

HYDRUS 2.0

Ultrasonic Meter

DIEHL
Metering



APPLICATION

HYDRUS 2.0 is a static ultrasonic water meter designed for all applications of domestic cold water supply enabling accurate measuring with long-term stability under difficult conditions (no measurement of air and insensitive to sedimentation). Developed within the framework of the MID, it complies with the European regulations and holds sanitary conformity certificates (KTW/W270, ACS, WRAS and others). The integrated communication function supports meter data provision via mobile reading (walk-by/drive-by/passive drive-by) or fixed network (upgrade without on-site configuration). In combination with Diehl Metering's IZAR fixed network system, which stands out with excellent coverage, high data granularity and timeliness will be maintained. This is what makes it a high responsive infrastructure to take actions immediately.

FEATURES

- ▶ DN 15 to 40
- ▶ MID approved with dynamic range up to R 800
- ▶ IP 68 suitable for outdoor installations
- ▶ Integrated radio communication based on Open Metering telegram (OMS Generation 3 or 4, Profile B)
- ▶ Wired M-Bus/Pulse/Pulse, wireless M-Bus, wireless M-Bus in combination with wired L-Bus/Pulse interface
- ▶ Display with error and alarm codes including leakage detection
- ▶ Battery lifetime up to 16 years
- ▶ U0 / D0, no need for calming sections

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GENERAL

		HYDRUS 2.0	
Medium temperature range	°C	+0.1 ... +90	
Ambient operating temperature	°C	-10 ... +55	
Ambient storage temperature	°C	-10 ... +70 (>35 °C max. 4 weeks)	
Nominal pressure	PN	bar	16
Power supply	Two 3.6 VDC lithium batteries		
Battery lifetime T30 ¹ /T50 ¹	Up to 16 years		
Communication interfaces	Optical, OMS wireless M-Bus 434 or 868 MHz, M-Bus, L-Bus and Pulse		
Data storage	For errors, alarms and measuring values, data logging capabilities to record up to 512 daily values +32 monthly values and an annual due date		
Protection class	IP 68		

¹ Depends on the sending interval of the radio telegram, the telegram length and the ambient temperature at the installation

TECHNICAL DATA DISPLAY

		HYDRUS 2.0	
Display indication	LCD, 9-digit, additional symbols/display counter/unit		
Units displayed DN 15 - DN 32	Volume (m ³ + 3 decimal places) and flow rate (m ³ /h + 3 decimal places)		
Units displayed DN 40	Volume (m ³ + 3 decimal places) and flow rate (m ³ /h + 2 decimal places)		
Values displayed	Display test - volume - battery lifetime - firmware version - software checksum - flow - current/continuous/historical error - alarm status - high resolution volume - due date - due date volume - reverse volume - display counter - low battery indication - leakage indication - metrological log access - radio signal ON/OFF - alarm indication - meter lock ON/OFF		

INTERFACES - OVERVIEW

		HYDRUS 2.0	
Optical	For switching the display loop		
Radio	434 or 868 MHz, Open Metering Standard radio frame (R3) for mobile reading sent every 14 ² /64 ³ seconds, long range radio frame (R4) for fixed network sent every 15 ² /5 ³ minutes		
M-Bus	2400 baud, cable length 1.5 m, power supply only via built-in battery - can be combined with two Pulse outputs		
L-Bus	In combination with radio, cable length 1.5 m (only one interface communicating at the same time)		
Pulse (Open drain)	Two Pulse outputs, or one Pulse and one L-Bus output, Pulse cable length 1.5 m		

² Fixed Network ready

³ Fixed Network light

SECURITY

		HYDRUS 2.0	
Versions	OMS Generation 3 or OMS Generation 4, Profile B, selectable		

PRIVACY

The HYDRUS 2.0 saves 512 consumption values with a daily interval. This data can be read locally and accessed only by using the IZAR@MOBILE 2. As a second logging, a small amount of 32 consumption values can be stored. The HYDRUS 2.0 has a minimal sending interval of about 14 seconds and uses the OMS Generation 3 or 4, Profile B security level. Both, the radio protocol and the optical interface are encrypted by default.

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VOLUME / PULSE OPEN DRAIN

HYDRUS 2.0	
Max. input voltage	V 30
Max. input current	mA 27
Max. voltage drop at active output	V/mA 2/27
Max. current through inactive output	µA/V 5/30
Max. reverse voltage without destroying outputs	V 6 (in case current does not exceed 27 mA)
Pulse rates	l/pulse Decadic 1 / 10 (depending on nominal diameter)
Pulse output 1 variants	Total volume or forward volume
Pulse output 2 variants	Flow direction or error, reverse volume
Pulse frequency	Max. frequency 10 Hz
Pulse width	125 ms

POSSIBLE COMMUNICATION INTERFACES

HYDRUS 2.0	
Wireless M-Bus/Pulse/L-Bus	3 wire
Wireless M-Bus only	without wire
M-Bus only	2 wire
M-Bus/Pulse/Pulse	5 wire
Pulse/Pulse	3 wire
IZAR BE PULSE	4 wire

REACH

Information pursuant to Article 33 (1) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006:

This product series contains components with the following substances in a concentration of more than 0.1% weight by weight (w/w):

- Lead (only for the flange variants)
- Lead titanium zirconium oxide

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TECHNICAL DATA

Nominal diameter	DN	mm	15	15	15	15	15	15	20
Permanent flow rate	Q ₃	m ³ /h	1.6	1.6	1.6	2.5	2.5	2.5	2.5
Overall length	L	mm	110	165	170	110	165	170	130
Dynamic (Q ₃ /Q ₁)	R		400	400	400	800	800	800	800
Overload flow rate	Q ₄	m ³ /h	2	2	2	3.125	3.125	3.125	3.125
Transitional flow rate	Q ₂	l/h	6.4	6.4	6.4	5	5	5	5
Minimum flow rate	Q ₁	l/h	4	4	4	3.13	3.13	3.13	3.13
Starting flow rate		l/h	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Pressure loss at Q ₃		bar	0.19	0.19	0.19	0.46	0.46	0.46	0.4
Pressure loss at Q ₄		bar	0.3	0.3	0.3	0.72	0.72	0.72	0.63
Maximum flow rate ⁴	Q _{high}	m ³ /h	2.8	2.8	2.8	4.37	4.37	4.37	4.37
Flow rate at ΔP = 1 bar			3.67	3.67	3.67	3.69	3.69	3.69	3.95

Nominal diameter	DN	mm	20	20	20	20	20	20	20
Permanent flow rate	Q ₃	m ³ /h	2.5	4	4	4	4	4	4
Overall length	L	mm	190	105	130	165	175	190	220
Dynamic (Q ₃ /Q ₁)	R		800	400	800	800	800	800	800
Overload flow rate	Q ₄	m ³ /h	3.125	5	5	5	5	5	5
Transitional flow rate	Q ₂	l/h	5	16	8	8	8	8	8
Minimum flow rate	Q ₁	l/h	3.13	10	5	5	5	5	5
Starting flow rate		l/h	1.4	3.0	2.5	2.5	2.5	2.5	2.5
Pressure loss at Q ₃		bar	0.4	0.55	0.4	0.4	0.4	0.4	0.4
Pressure loss at Q ₄		bar	0.63	0.86	0.63	0.63	0.63	0.63	0.63
Maximum flow rate ⁴	Q _{high}	m ³ /h	4.37	7	7	7	7	7	7
Flow rate at ΔP = 1 bar			3.95	5.39	5.39	5.39	5.39	5.39	5.39

⁴ Outlet pressure minimum 3 bar, maximum 100 hours per year, closed pipeline network

APPROVAL

DN 15 - 20		
Approval		MID DE-19-MI001-PTB012
Dynamic range (Q ₃ /Q ₁)	R	Up to 800
Standards		ISO 4064, EN 14154, OIML R49
Sanitary conformity		KTW/W270, ACS, WRAS

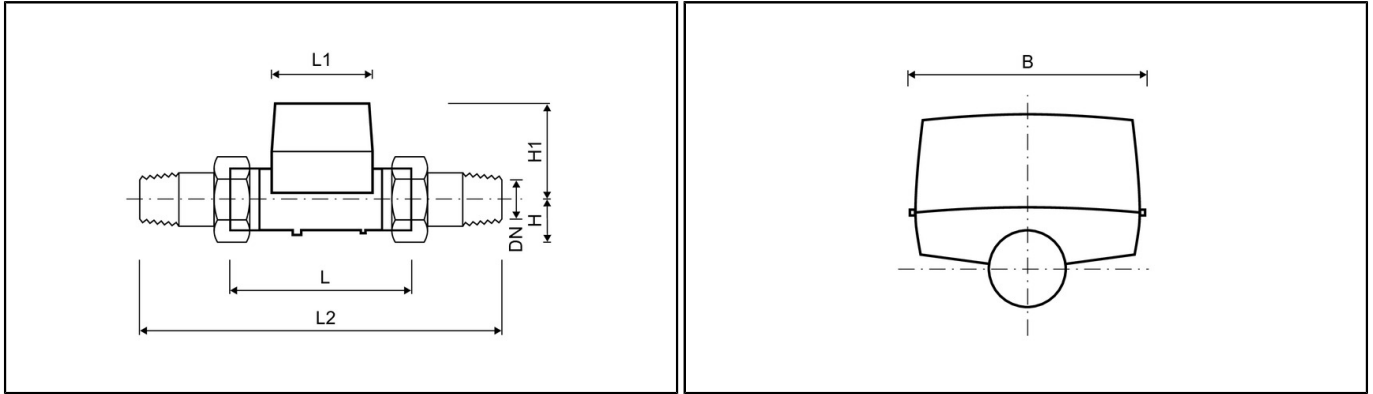
DYNAMIC RANGE (R=Q3/Q1)

DN 15 - 20		
Q ₃ 1.6 m ³ /h - T30	R	160; 400
Q ₃ 1.6 m ³ /h - T50	R	160; 400
Q ₃ 1.6 m ³ /h - T70 / T90	R	160; 400H / 250V
Q ₃ 2.5 m ³ /h - T30	R	160; 400; 800
Q ₃ 2.5 m ³ /h - T50	R	160; 400; 800
Q ₃ 2.5 m ³ /h - T70 / T90	R	160; 400; 800H / 400 V
Q ₃ 4 m ³ /h - T30	R	160; 400; 800 (630 for L 105 mm)
Q ₃ 4 m ³ /h - T50 / T70 / T90	R	160; 400; 800H / 400V (630H for L 105 mm)

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DIMENSIONS



Nominal diameter	DN	mm	15	15	15	15	15	15	20
Permanent flow rate	Q ₃	m ³ /h	1.6	1.6	1.6	2.5	2.5	2.5	2.5
Overall length	L	mm	110	165	170	110	165	170	130
Counter length	L1	mm	89	89	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89	89	89
Overall length with coupling	L2	mm	190	245	250	190	245	250	230
Connection thread on meter		Inch	G ³ / ₄ B	G ³ / ₄ B	G ³ / ₄ B	G ³ / ₄ B	G ³ / ₄ B	G ³ / ₄ B	G1B
Connection thread of coupling		Inch	R ¹ / ₂	R ¹ / ₂	R ¹ / ₂	R ¹ / ₂	R ¹ / ₂	R ¹ / ₂	R ³ / ₄
Height	H1	mm	71	71	71	71	71	71	74
Weight without coupling (approx.)		kg	0.7	0.8	0.8	0.7	0.8	0.8	0.8
Weight with coupling (approx.)		kg	1.1	1.2	1.2	1.1	1.2	1.2	1.2
Height	H	mm	18	18	18	18	18	18	21

