

## EW776xxx Series ULTRASONIC HEAT METERS

DN15 - DN100 for Heating and Cooling Applications

### SPECIFICATION DATA

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## GENERAL

### Application

Honeywell EW776 Series ultrasonic meters are static compact heat or chilled water meters with electronic measurement based on the ultrasonic principle, consisting of an electronic energy calculator, an ultrasonic flow sensor, and two temperature sensors.

They are used for metering hydronic heating and/or cooling energy in hydronic systems based on volume, supply, and return temperature.

EW7760 models are suitable for energy metering in heating systems only. EW7761 models are suitable for energy metering in heating, cooling, or combined systems.

### Approvals

- Heating: MID DE-10-MI004-PTB013, class 2
- Cooling: DE-16-M-PTB-0001
- CE

## Special Features

- Ultrasonic measuring principle
- Dynamic range of 250:1 ( $q_p:q_i$ ) in class 2
- Detachable calculator unit with connection cable 1.5 m long and wall mounting plate for wall attachment
- High battery efficiency
- A-cell: battery lifetime up to 11 years
- D-cell: battery lifetime up to 16 years
- High long-term stability, tested and verified by independent AGFW test
- Insensitive to contamination or soiling
- No moving parts in the flow
- ZVEI optical interface
- Optionally with integrated radio
- OMS (Open Metering Standard), 868 MHz
- Remote reading with up to two add-on plug and play modules

## TECHNICAL DATA

Media		
Medium	Water (Quality according to VDI2035)	
Connections/Sizes		
Connection sizes	DN15 to 100 $q_p$ 1.5 to 60 m <sup>3</sup> /h	
Operating temperatures		
Medium temperature	EW7760 (brass) DN15 - DN100	+5 to +130 °C
	EW7760 (grey cast iron) DN50 - DN100	+5 to +105 °C
	EW7761 (brass) DN15 - DN100	+5 to +130 °C
	EW7761 (grey cast iron) DN50 - DN100	+5 to +105 °C
Ambient temperature	5 to 55 °C	
Storage temperature	-25 to +60 °C (>35 °C maximum 4 weeks)	
Pressure values		
Maximum operating pressure	Threaded versions	maximum 16 bar
	Flanged versions	maximum 25 bar
Specifications		
Flow sensor	Heating	IP54 (EW7760)
	Cooling	IP68 (EW7761)
Calculator	IP54	
Measuring process	Fully electronic compact heat meter with ultrasonic volume measurement	
Display	LCD, 8-digit	
Display unit	MWh, kWh, °C, m <sup>3</sup> , m <sup>3</sup> /h	
Display values	99 999 999, 9 999 999.9, 999 999.99, 99 999.999	
Values displayed	Energy, power, volume, flow rate, temperature, and more	
Measuring cycle volume	Battery supply	1 s
	Mains power supply	1/8 s

Measuring cycle temperature	A-cell battery	16 s
	D-cell battery	4 s
	Mains power supply	2 s
Temperature difference	3 to 175 K	
Starting temperature difference	0.125 K	
Absolute temperature measuring range	1 to 180 °C	
Temperature sensors	Pt500 with 2-wire leads	
Diameter	5.2 mm	
Operating voltage	3.6 V	
Electromagnetic class	E2, M2	
Mechanical class	M1, M2	
Environmental class	C	
Battery life	11 years (A-cell, standard)	
Interfaces	Optical	
	Optional interfaces can be installed in communication slots	
Orientation	Horizontal, vertical	
Installation place (standard)	Return pipeline	

## Transportation And Storage

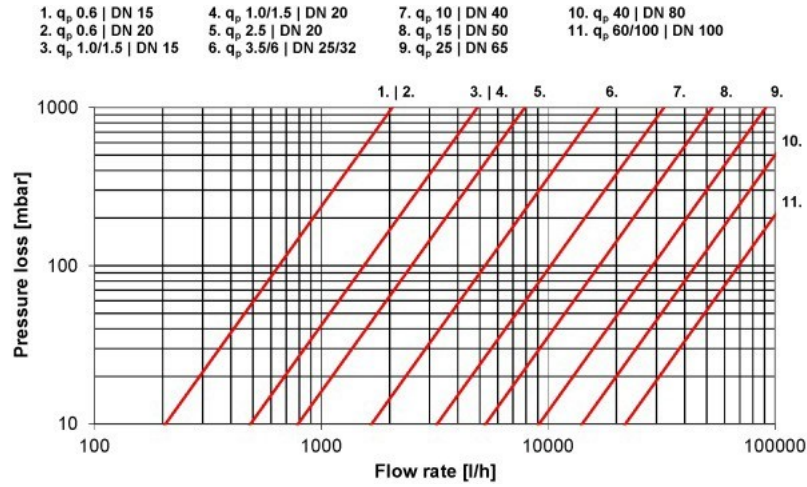
Keep parts in their original packaging and unpack them shortly before use. The following parameters apply during transportation and storage:

Parameter	Value
Environment:	clean, dry and dust free
Min. ambient temperature:	-20 °C
Max. ambient temperature:	60 °C
Min. ambient relative humidity:	0% (non condensing)
Max. ambient relative humidity:	93% (non condensing)

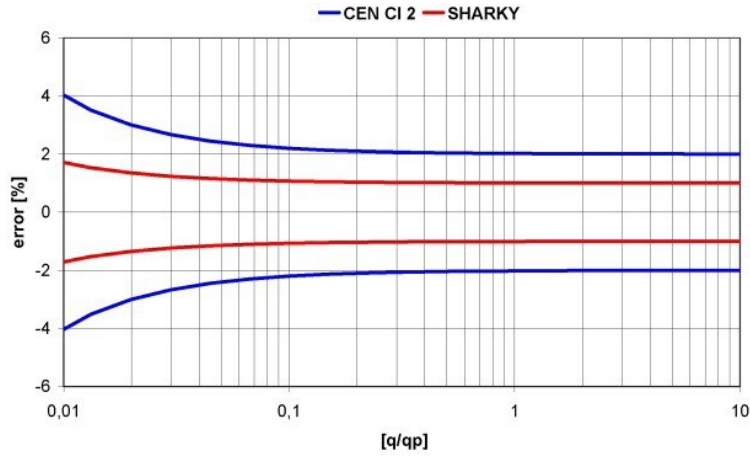
## Flow Data

Nominal size diameter:	DN	15	20	25/32	40	50	65	80	100
<b>Flow rates according to MID</b>									
Minimum ( $q_i$ ):	l/h	6 <sup>(1)</sup> /15	10 <sup>(1)</sup> /25	24 <sup>(1)</sup> /60	40 <sup>(1)</sup> /100	60 <sup>(1)</sup> /150	100 <sup>(1)</sup> /250	160 <sup>(1)</sup> /400	240 <sup>(1)</sup> /600
<b>Nominal (<math>q_p</math>):</b>	<b>m<sup>3</sup>/h</b>	<b>1.5</b>	<b>2.5</b>	<b>6</b>	<b>10</b>	<b>15</b>	<b>25</b>	<b>40</b>	<b>60</b>
Maximum ( $q_s$ ):	m <sup>3</sup> /h	3	5	12	20	30	50	80	120
Dynamic range:	$q_p/q_i$	250:1	250:1	250:1	250:1	250:1	250:1	250:1	250:1
<b>Additional flow data</b>									
Starting flow:	l/h	2.5	4	10	20	40	50	80	120
Overload flow rate:	m <sup>3</sup> /h	4.6	6.7	18.4	24	36	60	90	132
Pressure loss at $q_p$ :	mbar	120	100	128/190	140	140	75	80	75
(1) When installed in horizontal position									

## Pressure Loss Curve




## Typical Error Curve



### SIZING

- EW776 Series Ultrasonic Hydronic Meters should be selected in such a way that typical system flow rates are between approved minimum ( $q_i$ ) and maximum flow rate ( $q_s$ ).
- Overload flow rate may be reached for not more than 15 minutes per day.
- Flow rates below minimum and above maximum should be avoided.

## CONSTRUCTION

Overview	Components	Materials	
	1	Top cover	Plastic
	2	Display	LCD
	3	Approval mark	-
	4	Push button	-
	5	Key specifications	-
	6	Base plate	Plastic
	7	Volume sensor housing with threads to ISO 228 or flanges to EN 1092-2 PN25	Brass or cast iron with dark grey coating
<b>Not depicted components:</b>			
	Ultrasonic transducers	-	
	Flow tube assembly	Plastic, stainless steel	

## METHOD OF OPERATION

### Energy Calculator

The energy calculator records flow rate and temperature and calculates logs and displays data. The calculator can be mounted directly onto the flow sensor or to the wall. The meter can be read out from a single-line eight-digit display with units and symbols. A push button provides control of various display loops. All failures and faults are recorded automatically and displayed on the LCD screen. For protection, all relevant data is saved in a nonvolatile memory (EEPROM). This memory saves measured values, device parameters, and types of error at regular intervals.

### Flow Sensor

The ultrasonic technology of the flow sensor permits very high measuring accuracy and can be used in the supply or return pipeline. Standard place of installation is return pipeline. The configuration for supply can be defined during setup. An additional change after the first use/first contact with water is not possible anymore. Standard cable length between calculator and flow sensor is

- 1.5 m for meters up to  $q_p$  6
- 3 m for meters  $q_p$  10-60

NOTE: Other cable lengths are available on request.

## Power supply

### Standard

- A-cell lithium battery 3.6 VDC with 11-year nominal lifetime

### Optional

- D-cell lithium battery 3.6 VDC with 16-year nominal lifetime
- 24 VAC mains power supply with integrated, replaceable backup battery
- 230 VAC mains power supply with integrated, replaceable backup battery

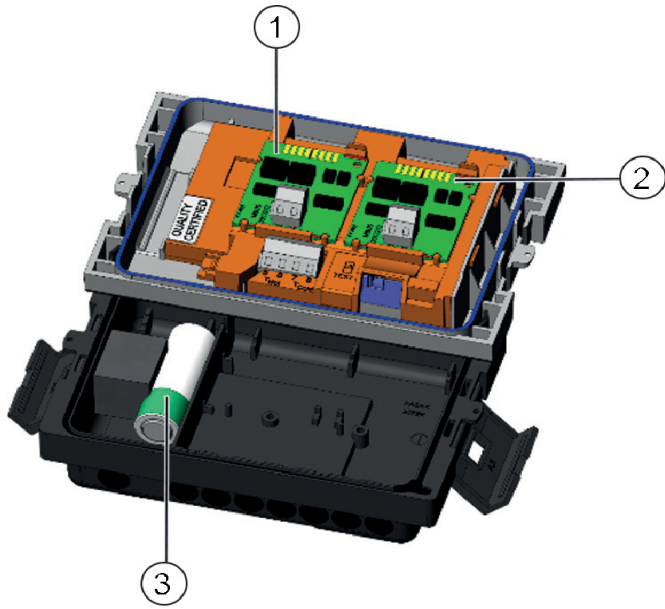
## Temperature Sensors

EW776 Series ultrasonic meters are supplied with installed Pt500 temperature sensors with 2-wire leads,  $\varnothing$  5.2 x 2.000 mm. The temperature sensors are installed to the meter with screw terminals and can be replaced by longer versions.

Temperature sensors may only be changed in pairs. "See ["ACCESSORIES" on page 11.](#)"

## Interfaces/Communication Slots

EW776 Series ultrasonic meters are equipped with a ZVEI optical interface for communication and testing as standard. All meters further have two communication slots which can be occupied with plug and play modules. For more details on interface modules, see chapter "Communication and Readout" below. In configuration example below, communication slot 1 and slot 2 are occupied.



1. Communication slot 1 (occupied)
2. Communication slot 2 (occupied)
3. Power Supply (A-Cell)

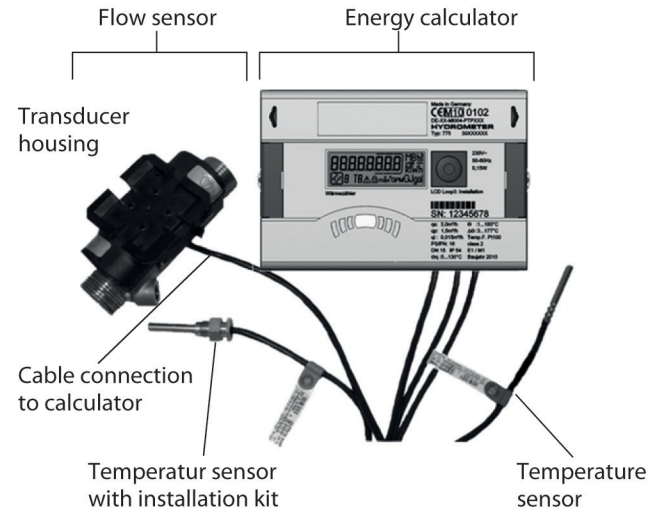
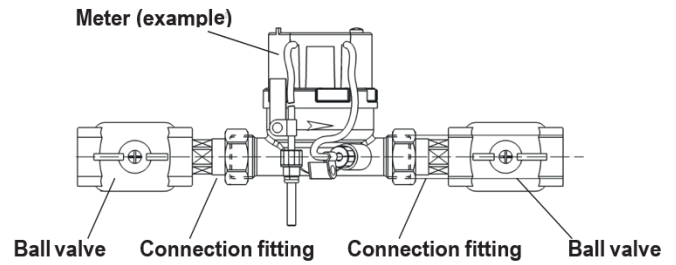
## INSTALLATION GUIDELINES

### Setup requirements

#### Flow Sensor

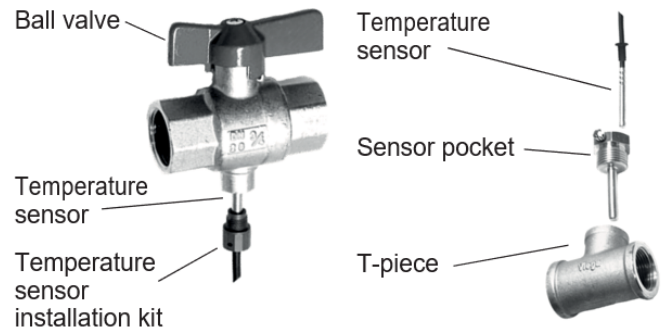
EW776 Series ultrasonic meters must be installed in the correct pipeline. When installed in the wrong pipeline, measurements are either unreliable, inaccurate, or non-existent. Pipeline configuration cannot be changed in the field.

- Calming legs before or after meters are not required but a calming leg of 3DN - 10DN before meters is recommended for flow stabilization.
- All sizes may be installed in any position.
- Avoid installation at highest point of system or system part as air may be trapped in meter.
- It is recommended to place a valve before and after the meter for easy replacement.
- For ball valves, connection fittings selection, “See [“ACCESSORIES” on page 11.](#)”



#### Temperature Sensors

- Temperature sensors have to be installed like for like. Example: if one temperature sensor is installed directly in the flow, the second temperature sensor also has to be installed directly in the flow
- Temperature sensors may only be installed directly in the flow or, for larger sizes, with MID approved sensor pockets (see [“ACCESSORIES” on page 11](#))
- Sensor pockets can also be used for smaller sizes, although installation directly in the flow is preferred
- Various fittings and other accessories are available for sensor installation (see [“ACCESSORIES” on page 11](#)).





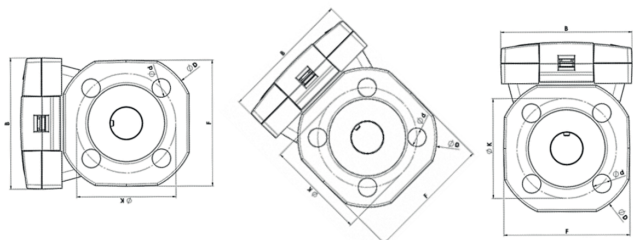
## Medium

Heat meters generally are only approved for metering of water and not for water / glycol mixtures or other fluids other than water. During measurement meter must be completely filled with water.

## Medium Temperature

Max. medium temperatures for flow sensor are as follows:

- 130 °C when horizontally mounted and transducers (black plastic housing on flow sensor) turned sideways for DN15 and DN20, or
- 105 °C when horizontally mounted and transducers turned sideways for sizes DN25 - DN100



Horizontal installation with counter showing sideways (preferred), 45 °C up (recommended minimum) and upwards (not recommended).

## Calculator

Calculator can be installed on or separate from meter, for example with wall mounting plate which is supplied with meter as standard or with other mounting plates available as accessory.

- Flow sensor and calculator of meters up to  $q_p$  6 are connected by a permanently fixed cable with a length of 1.5 m which may not be shortened, cut, or manipulated in any way
- Cable between flow sensor and calculator of meters  $q_p$  10 and larger has to be installed in the field
- In any case, calculator must be separated from flow sensor if medium temperature exceeds 90 °C!

