

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 (AoC DEU, 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 50 threads
- ▶ MID approved with dynamic range up to R 800
- ▶ IP 68 suitable for outdoor installations
- ▶ Integrated communication based on OMS specifications
- ▶ Wireless M-Bus for mobile reading in parallel to Fixed Network
- ▶ mioty®4OMS for OMS Generation 5 Fixed Network
- ▶ OMS over LoRaWAN® for LoRaWAN Fixed Network
- ▶ M-Bus/Pulse/Pulse, wireless M-Bus, wireless M-Bus along with L-Bus/Pulse
- ▶ Display with error and alarm codes including leakage detection
- ▶ Battery lifetime up to 16 years
- ▶ U0 / D0, no need for calming sections

HYDRUS 2.0

ULTRASONIC METER

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)
Environmental class	O (Outdoors)
Mechanical environmental class	M2
Electromagnetic environmental class	E2
Housing material	With thread connection: CW724R (lead-free); with flange connection: CC770S
Nominal pressure	PN bar 16
Power supply	Two 3.6 VDC lithium batteries
Battery lifetime T30 ¹ /T50 ¹	Up to 16 years
Battery lifetime T70 ¹ /T90 ¹	Up to 16 years
Communication interfaces	Optical, OMS Generation 5 (mioty®4OMS) 868 MHz, OMS Generation 3/4 wireless M-Bus 434/868 MHz, M-Bus, L-Bus and Pulse, LoRaWAN® 868 MHz, mioty® for Metering 434/868 MHz
Data storage	For errors, alarms and measuring values, data logging capabilities to record up to 1024 daily values +32 monthly values and two annual due dates
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 50	Volume (m ³ + 3 decimal places) and flow rate (m ³ /h + 3 decimal places)
Unit displayed DN50 (only for DMFR)	Volume (m ³ + 2 digits after decimal point) and flow rate (m ³ /h + 3 digits after decimal point)
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 - billing value indication - and more display loop options to choose from.

INTERFACES - OVERVIEW

HYDRUS 2.0	
Optical	For switching the display loop and configuring / reading the meter via IZAR@MOBILE
Wireless M-Bus	434 or 868 MHz, OMS Generation 3/4, OMS radio as standard for mobile reading (R3) sent every 14 / 64 seconds (default) and wireless M-Bus for fixed network (R4/R4+) sent every 5 / 15 / 60 minutes
mioty®4OMS	868 MHz, OMS Generation 5, OMS as standard for mobile reading (R3) sent every 64 seconds (default) and mioty®4OMS for fixed network sent every 60 minutes
mioty® for Metering	434 or 868 MHz, OMS Generation 3/4, OMS radio as standard for mobile reading (R3) sent every 64 seconds (default) and mioty® for Metering for fixed network (L1C) sent every 60 minutes
LoRaWAN®	868 MHz - OMS over LoRaWAN® for fixed network sent every 3 h / 5 h / 6 h (default) and OMS for mobile reading (R3) sent every 64s (default); Complies to v1.0.3, certified to v1.0.2, Class A, supports Adaptive data rate (ADR) and Over The Air (OTA) activation
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

HYDRUS 2.0

ULTRASONIC METER

SECURITY

HYDRUS 2.0	
Wireless M-Bus	OMS Generation 4 Profile B, individual keys (default) / OMS Generation 3 (selectable)
mioty®4OMS	OMS Generation 4 Profile B, individual keys (default)
mioty® for Metering	OMS Generation 4 Profile B, individual keys (default) / OMS Generation 3 (selectable)
LoRaWAN®	Fixed Network uses internal LoRaWAN® transport encryption; Mobile Network uses OMS Generation 4 Profile B Individual keys

PRIVACY

The HYDRUS 2.0 stores internally historical consumption values. The logging data is only available by local reading with IZAR@MOBILE. Optical and radio communication implements encryption and authentication according to OMS Specification and LoRaWAN® specification.

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	50 - 125 ms

POSSIBLE COMMUNICATION INTERFACES

HYDRUS 2.0	
Wireless M-Bus/Pulse/L-Bus	3 wire
Wireless M-Bus only	without wire
mioty®4OMS and OMS Radio	without wire
LoRaWAN® and OMS radio	without wire
M-Bus only	2 wire
M-Bus/Pulse/Pulse	5 wire
Pulse/Pulse	3 wire
IZAR BE PULSE	4 wire
Line for DMFR only	With IZAR BE PULSE completely soldered to HYDRUS 2 to put a radio clip-on module (LoRaWAN, Wize, OMS)

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) - (CAS no.: 7439-92-1)
- Lead titanium zirconium oxide (CAS no.: 12626-81-2)

HYDRUS 2.0 DN 15 - 20

ULTRASONIC METER

TECHNICAL DATA

Nominal diameter	DN	mm	15	15 ³	15	15	20
Permanent flow rate	Q ₃	m ³ /h	2.5	2.5	2.5	2.5	2.5
Overall length	L	mm	110	115	165	170	130
Dynamic (Q ₃ /Q ₁)	R		800	800	800	800	800
Overload flow rate	Q ₄	m ³ /h	3.125	3.125	3.125	3.125	3.125
Transitional flow rate	Q ₂	l/h	5	5	5	5	5
Minimum flow rate	Q ₁	l/h	3.13	3.13	3.13	3.13	3.13
Starting flow rate		l/h	1.4	1.4	1.4	1.4	1.4
Pressure loss at Q ₃		bar	0.46	0.46	0.46	0.46	0.4
Pressure loss at Q ₄		bar	0.72	0.72	0.72	0.72	0.63
Maximum flow rate ²	Q _{high}	m ³ /h	4.37	4.37	4.37	4.37	4.37
Flow rate at ΔP = 1 bar			3.69	3.69	3.69	3.69	3.95

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

² Outlet pressure minimum 3 bar, maximum 100 hours per year, closed pipeline network

³ Please see table DIMENSIONS

APPROVAL

DN 15 - 20		
Approval		MID DE-19-MI001-PTB012
Dynamic range (Q ₃ /Q ₁)	R	Up to 800
Standards		EN 4064, EN 14154, OIML R49
Sanitary conformity		AoC DEU, ACS, WRAS, Belgaqua, KIWA Netherlands, OTH, PZH, SVGW
OMS Certification		OMS Generation 4
LoRaWAN® certification		1.0.2

DYNAMIC RANGE (R=Q₃/Q₁)

DN 15 - 20		
Q ₃ 1.6 m ³ /h - T30 / T50	R	400
Q ₃ 1.6 m ³ /h - T70 / T90	R	400H; 250V
Q ₃ 2.5 m ³ /h - T30 / T50	R	160; 800 (400 for L 115 mm)
Q ₃ 2.5 m ³ /h - T70 / T90	R	160; 400; 800H / 400 V (250 for L 115 mm)
Q ₃ 4 m ³ /h - T30	R	160; 400; 800 (630 for L 105 mm and 115 mm)
Q ₃ 4 m ³ /h - T50 / T70 / T90	R	160; 400; 800H / 400V (630H for L 105 mm and 115 mm)

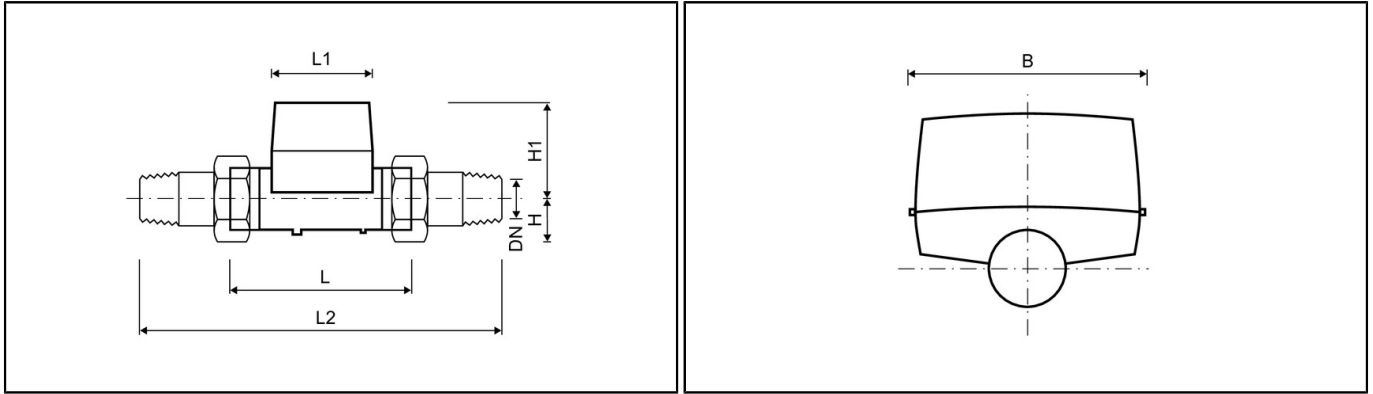
H=horizontal installation position / V=vertical installation position

Other values on request

HYDRUS 2.0 DN 15 - 20

ULTRASONIC METER

DIMENSIONS



Nominal diameter	DN	mm	15	15 ³	15	15	20
Permanent flow rate	Q ₃	m ³ /h	2.5	2.5	2.5	2.5	2.5
Overall length	L	mm	110	115	165	170	130
Housing			brass/composite	brass/composite	brass/composite	brass/composite	brass
Counter length	L1	mm	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89
Body (DMFR only)			brass/composite	brass/composite	brass/composite	brass/composite	brass
Overall length with coupling	L2	mm	190	195	245	250	230
Connection thread on meter		Inch	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 ³ / ₄
Height	H1	mm	71	71	71	71	74
Weight without coupling (approx.)		kg	0.7 / 0.5	0.7 / 0.5	0.8 / 0.6	0.8 / 0.6	0.8
Weight with coupling (approx.)		kg	1.1 / 0.9	1.1 / 0.9	1.2 / 1.0	1.2 / 1.0	1.2
Height	H	mm	18	18	18	18	21
Nominal diameter	DN	mm	20	20	20	20	
Permanent flow rate	Q ₃	m ³ /h	2.5	4	4	4	
Overall length	L	mm	190	130	165	190	
Housing			brass/composite	brass	brass	brass/composite	
Counter length	L1	mm	89	89	89	89	
Counter width	B	mm	89	89	89	89	
Body (DMFR only)			brass/composite	brass	brass	brass/composite	
Overall length with coupling	L2	mm	290	230	295	290	
Connection thread on meter		Inch	G1B	G1B	G1 ¹ / ₄ B	G1B	
Connection thread of coupling		Inch	R ³ / ₄	R ³ / ₄	R1	R ³ / ₄	
Height	H1	mm	74	74	74	74	
Weight without coupling (approx.)		kg	0.9 / 0.6	0.8	1.0	0.9 / 0.6	
Weight with coupling (approx.)		kg	1.3 / 1.0	1.2	1.6	1.3 / 1.0	
Height	H	mm	21	21	27	21	

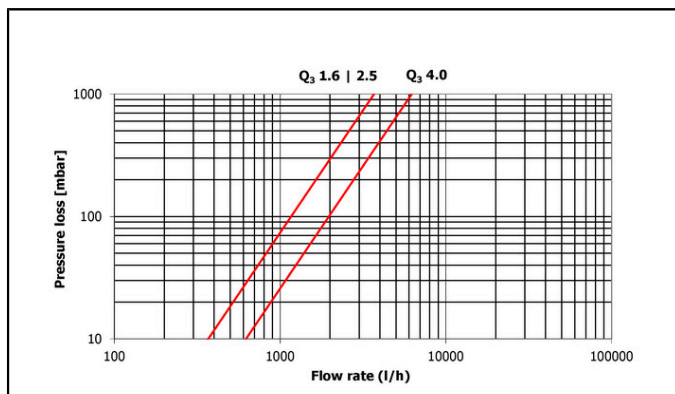
³ Further version with connection thread on meter inlet G7/8B and meter outlet G3/4B on request.

⁴ Wrench size should not be bigger than 38 mm

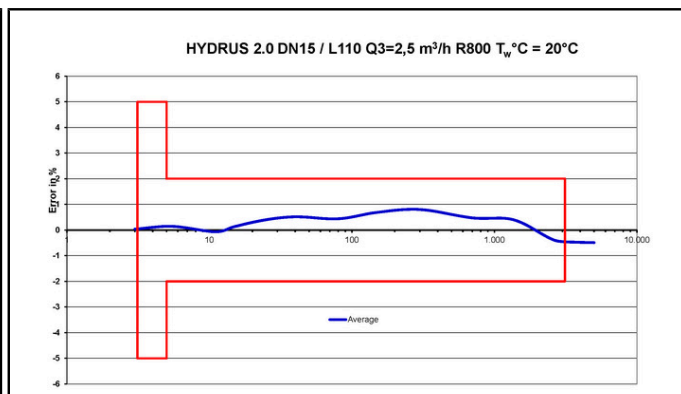
HYDRUS 2.0 DN 15 - 20

ULTRASONIC METER

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

HYDRUS 2.0 DN 25 - 50

ULTRASONIC METER

TECHNICAL DATA

Nominal diameter	DN	mm	25	25	32	40	40	40
Permanent flow rate	Q ₃	m ³ /h	6.3	10	10	10	10	16
Overall length	L	mm	260	260	260	200	300	200
Dynamic (Q ₃ /Q ₁)	R		400	800	800	400	400	800
Overload flow rate	Q ₄	m ³ /h	7.87	12.5	12.5	12.5	12.5	20
Transitional flow rate	Q ₂	l/h	25.2	20	20	40	40	32
Minimum flow rate	Q ₁	l/h	15.8	12.5	12.5	25	25	20
Starting flow rate		l/h	5	5	5	8.7	8.7	8.7
Pressure loss at Q ₃		bar	0.22	0.54	0.33	0.22	0.22	0.2
Pressure loss at Q ₄		bar	0.34	0.84	0.53	0.34	0.34	0.31
Maximum flow rate ²	Q _{high}	m ³ /h	11.02	17.5	17.5	17.5	17.5	28
Flow rate at ΔP = 1 bar			13.43	13.43	10.95	21.32	21.32	36.0

Nominal diameter	DN	mm	40	50	50	50	50
Permanent flow rate	Q ₃	m ³ /h	16	16	16	25	25
Overall length	L	mm	300	270	300	270	300
Dynamic (Q ₃ /Q ₁)	R		800	250	250	400	400
Overload flow rate	Q ₄	m ³ /h	20	20	20	31.25	31.25
Transitional flow rate	Q ₂	l/h	32	102	102	100	100
Minimum flow rate	Q ₁	l/h	20	64	64	62.5	62.5
Starting flow rate		l/h	8.7	25	25	25	25
Pressure loss at Q ₃		bar	0.2	0.14	0.14	0.33	0.33
Pressure loss at Q ₄		bar	0.31	0.22	0.22	0.52	0.52
Maximum flow rate ²	Q _{high}	m ³ /h	28	32.13	32.13	32.13	32.13
Flow rate at ΔP = 1 bar			36.0	44.0	44.0	44.0	44.0

² Outlet pressure minimum 3 bar, maximum 100 hours per year, closed pipeline network

APPROVAL

DN 25 - 50		
Approval		MID DE-19-MI001-PTB012
Dynamic range (Q ₃ /Q ₁)	R	Up to 800
Standards		EN 4064, EN 14154, OIML R49
Sanitary conformity		AoC DEU, ACS, WRAS, Belgaqua, KIWA Netherlands, OTH, PZH, SVGW
OMS Certification		OMS Generation 4
LoRaWAN® certification		1.0.2

DYNAMIC RANGE (R=Q3/Q1)

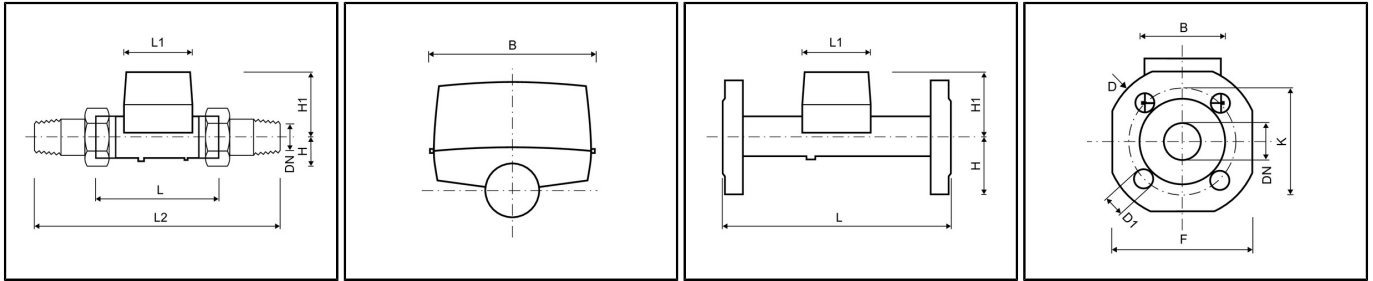
DN 25 - 50		
Q ₃ 6.3 m ³ /h - T30	R	160; 400
Q ₃ 6.3 m ³ /h - T50 / T70 / T90	R	160; 400H / 250V
Q ₃ 10 m ³ /h - DN 25, DN 32 - T30	R	160; 400; 800
Q ₃ 10 m ³ /h - DN 25, DN 32 - T50 / T70 / T90	R	160; 400; 800H / 400V
Q ₃ 16 m ³ /h - DN 40 - T30	R	160; 400; 800
Q ₃ 16 m ³ /h - DN 40 - T50 / T70 / T90	R	160; 400; 800H / 400 V
Q ₃ 16 m ³ /h - DN 50	R	250
Q ₃ 25 m ³ /h - DN 50	R	400

HYDRUS 2.0 DN 25 - 50

ULTRASONIC METER

H=horizontal installation position / V=vertical installation position
Other values on request

DIMENSIONS



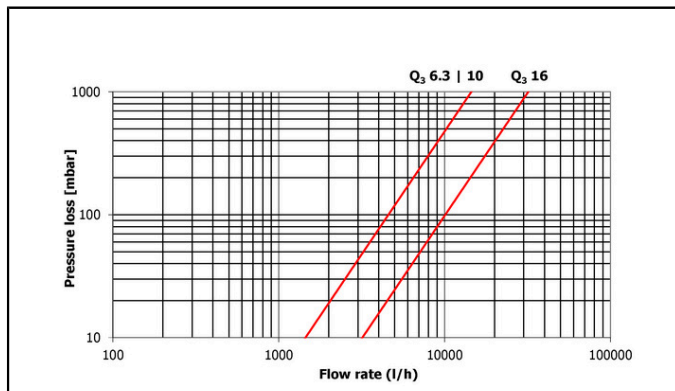
Nominal diameter	DN	mm	25	25	32	40	40	40
Permanent flow rate	Q ₃	m ³ /h	6.3	10	10	10	10	16
Overall length	L	mm	260	260	260	200	300	200
Counter length	L1	mm	89	89	89	96	96	96
Counter width	B	mm	89	89	89	89	89	89
Body (DMFR only)			brass	brass	brass	brass	brass	brass
DIMENSIONS - THREAD								
Overall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

HYDRUS 2.0 DN 25 - 50

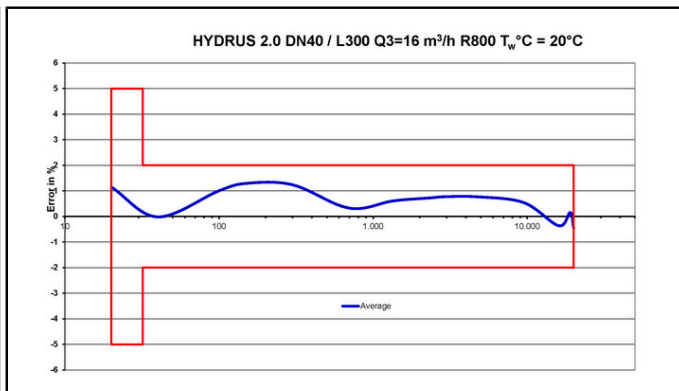
ULTRASONIC METER

Nominal diameter	DN	mm	40	50	50	50	50
Permanent flow rate	Q ₃	m ³ /h	16	16	16	25	25
Overall length	L	mm	300	270	300	270	300
Counter length	L1	mm	96	92	92	92	92
Counter width	B	mm	89	94	94	94	94
Body (DMFR only)			brass	brass	brass	brass	brass
DIMENSIONS - THREAD			.	.	.	.	.
Overall length with coupling	L2	mm	440	390	420	390	420
Connection thread on meter		Inch	G2B	G2½B	G2½B	G2½B	G2½B
Connection thread of coupling		Inch	R1½	R2	R2	R2	R2
Height	H1	mm	82	90	90	90	90
Weight without coupling (approx.)		kg	2.6	3.9	4.05	3.9	4.05
Weight with coupling (approx.)		kg	3.8	5.5	5.65	5.5	5.65
Height	H	mm	36	41	41	41	41
DIMENSIONS - FLANGE			.	.	.	.	.
Flange diameter	D	mm	148	-	-	-	-
Hole circle diameter	K	mm	110	-	-	-	-
Number of screwholes		pcs	4	-	-	-	-
Screwhole diameter	D1	mm	18	-	-	-	-
Height	H	mm	69	-	-	-	-
Height	H1	mm	87	-	-	-	-
Width	F	mm	138	-	-	-	-
Weight with flanges (approx.)		kg	6.3	-	-	-	-

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph