HYDRUS 2.0 RESIDENTIAL

ULTRASONIC METER

DIEHL
Metering

APPLICATION

HYDRUS 2.0 RESIDENTIAL is a static water meter operating on ultrasonic measuring
technology. This technology enables accurate calculation of water consumption with long-term stability and eliminates measuring deviations caused by sand, suspended particles, scale or air pockets. Moreover it does not require any earthing.
Developed within the framework of the MID, HYDRUS 2.0 RESIDENTIAL complies with
the European regulations and holds sanitary conformity certificates (ACS, WRAS, BELGAQUA, DM174 and others). The meter is also designed for cold and hot water.
Its integrated radio enables remote reading of the meter's index and alarms both in mobile (walk-by, drive-by, passive drive-by) and fixed network mode.
HYDRUS 2.0 RESIDENTIAL offers a wide choice of connectivities compatible with the
different IZAR reading modes.
A complete Diehl Metering solution is thus available to meet your needs.

FEATURES

- DN 15 to 50
- MID approval up to R=800
- IP 68
- OMS radio, Wired M-Bus/Pulse x2, OMS radio/L-Bus/Pulse, Pulse x2, Remote radio with IZAR BE PULSE
- Display with symbols and error codes

smart in solutions

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- Alarm functions
- Battery lifetime up to 16 years
- U0 / D0, no calming section needed

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GENERAL

			HYDRUS 2.0 RESIDENTIAL
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			2x 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 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 1024 daily values +32 monthly values and two annual due dates
Protection class			IP 68

[1] Theorical lifetime, 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 RESIDENTIAL
Display indication	LCD, 9-digit, additional symbols/display counter/unit
Units displayed DN 15 - DN 50	Volume (m³ + 3 digits after decimal point) and flow rate (m³/h + 3 digits after decimal point)
Values displayed	Display test - volume - battery lifetime - firmware version - software checksum - flow rate - current/continuous/historical error - alarm status - high resolution volume - due date - due date volume - reverse volume - flow direction - display counter - low battery indication - leakage indication - metrological log access - radio signal ON/OFF - alarm indication - billing symbol

COMMUNICATION INTERFACES

	HYDRUS 2.0 RESIDENTIAL
Optical	For switching the display menu, reading and configuration with IZAR@MOBILE
Radio	434 or 868 MHz, Open Metering Standard (OMS) radio frame (short frame) for mobile reading sent every 14 seconds, long range radio frame for fixed network sent every 15 minutes
M-Bus	2,400 baud, cable length 1.5 m*, power supply only via built-in battery
L-Bus	Only active when radio is deactivated
Pulse (Open drain)	1 or 2 pulse outputs with cable length 1.5 m*, Pulse output soldered with IZAR BE PULSE cable lenght 1.5m*

*May vary by up to ± 3.5% due to manufacturing tolerances.

SECURITY

	HYDRUS 2.0 RESIDENTIAL
Versions	OMS Generation 3 - Profile A or OMS Generation 4 - Profile B

PRIVACY

The HYDRUS 2.0 RESIDENTIAL saves 512 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. Both the radio protocol and the optical interface are encrypted by default.

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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	1 / 10 (depending on nominal diameter)
Configuration pulse output 1		Total volume or forward volume
Configuration pulse output 2		Flow direction, error, reverse volume or forward volume
Pulse frequency		Max. frequency 10 Hz
Pulse width		50 - 125 ms

AVAILABLE VERSIONS

	HYDRUS 2.0 RESIDENTIAL
OMS radio + Pulse / L-Bus + Pulse	3 wires - radio and forward volume on pulse output / 3 wires - L-Bus and forward volume on pulse output
Wired M-Bus + Pulses x2	5 wires - forward volume on pulse output 1 and reverse volume on pulse output 2
Pulses x2	4 wires - total volume on pulse output 1 and direction on pulse output 2 with fraud
Remote radio with IZAR BE PULSE	With IZAR BE PULSE completly soldered to HYDRUS 2 to put a radio clip-on module (LoRaWAN, Sigfox, 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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HYDRUS 2.0 RESIDENTIAL DN 15 - 20