## COMMUNICATION AND READOUT

EW776 Series ultrasonic meters have an optical interface on the front panel and two internal communication slots which can be fitted with plug and play modules. Some EW776 models are factory fitted with modules so that one or both slots are occupied. Empty slots can be retrofitted with modules. Possible module combinations are shown in Table below. Not all models are available in all sizes. It is the responsibility of the purchaser and the installers and users of this unit to ensure that it is wired or installed into a secure network which prevents any unauthorized security intrusion or any other external risk.

## Software

In general, it is not necessary to parametrize EW776 meters in the field unless standard values should be changed, for example pulse value for a meter with pulse output module. Such changes can be done with the Izar@Mobile 2 software. Izar@Mobile 2 is available in two versions:

- Izar@Mobile 2 Standard allows modification of primary and secondary address as well as some due dates and tariffs
- Izar@Mobile 2 Expert allows further settings, for example display contents and order of appearance and advanced meter configuration

The Izar@Mobile 2 software is available free of charge from Resideo server. To activate Expert functions, the software license EWP3066170 is required which is not free of charge and must be purchased separately.

Model	Communication slot configuration	OS# starting	Sizes available
A type: freely configurable	Slot 1: empty Slot 2: empty	EW7760A EW7761A	DN15 - 100 DN15 - 100
M type: with M-Bus on board	Slot 1: M-Bus module Slot 2: empty	EW7760M EW7761M	DN15...25 DN15...100

## COMMUNICATION OPTIONS

### Optical interface on front panel

Included as standard in all EW776 Series ultrasonic meters. ZVEI interface, M-Bus protocol, for readout and parametrization. Required for access to meter:

- Bluetooth optohead (EWA3001799)
- PC with Izar@Mobile 2 software

### Optional onboard RF module

Transmission interval 12 - 20 seconds (depending on telegram length), suitable for walk by, drive by and fixed RF networks. Open Metering Standard protocol, frequency 868 MHz. RF module is on board and not retrofittable.

### M-Bus interface module (EWA3022071)

Configurable telegram, according to EN13757-3, data reading and parametrization via two wires with polarity reversal protection, auto baud detection (300 and 2400 baud), 2 M-Bus connections with 2 primary addresses.

### Pulse output module (EWA3022073)

Module with 2 Open Collector pulse outputs (potential-free):

- Output 1: 4 Hz (pulse width 125 ms), pulse or static conditions (e.g. errors).
- Output 2: 100 Hz (pulse width 5 ms), ratio: pulse duration / pulse break ~ 1:1, configurable with Izar@Mobile 2 software.

### Pulse input module (EWA3022074)

Module with 2 pulse inputs, max. 20 Hz, configurable with

Izar@Mobile 2 software, remote data transfer.

Combined pulse in-/output module (EWA3022075) Module with 2 pulse inputs and 1 pulse output, configurable with Izar@Mobile 2 software, required for leak detection.

### Analogue output module (EWA3022106)

Module for 4 - 20 mA with 2 programmable passive outputs, programmable value in case of error. Field retrofittable only to EW776 meters with two free communication slots as this module occupies both communication slots and can therefore only be combined with RF (which is on board and does not occupy any slot). Not all module combinations are possible. The following table gives an overview of possible combinations:

Slot 1	Slot 2			
	RF	No module	M-Bus	Pulse in
No module	X	X		
M-Bus	X	X	X	
Pulse out	X	X	X	X
Pulse in	X	X	X	
Pulse in/out	X	X	X	
Analogue	X	X		

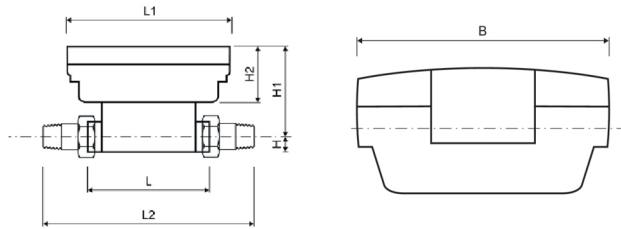
All modules except RF can be retrofitted. RF module is on board and not retrofittable.

Approval of meter is not affected when modules are retrofitted.

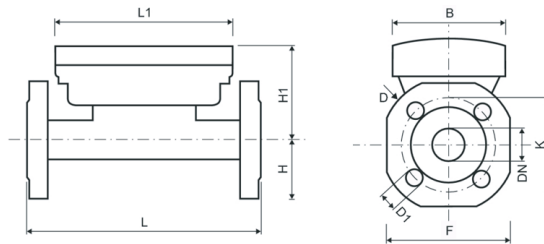


## DIMENSIONS

### Overview



Nominal size diameter:	DN	15	20	25	40
<b>Dimension:</b>	Length L	110	130	260	300
	Length L2	190	230	380	440
	Meter thread	G 3/4" B	G 1" B	G 1 1/4" B	G 2" B
	Height H	14.5	18	23	33
	Height H1	82	84	88.5	94
	Height H2	54	54	54	54
	Length L	150	150	150	150
	Width B	100	100	100	100
<b>Weight:</b>	kg	0.8	0.9	1.5	3.0



Nominal size diameter:	DN	20	25	32	40	50	65	80	100
<b>Dimensions:</b>	Length L	190	260	260	300	270	300	300	360
	Height H	47.5	50	62.5	69	73.5	85	92.5	108
	Height H1	84	88.5	88.5	94	99	106.5	114	119
	Height H2	54	54	54	54	54	54	54	54
	Length L1	150	150	150	150	150	150	150	150
	Width B	100	100	100	100	100	100	100	100
	Flange $\varnothing$ D	105	114	139	148	163	184	200	235
	Flange size F	95	100	125	138	147	170	185	216
	Bolt circle $\varnothing$ K	75	85	100	110	125	145	160	190
<b>Weight:</b>	kg	2.75	3.5	4.8	6.8	7.6	9.6	11	17

NOTE: All dimensions in mm unless stated otherwise.  
Length L2 is approximate and varies depending on type of fitting used.

## ORDERING INFORMATION

### EW776 Series with two free communication slots (no modules installed)

Item:	Nominal size diameter:	Flow rate:	Length:	Ordering Number	
				for heating only	for heating and chilled water
Threaded connections	15	1.5 m <sup>3</sup> /h	110 mm	EW7760A1200	EW7761A1200
	20	2.5 m <sup>3</sup> /h	130 mm	EW7760A2000	EW7761A2000
	25	6.0 m <sup>3</sup> /h	260 mm	EW7760A3600	EW7761A3600
	40	10 m <sup>3</sup> /h	300 mm	EW7760A4600	EW7761A4600
Flanged connections	32	6.0 m <sup>3</sup> /h	260 mm	EW7760A4000	EW7761A4000
	40	10 m <sup>3</sup> /h	300 mm	EW7760A4800	EW7761A4800
	50	15 m <sup>3</sup> /h	270 mm	EW7760A5200	EW7761A5200
	65	25 m <sup>3</sup> /h	300 mm	EW7760A6000	EW7761A6000
	80	40 m <sup>3</sup> /h	300 mm	EW7760A7000	EW7761A7000
	100	60 m <sup>3</sup> /h	360 mm	EW7760A7800	n.a.

### EW776 Series with two free communication slots and installed 230 V mains power supply

Item:	Nominal size diameter:	Flow rate:	Length:	Ordering Number	
				for heating only	for heating and chilled water
Threaded connections	15	1.5 m <sup>3</sup> /h	110 mm		EW7761A1223

### EW776 Series with installed M-Bus module and one free communication slot

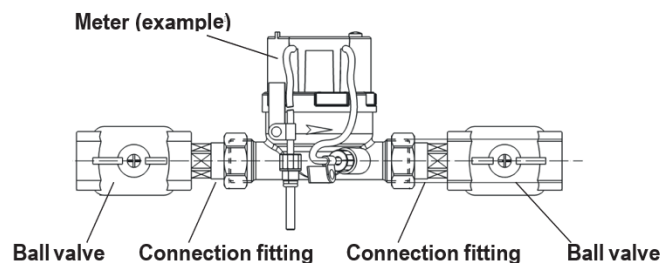
Item:	Nominal size diameter:	Flow rate:	Length:	Ordering Number	
				for heating only	for heating and chilled water
Threaded connections	15	1.5 m <sup>3</sup> /h	110 mm	EW7760M1200	EW7761M1200
	20	2.5 m <sup>3</sup> /h	130 mm	EW7760M2000	EW7761M2000
	25	6.0 m <sup>3</sup> /h	260 mm	EW7760M3600	EW7761M3600
Flanged connections	32	6.0 m <sup>3</sup> /h	260 mm		EW7761M4000
	40	10 m <sup>3</sup> /h	300 mm		EW7761M4800
	50	15 m <sup>3</sup> /h	270 mm		EW7761M5200
	65	25 m <sup>3</sup> /h	300 mm		EW7761M6000
	80	40 m <sup>3</sup> /h	300 mm		EW7761M7000
	100	60 m <sup>3</sup> /h	360 mm		EW7761M7800

### Scope of Delivery

- EW776 Series ultrasonic meter consisting of energy calculator and flow sensor
- Cable for connection of energy calculator to flow sensor for sizes DN40 and larger. (Sizes below DN40 have a fixed factory fitted cable)
- Supply and return temperature sensors installed to energy calculator, length = 2 m (except for ...25 versions)
- One or two installation kits EWA3001303 for pipe installation of temperature sensors:
  - DN15 - 20: one kit included (one sensor is already installed in meter housing)
  - DN25 - 50: two kits included
  - DN65 and larger: no kits included as immersion pockets are to be used
- Wall mounting plate EWA3007090
- Two paper sealings
- Operating and setup instructions

## ACCESSORIES

Unless stated otherwise, accessories are sold in single packs. Table below shows which connection set and ball valve can be used for which meter size. The meter size is given in the top line and refers to the eighth and ninth characters of the OS number. Example: Items listed in the column headed '12xx' can be used for all OS numbers with '12' as eighth and ninth character, e.g. 'EW7760A1200', 'EW7761M1200' or 'EW7760K1273' and so on.



EW776xX	12xx	14xx, 20xx	36xx	46xx
DN size	DN15	DN20	DN25	DN40
Connection size	G3/4"	G1"	G1 1/4"	G2"
<b>Connection fittings</b>				
Connection set with externally threaded tailpiece	1 x EWA1500035	1 x EWA1500042	1 x EWA1500062	1 x EWA1500072
<b>Ball valves</b>				
Ball valve with additional port	EWA087HY004	EWA087HY005	EWA087HY006	n.a.

	Description	Part No.
	<b>Set of two union nuts, two sealings, and two externally threaded brass tailpieces (one pack per meter required) – sealable with locking wire</b>	
	For DN15, 1/2" x 3/4"	EWA1500035
	For DN20, 3/4" x 1"	EWA1500042
	For DN25, 1" x 1 1/4"	EWA1500062
	For DN40, 1 1/2" x 2"	EWA1500072
	<b>Pair of Pt500 temperature sensors, Ø5.2 mm (MID approved)</b>	
	Cable length 2 m	EWA3002680
	Cable length 3 m	EWA3002681
	Cable length 5 m	EWA3002682
	Cable length 10 m	EWA3002679
	<b>Temperature sensor installation kit (bulk pack of 20pcs)</b>	
	Brass, max. 130 °C	EWA3001303
	Plastic, max. 90 °C	EWA3001305
	<b>Tailpiece for direct connection of supply temperature sensor Temperature sensor installation kit required</b>	
	R1/2" external thread, M10x1 sensor thread	EWA087HY003
	G1/4" external thread, M10x1 sensor thread	EWA354830

	Description	Part No.
	Ball valve with internal threads	
	For DN15, G 1/2" internal thread	EWA087HY004
	For DN20, G 3/4" internal thread	EWA087HY005
	For DN25, G1" internal threads	EWA087HY006
	<b>Brass immersion pocket with MID approval</b>	
	Brass pocket, 35 mm MID	EWA3002684
	Brass pocket, 52 mm MID	EWA3002685
	Brass pocket, 85 mm MID	EWA3004406
	Brass pocket, 120 mm MID	EWA3004407
	<b>Retrofittable communication modules</b>	
	M-Bus module, single pack	EWA3022071
	Pulse output module	EWA3022073
	Pulse input module, single pack	EWA3022074
	Combined pulse in-/output module	EWA3022075
	Analogue 4 - 20 mA module	EWA3022106
	Ribbon cable for EW776 modules	EWA3026382
	<b>External M-Bus to RF module</b>	
	For all EW776 with M-Bus module	EW9100AEZ001
	<b>Power supply</b>	
	Replacement A-cell battery	EWA3022102
	D-cell battery	EWA3022103
	Mains supply unit 230 VAC	EWA3022076
	Mains supply unit 24 VAC	EWA3022079
	<b>Calculator mounts</b>	
	Wall mount, single pack	EWA3007090
	<b>Bluetooth optohead</b>	
	For all EW776	EWA3001799

	Description	Part No.
	<b>izar@Mobile 2 Set Expert</b>	
	License for all EW776	EWP3066170

# Honeywell

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