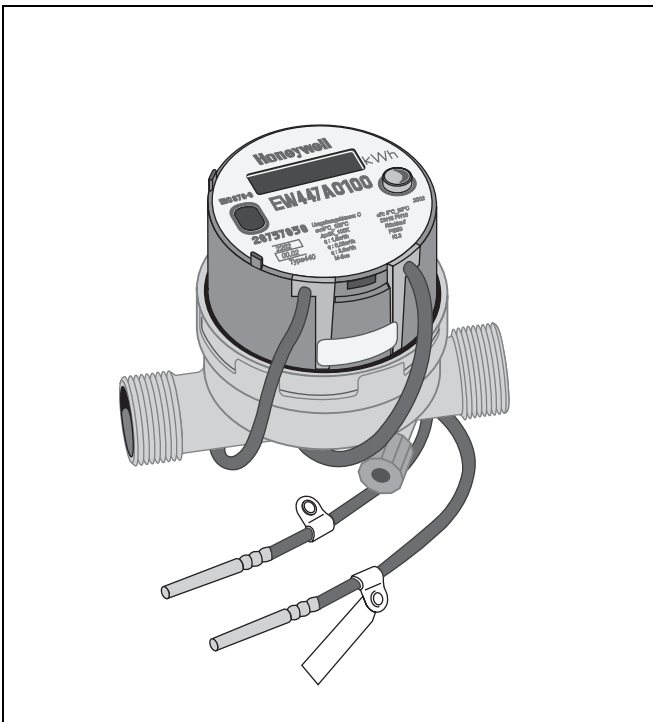


## EW447-EW452 Series Mechanical Heat Meters

### FOR HEATING AND COOLING APPLICATIONS

#### PRODUCT DATA



### Design

Hydronic meters of the EW447-452 Series consist of:

- Electronic energy integrator 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 integrator 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 qp 0.6 to qp 60 m<sup>3</sup>/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**
- **RF version in preparation**

### Software

Hydro-Set software parametrization tool based on M-Bus and optical interface for

- Readout of measured values
  - 18 final monthly values
  - Value on readout date
  - Error log
  - Total down time
  - Max. power
  - Max. flow rate
  - Max. temperature
  - Operating hours
  - Etc.
- Printing meter logs
- Meter configuration
  - Readout date
  - Primary address
  - Limits for cooling & heat meter
  - Reset of max. values

## Specifications

**Table 1. Specifications**

<b>Medium</b>	Water quality to VDI2035
<b>Medium temperature</b>	5...90°C (41...194°F)
<b>Ambient temperature</b>	5...55°C (41...131°F) - PTB approval
<b>Operating pressure</b>	PN16
<b>k<sub>vs</sub>(cv)-values</b>	see table below
<b>Ambient class</b>	EN1434 class C
<b>Protection class</b>	IP54
<b>Type</b>	Compact heatmeter to EN1434
<b>Measuring process</b>	EW447/EW450: direct electronic impeller scanning EW448/EW449/EW451/EW452: multijet impeller scanning via magnetic coupling with sensors
<b>Display</b>	LCD, 7-digit
<b>Units</b>	MWh - kWh - GJ - MJ - kW - m <sup>3</sup> /h - l/h - m <sup>3</sup> - l
<b>Total values</b>	9 999 999 - 999 999.9 - 99 999.99 - 9 999.999
<b>Values displayed</b>	Power - Energy - Flow rate - Temperature
<b>Temperature sensors</b>	Pt500 with 2-wire leads
<b>Sensor current</b>	Pt500 peak < 2; rms 0,012 mA
<b>Measuring cycle</b>	32s
<b>Max. measurable temperature difference</b>	147K
<b>Min. measurable temperature difference</b>	3K
<b>Energy billing from</b>	0.25K
<b>Absolute temperature measuring range (integrator)</b>	0...150°C
<b>Operating voltage</b>	3.0V lithium battery