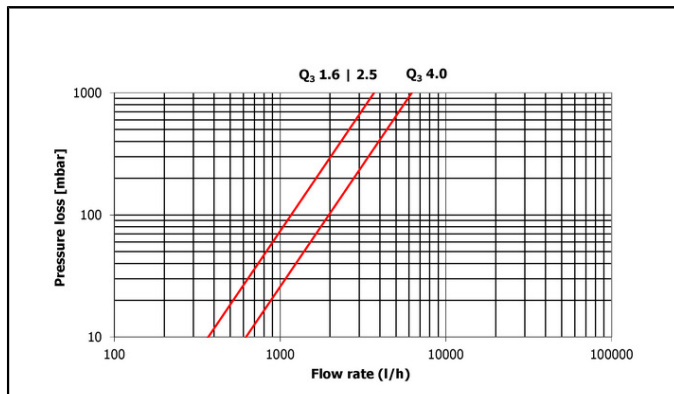
Nominal diameter	DN	mm	20	20	20	20	20	20	20
Permanent flow rate	Q ₃	m ³ /h	2.5	4	4	4	4	4	4
Overall length	L	mm	190	105	130	165	175	190	220
Counter length	L1	mm	89	89	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89	89	89
Overall length with coupling	L2	mm	290	205	230	295	295	290	320
Connection thread on meter		Inch	G1B	G1B	G1B	G1 ¹ / ₄ B	G1 ¹ / ₄ B	G1B	G1B
Connection thread of coupling		Inch	R ³ / ₄	R ³ / ₄ ⁵	R ³ / ₄	R1	R1	R ³ / ₄	R ³ / ₄
Height	H1	mm	74	74	74	74	74	74	74
Weight without coupling (approx.)		kg	0.9	0.8	0.8	1.0	1.0	0.9	1.2
Weight with coupling (approx.)		kg	1.3	1.2	1.2	1.6	1.6	1.3	1.4
Height	H	mm	21	21	21	27	27	21	21

⁵ Wrench size should not be bigger than 38 mm

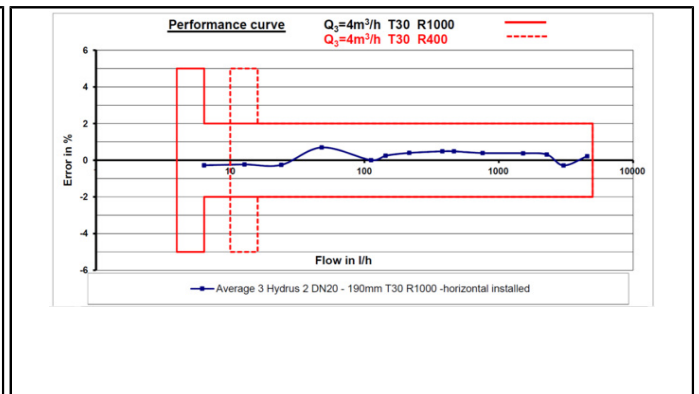
HYDRUS 2.0_{DN 15 - 20}

Ultrasonic Meter

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

HYDRUS 2.0^{DN 25 - 40}

Ultrasonic Meter

TECHNICAL DATA

Nominal diameter	DN	mm	25	25	25	25	25
Permanent flow rate	Q ₃	m ³ /h	6.3	6.3	6.3	6.3	10
Overall length	L	mm	135	150	175	260	150
Dynamic (Q ₃ /Q ₁)	R		400	400	400	400	800
Overload flow rate	Q ₄	m ³ /h	7.87	7.87	7.87	7.87	12.5
Transitional flow rate	Q ₂	l/h	25.2	25.2	25.2	25.2	20
Minimum flow rate	Q ₁	l/h	15.8	15.8	15.8	15.8	12.5
Starting flow rate		l/h	5	5	5	5	5
Pressure loss at Q ₃		bar	0.22	0.22	0.22	0.22	0.54
Pressure loss at Q ₄		bar	0.34	0.34	0.34	0.34	0.84
Maximum flow rate ⁴	Q _{high}	m ³ /h	11.02	11.02	11.02	11.02	17.5
Flow rate at ΔP = 1 bar			13.43	13.43	13.43	13.43	13.43

