nominal flowrate 1.5 m³/h, length 190mm, nominal pressure PN16, connection threaded 1";					2	3												
Nominal flowrate 1.5 m³/h, length 190mm, nominal pressure PN25, connection flanged DN 20;					2	4												
Nominal flowrate 2.5 m³/h, length 130mm, nominal pressure PN16, connection threaded 1";					3	6												
Nominal flowrate 2.5 m³/h, length 190mm, nominal pressure PN16, connection threaded 1";					3	8												
Mounting in return, return sensor directly integrated into the volume measuring unit;							1											
Mounting in flow, flow sensor directly integrated into the volume measuring unit;							4											
Sensor Pt500, not removable, directly in water, type DS /M10x1/immersion length 27.5 mm, cable length 1.5 m;									7	B								
Sensor Pt500, not removable, directly in water, type DS / M10x1/ immersion length 27.5 mm, cable length 5 m;									7	C								
Sensor Pt500, not removable, directly in the water or for protection pocket, Ø5,2x45mm, cable length 1,5m;									7	H								
Sensor Pt500, not removable, directly in the water or for protection pocket, Ø5,2x45mm, cable length 5m;									7	J								
Split version with 1m control cable;											B							
With 11-year battery (not for 8s temperature measurement cycle);												3						
With standard battery for 6 years lifetime												7						
For external 24V AC/DC supply, galvanic insulation, with 1.5m cable												K						
Without communication interface;													0					
With pulse output;													1					
With M-bus; *													5					
* max. mean frequency of reading at 300/2400 baud: 24h/3h																		
Logo Landis+Gyr ULTRAHEAT															0			

MLFB-digit:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16
Dial plate for Germany;																A		
Dial plate for Switzerland (German and French);																B		
Dial plate for Austria;																D		
Dial plate for the Netherlands;																E		
Dial plate for Denmark;																F		
Dial plate for the Czech Republic;																G		
Dial plate for Hungary;																J		
Dial plate for the Ukraine;																N		
Dial plate in English, not country-specific																T		
Dial plate for Slovakia;																U		
Dial plate for Belgium;																Z*		
Dial plate for Teplokom Russia;																Z*		
Dial plate for Kazakhstan;																Z*		
Dial plate for Belarus;																Z*		
Dial plate for Armenia;																Z*		
Dial plate for Aqua Ukraine;																Z*		
Dial plate for Lithuania;																Z*		
Dial plate for Russia;																Z*		
Dial plate for Uzbekistan;																Z*		
Display: kWh;																	A	
Display: MWh with 3 decimal places;																	B	
Display: MJ;																	C	
Display: GJ with 3 decimal places;																	D	
Tested according to CEN 1434 class 3, with lock mark.																		2
Certified according to CEN 1434 class 3. **																		3
Tested according to CEN 1434 class 2, with lock mark.																		4
Certified according to CEN 1434 class 2. **																		5
conform according to MID class 2																		S
conform according to MID class 3																		R

* Order number supplement (ATG) required

** Certified meters are available according to the current approvals.

For the exact definition of special meter versions order number supplements (ATGs) may be necessary. The structure of the ordering code is then as follows:

Example of type codes

	2WR6	38	1	-7B	B	1	0	-0	A	B	3	(-Z)	xyz
Type reference:	**2WR6**	**38**	**1**	**-7B**	**B**	**1**	**0**	**-0**	**A**	**B**	**3**	**(-Z)**	**xyz**
	x	x	x	x	x	x	x	x	x	x	x		x
Basic type	x x x x	x	x	x	x	x	x	x	x	x	x		x
Nominal flowrate	x x x x x x x	x	x	x	x	x	x	x	x	x		x
Integration	x x x x x x x x x x	x	x	x	x	x	x	x	x		x
Temperature sensor	x x x x x x x x x x x x x x	x	x	x	x	x	x	x		x
Calculator design	x x x x x x x x x x x x x x x x x	x	x	x	x	x	x		x
Power supply	x x x x x x x x x x x x x x x x x x x	x	x	x	x	x		x
Communication interface	x x x x x x x x x x x x x x x x x x x x x x	x	x	x	x		x
Manufacturer's label	x x x x x x x x x x x x x x x x x x x x x x x x x x	x	x	x		x
Country	x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x	x	x		x
Unit of energy	x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x	x		x
Certification	x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x		x
ATG(s)	x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x		

Example for a special dial plate (Russia):

2 W R 6 0 5 1 - 7 B B 1 0 - 0 Z B 2   P 2 A

The most used ATGs can be taken from the table next page:

Order number supplements:

Variants of the meter via ATG:

Condition in the MLFB	Meaning	ATG
14th digit is Z	Dial plate for Belgium;	P 1 A
14th digit is Z	Dial plate for Teplokom Russia;	P 2 A
14th digit is Z	Dial plate for Kazakhstan;	P 3 A
14th digit is Z	Dial plate for Belarus;	P 4 A
14th digit is Z	Dial plate for Lithuania;	P 7 A
14th digit is Z	Dial plate for Armenia;	P 5 B
14th digit is Z	Dial plate for Aqua Ukraine;	P 6 B
14th digit is Z	Dial plate for Russia;	P 7 B
14th digit is Z	Dial plate for Uzbekistan;	P 8 B
11th digit is 1	The measuring interval for temperature measurement is 8s instead of 60s *	IT 08
12th digit is 1	Pulses for volume (only together with option "pulse output");	KV

* not together with 11-year battery

Variants of the meter via supplementary text:

Cold meter		
	Cold meter (6/12°C), water as medium, tube with IP65, without approval	K00
Set day		
	Yearly set day is July 01st (standard: January 01st)	ST0107

Accessories for 2WR6

| Description	Ordering No.
Protection pocket G ½", high-grade steel, ∅ 5.2 x 37mm	WZT–S43V
Protection pocket G ½" MS, 5.2 x 35mm	WZT-M35
Protection pocket G ½" MS, 5.2 x 50 mm	WZT-M50
Mounting element ½" with sensor drill-hole M10 x 1, with Cu seal	WZT-A12
Ball valve Rp 1" for sensor DS M10x1	WZT-K1
Ball valve Rp ½" for sensor DS M10x1	WZT-K12
Ball valve ¾" for sensor M10x1	WZT-K34
Welding sleeve M10 x 1 for temperature sensors DS	WZT-G10
Threaded sleeve for welding on ½" 45°	WZT-G12
Welding sleeve G ½" x 90°, for 43, 100, 150 mm sensor	WZT-GLG

Special mounting accessories for tubes

|	
Set G ¾B – R ½ (2 meter fittings incl. 2 gaskets)	WZM-E34
Set G 1B – R ¾ (2 meter fittings incl. 2 gaskets)	WZM-E1
Kit extension from 110 mm G ¾B to 130 mm G 1 B (in pairs with gaskets)	WZM-V130.G1
Kit extension from 110 mm G ¾B to 190 mm G 1 B (in pairs with gaskets)	WZM-V190
Spacer for heat meter G ¾ - 110 mm, incl. flat gaskets	WZM-G110
Spacer for heat meter G 1 - 130 mm, incl. flat gaskets	WZM-G130
Spacer for heat meter G 1 - 190 mm, incl. flat gaskets	WZM-G190

Software and related accessories	Optical read head with 9 pin plug for PC (COM) interface (PappaWin) not for pulsing interface on test rigs	9956467001
	Software PappaWin, first license, CD-ROM, with dongle for parallel port	2WR9300-0AA11-0A
	Software PappaWin, second license, CD-ROM, with dongle for parallel port	2WR9300-1AA11-0A
	Software PappaWin Profi, first license, CD-ROM, with dongle for parallel port	2WR9300-2AA11-0A
	Software PappaWin Profi, second license, CD-ROM, with dongle for parallel port	2WR9300-3AA11-0A
	Software PappaWin, first license, CD-ROM, with dongle as pcmcia card	2WR9300-0AC11-0A
	Software PappaWin, second license, CD-ROM, with dongle as pcmcia card	2WR9300-1AC11-0A
	Software PappaWin Profi, first license, CD-ROM, with dongle as pcmcia card	2WR9300-2AC11-0A
	Software PappaWin Profi, second license, CD-ROM, with dongle as pcmcia card	2WR9300-3AC11-0A
	Software PappaWin, first license, CD-ROM, with dongle as USB stick	2WR9300-0AD11-0A
	Software PappaWin, second license, CD-ROM, with dongle as USB stick	2WR9300-1AD11-0A
	Software PappaWin Profi, first license, CD-ROM, with dongle as USB stick	2WR9300-2AD11-0A
	Software PappaWin Profi, second license, CD-ROM, with dongle as USB stick	2WR9300-3AD11-0A

Pressure loss characteristics:

pressure loss 2WR6
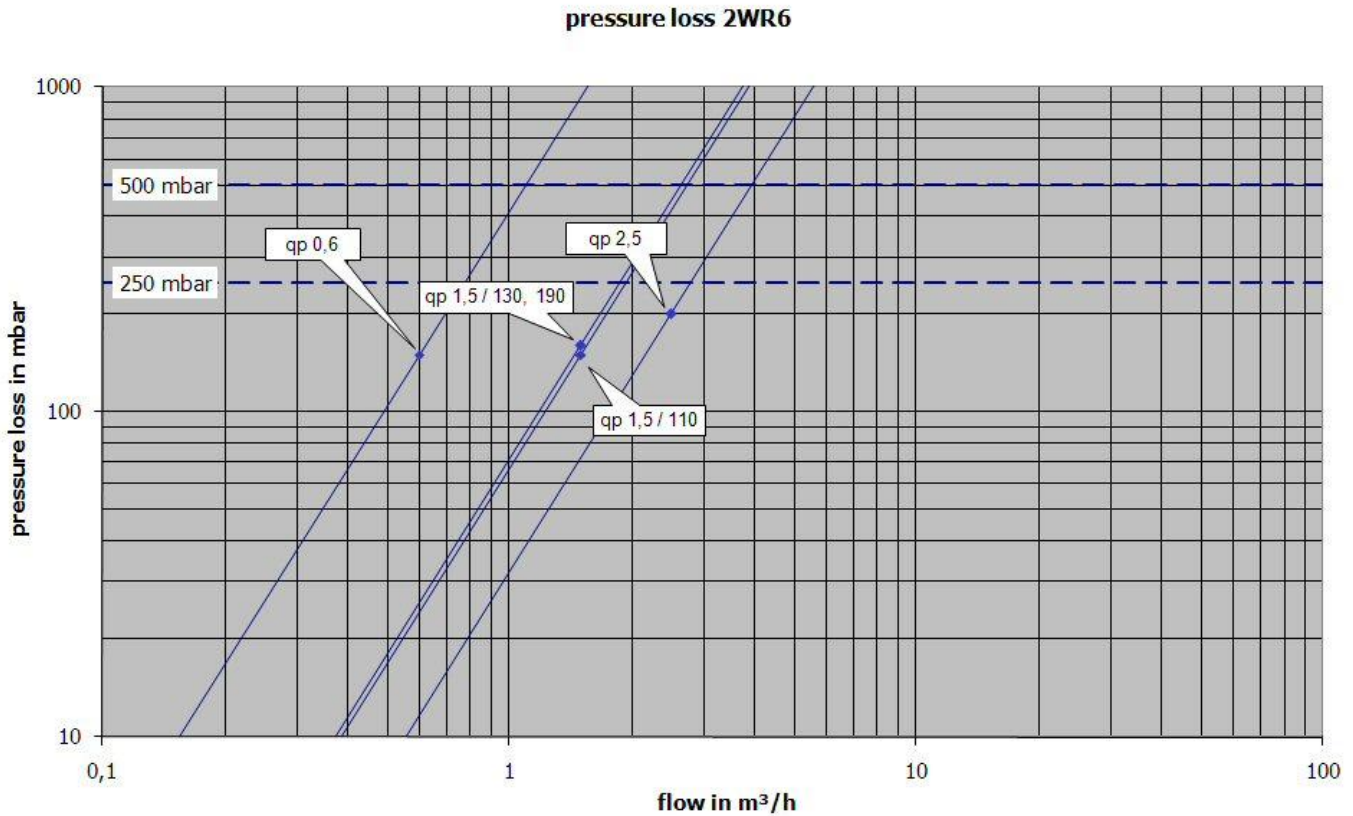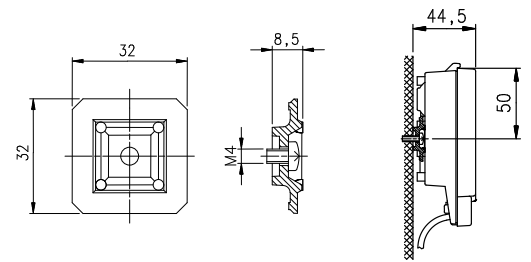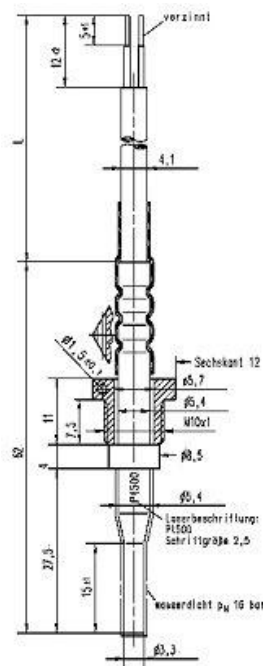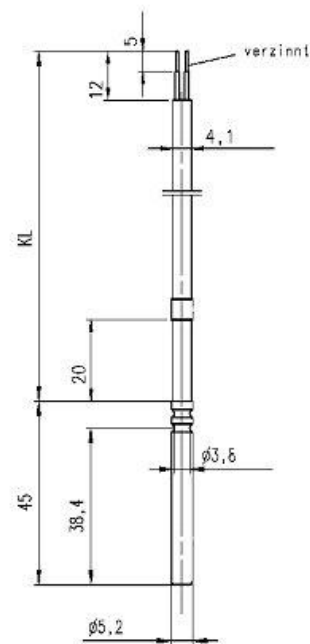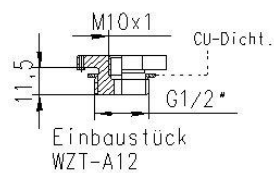
Meter dimensions:
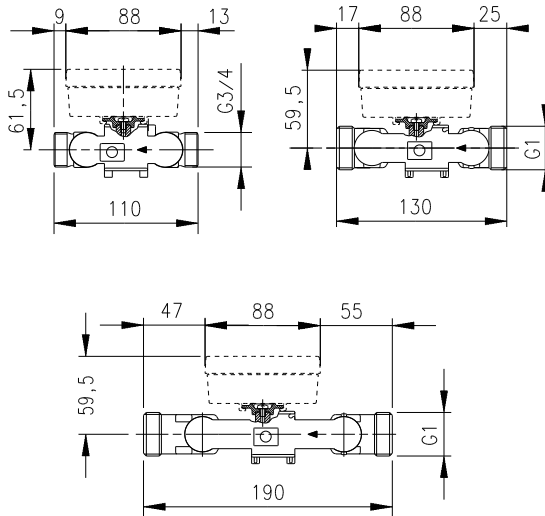
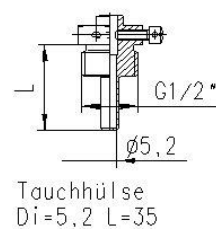Wall mounting:

T-sensor 27,5mm, directly in water:

T-sensor 45mm for protection pocket:

Mounting element:

Protection pocket:

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