**Table 2. Specifications**

	Series	EW447/EW450			EW448/EW451			EW449/EW452			
	qp	0.6	1.5	2.5	3.5	6	10	15	25	40	60
<b>Maximum (qs)</b>	m <sup>3</sup> /h	1.2	3	5	7	12	20	50	50	110	140
<b>Nominal (qp)</b>	m <sup>3</sup> /h	0.6	1.5	2.5	3.5	6	10	15	25	40	60
<b>Minimum (qi)</b>	l/h	6	15	25	70	120	200	300	500	800	1200
<b>Starting</b>	l/h	2	4	6	35	60	100	60	60	90	90
<b>k<sub>vs</sub> (cv)-value</b>	m <sup>3</sup> /h	1.22	3.04	5.08	7	12	20	60	66	141	190
<b>Δp at qp</b>	mbar	243	243	242	250	250	250	62	142	80	100

## 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.

### Supply voltage:

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

### Temperature sensors

Pt500 type temperature sensors to DIN EN 60751 are used as standard.

The temperature sensors are permanently connected to the integrator. They have the following cable lengths:

EW447/EW450	0.4m with sensor installed in volume measuring housing 1.5m for sensor installation in corresponding supply/return pipe
EW448/EW451	1.5m with sensor installed in volume measuring housing 3m for sensor installation in corresponding supply/return pipe
EW449/EW452	2 x 6m for sensor installation in supply and corresponding return pipe

## Ordering Information

Table 3. 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 <sup>3</sup> /h	DN15	110 mm	G 3/4 B	None	EW447A0100	EW450A0100
1.5 m <sup>3</sup> /h	DN15	110 mm	G 3/4 B	None	EW447A1200	EW450A1200
2.5 m <sup>3</sup> /h	DN20	130 mm	G 1 B	None	EW447A2000	EW450A2000
3.5 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	None	EW448A2800	EW451A2800
6.0 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	None	EW448A3600	EW451A3600
10 m <sup>3</sup> /h	DN40	300 mm	G 2 B	None	EW448A4600	EW451A4600
15 m <sup>3</sup> /h	DN50	270 mm	Flanges PN16	None	EW449A5100	EW452A5100
25 m <sup>3</sup> /h	DN65	300 mm	Flanges PN16	None	EW449A5900	EW452A5900
40 m <sup>3</sup> /h	DN80	300 mm	Flanges PN16	None	EW449A6900	EW452A6900
60 m <sup>3</sup> /h	DN100	360 mm	Flanges PN16	None	EW449A7700	EW452A7700
<b>With M-Bus output</b>						
0.6 m <sup>3</sup> /h	DN15	110 mm	G 3/4 B	M-Bus	EW447M0100	EW450M0100
1.5 m <sup>3</sup> /h	DN15	110 mm	G 3/4 B	M-Bus	EW447M1200	EW450M1200
2.5 m <sup>3</sup> /h	DN20	130 mm	G 1 B	M-Bus	EW447M2000	EW450M2000
3.5 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	M-Bus	EW448M2800	EW451M2800
6.0 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	M-Bus	EW448M3600	EW451M3600
10 m <sup>3</sup> /h	DN40	300 mm	G 2 B	M-Bus	EW448M4600	EW451M4600
15 m <sup>3</sup> /h	DN50	270 mm	Flanges PN16	M-Bus	EW449M5100	EW452M5100
25 m <sup>3</sup> /h	DN65	300 mm	Flanges PN16	M-Bus	EW449M5900	EW452M5900
40 m <sup>3</sup> /h	DN80	300 mm	Flanges PN16	M-Bus	EW449M6900	EW452M6900
60 m <sup>3</sup> /h	DN100	360 mm	Flanges PN16	M-Bus	EW449M7700	EW452M7700
<b>With pulse output</b>						
0.6 m <sup>3</sup> /h	DN15	110 mm	G 3/4 B	Pulse output	EW447P0100	EW450P0100
1.5 m <sup>3</sup> /h	DN15	110 mm	G 3/4 B	Pulse output	EW447P1200	EW450P1200
2.5 m <sup>3</sup> /h	DN20	130 mm	G 1 B	Pulse output	EW447P2000	EW450P2000
3.5 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	Pulse output	EW448P2800	EW451P2800
6.0 m <sup>3</sup> /h	DN25	260 mm	G 1 1/4 B	Pulse output	EW448P3600	EW451P3600
10 m <sup>3</sup> /h	DN40	300 mm	G 2 B	Pulse output	EW448P4600	EW451P4600
15 m <sup>3</sup> /h	DN50	270 mm	Flanges PN16	Pulse output	EW449P5100	EW452P5100
25 m <sup>3</sup> /h	DN65	300 mm	Flanges PN16	Pulse output	EW449P5900	EW452P5900
40 m <sup>3</sup> /h	DN80	300 mm	Flanges PN16	Pulse output	EW449P6900	EW452P6900
60 m <sup>3</sup> /h	DN100	360 mm	Flanges PN16	Pulse output	EW449P7700	EW452P7700

## Operation

The integrator display has two loops.

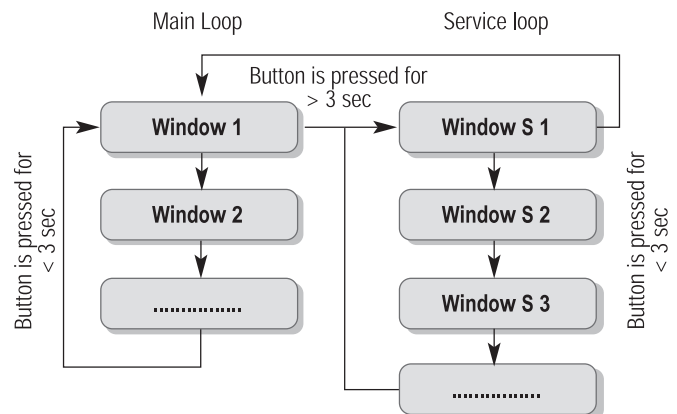
- Main loop
- Service loop

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

+ 1 2 3 4 5 6 7

Basic display  
+ meter is active

Button pressed for < 3 sec

+ 8,8,8,8,8,8,8  
- all on - 3 sec. / 1 sec. - all off -

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

H 7 6 5 4 3 2 1      14, 03, 06  
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

s 1 1, 0 0 0

current flow in m<sup>3</sup>

s 2 4 6, 7

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

s 3 3 8, 2

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

s 4 8, 5

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

s 5 4, 5 0 0

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

s H 6, 4 6 7

accumulated volume since initial operation in m<sup>3</sup> \*2

s H 31, 12, 06

next reading date DD.MM.YY

s 1 2,3,4,5,6,7,8

secondary address 8 digits

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

Button pressed for > 3 sec

s 6 119,02,01

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



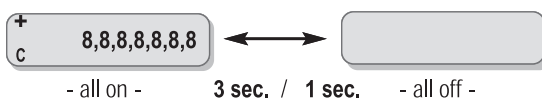
Basic display  
+ meter is active

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.

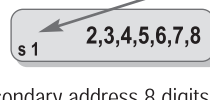
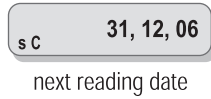
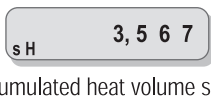
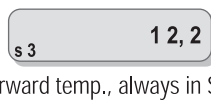
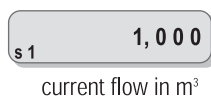


