

# 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.

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 Generation 3 or 4, Profile B)
- ▶ LoRaWAN® communication (Fixed Network) and OMS radio as a back-up mode
- ▶ 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)	
Environmental class	O (Outdoors)		
Mechanical environmental class	M2		
Electromagnetic environmental class	E2		
Nominal pressure	PN	bar	16
Power supply	Two 3.6 VDC lithium batteries		
Battery lifetime T30 <sup>1</sup> /T50 <sup>1</sup>	Up to 16 years		
Battery lifetime T70 <sup>1</sup> /T90 <sup>1</sup>	Up to 16 years		
Communication interfaces	Optical, OMS wireless M-Bus 434 or 868 MHz, M-Bus, L-Bus and Pulse, LoRaWAN <sup>®</sup> 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		

<sup>1</sup> 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 <sup>3</sup> + 3 decimal places) and flow rate (m <sup>3</sup> /h + 3 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 - 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 434 or 868 MHz, Open Metering radio as standard (R3) for mobile reading sent every 14 / 64 seconds, long range radio frame (R4 / R4+ / mioty <sup>®</sup> for Metering) for fixed network sent every 5 / 15 / 60 minutes, LoRaWAN <sup>®</sup> long range radio frame for fixed network sent every 6h (basics) / 3h (advanced) default configuration
Radio	2400 baud, cable length 1.5 m, power supply only via built-in battery - can be combined with two Pulse outputs
M-Bus	In combination with radio, cable length 1.5 m (only one interface communicating at the same time)
L-Bus	
Pulse (Open drain)	Two Pulse outputs, or one Pulse and one L-Bus output, Pulse cable length 1.5 m

### SECURITY

HYDRUS 2.0	
Versions	OMS Generation 3 or OMS Generation 4, Profile B, selectable
LoRaWAN <sup>®</sup>	Certified according to the standard 1.0.2

### 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 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		50 - 125 ms

### LORAWAN® CHARACTERISTICS

HYDRUS 2.0		
Class		A
Certificate		1.0.2
Frequency	MHz	868
Spreading factor		adaptive data rate

### 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
LoRaWAN® and OMS radio		without 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) - (CAS no.: 7439-92-1)
- Lead titanium zirconium oxide (CAS no.: 12626-81-2)

### SUSTAINABILITY:

An important aspect of our business is to reduce our impact on climate change, and we therefore strive to minimize our carbon footprint.

Carbon footprint (expressed in kg CO<sub>2</sub> eq) for:

- DN 15/110 - Radio 434 MHz: 9.17
- DN 15/110 - M-Bus: 9.21
- DN 20/190 - Radio 434 MHz & Pulse: 10.1
- DN 20/190 - Radio 868 MHz & Pulse: 10.3
- DN 20/190 - Radio 868 MHz: 10.3
- DN 20/190 - M-Bus: 10.1
- DN 20/190 - Pulse: 9.92
- DN 25/260 - Radio 868 MHz: 11.9
- DN 25/260 - M-Bus: 12.1
- DN 40/300 - Radio 868 MHz: 16.5
- DN 40/300 - M-Bus: 16.1

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These data are taken from the Life Cycle Assessment (LCA) that was conducted to evaluate the environmental effects of the product over its entire life cycle.

Please note that an Environmental Product Declaration (EPD) is available on the Customer Portal for the above mentioned versions.

We at Diehl Metering feel responsible for our products until their end of life. You will find the End-of-Life Card on the Customer Portal in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE) for the following version:

- HYDRUS 2.0 Domestic

Want to know more? Please get in touch with your Sales Representative.

