

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, wireless M-Bus, wireless M-Bus/L-Bus/Pulse and Pulse interface
- ▶ Display with error and alarm codes including leakage detection
- ▶ Battery lifetime up to 16 years

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GENERAL

HYDRUS 2.0		
Medium temperature range	°C	0.1 ... 50
Ambient operating temperature	°C	1 ... 70
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 configuration and 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, or one Pulse and one L-Bus output
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

SECURITY

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

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 and some selected data can be sent by radio. 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. The device uses five keys for the protection of values which are sent out by radio.

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VOLUME / PULSE OPEN DRAIN

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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	
Pulse output 2 variants	Flow direction	
Pulse frequency	Max. frequency 10 Hz	

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 PULSE BE	4 wire

HYDRUS 2.0^{DN 15 - 20}

ULTRASONIC METER

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
R standard			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
Kv (ΔP=Q ² /Kv ²)			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	175	190	220	
R standard			800	400	800	800	800	800	
Overload flow rate	Q ₄	m ³ /h	3.125	5	5	5	5	5	
Transitional flow rate	Q ₂	l/h	5	16	8	8	8	8	
Minimum flow rate	Q ₁	l/h	3.13	10	5	5	5	5	
Starting flow rate		l/h	1.4	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	
Pressure loss at Q ₄		bar	0.63	0.86	0.63	0.63	0.63	0.63	
Maximum flow rate ⁴	Q _{high}	m ³ /h	4.37	7	7	7	7	7	
Kv (ΔP=Q ² /Kv ²)			3.95	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

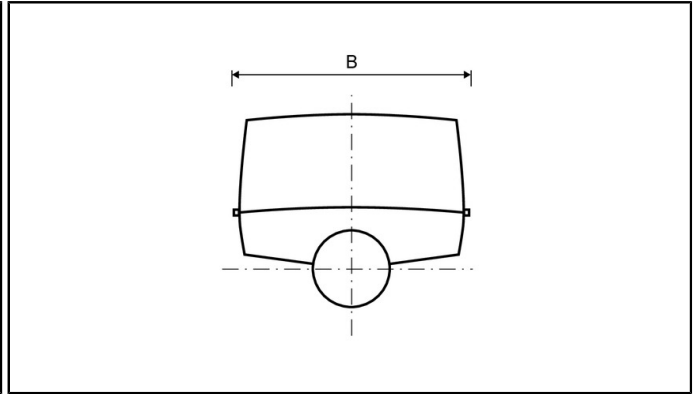
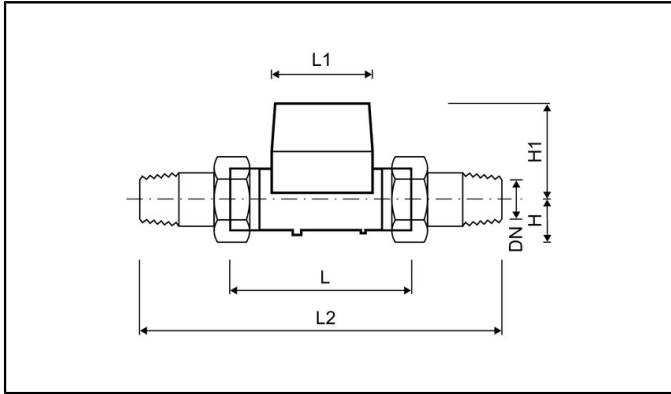
DYNAMIC RANGE (R=Q₃/Q₁)

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 2.5 m ³ /h - T30	R	160 / 400 / 800
Q ₃ 2.5 m ³ /h - T50	R	160 / 400 / 800
Q ₃ 4 m ³ /h - T30	R	160 / 400 / 800
Q ₃ 4 m ³ /h - T50	R	160 / 400 / 800 (horizontal)

HYDRUS 2.0^{DN 15 - 20}

ULTRASONIC METER

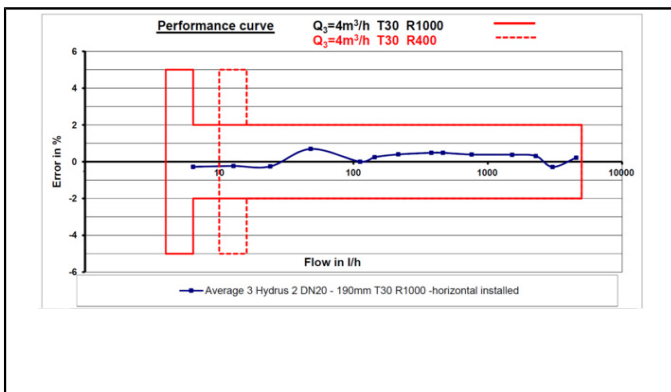
DIMENSIONS



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	175	190	220	
Counter length	L1	mm	89	89	89	89	89	89	
Counter width	B	mm	89	89	89	89	89	89	
Overall length with coupling	L2	mm	290	205	230	295	290	320	
Connection thread on meter		Inch	G1B	G1B	G1B	G1 ¹ / ₄ B	G1B	G1B	
Connection thread of coupling		Inch	R ³ / ₄	R ³ / ₄	R ³ / ₄	R1	R ³ / ₄	R ³ / ₄	
Height	H1	mm	74	74	74	74	74	74	
Weight without coupling (approx.)		kg	0.9	0.8	0.8	1.0	0.9	1.2	
Weight with coupling (approx.)		kg	1.3	1.2	1.2	1.6	1.3	1.4	
Height	H	mm	21	21	21	27	21	21	

TYPICAL ERROR GRAPH



HYDRUS 2.0_{DN 25 - 40}

ULTRASONIC METER

TECHNICAL DATA

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

Nominal diameter	DN	mm	25	32	40	40	40	40
Permanent flow rate	Q ₃	m ³ /h	10	10	10	10	16	16
Overall length	L	mm	260	260	200	300	200	300
R standard			800	800	400	400	800	800
Overload flow rate	Q ₄	m ³ /h	12.5	12.5	12.5	12.5	20	20
Transitional flow rate	Q ₂	l/h	20	20	40	40	32	32
Minimum flow rate	Q ₁	l/h	12.5	12.5	25	25	20	20
Starting flow rate		l/h	5	5	8.7	8.7	8.7	8.7
Pressure loss at Q ₃		bar	0.54	0.54	0.22	0.22	0.5	0.5
Pressure loss at Q ₄		bar	0.84	0.84	0.34	0.34	0.78	0.78
Maximum flow rate ⁴	Q _{high}	m ³ /h	17.5	17.5	17.5	17.5	28	28
Kv (ΔP=Q ² /Kv ²)			13.43	13.43	21.32	21.32	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

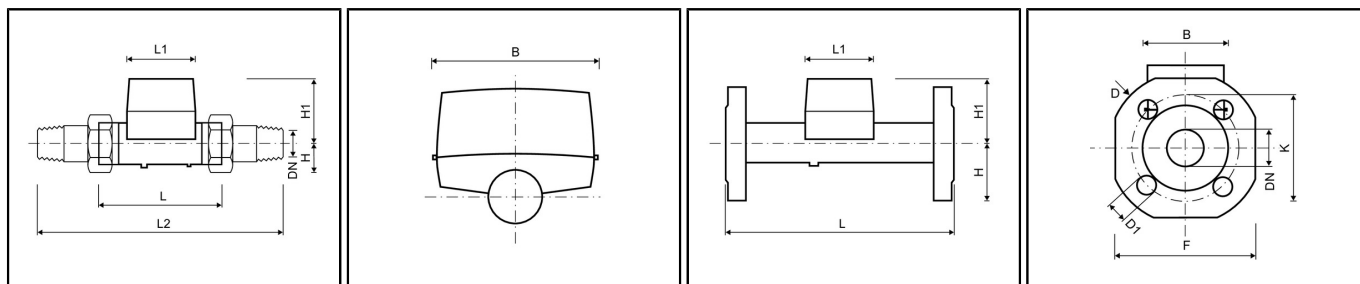
DYNAMIC RANGE (R=Q₃/Q₁)

DN 25 - 40		
Q ₃ 6.3 m ³ /h - T30	R	160 / 400
Q ₃ 6.3 m ³ /h - T50	R	160 / 400 (horizontal)
Q ₃ 10 m ³ /h - DN 25 - T30	R	160 / 400 / 800
Q ₃ 10 m ³ /h - DN 25 - T50	R	160 / 200 / 400 / 800 (horizontal)
Q ₃ 10 m ³ /h - DN 32 - T30	R	160 / 400 / 800
Q ₃ 10 m ³ /h - DN 32 - T50	R	160 / 400 / 800 (horizontal)
Q ₃ 10 m ³ /h - DN 40 - T30	R	160 / 400
Q ₃ 10 m ³ /h - DN 40 - T50	R	160 / 400 (horizontal)
Q ₃ 16 m ³ /h - T30	R	160 / 400 / 800
Q ₃ 16 m ³ /h - T50	R	160 / 400 / 800 (horizontal)

HYDRUS 2.0^{DN 25 - 40}

ULTRASONIC METER

DIMENSIONS



Nominal diameter	DN	mm	25	25	25	25	25	25
Permanent flow rate	Q ₃	m ³ /h	6.3	6.3	6.3	6.3	10	10
Overall length	L	mm	135	150	175	260	150	175
Counter length	L1	mm	89	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89	89
DIMENSIONS - THREAD			.	.	.	.	.	.
Overall length with coupling	L2	mm	255	270	295	380	270	295
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1	R1
Height	H1	mm	78	78	78	78	78	78
Weight without coupling (approx.)		kg	1.0	1.0	1.1	1.4	1.0	1.4
Weight with coupling (approx.)		kg	1.6	1.6	1.7	2.0	1.6	2.0
Height	H	mm	27	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	32	40	40	40	40
Permanent flow rate	Q ₃	m ³ /h	10	10	10	10	16	16
Overall length	L	mm	260	260	200	300	200	300
Counter length	L1	mm	89	89	96	96	96	96
Counter width	B	mm	89	89	89	89	89	89
DIMENSIONS - THREAD								
Overall length with coupling	L2	mm	380	380	340	440	340	440
Connection thread on meter		Inch	G1¼B	G1½B	G2B	G2B	G2B	G2B
Connection thread of coupling		Inch	R1	R1¼	R1½	R1½	R1½	R1½
Height	H1	mm	78	78	82	82	82	82
Weight without coupling (approx.)		kg	1.4	1.5	1.8	2.6	1.8	2.6
Weight with coupling (approx.)		kg	2.0	2.1	3.0	3.8	3.0	3.8
Height	H	mm	27	30	36	36	36	36
DIMENSIONS - FLANGE								
Flange diameter	D	mm	115	140	-	148	-	148
Hole circle diameter	K	mm	85	100	-	110	-	110
Number of screwholes		pcs	4	4	-	4	-	4
Screwhole diameter	D1	mm	14	18	-	18	-	18
Height	H	mm	50	62.5	-	69	-	69
Height	H1	mm	84	84	-	87	-	87
Width	F	mm	100	125	-	138	-	138
Weight with flanges (approx.)		kg	3.4	4.6	-	6.3	-	6.3

TYPICAL ERROR GRAPH