C -> Cold

H -> Heat

### Service loop

Button pressed for < 3 sec



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

Button pressed for > 3 sec



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

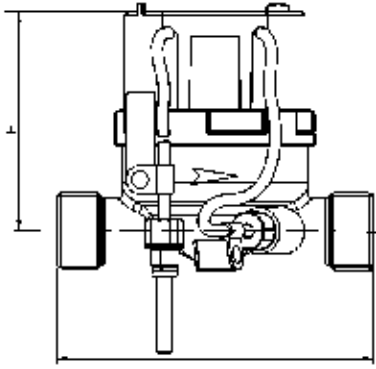


Fig. 1. Dimensions EW447 and EW450

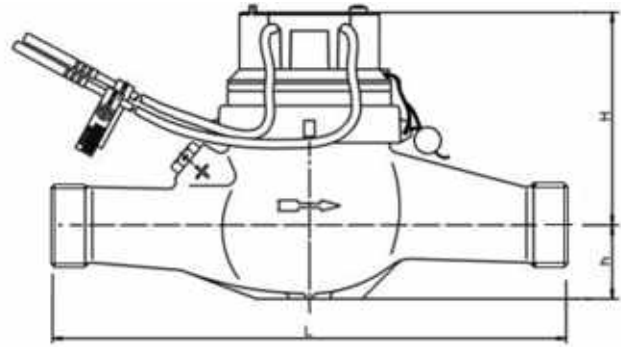


Fig. 2. Dimensions EW448 and EW451

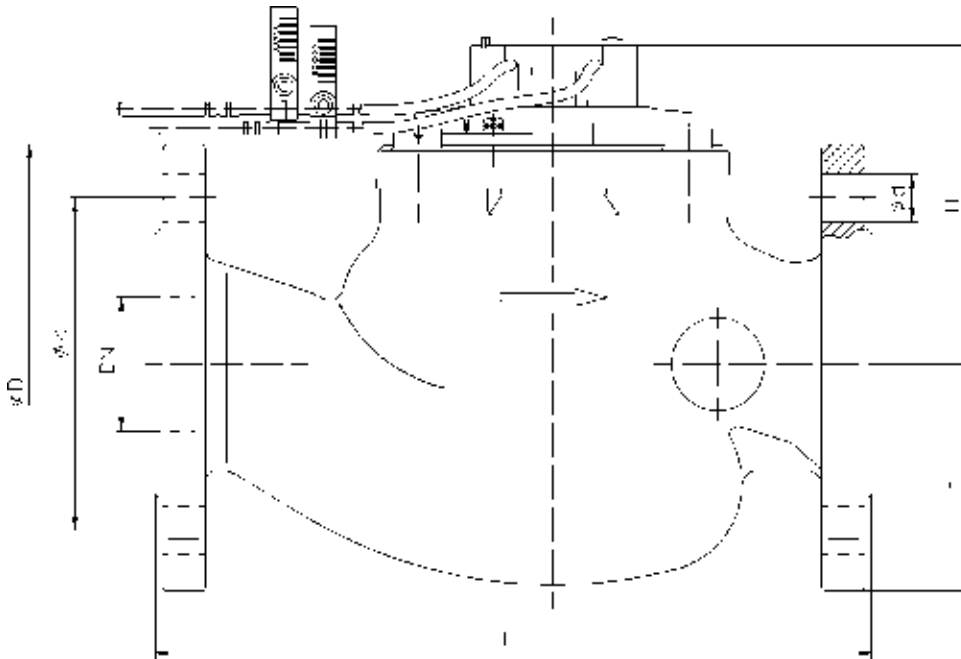


Fig. 3. Dimensions EW449 and EW452

Table 4. Dimensions

Nominal size	qp [m <sup>3</sup> /h]	0.6 / 1.5	2.5	3.5 / 6	10	15	25	40	60
DN size		15	20	25	40	50	65	80	100
Body length	L [mm]	110	130	260	300	270	300	300	360
Height of pipe axis to top	H [mm]	75	75	110	125	125	125	160	170
Height of pipe axis to bottom	h [mm]	-	-	45	50	84	97	102	113
Body thread	G [inch]	G3/4B	G1B	G1 1/4B	G2B	Flanged	Flanged	Flanged	Flanged
Flange diameter	D [mm]	-	-	-	-	165	185	200	220
Bolt circle diameter	h [mm]	-	-	-	-	125	145	160	180
Weight	[kg]	0,9	1	2,9	5,1	14,2	18	24	28

## Installation Position

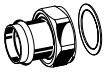
- EW447/EW448/EW450 and EW451: installation in any position possible
- EW449 and EW452: installation only in horizontal position possible

### Accessories

**Union nut, sealing and externally threaded red bronze tail-piece**

	DN 15	VA7401A015
	DN 20	VA7401A020
	DN 25	VA7401A025

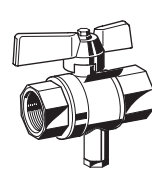
**Sanpress red bronze compression-fitting with sealing**

	DN15, for 15 mm pipe-Ø	VA7404A015
	DN15, for 18 mm pipe-Ø	VA7404A018
	DN20, for 22 mm pipe-Ø	VA7404A020
	DN25, for 28 mm pipe-Ø	VA7404A025

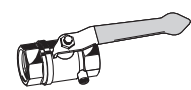
**Union nut, sealing and internally threaded red bronze tail-piece**

	DN 15	VA7405A015
	DN 18	VA7405A018
	DN 20	VA7405A020
	DN 25	VA7405A025

**Ballvalve with connection for supply temperature sensor**


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

**Ballvalve with two side connections G1/4" internal thread and one blind stop**

	G1/2" internal threads	VB550SY2015
	G3/4" internal threads	VB550SY2020
	G1" internal threads	VB550SY2025
	G1 1/4" internal threads	VB550SY2032
	G1 1/2" internal threads	VB550SY2040

NOTE: Only available in packing units of 6 pcs or 8 pcs (3/4")  
For connection of supply temperature sensor adapter EWA354830 is required

**Tailpiece for connection of supply temperature sensor**

	R1/2" external thread, M10x1 sensor thread	EWA087HY003
	G1/4" external thread, M10x1 sensor thread	EWA354830

**Brass immersion pocket (for use with MID meters)**

	35mm	EWA3002684
	52mm	EWA3002685
	85mm	EWA3004406
	120mm	EWA3004407

### Measuring Accuracy

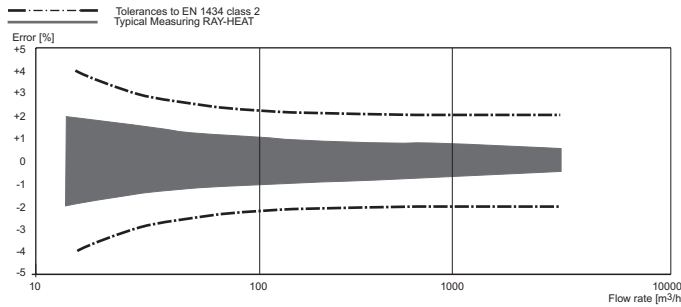


Fig. 4. EW447 and EW450 Series

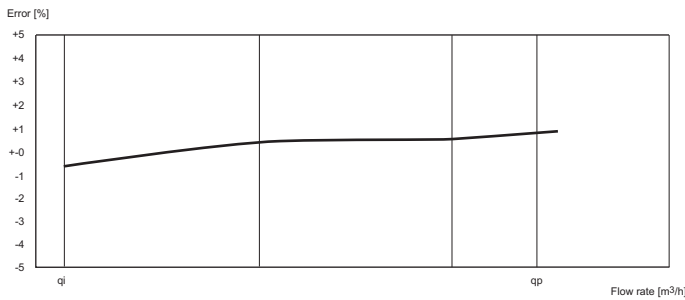


Fig. 5. EW448 and EW451 Series

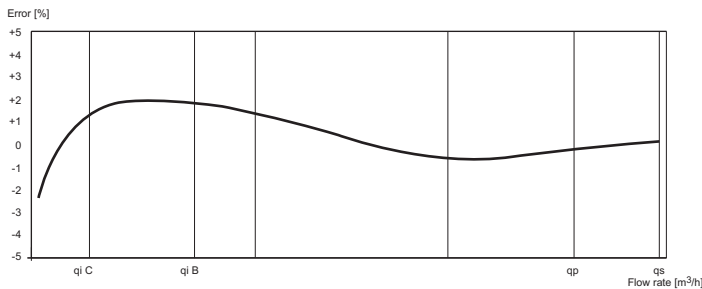


Fig. 6. EW449 and EW452 Series

Flow Diagram

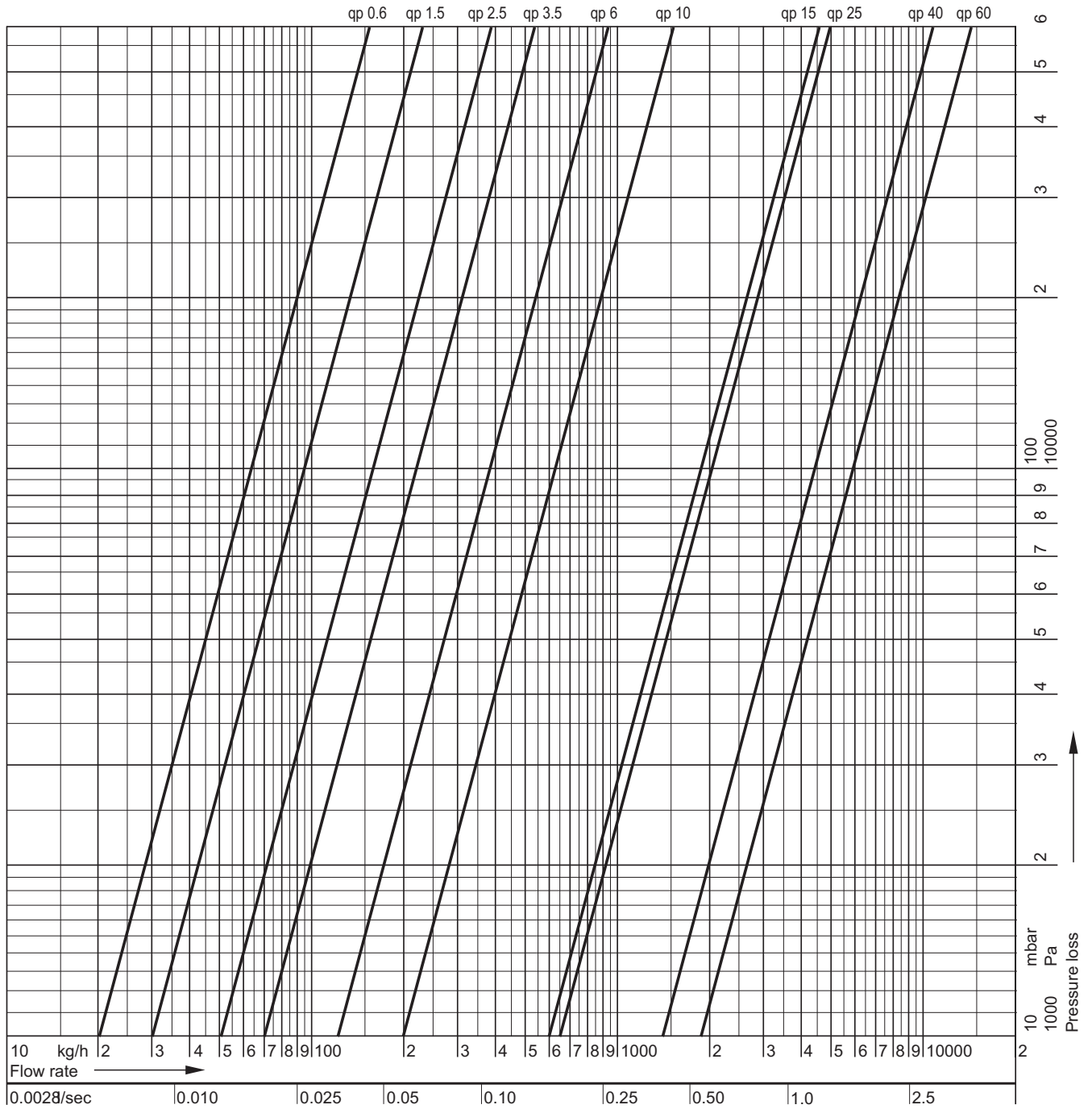


Fig. 7. Pressure drop diagram EW447-EW452 Series