Nominal diameter	DN	mm	25	25	32	40	40
Permanent flow rate	Q ₃	m ³ /h	10	10	10	16	16
Overall length	L	mm	175	260	260	200	300
Dynamic (Q ₃ /Q ₁)	R		800	800	800	800	800
Overload flow rate	Q ₄	m ³ /h	12.5	12.5	12.5	20	20
Transitional flow rate	Q ₂	l/h	20	20	20	32	32
Minimum flow rate	Q ₁	l/h	12.5	12.5	12.5	20	20
Starting flow rate		l/h	5	5	5	8.7	8.7
Pressure loss at Q ₃		bar	0.54	0.54	0.54	0.5	0.5
Pressure loss at Q ₄		bar	0.84	0.84	0.84	0.78	0.78
Maximum flow rate ⁴	Q _{high}	m ³ /h	17.5	17.5	17.5	28	28
Flow rate at ΔP = 1 bar			13.43	13.43	13.43	22.63	22.63

⁴ Outlet pressure minimum 3 bar, maximum 100 hours per year, closed pipeline network

APPROVAL

DN 25 - 40		
Approval		MID DE-19-MI001-PTB012
Dynamic range (Q ₃ /Q ₁)	R	Up to 800
Standards		ISO 4064, EN 14154, OIML R49
Sanitary conformity		KTW/W270, ACS, WRAS

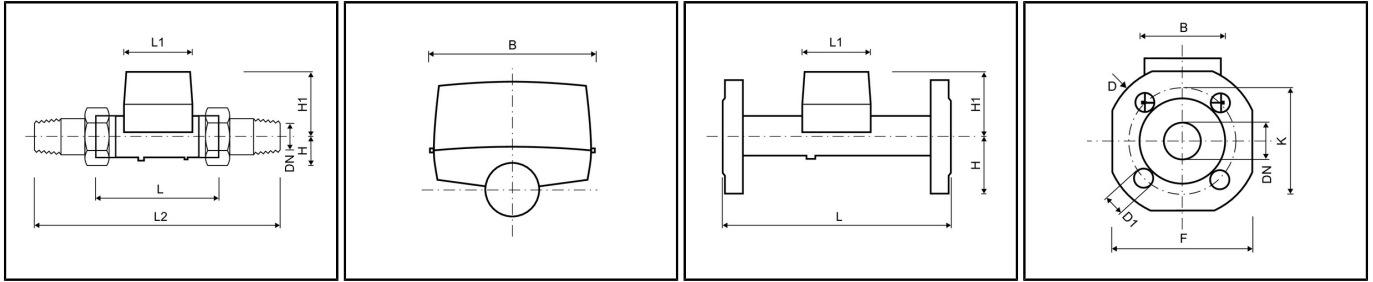
DYNAMIC RANGE (R=Q₃/Q₁)

DN 25 - 40		
Q ₃ 6.3 m ³ /h - T30	R	160; 400
Q ₃ 6.3 m ³ /h - T50 / T70 / T90	R	160; 400H / 250V
Q ₃ 10 m ³ /h - DN 25 - T30	R	160; 400; 800
Q ₃ 10 m ³ /h - DN 25 - T50 / T70 / T90	R	160; 400; 800H / 400V
Q ₃ 10 m ³ /h - DN 32 - T30	R	160; 400; 800
Q ₃ 10 m ³ /h - DN 32 - T50 / T70 / T90	R	160; 400; 800H / 400V
Q ₃ 16 m ³ /h - T30	R	160; 400; 800
Q ₃ 16 m ³ /h - T50 / T70 / T90	R	160; 400; 800H / 400 V

