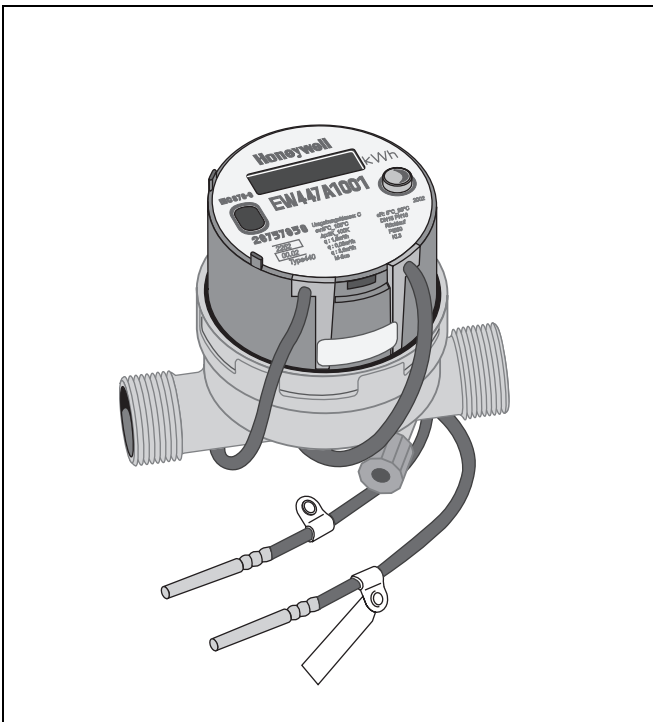


EW447-EW452 Series Mechanical Heat Meters

FOR HEATING AND COOLING APPLICATIONS

PRODUCT DATA



Design

Hydronic meters of the EW447-452 Series consist of:

- Electronic energy meter with fixed cable connection to the volume measuring component, supply and return temperature probe
- Mechanical volume measuring component with external threads according to ISO228 (DN15...DN40) or flanges (DN25...DN100)

Materials

- Housing of electronic energy meter made of plastic
- Housing of mechanical volume measuring component made of brass (EW447, EW448, EW450 and EW451) or of cast iron (EW449 and EW452)

Application

Static compact heat meter with electronic measurement, consisting of electronic energy integrator and mechanical volume measuring component.

Metering of hydronic heating and / or cooling energy in hydronic systems based on volume, supply and return temperature.

EW447-EW449 models are suitable for energy metering of heating systems.

EW450-EW452 models are suitable for energy metering of cooling and combined cooling and heating systems.

Features

- **Electronic sensor control for recording flow rate**
- **Nominal size q_p 0.6 to q_p 60 m³/h**
- **Model 447/450 with direct electronic impeller scanning**
Model 448/449/451/452 with magnetic coupling for electronic scanning of sensor disc
- **Lithium battery guarantees longer lifetime than calibration interval**
- **Optical ZVEI interface equipped as standard**
- **Primary interface**
 - **Optional: M-Bus interface to EN 1434-3**
 - **Optional: Pulse output for energy and volume for heat meter**
Pulse output for cold and heat energy in cooling & heat meter (open-collector)
- **Adjustable reading date for billing**
- **Rotatable integrator**

Specifications

Energy Integrator (All Types)

Table 1. Specifications for Energy Intergrator

Integrator				
Basic features	Ambient class		EN 1434 class C	
	Protection class		IP54	
	Type		Compact heat meter to EN 1434	
	meteological class		Dynamics q_p/q_i 100:1 class 2	
Display	Display indication		LCD, 7-digit	
	Unit		MWh - kWh - GJ - MJ - kW - m ³ /h - l/h - m ³ - l	
	Total values		9 999 999 - 999 999,9 - 99 999,99 - 9 999,999	
	Values displayed		power - energy - flow rate - temperature	
Temperature-Input	Temperature sensor type		Pt 500 / 2-wire	
	Measuring cycle	T s	32	
	Max. temperature difference	$\Delta\Theta_{max}$ K	+147	
	Min. temperature difference	$\Delta\Theta_{min}$ K	+3	
	Energy billing from	$\Delta\Theta$ K	+ 0.25	
	Absolute temperature measurement range	Q °C	0...150	
Volume- / energy - pulse Open Collector (high current sink)	Max. frequency		Hz	approx. 4
	Max. input voltage		V	30
	Max. input current		mA	100
	Max. voltage drop at active output		V/mA	2/27
	Max. current through inactive output		$\mu A/V$	5/30
	Max. reverse voltage without destroying outputs		V	6
	Pulse duration		ms	125
	Min. Pulse breakpause		ms	125
Supply voltage	Operating voltage	U_N V _{DC}	3.0 (lithium battery)	
	Nominal power	P_N μW	30	

Volume Measuring Component (EW447 and EW450)

Table 2. Specifications for Volume Measuring Component (EW447 and EW450)

Flow sensor				0.6	1.5	2.5
Flow rate ranges	Maximum	q_s	m ³ /h	1.2	3	2
	Nominal flow	q_p	m ³ /h	0.6	1.5	2.5
	Minimum	q_i	l/h	6	15	25
Head loss at q_p		Δp	mbar	243	243	242
Starting flows	horizontal position		l/h	2	4	6
Operating pressure	maximal	P_N	bar	16	16	16
Connection	Thread on meter	Zoll		G ³ / ₄ B	G ³ / ₄ B	G1 B
	Coupling	Zoll		R ¹ / ₂	R ¹ / ₂	R ³ / ₄
	Nominal diameter	DN	mm	15	15	20
Overall length			mm	110	110	130
Installation	in any position					
*Zeta				56.25	9	10.24
Weight incl. integrator	g			900	900	990

Volume Measuring Component (EW448 and EW451)

Table 3. Specifications for Volume Measuring Component (EW448 and EW451)

M-TWZ				3.5	6	10	
Flow rate ranges	Maximum	Q_{max}	m ³ /h	7	12	20	
	Nominal flow rate	Q_n	m ³ /h	3.5	6	10	
	Minimum	q_i	l/h	70	120	200	
Head loss	at Q_n	Δp	m/bar	250	250	250	
Starting flows			l/h	35	60	100	
Operating pressure	maximal	P_N	bar	16	16	16	
Connection	Thread on meter		inch	G1 ¹ / ₄ B	G1 ¹ / ₄ B	G 2 B	
	Coupling		inch	R 1	R1	R1 ¹ / ₂	
	Flange (only horizontal)	outer- \varnothing	D	mm	115	115	150
		Hole circle- \varnothing	K	mm	85	85	110
Nominal size		DN	mm	25	25	40	
Overall length	without coupling	horizontal	mm	260	260	300	
		vertical	mm	150	150	200	
	Flange		mm	260	260	300	
Medium	Working range		°C	15...90			
Installation	Installation position			depending on version			
Weight	without coupling	horizontal	kg	2.9	2.9	5.1	
		vertical	kg	3.1	3.1	5.5	
	Flange		kg	4.9	4.9	8.6	
Friction factor Zeta				13	4.4	1.04	

Volume Measuring Component (EW449 and EW452)

Table 4. Specifications for Volume Measuring Component (EW449 and EW452)

M-TWZ				50	65	80	100	
Flow rate ranges	Maximum	q_s	m ³ /h	50	50	110	140	
	Nominal flow rate	q_p	m ³ /h	15	25	40	60	
	Minimum	q_i	l/h	300	500	800	1200	
Head loss	at Q_n	Δp	m/bar	62	142	80	100	
Starting flows			l/h	60	60	90	90	
Operating pressure	maximal	P_N	bar	16	16	16	16	
Connection	Flange	outer- \varnothing	D	mm	165	185	200	220
		Hole circle- \varnothing	K	mm	125	145	160	180
		Nominal size	DN	mm	50	65	80	100
Overall length			mm	270	300	300	360	
Medium	Working range		°C	15...90				
Installation	Installation position			horizontal				
Weight			kg	14.2	18	24	28	
Friction factor Zeta				2.8	6.6	3.3	4.5	

Function

Integrator

The integrator contains all the necessary circuits for recording flow rate and temperature and for calculating, logging and displaying the data. The meter can be conveniently read from a single line seven-digit display with units and symbols. A push-button provides user friendly control of the various display loops. All failures and faults are recorded automatically and displayed on the LCD screen. To protect the reading data, all relevant data is saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

Mechanical volume measuring component

The technology of the volume measuring component permits very high measuring accuracy and can be used in the supply or return pipeline. The volume measuring component meets the requirements of EN1434 / class 2 and 3. The standard cable length between the calculator and the volume measuring component is 1.5m (5m optional).

Supply voltage:

- Lithium battery 3.0 V DC (10-year life)

Temperature sensors

Type Pt 500 temperature sensors to DIN EN 60751 are used as standard.

The temperature sensors are permanently connected to the integrator with the following cable length:

M-MKWZ / MKKWZ	Model 447/450	0.4 m mounted in housing 1.5 m free
M-TWZ / TKWZ	Model 448/451	1.5 m and 3 m free
WS-TWZ / TKWZ	Model 449/452	2 x 6 m free

Accessories

- Ball valves for mounting temperature sensors
- Adapters for direct mounting of temperature sensor
- Pockets
- Data cables for M-Bus, L-Bus and pulse output
- ZVEI optical probe
- HYDRO RADIO external

Software

Hydro Set

Software parametrization tool based on the M-Bus and optical interface for

- reading measured values
 - **18 final monthly values**
 - **value on reading date**
 - **error log**
 - **total down time**
 - **max. power**
 - **max. flow rate**
 - **max. temperature**
 - **operating hours meter**
 - **etc.**
- printing meter logs
- configuration of meters
 - **reading date**
 - **primary address**
 - **limit for cooling & heat meter**
 - **resetting max. values**

Operation

The integrator display has two loops.

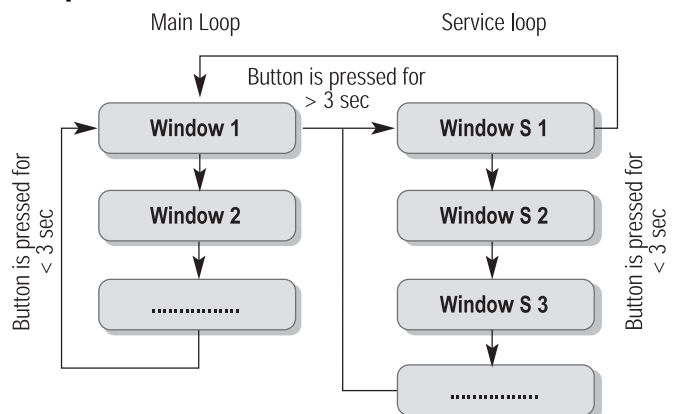
- Main loop
- Service loop

The main loop is configured to display the data for current energy and energy on reading date. The service loop displays the current data for flow rate, temperatures, power, volume and next reading date.

A button is mounted on the front panel of the meter. This can be pressed for a short or long time. A short press of the button (< 3 seconds) switches to the next display within a loop and a long press (> 3 seconds) switches between the display loops.

NOTE: The LC display has a power save mode, which is activated by pressing a button. The display switches off automatically and changes to the power save mode if the button is not pressed for 5 minutes.

Loop Overview



EW447, EW448 and EW449 Series

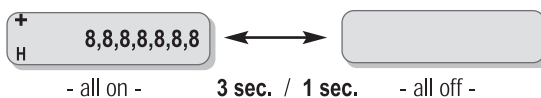
Main loop

Accumulated energy since initial operation



Basic display
+ meter is active

Button pressed for < 3 sec



Segment test of LC display, then automatic change to date reading
Attention: changeover time 4 sec.



Energy on reading date in selected energy unit

Reading date

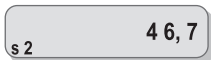
Alternates between Energy H -> heat on reading date and reading date. (3 sec. / 1 sec.)
If the first reading date has not yet been reached, the production date is shown.

Service loop

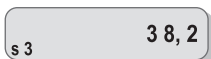
Button pressed for < 3 sec



current flow in m³



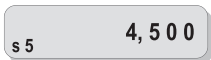
forward temp., always in °C to 1 decimal place



forward temp., always in °C to 1 decimal place



temp. difference, always in °C to 1 decimal place



current power, always in kW, even if basic display e.g. in MWh *1 *2



accumulated volume since initial operation in m³ *2



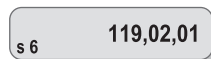
next reading date DD.MM.YY



secondary address 8 digits

Attention: First digit of the 8-digit serial number after the service loop display

Button pressed for > 3 sec



SW-Version number
119 -> Complete SW version
02 -> SW version of part not subject to calibration
02 -> SW version of part subject to calibration

Decimal places

*1 Main display no decimal place -> 3 decimal places

*2 Decimal place in main display -> decimal place same as main display

EW450, EW451 and EW452 Series

Main loop

Accumulated cold since initial operation



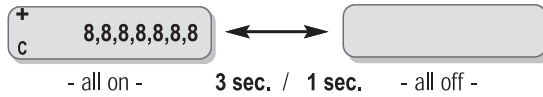
Basic display
+ meter is active

Accumulated heat since initial operation



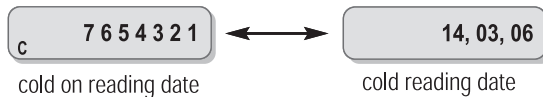
H -> Heat

Button pressed for < 3 sec



Segment test of LC display, then automatic change to date reading

Attention: changeover time 4 sec.



Alternates between energy on reading date and reading date (3 sec. / 1 sec.)

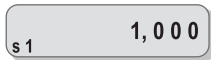
If the first reading date has not yet been reached, the production date is shown.



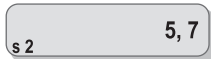
C -> Cold
H -> Heat

Service loop

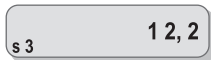
Button pressed for < 3 sec



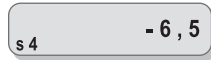
current flow in m³



forward temp., always in SW version number
°C to 1 decimal place



forward temp., always in SW version number
°C to 1 decimal place



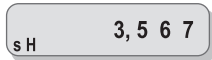
temp. difference, always in °C to 1 decimal place with sign



current power, always in kW, even if basic display e.g. in MWh *1 *2



accumulated volume since initial operation in m³ *2



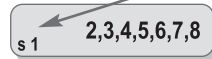
accumulated heat volume since initial operation in m³ *2



next reading date cold DD.MM.YY



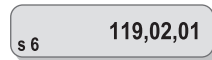
next reading date heat DD.MM.YY



secondary address 8 digits

Attention: First digit of the 8-digit serial number after the service loop display

Button pressed for > 3 sec



SW-Version number

119 -> Complete SW version

02 -> SW version of part not subject to calibration

02 -> SW version of part subject to calibration

Decimal Places

*1 Main display no decimal place -> 3 decimal places

*2 Decimal place in main display -> decimal place same as main display

Easy operation

A pushbutton mounted on the front of the meter is used to switch to the various displays. The button can be pressed for a short or long time. A short press of the button (< 3 seconds) switches to the next display within a loop and a long press (> 3 seconds) switches to the next display loop.

Dimensions

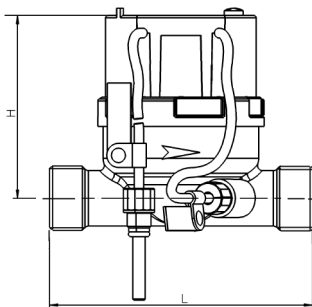


Fig. 1. Dimensions EW447 and EW450

Table 5. Dimensions EW447 and EW450 Series (Fig. 1)

	$q_p = 0.6 \text{ m}^3/\text{h}$	$q_p = 1.5 \text{ m}^3/\text{h}$	$q_p = 2.5 \text{ m}^3/\text{h}$
DN	15	15	20
Thread on meter (inch)	G $\frac{3}{4}$ B	G $\frac{3}{4}$ B	G 1 B
L (mm)	110	110	130
Coupling thread (inch)	R $\frac{1}{2}$	R $\frac{1}{2}$	R $\frac{3}{4}$
H (mm)	75	75	75

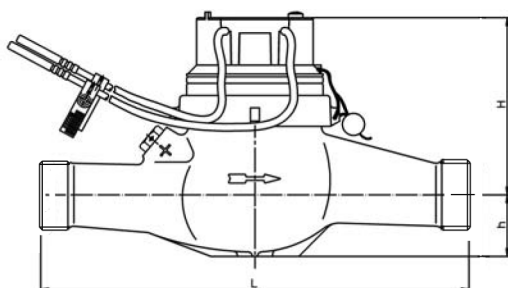


Fig. 2. Dimensions EW448 and EW451

Table 6. Dimensions EW448 and EW451 Series (Fig. 2)

	$q_p = 3.5 \text{ m}^3/\text{h}$	$q_p = 6 \text{ m}^3/\text{h}$	$q_p = 10 \text{ m}^3/\text{h}$
DN	25	25	40
Thread on meter (inch)	G $1\frac{1}{4}$ B	G $1\frac{1}{4}$ B	G 2 B
L (mm)	260	260	300
Coupling thread (inch)	R1	R1	R $1\frac{1}{2}$
H (mm)	110	110	125
h (mm)	45	45	50

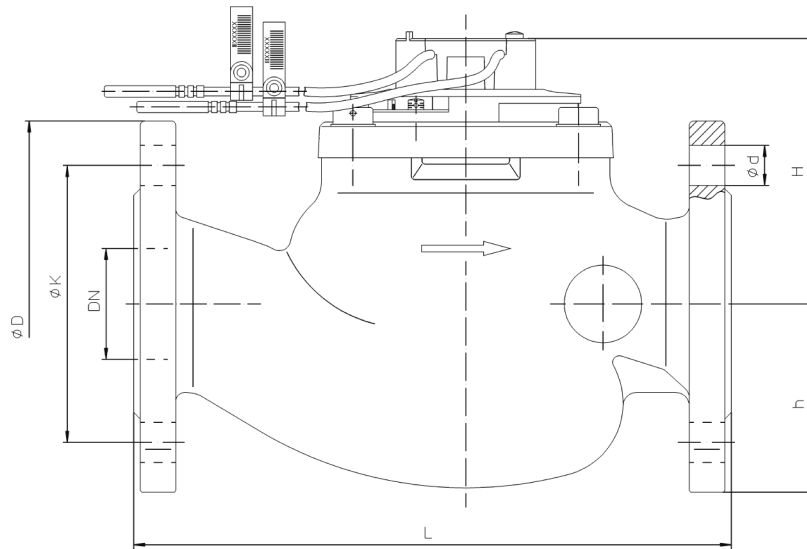


Fig. 3. Dimensions EW449 and EW452
Table 7. Dimensions EW448 and EW451 Series (Fig. 3)

	$q_p = 15 \text{ m}^3/\text{h}$	$q_p = 25 \text{ m}^3/\text{h}$	$q_p = 40 \text{ m}^3/\text{h}$	$q_p = 60 \text{ m}^3/\text{h}$
DN	50	65	80	100
Flange- \varnothing (mm)	165	185	200	220
Hole circle- \varnothing	125	145	160	180
L (mm)	270	300	300	360
H (mm)	125	125	160	170
h (mm)	84	97	102	113

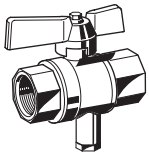
Ordering Information

Table 8. Available versions and OS-Nos (OS=Ordering Specification)

Size qp	Size DN	Length	Connection	Interface	OS-No. (heating only)	OS-No. (cooling and heating)
0.6 m ³ /h	DN15	110 mm	G 3/4 B	None	EW447A0100	EW450A0100
1.5 m ³ /h	DN15	110 mm	G 3/4 B	None	EW447A1200	EW450A1200
2.5 m ³ /h	DN20	130 mm	G 1 B	None	EW447A2000	EW450A2000
3.5 m ³ /h	DN25	260 mm	G 1 1/4 B	None	EW448A2800	EW451A2800
6.0 m ³ /h	DN25	260 mm	G 1 1/4 B	None	EW448A3600	EW451A3600
10 m ³ /h	DN40	300 mm	G 2 B	None	EW448A4600	EW451A4600
15 m ³ /h	DN50	270 mm	Flanges PN16	None	EW449A5100	EW452A5100
25 m ³ /h	DN65	300 mm	Flanges PN16	None	EW449A5900	EW452A5900
40 m ³ /h	DN80	300 mm	Flanges PN16	None	EW449A6900	EW452A6900
60 m ³ /h	DN100	360 mm	Flanges PN16	None	EW449A7700	EW452A7700
With M-Bus output						
0.6 m ³ /h	DN15	110 mm	G 3/4 B	M-Bus	EW447M0100	EW450M0100
1.5 m ³ /h	DN15	110 mm	G 3/4 B	M-Bus	EW447M1200	EW450M1200
2.5 m ³ /h	DN20	130 mm	G 1 B	M-Bus	EW447M2000	EW450M2000
3.5 m ³ /h	DN25	260 mm	G 1 1/4 B	M-Bus	EW447M2800	EW451M2800
6.0 m ³ /h	DN25	260 mm	G 1 1/4 B	M-Bus	EW448M3600	EW451M3600
10 m ³ /h	DN40	300 mm	G 2 B	M-Bus	EW448M4600	EW451M4600
15 m ³ /h	DN50	270 mm	Flanges PN16	M-Bus	EW449M5100	EW452M5100
25 m ³ /h	DN65	300 mm	Flanges PN16	M-Bus	EW449M5900	EW452M5900
40 m ³ /h	DN80	300 mm	Flanges PN16	M-Bus	EW449M6900	EW452M6900
60 m ³ /h	DN100	360 mm	Flanges PN16	M-Bus	EW449M7700	EW452M7700
With pulse output						
0.6 m ³ /h	DN15	110 mm	G 3/4 B	Pulse output	EW447P0100	EW450P0100
1.5 m ³ /h	DN15	110 mm	G 3/4 B	Pulse output	EW447P1200	EW450P1200
2.5 m ³ /h	DN20	130 mm	G 1 B	Pulse output	EW447P2000	EW450P2000
3.5 m ³ /h	DN25	260 mm	G 1 1/4 B	Pulse output	EW448P2800	EW451P2800
6.0 m ³ /h	DN25	260 mm	G 1 1/4 B	Pulse output	EW448P3600	EW451P3600
10 m ³ /h	DN40	300 mm	G 2 B	Pulse output	EW448P4600	EW451P4600
15 m ³ /h	DN50	270 mm	Flanges PN16	Pulse output	EW449P5100	EW452P5100
25 m ³ /h	DN65	300 mm	Flanges PN16	Pulse output	EW449P5900	EW452P5900
40 m ³ /h	DN80	300 mm	Flanges PN16	Pulse output	EW449P6900	EW452P6900
60 m ³ /h	DN100	360 mm	Flanges PN16	Pulse output	EW449P7700	EW452P7700

Accessories

Ballvalve with connection for supply temperature probe



G1/2 internal thread	EWA087HY004
G3/4 internal thread	EWA087HY005
G1 internal thread	EWA087HY006

Tailpiece for connection of supply temperature sensor



R1/2 external thread, M10x1 sensor thread	EWA087HY003
--	-------------

Measuring Accuracy

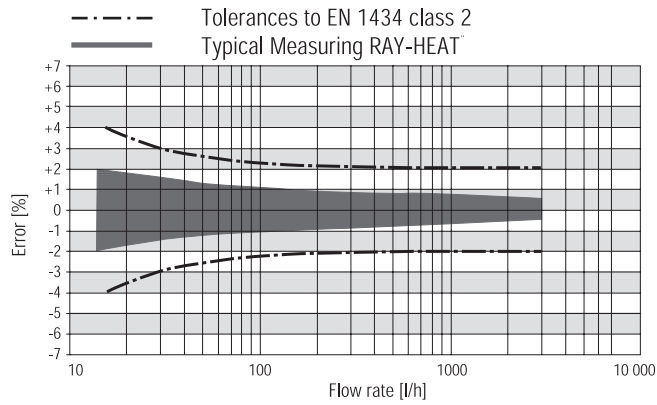


Fig. 4. EW447 and EW450 Series

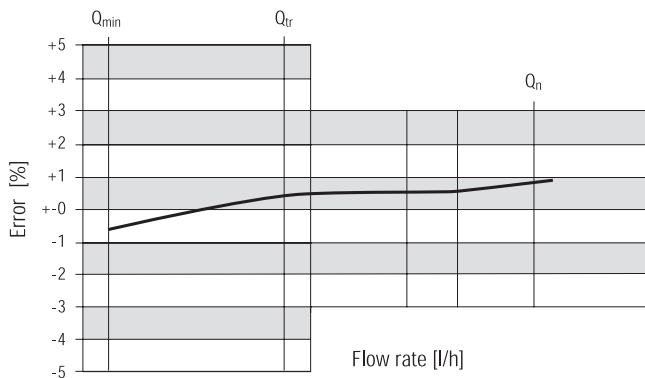


Fig. 5. EW448 and EW451 Series

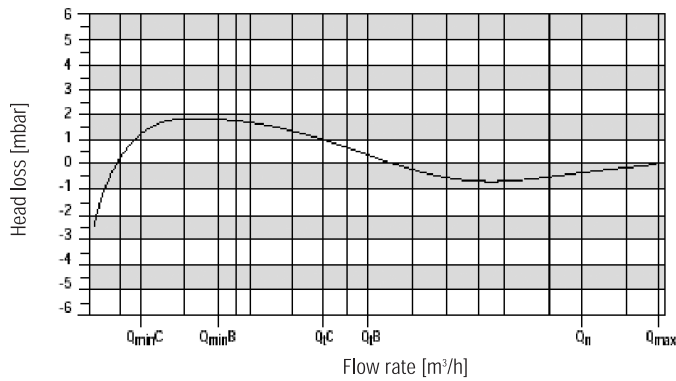


Fig. 6. EW449 and EW452 Series

Flow Diagrams

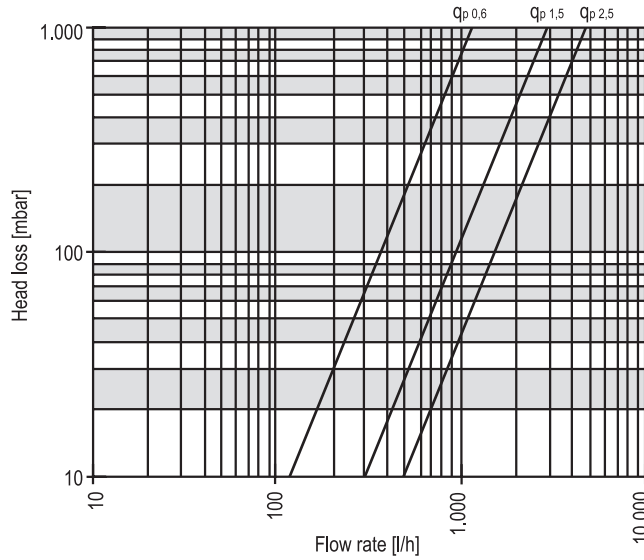


Fig. 7. Pressure drop diagram EW447 and EW450 Series

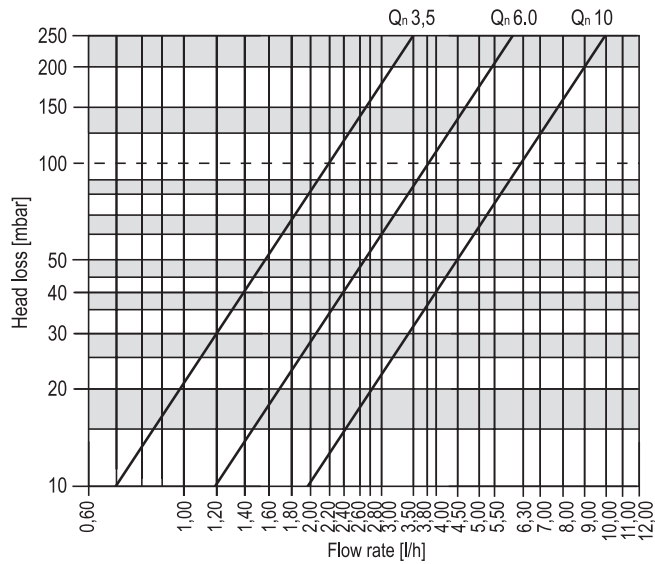


Fig. 8. Pressure drop diagram EW448 and EW451 Series

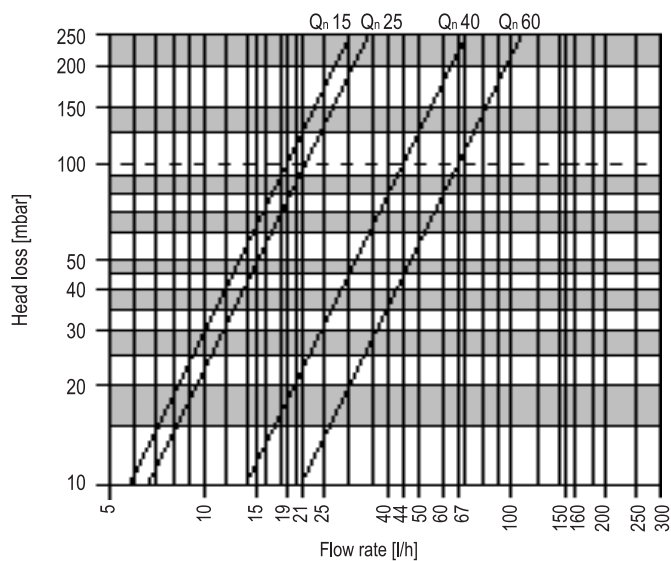


Fig. 9. Pressure drop diagram EW449 and EW452 Series

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