ULTRASONIC METER

TECHNICAL DATA

Nominal diameter	DN	mm						
Permanent flow rate	Q_3	m^3/h		1.6	1.6	2.5	2.5	2.5
Overall length	L	mm		165	170	110	115	165
Dynamic (Q_3/Q_1)	R			400	400	800	800	800
Overload flow rate	Q_4	m^3/h		2	2	3.125	3.125	3.125
Transitional flow rate	Q_2	l/h		6.4	6.4	5	5	5
Minimum flow rate	Q_1	l/h		4	4	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		0.19	0.19	0.46	0.46	0.46
Pressure loss at Q_4		bar		0.3	0.3	0.72	0.72	0.72
Maximum flow rate[2]	Q_{high}	m³/h		2.8	2.8	4.37	4.37	4.37
Flow rate at ΔP = 1 bar				3.67	3.67	3.69	3.69	3.69

Nominal diameter	DN	mm	15	20	20	20	20	20
Permanent flow rate	Q_3	m^3/h	2.5	2.5	2.5	2.5	4	4
Overall length	L	mm	170	115	130	190	105	115
Dynamic (Q_3/Q_1)	R		800	400	800	800	400	630
Overload flow rate	Q_4	m^3/h	3.125	3.125	3.125	3.125	5	5
Transitional flow rate	Q_2	l/h	5	10	5	5	16	10
Minimum flow rate	Q_1	l/h	3.13	6.25	3.13	3.13	10	6.3
Starting flow rate		l/h	1.4	1.4	1.4	1.4	3.0	3.0
Pressure loss at Q_3		bar	0.46	0.4	0.4	0.4	0.55	0.55
Pressure loss at Q_4		bar	0.72	0.63	0.63	0.63	0.86	0.86
Maximum flow rate[2]	Q_{high}	m³/h	4.37	4.37	4.37	4.37	7	7
Flow rate at ΔP = 1 bar			3.69	3.95	3.95	3.95	5.39	5.39

Nominal diameter	DN	mm	20	20	20	20	20	
Permanent flow rate	Q_3	m^3/h	4	4	4	4	4	
Overall length	L	mm	130	165	175	190	220	
Dynamic (Q_3/Q_1)	R		800	800	800	800	800	
Overload flow rate	Q_4	m^3/h	5	5	5	5	5	
Transitional flow rate	Q_2	l/h	8	8	8	8	8	
Minimum flow rate	Q_1	l/h	5	5	5	5	5	
Starting flow rate		l/h	2.5	2.5	2.5	2.5	2.5	
Pressure loss at Q_3		bar	0.4	0.4	0.4	0.4	0.4	
Pressure loss at Q_4		bar	0.63	0.63	0.63	0.63	0.63	
Maximum flow rate[2]	Q_{high}	m³/h	7	7	7	7	7	
Flow rate at ΔP = 1 bar			5.39	5.39	5.39	5.39	5.39	

[2] Outlet pressure minimum 3 bars, maximum 100 hours per year, closed pipeline network
[3] Please see table DIMENSIONS
Other on request

APPROVAL

		DN 15 - 20
Approval		MID DE-19-MI001-PTB012 | UK/0126/0326
Dynamic range (Q_3/Q_1)	R	Up to R=800
Standards		ISO 4064 | EN 14154 | OIML R49
Sanitary conformity		ACS | WRAS | DM174 | BELGAQUA | KTW / W270

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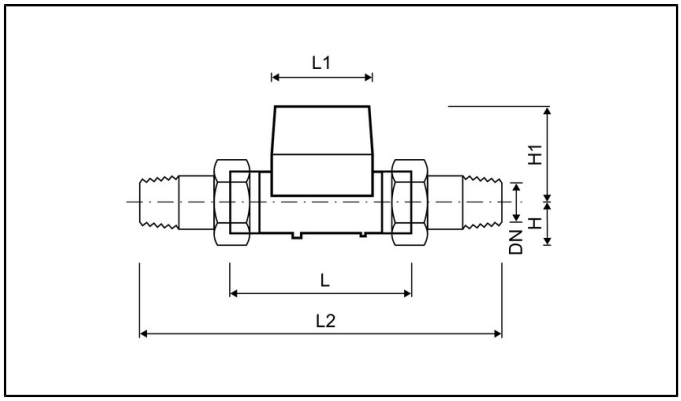
ULTRASONIC METER

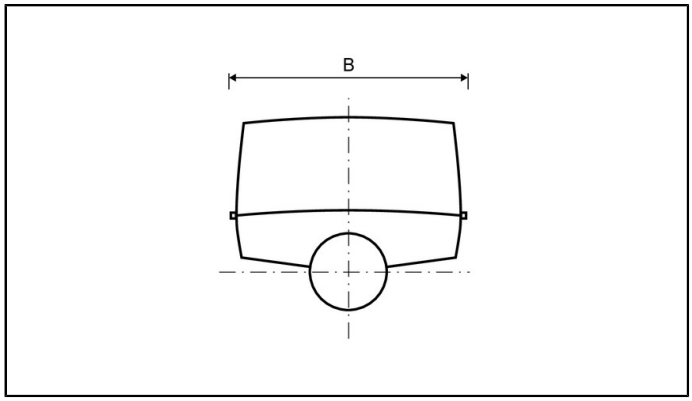
DYNAMIC RANGE (R=Q3/Q1)

		DN 15 - 20
Q_3 2.5 m³/h - T30 / T50	R	800
Q_3 2.5 m³/h - T70 / T90	R	800H / 400V
Q_3 4 m³/h - T30	R	800
Q_3 4 m³/h - T50 / T70 / T90	R	800H / 400V

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

DIMENSIONS





Nominal diameter	DN	mm	15	15	15	15[3]	15
Permanent flow rate	Q_3	m³/h	1.6	1.6	2.5	2.5	2.5
Overall length	L	mm	165	170	110	115	165
Counter length	L1	mm	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89
Overall length with coupling	L2	mm	245	250	190	195	245
Connection thread on meter		Inch	G¾B	G¾B	G¾B	G¾B	G¾B
Connection thread of coupling		Inch	R½	R½	R½	R½	R½
Height	H1	mm	71	71	71	71	71
Weight without coupling (approx.)		kg	0.8	0.8	0.7	0.7	0.8
Weight with coupling (approx.)		kg	1.2	1.2	1.1	1.1	1.2
Height	H	mm	18	18	18	18	18

Nominal diameter	DN	mm	15	20	20	20	20	20
Permanent flow rate	Q_3	m³/h	2.5	2.5	2.5	2.5	4	4
Overall length	L	mm	170	115	130	190	105	115
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	250	215	230	290	205	215
Connection thread on meter		Inch	G¾B	G1B	G1B	G1B	G1B	G1B
Connection thread of coupling		Inch	R½	R¾	R¾	R¾	R¾[4]	R¾[4]
Height	H1	mm	71	74	74	74	74	74
Weight without coupling (approx.)		kg	0.8	0.8	0.8	0.9	0.8	0.8
Weight with coupling (approx.)		kg	1.2	1.2	1.2	1.3	1.2	1.2
Height	H	mm	18	21	21	21	21	21

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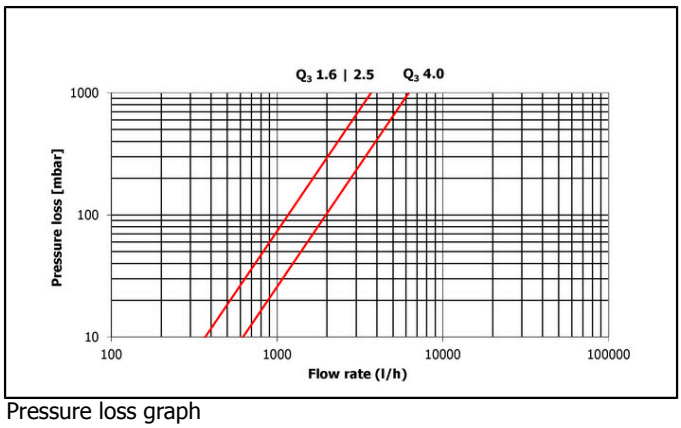
ULTRASONIC METER

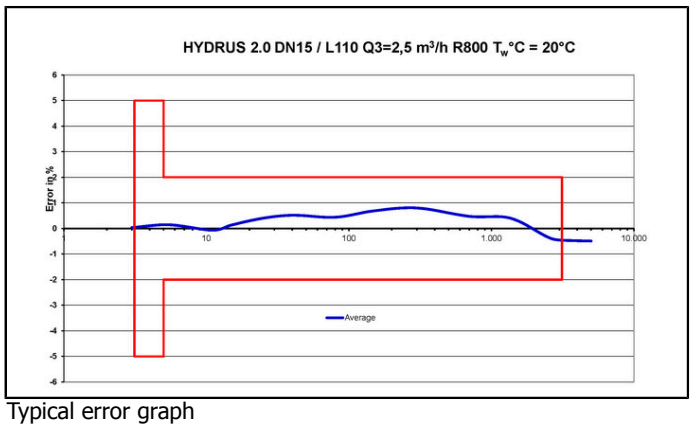
Nominal diameter	DN	mm	20	20	20	20	20
Permanent flow rate	Q_3	m^3/h	4	4	4	4	4
Overall length	L	mm	130	165	175	190	220
Counter length	L1	mm	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89
Overall length with coupling	L2	mm	230	295	295	290	320
Connection thread on meter		Inch	G1B	G1 B	G1¼B	G1B	G1B
Connection thread of coupling		Inch	R¾	R1	R1	R¾	R¾
Height	H1	mm	74	74	74	74	74
Weight without coupling (approx.)		kg	0.8	1.0	1.0	0.9	1.2
Weight with coupling (approx.)		kg	1.2	1.6	1.6	1.3	1.4
Height	H	mm	21	27	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

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

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HYDRUS 2.0 RESIDENTIAL DN 25 - 50

ULTRASONIC METER

TECHNICAL DATA

Nominal diameter	DN	mm	25	25	25	25	25	25	25
Permanent flow rate	Q_3	m^3/h	6.3	6.3	6.3	6.3	10	10	10
Overall length	L	mm	135	150	175	260	150	175	260
Dynamic (Q_3/Q_1)	R		400	400	400	400	800	800	800
Overload flow rate	Q_4	m^3/h	7.87	7.87	7.87	7.87	12.5	12.5	12.5
Transitional flow rate	Q_2	l/h	25.2	25.2	25.2	25.2	20	20	20
Minimum flow rate	Q_1	l/h	15.8	15.8	15.8	15.8	12.5	12.5	12.5
Starting flow rate		l/h	5	5	5	5	5	5	5
Pressure loss at Q_3		bar	0.22	0.22	0.22	0.22	0.54	0.54	0.54
Pressure loss at Q_4		bar	0.34	0.34	0.34	0.34	0.84	0.84	0.84
Maximum flow rate[2]	Q_{high}	m^3/h	11.02	11.02	11.02	11.02	17.5	17.5	17.5
Flow rate at ΔP = 1 bar			13.43	13.43	13.43	13.43	13.43	13.43	13.43

Nominal diameter	DN	mm	32	40	40	50	50	50	50
Permanent flow rate	Q_3	m^3/h	10	16	16	16	16	25	25
Overall length	L	mm	260	200	300	270	300	270	300
Dynamic (Q_3/Q_1)	R		800	800	800	250	250	400	400
Overload flow rate	Q_4	m^3/h	12.5	20	20	20	20	31.25	31.25
Transitional flow rate	Q_2	l/h	20	32	32	102	102	100	100
Minimum flow rate	Q_1	l/h	12.5	20	20	64	64	62.5	62.5
Starting flow rate		l/h	5	8.7	8.7	25	25	25	25
Pressure loss at Q_3		bar	0.54	0.5	0.5	0.1	0.1	0.25	0.25
Pressure loss at Q_4		bar	0.84	0.78	0.78	0.19	0.19	0.45	0.45
Maximum flow rate[2]	Q_{high}	m^3/h	17.5	28	28	32.13	32.13	32.13	32.13
Flow rate at ΔP = 1 bar			13.43	22.63	22.63	46.0	46.0	46.0	46.0

[2] Outlet pressure minimum 3 bars, maximum 100 hours per year, closed pipeline network
Other on request

APPROVAL

		DN 25 - 50
Approval		MID DE-19-MI001-PTB012
Dynamic range (Q_3/Q_1)	R	Up to R=800
Standards		EN 4064, EN 14154, OIML R49
Sanitary conformity		KTW/W270, ACS, WRAS, Belgaqua, KIWA Netherlands, OTH, PZH, SVGW

DYNAMIC RANGE (R=Q3/Q1)

		DN 25 - 50
Q_3 6.3 m^3/h - T30	R	400
Q_3 6.3 m^3/h - T50 / T70 / T90	R	400H / 250V
Q_3 10 m^3/h - T30	R	800
Q_3 10 m^3/h - T50 / T70 / T90	R	800H / 400V
Q_3 16 m^3/h - T30	R	800
Q_3 16 m^3/h - T50 / T70 / T90	R	800H / 400V
Q_3 16 m^3/h - DN 50 - T30 / T50 / T70 / T90	R	250
Q_3 25 m^3/h - DN 50 - T30 / T50 / T70 / T90	R	400

H=horizontal installation position / V=vertical installation position

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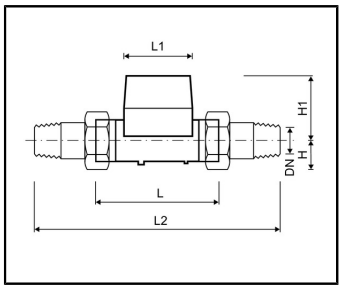
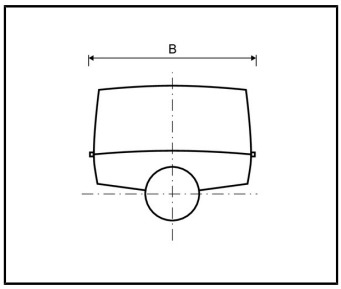
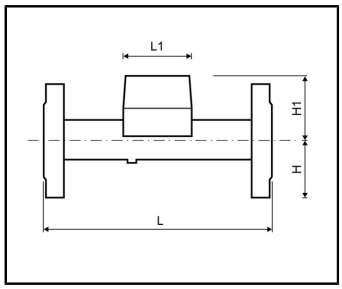
HYDRUS 2.0 RESIDENTIAL DN 25 - 50

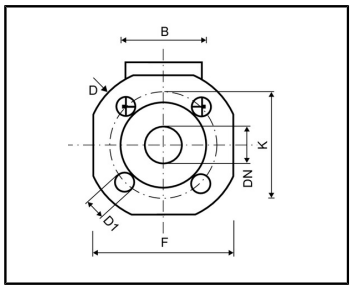
ULTRASONIC METER

DIMENSIONS









Nominal diameter	DN	mm	25	25	25	25	25	25	25
Permanent flow rate	Q_3	m^3/h	6.3	6.3	6.3	6.3	10	10	10
Overall length	L	mm	135	150	175	260	150	175	260
Counter length	L1	mm	89	89	89	89	89	89	89
Counter width	B	mm	89	89	89	89	89	89	89
DIMENSIONS - THREAD			.	.	.	.	.	.	.
Overall length with coupling	L2	mm	255	270	295	380	270	295	380
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B	G1¼B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1	R1	R1
Height	H1	mm	78	78	78	78	78	78	78
Weight without coupling (approx.)		kg	1.0	1.0	1.1	1.4	1.0	1.4	1.4
Weight with coupling (approx.)		kg	1.6	1.6	1.7	2.0	1.6	2.0	2.0
Height	H	mm	27	27	27	27	27	27	27
DIMENSIONS - FLANGE			.	.	.	.	.	.	.
Flange diameter	D	mm	-	-	-	115	-	-	115
Hole circle diameter	K	mm	-	-	-	85	-	-	85
Number of screwholes		pcs	-	-	-	4	-	-	4
Screwhole diameter	D1	mm	-	-	-	14	-	-	14
Height	H	mm	-	-	-	50	-	-	50
Height	H1	mm	-	-	-	84	-	-	84
Width	F	mm	-	-	-	100	-	-	100
Weight with flanges (approx.)		kg	-	-	-	3.4	-	-	3.4

Nominal diameter	DN	mm	32	40	40	50	50	50	50
Permanent flow rate	Q_3	m^3/h	10	16	16	16	16	25	25
Overall length	L	mm	260	200	300	270	300	270	300
Counter length	L1	mm	89	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	380	340	440	390	420	390	420
Connection thread on meter		Inch	G1½B	G2B	G2B	G2½B	G2½B	G2½B	G2½B
Connection thread of coupling		Inch	R1¼	R1½	R1½	R2	R2	R2	R2
Height	H1	mm	78	82	82	90	90	90	90
Weight without coupling (approx.)		kg	1.5	1.8	2.6	3.9	4.05	3.9	4.05
Weight with coupling (approx.)		kg	2.1	3.0	3.8	5.5	5.65	5.5	5.65
Height	H	mm	30	36	36	41	41	41	41
DIMENSIONS - FLANGE			.	.	.	.	.	.	.
Flange diameter	D	mm	140	-	148	-	-	-	-
Hole circle diameter	K	mm	100	-	110	-	-	-	-
Number of screwholes		pcs	4	-	4	-	-	-	-
Screwhole diameter	D1	mm	18	-	18	-	-	-	-
Height	H	mm	62.5	-	69	-	-	-	-
Height	H1	mm	84	-	87	-	-	-	-
Width	F	mm	125	-	138	-	-	-	-
Weight with flanges (approx.)		kg	4.6	-	6.3	-	-	-	-

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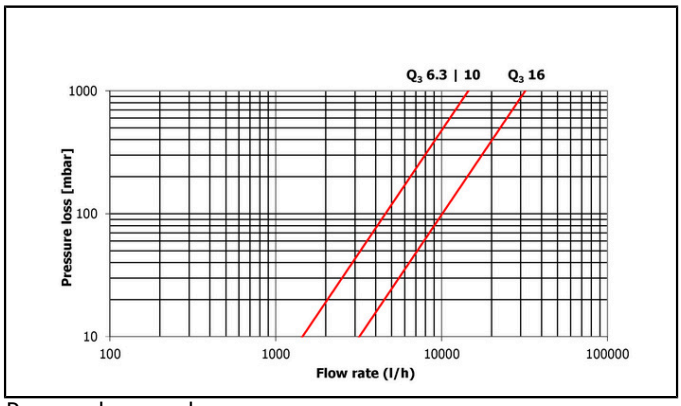
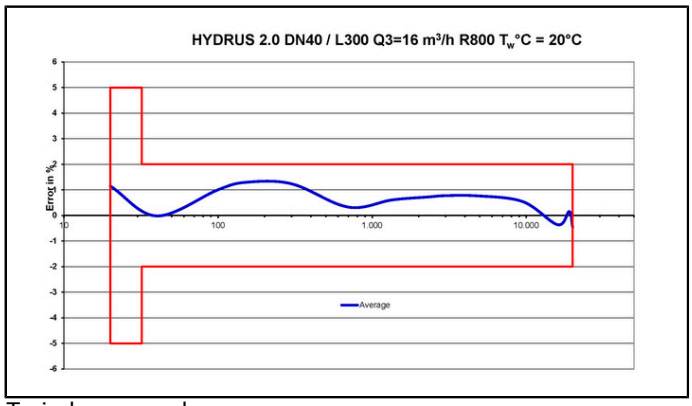
HYDRUS 2.0 RESIDENTIAL DN 25 - 50

ULTRASONIC METER

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

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