HYDRUS 2.0 DN 25 - 40

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DIMENSIONS



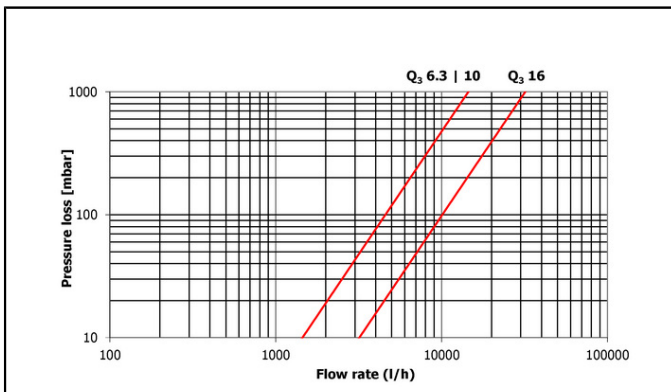
Nominal diameter	DN	mm	25	25	25	25	25
Permanent flow rate	Q ₃	m ³ /h	6.3	6.3	6.3	6.3	10
Overall length	L	mm	135	150	175	260	150
Counter length	L1	mm	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89
DIMENSIONS - THREAD			.	.	.	.	.
Overall length with coupling	L2	mm	255	270	295	380	270
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1
Height	H1	mm	78	78	78	78	78
Weight without coupling (approx.)		kg	1.0	1.0	1.1	1.4	1.0
Weight with coupling (approx.)		kg	1.6	1.6	1.7	2.0	1.6
Height	H	mm	27	27	27	27	27
DIMENSIONS - FLANGE			.	.	.	.	.
Flange diameter	D	mm	-	-	-	115	-
Hole circle diameter	K	mm	-	-	-	85	-
Number of screwholes		pcs	-	-	-	4	-
Screwhole diameter	D1	mm	-	-	-	14	-
Height	H	mm	-	-	-	50	-
Height	H1	mm	-	-	-	84	-
Width	F	mm	-	-	-	100	-
Weight with flanges (approx.)		kg	-	-	-	3.4	-

HYDRUS 2.0^{DN 25 - 40}

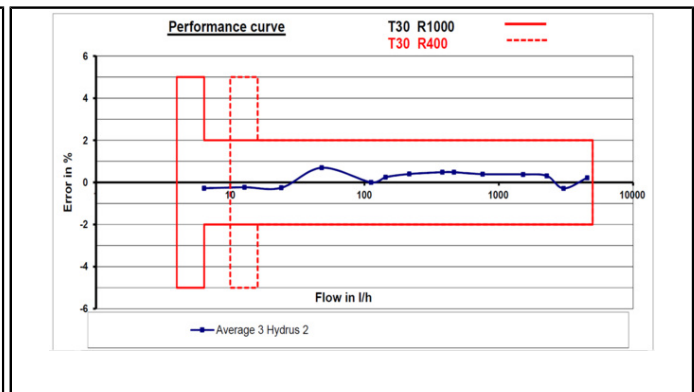
Ultrasonic Meter

Nominal diameter	DN	mm	25	25	32	40	40
Permanent flow rate	Q ₃	m ³ /h	10	10	10	16	16
Overall length	L	mm	175	260	260	200	300
Counter length	L1	mm	89	89	89	96	96
Counter width	B	mm	89	89	89	89	89
DIMENSIONS - THREAD							
Overall length with coupling	L2	mm	295	380	380	340	440
Connection thread on meter		Inch	G1¼B	G1¼B	G1½B	G2B	G2B
Connection thread of coupling		Inch	R1	R1	R1¼	R1½	R1½
Height	H1	mm	78	78	78	82	82
Weight without coupling (approx.)		kg	1.4	1.4	1.5	1.8	2.6
Weight with coupling (approx.)		kg	2.0	2.0	2.1	3.0	3.8
Height	H	mm	27	27	30	36	36
DIMENSIONS - FLANGE							
Flange diameter	D	mm	-	115	140	-	148
Hole circle diameter	K	mm	-	85	100	-	110
Number of screwholes		pcs	-	4	4	-	4
Screwhole diameter	D1	mm	-	14	18	-	18
Height	H	mm	-	50	62.5	-	69
Height	H1	mm	-	84	84	-	87
Width	F	mm	-	100	125	-	138
Weight with flanges (approx.)		kg	-	3.4	4.6	-	6.3

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph