

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. The integrated LoRaWAN® communication enables private or public operated fixed network reading.

FEATURES

- ▶ DN 15 to 50
- ▶ MID approved with dynamic range up to R 800
- ▶ IP 68 suitable for outdoor installations
- ▶ Integrated radio communication based on Open Metering telegram
- ▶ OMS over LoRaWAN® for fixed Network with wM-Bus for mobile network
- ▶ M-Bus/Pulse/Pulse, wM-Bus, wM-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

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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)	
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 wM-Bus / Long range radio (R4, R4+, mioty [®] for Metering) 434 or 868 MHz, M-Bus, L-Bus and Pulse, LoRaWAN [®] 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	
wM-Bus (R3)		434 or 868 MHz, Open Metering radio as standard (R3) for mobile reading sent every 14 / 64 seconds (default)	
Long range radio R4 / R4+ / mioty [®] for Metering		434 or 868 MHz, OMS for fixed network sent every 5 / 15 / 60 minutes	
LoRaWAN [®]		868 MHz - OMS over LoRaWAN [®] for fixed network sent every 3 h / 5 h / 6 h (default) and OMS wM-Bus for mobile network sent every 64s (default); Complies to v1.0.3, certified to v1.0.2, Class A, supports Adaptive data rate (ADR)	
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	

SECURITY

		HYDRUS 2.0	
wM-Bus (R3), R4, R4+, mioty [®] for Metering		OMS Generation 3 or OMS Generation 4 Profile B, selectable	
LoRaWAN [®]		Fixed Network uses internal LoRaWAN [®] transport encryption; Mobile Network uses OMS Generation 4 Profile B Individual keys	

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PRIVACY

The HYDRUS 2.0 saves 1024 consumption values with a daily interval. This data can be read locally and accessed only by using the IZAR@MOBILE. 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 (not available with radio meters with C1 mobile mode or LoRaWAN®/C2) or 4, Profile B security level. Both, the radio protocol and the optical interface are encrypted by default.

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	
wM-Bus/Pulse/L-Bus	3 wire
wM-Bus only	without wire
R4 / R4+ / mioty® for Metering	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)

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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
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)

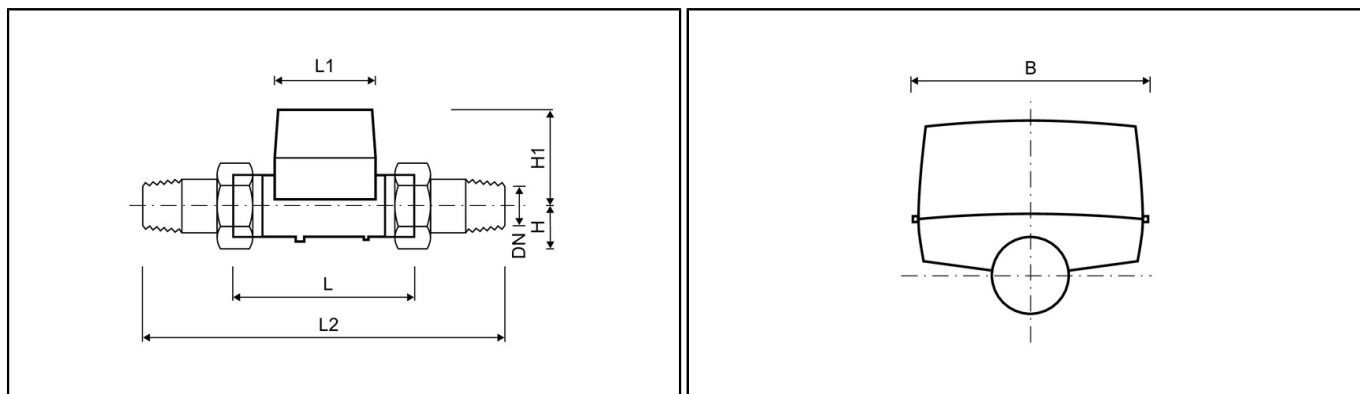
H=horizontal installation position / V=vertical installation position

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

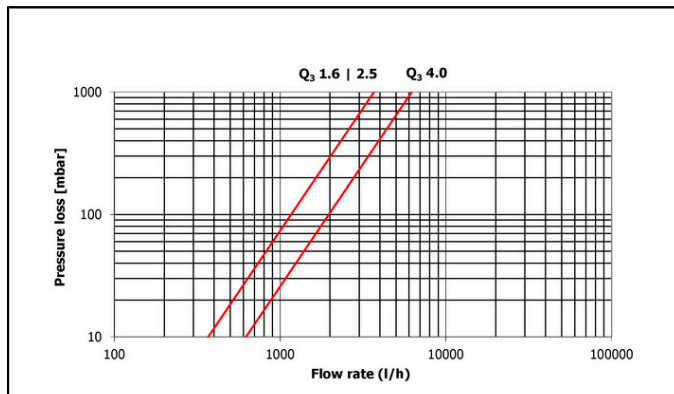
³ Further version with connection thread on meter inlet G7/8B and meter outlet G3/4B on request.

⁴ Wrench size should not be bigger than 38 mm

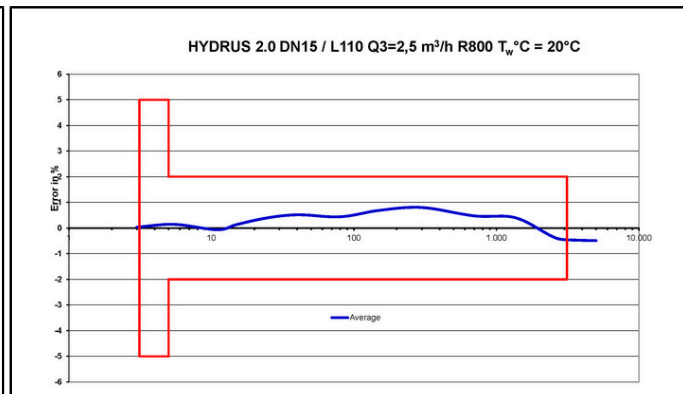
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PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

HYDRUS 2.0 DN 25 - 50

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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
LoRaWAN® certification	1.0.2

DYNAMIC RANGE (R=Q3/Q1)

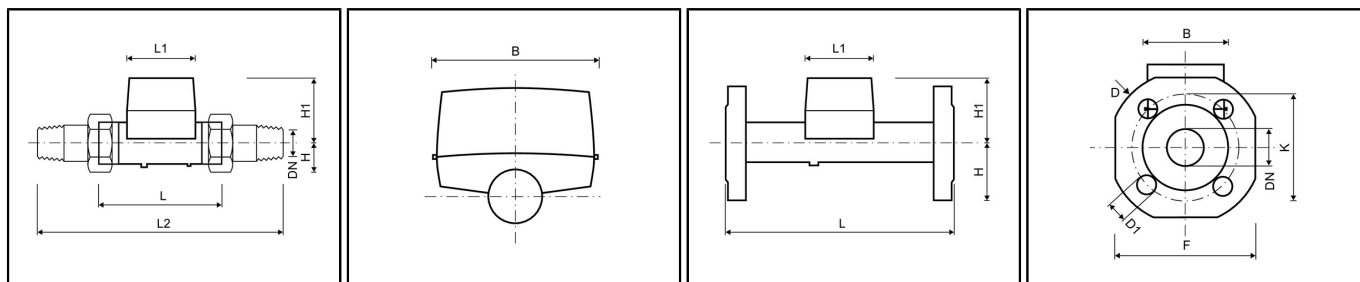
DN 25 - 50		
Q ₃ 6.3 m ³ /h - T30	R	160; 400
Q ₃ 6.3 m ³ /h - T50 / T70 / T90	R	160; 400H / 250V
Q ₃ 10 m ³ /h - DN 25, DN 32 - T30	R	160; 400; 800
Q ₃ 10 m ³ /h - DN 25, DN 32 - T50 / T70 / T90	R	160; 400; 800H / 400V
Q ₃ 16 m ³ /h - DN 40 - T30	R	160; 400; 800
Q ₃ 16 m ³ /h - DN 40 - T50 / T70 / T90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

H=horizontal installation position / V=vertical installation position

HYDRUS 2.0 DN 25 - 50

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DIMENSIONS



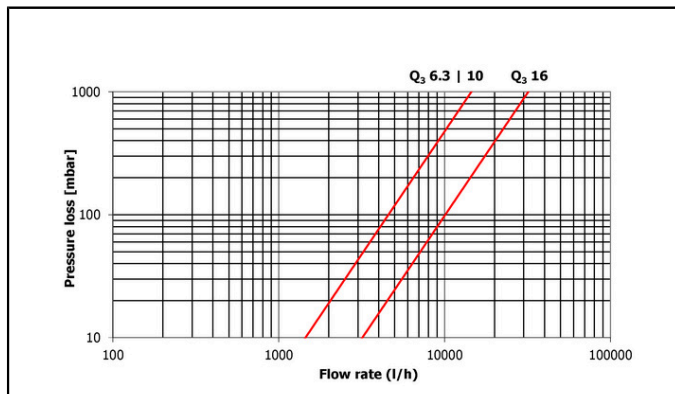
Nominal diameter	DN	mm	25	25	32	40	40	40
Permanent flow rate	Q ₃	m ³ /h	6.3	10	10	10	10	16
Overall length	L	mm	260	260	260	200	300	200
Counter length	L1	mm	89	89	89	96	96	96
Counter width	B	mm	89	89	89	89	89	89
Body (DMFR only)			brass	brass	brass	brass	brass	brass
DIMENSIONS - THREAD								
Overall 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

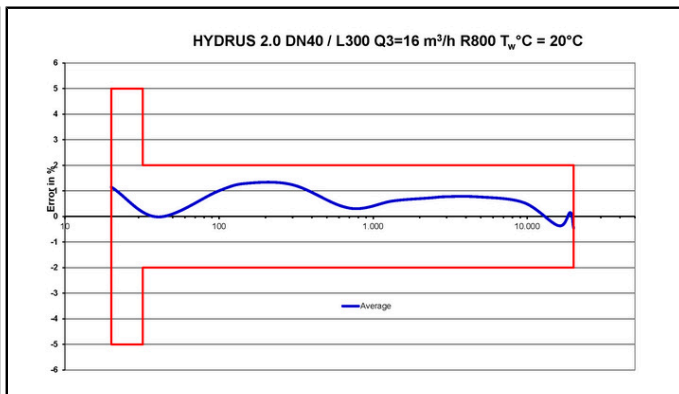
ULTRASONIC METER

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