# HYDRUS 2.0 DN 15 - 20

## ULTRASONIC METER

### TECHNICAL DATA

Nominal diameter	DN	mm	15	15	20	20	20	20	20	20
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	2.5	2.5	2.5	2.5	4	4	4	4
Overall length	L	mm	110	165	130	190	105	130	165	190
Dynamic (Q <sub>3</sub> /Q <sub>1</sub> )	R		800	800	800	800	400	800	800	800
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	3.125	3.125	3.125	3.125	5	5	5	5
Transitional flow rate	Q <sub>2</sub>	l/h	5	5	5	5	16	8	8	8
Minimum flow rate	Q <sub>1</sub>	l/h	3.13	3.13	3.13	3.13	10	5	5	5
Starting flow rate		l/h	1.4	1.4	1.4	1.4	3.0	2.5	2.5	2.5
Pressure loss at Q <sub>3</sub>		bar	0.46	0.46	0.4	0.4	0.55	0.4	0.4	0.4
Pressure loss at Q <sub>4</sub>		bar	0.72	0.72	0.63	0.63	0.86	0.63	0.63	0.63
Maximum flow rate <sup>2</sup>	Q <sub>high</sub>	m <sup>3</sup> /h	4.37	4.37	4.37	4.37	7	7	7	7
Flow rate at ΔP = 1 bar			3.69	3.69	3.95	3.95	5.39	5.39	5.39	5.39

<sup>2</sup> Outlet pressure minimum 3 bar, maximum 100 hours per year, closed pipeline network

<sup>3</sup> Please see table DIMENSIONS

### APPROVAL

DN 15 - 20	
Approval	MID DE-19-MI001-PTB012
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> )	R Up to 800
Standards	EN 4064, EN 14154, OIML R49
Sanitary conformity	KTW/W270, ACS, WRAS, Belgaqua, KIWA Netherlands, OTH, PZH, SVGW
LoRaWAN <sup>®</sup> certification	1.0.2

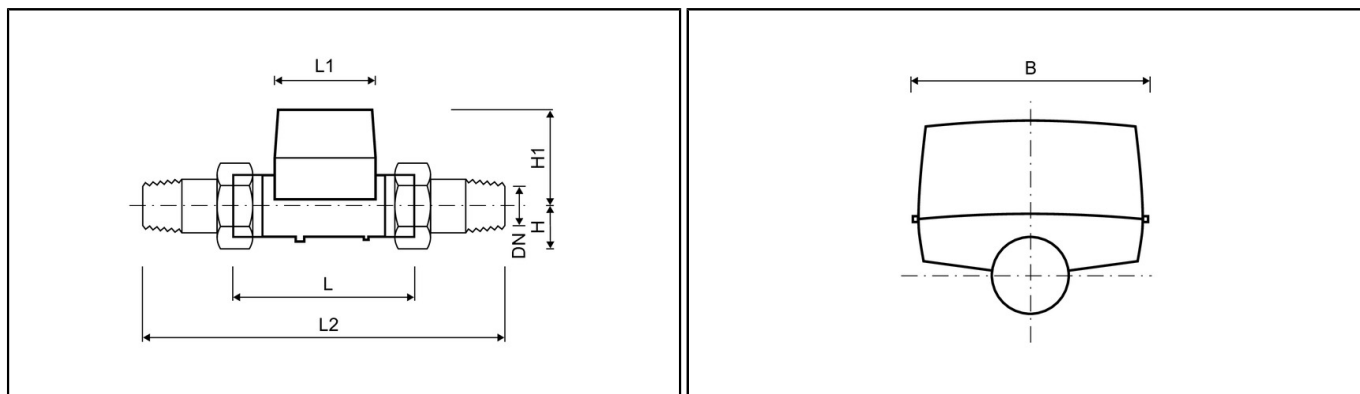
### DYNAMIC RANGE (R=Q<sub>3</sub>/Q<sub>1</sub>)

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

# HYDRUS 2.0 DN 15 - 20

## ULTRASONIC METER

### DIMENSIONS

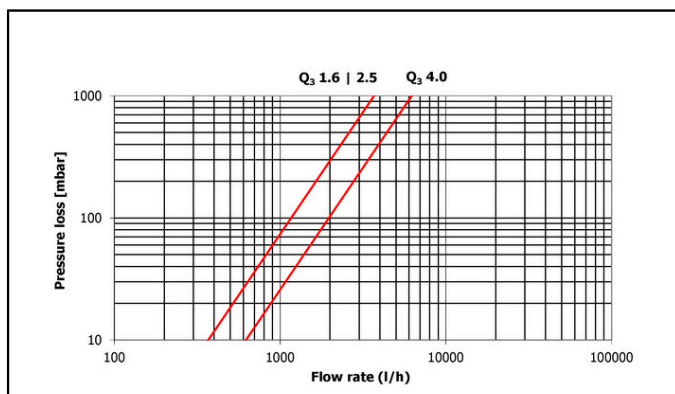


Nominal diameter	DN	mm	15	15	20	20	20	20	20	20
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	2.5	2.5	2.5	2.5	4	4	4	4
Overall length	L	mm	110	165	130	190	105	130	165	190
Counter length	L1	mm	89	89	89	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89	89	89	89
Overall length with coupling	L2	mm	190	245	230	290	205	230	295	290
Connection thread on meter		Inch	G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B	G1B	G1B	G1B	G1B	G1 <sup>1</sup> / <sub>4</sub> B	G1B
Connection thread of coupling		Inch	R <sup>1</sup> / <sub>2</sub>	R <sup>1</sup> / <sub>2</sub>	R <sup>3</sup> / <sub>4</sub>	R <sup>3</sup> / <sub>4</sub>	R <sup>3</sup> / <sub>4</sub> <sup>4</sup>	R <sup>3</sup> / <sub>4</sub>	R1	R <sup>3</sup> / <sub>4</sub>
Height	H1	mm	71	71	74	74	74	74	74	74
Weight without coupling (approx.)		kg	0.7	0.8	0.8	0.9	0.8	0.8	1.0	0.9
Weight with coupling (approx.)		kg	1.1	1.2	1.2	1.3	1.2	1.2	1.6	1.3
Height	H	mm	18	18	21	21	21	21	27	21

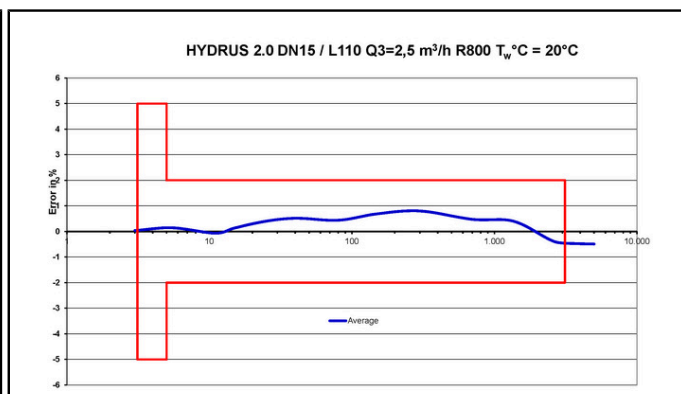
<sup>3</sup> Further version with connection thread on meter inlet G7/8B and meter outlet G3/4B on request.

<sup>4</sup> Wrench size should not be bigger than 38 mm

### 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	25	25	25	32	40
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	6.3	6.3	6.3	10	10	10	10
Overall length	L	mm	135	150	260	150	260	260	200
Dynamic (Q <sub>3</sub> /Q <sub>1</sub> )	R		400	400	400	800	800	800	400
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	7.87	7.87	7.87	12.5	12.5	12.5	12.5
Transitional flow rate	Q <sub>2</sub>	l/h	25.2	25.2	25.2	20	20	20	40
Minimum flow rate	Q <sub>1</sub>	l/h	15.8	15.8	15.8	12.5	12.5	12.5	25
Starting flow rate		l/h	5	5	5	5	5	5	8.7
Pressure loss at Q <sub>3</sub>		bar	0.22	0.22	0.22	0.54	0.54	0.54	0.22
Pressure loss at Q <sub>4</sub>		bar	0.34	0.34	0.34	0.84	0.84	0.84	0.34
Maximum flow rate <sup>2</sup>	Q <sub>high</sub>	m <sup>3</sup> /h	11.02	11.02	11.02	17.5	17.5	17.5	17.5
Flow rate at ΔP = 1 bar			13.43	13.43	13.43	13.43	13.43	13.43	21.32

Nominal diameter	DN	mm	40	40	40	50	50	50	50
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	10	16	16	16	16	25	25
Overall length	L	mm	300	200	300	270	300	270	300
Dynamic (Q <sub>3</sub> /Q <sub>1</sub> )	R		400	800	800	250	250	400	400
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	12.5	20	20	20	20	31.25	31.25
Transitional flow rate	Q <sub>2</sub>	l/h	40	32	32	102	102	100	100
Minimum flow rate	Q <sub>1</sub>	l/h	25	20	20	64	64	62.5	62.5
Starting flow rate		l/h	8.7	8.7	8.7	25	25	25	25
Pressure loss at Q <sub>3</sub>		bar	0.22	0.2	0.2	0.14	0.14	0.33	0.33
Pressure loss at Q <sub>4</sub>		bar	0.34	0.31	0.31	0.22	0.22	0.52	0.52
Maximum flow rate <sup>2</sup>	Q <sub>high</sub>	m <sup>3</sup> /h	17.5	28	28	32.13	32.13	32.13	32.13
Flow rate at ΔP = 1 bar			21.32	36.0	36.0	44.0	44.0	44.0	44.0

<sup>2</sup> 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 <sub>3</sub> /Q <sub>1</sub> )	R Up to 800
Standards	EN 4064, EN 14154, OIML R49
Sanitary conformity	KTW/W270, ACS, WRAS, Belgaqua, KIWA Netherlands, OTH, PZH, SVGW
LoRaWAN® certification	1.0.2

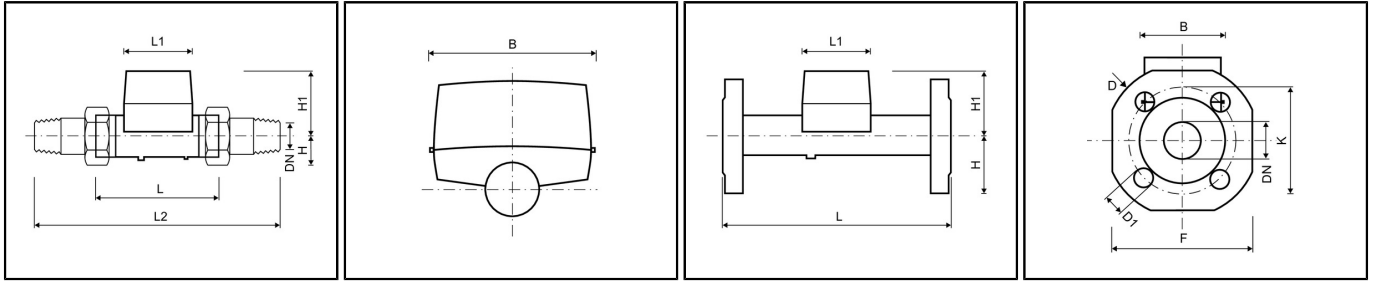
### DYNAMIC RANGE (R=Q<sub>3</sub>/Q<sub>1</sub>)

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

# HYDRUS 2.0 DN 25 - 50

## ULTRASONIC METER

### DIMENSIONS



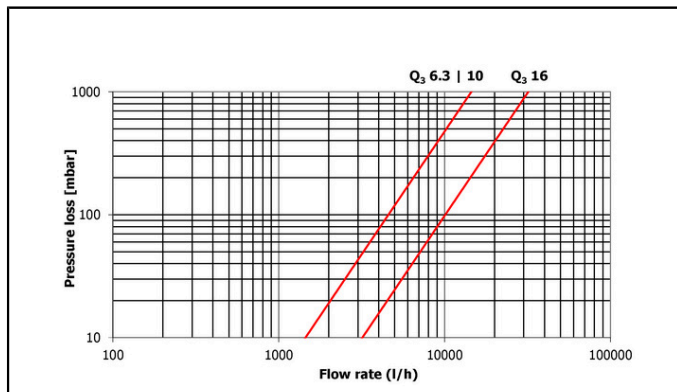
Nominal diameter	DN	mm	25	25	25	25	25	32	40
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	6.3	6.3	6.3	10	10	10	10
Overall length	L	mm	135	150	260	150	260	260	200
Counter length	L1	mm	89	89	89	89	89	89	96
Counter width	B	mm	89	89	89	89	89	89	89
DIMENSIONS - THREAD									
Overall length with coupling	L2	mm	255	270	380	270	380	380	340
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B	G1½B	G2B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1	R1¼	R1½
Height	H1	mm	78	78	78	78	78	78	82
Weight without coupling (approx.)		kg	1.0	1.0	1.4	1.0	1.4	1.5	1.8
Weight with coupling (approx.)		kg	1.6	1.6	2.0	1.6	2.0	2.1	3.0
Height	H	mm	27	27	27	27	27	30	36
DIMENSIONS - FLANGE									
Flange diameter	D	mm	-	-	115	-	115	140	-
Hole circle diameter	K	mm	-	-	85	-	85	100	-
Number of screwholes		pcs	-	-	4	-	4	4	-
Screwhole diameter	D1	mm	-	-	14	-	14	18	-
Height	H	mm	-	-	50	-	50	62.5	-
Height	H1	mm	-	-	84	-	84	84	-
Width	F	mm	-	-	100	-	100	125	-
Weight with flanges (approx.)		kg	-	-	3.4	-	3.4	4.6	-
Nominal diameter	DN	mm	40	40	40	50	50	50	50
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	10	16	16	16	16	25	25
Overall length	L	mm	300	200	300	270	300	270	300
Counter length	L1	mm	96	96	96	92	92	92	92
Counter width	B	mm	89	89	89	94	94	94	94
DIMENSIONS - THREAD									
Overall length with coupling	L2	mm	440	340	440	390	420	390	420
Connection thread on meter		Inch	G2B	G2B	G2B	G2½B	G2½B	G2½B	G2½B
Connection thread of coupling		Inch	R1½	R1½	R1½	R2	R2	R2	R2
Height	H1	mm	82	82	82	90	90	90	90
Weight without coupling (approx.)		kg	2.6	1.8	2.6	3.9	4.05	3.9	4.05
Weight with coupling (approx.)		kg	3.8	3.0	3.8	5.5	5.65	5.5	5.65
Height	H	mm	36	36	36	41	41	41	41
DIMENSIONS - FLANGE									
Flange diameter	D	mm	148	-	148	-	-	-	-
Hole circle diameter	K	mm	110	-	110	-	-	-	-
Number of screwholes		pcs	4	-	4	-	-	-	-
Screwhole diameter	D1	mm	18	-	18	-	-	-	-
Height	H	mm	69	-	69	-	-	-	-
Height	H1	mm	87	-	87	-	-	-	-
Width	F	mm	138	-	138	-	-	-	-
Weight with flanges (approx.)		kg	6.3	-	6.3	-	-	-	-

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 Subject to technical adjustments

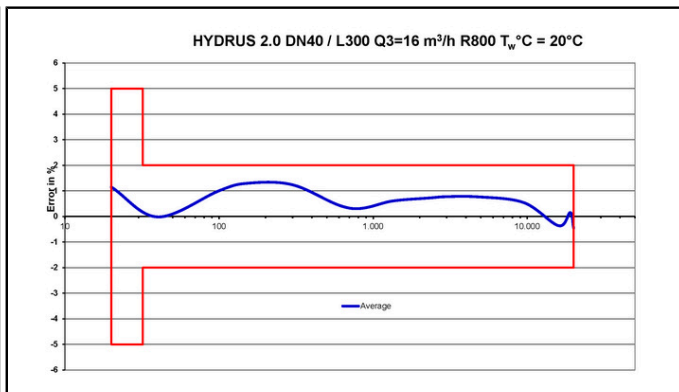
# HYDRUS 2.0 DN 25 - 50

## ULTRASONIC METER

### PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph