

# HYDRUS

ULTRASONIC METER

**DIEHL**  
Metering



## APPLICATION

Static ultrasonic water meter for accurate measuring and recording for all applications of water supply.

## FEATURES

- ▶ Real data communication, open metering telegram
- ▶ Long-term stability under difficult conditions
- ▶ Unlimited system capability
- ▶ Leak detection
- ▶ Higher performance than class D requirements
- ▶ No calming sections required
- ▶ No measurement of air
- ▶ Insensitive against sedimentation
- ▶ Mounting in any installation position, battery lifetime up to 16 years
- ▶ Suitable for outdoor installation
- ▶ Displaying of error and alarm codes
- ▶ No over-run performance
- ▶ No magnetic influence
- ▶ Data logger for consumption values

# HYDRUS

## ULTRASONIC METER

### GENERAL

		HYDRUS	
Medium temperature range	°C	0.1 ... 90	
Ambient operating temperature	°C	1 ... 70	
Ambient storage temperature	°C	-20 ... +70 (>35 °C max. 4 weeks)	
Nominal pressure	PN	bar	16
Power supply	Two 3.6 VDC lithium-batteries (only one battery with M-Bus possible)		
Battery lifetime T30*/T50*	Up to 12 years (one battery), up to 16 years (two batteries)		
Battery lifetime T90*	Up to 12 years (all interfaces)		
Interfaces	Optical, radio 434 or 868 MHz, M-Bus, L-Bus, pulse		
Data storage	For events and for consumption values		
Protection class	IP 68		

\* depends on the sending interval of the radio telegram, the telegram length and the ambient temperature at the installation.

### TECHNICAL DATA DISPLAY

		HYDRUS	
Display indication	LCD, 8-digit		
Units DN 15 - DN 32	Flow and volume (m <sup>3</sup> + 3 digits after the comma)		
Units DN 40 + DN 50	Flow (m <sup>3</sup> + 3 digits after the comma); Volume (m <sup>3</sup> + 2 digits after the comma)		
Values displayed (depending on configuration)	Volume <sup>1</sup> - flow - mediums temperature - display test <sup>1</sup> - current error and alarm status <sup>1</sup> - date - primary and secondary address - radio signal ON/OFF - battery lifetime <sup>1</sup> - accounting day - error hour counter - pulse values - software checksum <sup>1</sup>		

<sup>1</sup>: Display according to approval (always on)

### INTERFACES - OVERVIEW

		HYDRUS	
Optical	For configuration of display and radio telegram, to switch to the various display		
Radio	434 or 868 MHz, real data telegram (configurable), Open Metering Standard		
M-Bus	2400 Baud (adjustable to 300 Baud), configurable telegram, cable length 1.5 m, power supply only via built-in battery		
L-Bus	In combination with radio, cable length 1.5 m		
Pulse (Open collector)	Two configurable pulse outputs, cable length 1.5 m		

### VOLUME- / PULSE OPEN COLLECTOR

		HYDRUS	
Max. frequency	Hz	20	
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	
Min. pulse duration	ms	25 (at max. frequency of 20 Hz)	
Min. pulse pause	ms	25	

# HYDRUS<sub>DN 15 - 20</sub>

## ULTRASONIC METER

### TECHNICAL DATA<sup>1 2</sup>

Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	1.6	1.6	1.6	1.6	1.6	2.5	2.5
Nominal diameter	DN	mm	15	15	15	20	20	15	15
Overall length	L	mm	110	165	170	130	190	110	165
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	2	2	2	2	2	3.125	3.125
Transitional flow rate	Q <sub>2</sub>	l/h	10.24	10.24	10.24	10.24	10.24	16	16
Minimum flow rate	Q <sub>1</sub>	l/h	6.4	6.4	6.4	6.4	6.4	10	10
Starting flow rate		l/h	1.3	1.3	1.3	1.3	1.3	2.6	2.6
Pressure loss at Q <sub>3</sub>		bar	0.6	0.6	0.6	0.6	0.6	0.33	0.33
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	2.5	2.5	2.5	4	4	4	
Nominal diameter	DN	mm	15	20	20	20	20	20	
Overall length	L	mm	170	130	190	130	175	190	
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	3.125	3.125	3.125	5	5	5	
Transitional flow rate	Q <sub>2</sub>	l/h	16	16	16	25.6	25.6	25.6	
Minimum flow rate	Q <sub>1</sub>	l/h	10	10	10	16	16	16	
Starting flow rate		l/h	2.6	2.6	2.6	4.3	4.3	4.3	
Pressure loss at Q <sub>3</sub>		bar	0.33	0.25	0.25	0.3	0.3	0.3	

1: At dynamic range R 250

2: Further overall lengths on request

### APPROVAL

DN 15 - 20		
Approval		MID LNE 14586, OIML R49, EN 14154, TVO, KTW
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 1.6 m <sup>3</sup> /h (T30 - T50)	R	160 / 200 / 250
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 2.5 m <sup>3</sup> /h (T30 - T50)	R	160 / 200 / 250 / 315 / 400
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 4 m <sup>3</sup> /h (T30 - T50)	R	160 / 200 / 250
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 1.6 - 4 m <sup>3</sup> /h (T90)	R	160 / 200

### PULSE INTERFACE - SPECIFICATION

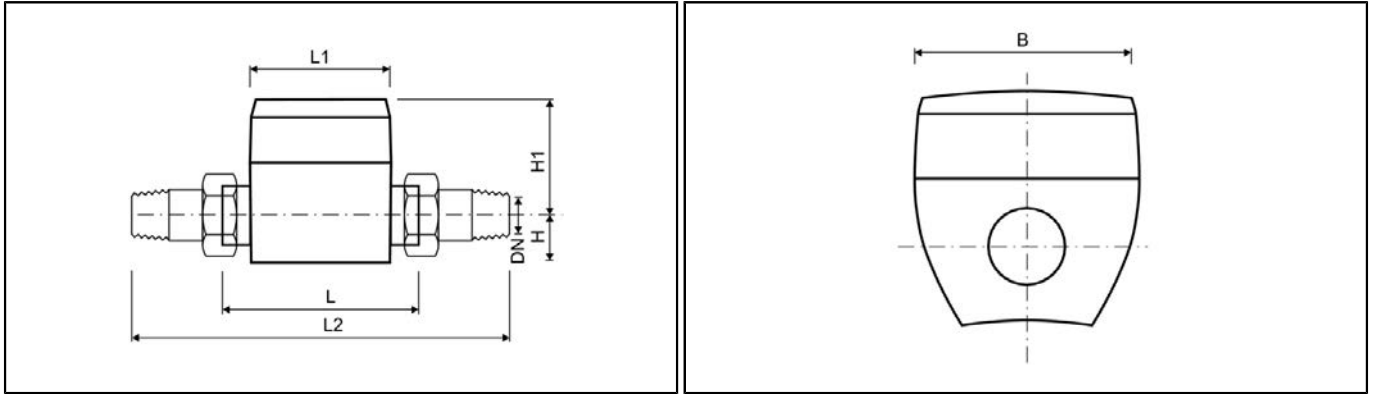
DN 15 - 20		
Pulse rates	l/pulse	Decadic 0.1 ... 100
Display		3 digits after comma
Pulse value 1	l/pulse	0.1 (factory setting)
Pulse value 2	l/pulse	1 (factory setting)
Pulse variants		Two forward pulses; pulse and direction signal

Note: In the field the pulse values can be configured as desired in the specified value range.

# HYDRUS<sup>DN 15 - 20</sup>

## ULTRASONIC METER

### DIMENSIONS

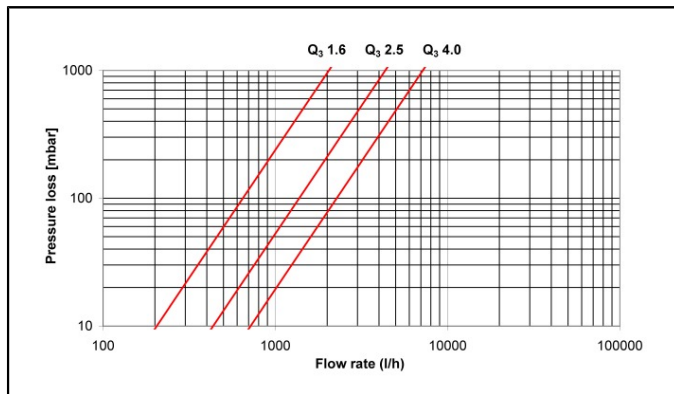


Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	1.6	1.6	1.6	1.6	1.6	2.5	2.5
Nominal diameter	DN	mm	15	15	15	20	20	15	15
Overall length	L	mm	110	165	170	130	190	110	165
Counter length	L1	mm	88	88	88	88	88	88	88
Counter width	B	mm	94	94	94	94	94	94	94
Overall length with coupling	L2	mm	186	240	245	225	290	186	240
Connection thread on meter		Inch	G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B	G1B	G1B	G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B
Connection thread of coupling		Inch	R <sup>1</sup> / <sub>2</sub>	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>1</sup> / <sub>2</sub>	R <sup>1</sup> / <sub>2</sub>
Height	H1	mm	67	67	67	65	65	67	67
Weight without coupling (approx.)		kg	0.8	1	1	0.9	1.1	0.8	1
Weight with coupling (approx.)		kg	1	1.4	1.4	1.3	1.5	1	1.4
Height	H	mm	32	32	32	34	34	32	32
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	2.5	2.5	2.5	4	4	4	
Nominal diameter	DN	mm	15	20	20	20	20	20	
Overall length	L	mm	170	130	190	130	175	190	
Counter length	L1	mm	88	88	88	88	88	88	
Counter width	B	mm	94	94	94	94	94	94	
Overall length with coupling	L2	mm	245	225	290	225	295	290	
Connection thread on meter		Inch	G <sup>3</sup> / <sub>4</sub> B	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>3</sup> / <sub>4</sub>	R <sup>3</sup> / <sub>4</sub>	R <sup>3</sup> / <sub>4</sub>	R1	R <sup>3</sup> / <sub>4</sub>	
Height	H1	mm	67	65	65	65	65	65	
Weight without coupling (approx.)		kg	1	0.9	1.1	0.9	1.1	1.1	
Weight with coupling (approx.)		kg	1.4	1.3	1.5	1.3	1.7	1.5	
Height	H	mm	32	34	34	34	34	34	

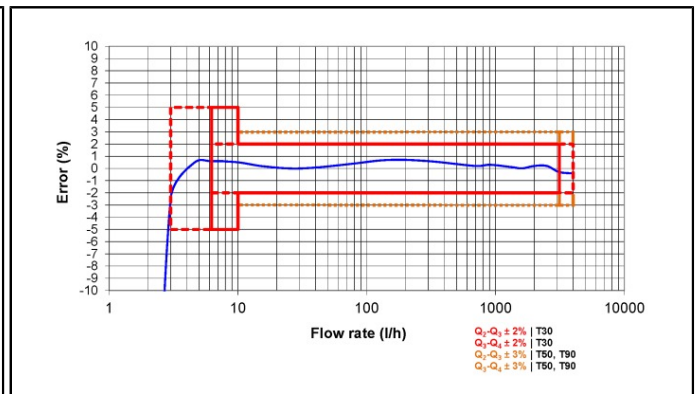
# HYDRUS<sup>DN 15 - 20</sup>

ULTRASONIC METER

## PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

# HYDRUS<sup>DN 25 - 50</sup>

## ULTRASONIC METER

### TECHNICAL DATA<sup>1 2</sup>

Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	6.3	6.3	6.3	6.3	6.3	10
Nominal diameter	DN	mm	25	25	25	25	32	25
Overall length	L	mm	135	150	175	260	260	135
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	7.87	7.87	7.87	7.87	7.87	12.5
Transitional flow rate	Q <sub>2</sub>	l/h	50.4	50.4	50.4	50.4	50.4	80
Minimum flow rate	Q <sub>1</sub>	l/h	31.5	31.5	31.5	31.5	31.5	50
Starting flow rate		l/h	10	10	10	10	10	10
Pressure loss at Q <sub>3</sub>		bar	0.25	0.25	0.25	0.25	0.25	0.55
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	10	10	10	10	10	10
Nominal diameter	DN	mm	25	25	25	32	40	40
Overall length	L	mm	150	175	260	260	200	300
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	12.5	12.5	12.5	12.5	12.5	12.5
Transitional flow rate	Q <sub>2</sub>	l/h	80	80	80	80	80	80
Minimum flow rate	Q <sub>1</sub>	l/h	50	50	50	50	50	50
Starting flow rate		l/h	10	10	10	10	16	16
Pressure loss at Q <sub>3</sub>		bar	0.55	0.55	0.55	0.55	0.1	0.1
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	16	16	16	16	25	25
Nominal diameter	DN	mm	40	40	50	50	50	50
Overall length	L	mm	200	300	270	300	270	300
Overload flow rate	Q <sub>4</sub>	m <sup>3</sup> /h	20	20	20	20	31.25	31.25
Transitional flow rate	Q <sub>2</sub>	l/h	128	128	128	128	200	200
Minimum flow rate	Q <sub>1</sub>	l/h	80	80	80	80	125	125
Starting flow rate		l/h	16	16	25	25	25	25
Pressure loss at Q <sub>3</sub>		bar	0.24	0.24	0.1	0.1	0.25	0.25

1: At dynamic range R 200

2: Further overall lengths on request

### APPROVAL

DN 25 - 50		
Approval	MID LNE 14586, OIML R49, EN 14154, TVO, KTW	
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 6.3 m <sup>3</sup> /h (T30 - T50)	R	40 / 80 / 160 / 200
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 10 m <sup>3</sup> /h (T30 - T50)	R	40 / 80 / 160 / 200 / 250
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 16 m <sup>3</sup> /h (T30 - T50)	R	40 / 80 / 160 / 200 / 250 / 315* / 400*
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 25m <sup>3</sup> /h (T30 - T50)	R	40 / 80 / 160 / 200 / 250 / 315 / 400
Dynamic range (Q <sub>3</sub> /Q <sub>1</sub> ) - Q <sub>3</sub> 6.3 - 25 m <sup>3</sup> /h (T90)	R	40 / 80 / 160

\* not for DN 50

### PULSE INTERFACE - SPECIFICATION

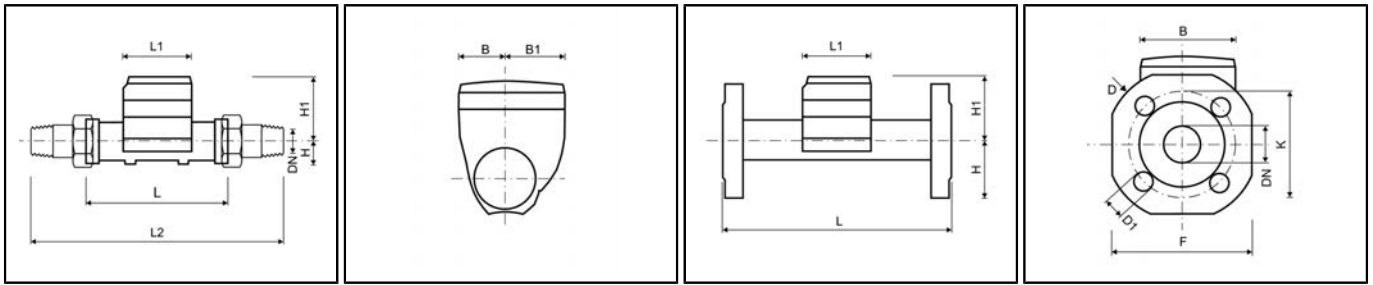
DN 25 - 50		
Pulse rates	l/pulse	Decadic for DN 25, DN 32, DN 40 (1 ... 1000), decadic for DN 50 (10 ... 1000)
Display	2 digits after comma	
Pulse value 1	l/pulse	10 (factory setting)
Pulse value 2	Direction (factory setting)	
Pulse variants	Pulse and direction signal	

Note: In the field the pulse values can be configured as desired in the specified value range.

# HYDRUS<sup>DN 25 - 50</sup>

## ULTRASONIC METER

### DIMENSIONS



Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	6.3	6.3	6.3	6.3	6.3	10
Nominal diameter	DN	mm	25	25	25	25	32	25
Overall length	L	mm	135	150	175	260	260	135
Counter length	L1	mm	92	92	92	92	92	92
Counter width	B	mm	94	94	94	94	94	94
DIMENSIONS - THREAD								
Overall length with coupling	L2	mm	255	270	295	380	380	255
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G1½B	G1¼B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1¼	R1
Height	H1	mm	84	84	84	84	84	84
Weight without coupling (approx.)		kg	1.17	1.24	1.29	1.6	1.8	1.17
Weight with coupling (approx.)		kg	1.77	1.84	1.89	2.2	2.4	1.77
Height	H	mm	26	26	26	26	26	26
DIMENSIONS - FLANGE								
Flange diameter	D	mm	-	-	-	115	140	-
Hole circle diameter	K	mm	-	-	-	85	100	-
Number of screwholes		pcs	-	-	-	4	4	-
Screwhole diameter	D1	mm	-	-	-	14	18	-
Height	H	mm	-	-	-	50	62.5	-
Height	H1	mm	-	-	-	84	84	-
Width	F	mm	-	-	-	100	125	-
Weight with flanges (approx.)		kg	-	-	-	3.45	4.7	-

# HYDRUS<sup>DN 25 - 50</sup>

## ULTRASONIC METER

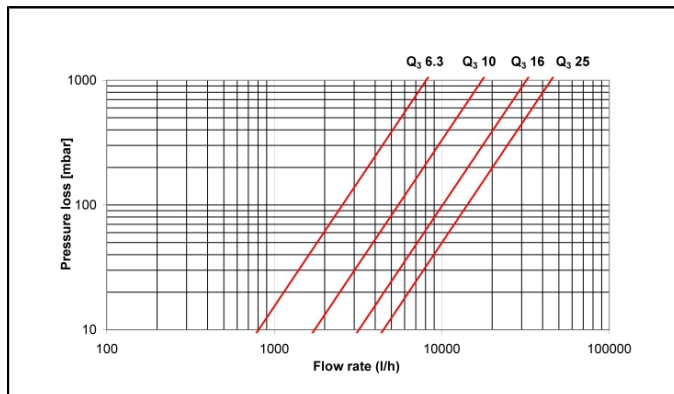
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	10	10	10	10	10	10
Nominal diameter	DN	mm	25	25	25	32	40	40
Overall length	L	mm	150	175	260	260	200	300
Counter length	L1	mm	92	92	92	92	92	92
Counter width	B	mm	94	94	94	94	94	94
DIMENSIONS - THREAD			.	.	.	.	.	.
Overall length with coupling	L2	mm	270	295	380	380	340	440
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1½B	G2B	G2B
Connection thread of coupling		Inch	R1	R1	R1	R1¼	R1½	R1½
Height	H1	mm	84	84	84	84	87	87
Weight without coupling (approx.)		kg	1.24	1.29	1.6	1.8	2.4	3.05
Weight with coupling (approx.)		kg	1.84	1.89	2.2	2.4	3.6	4.25
Height	H	mm	26	26	26	26	31	31
DIMENSIONS - FLANGE			.	.	.	.	.	.
Flange diameter	D	mm	-	-	115	140	-	148
Hole circle diameter	K	mm	-	-	85	100	-	110
Number of screwholes		pcs	-	-	4	4	-	4
Screwhole diameter	D1	mm	-	-	14	18	-	18
Height	H	mm	-	-	50	62.5	-	69
Height	H1	mm	-	-	84	84	-	87
Width	F	mm	-	-	100	125	-	138
Weight with flanges (approx.)		kg	-	-	3.45	4.7	-	6.67
Permanent flow rate	Q <sub>3</sub>	m <sup>3</sup> /h	16	16	16	16	25	25
Nominal diameter	DN	mm	40	40	50	50	50	50
Overall length	L	mm	200	300	270	300	270	300
Counter length	L1	mm	92	92	92	92	92	92
Counter width	B	mm	94	94	94	94	94	94
DIMENSIONS - THREAD			.	.	.	.	.	.
Overall length with coupling	L2	mm	340	440	390	-	390	-
Connection thread on meter		Inch	G2B	G2B	G2½B	-	G2½B	-
Connection thread of coupling		Inch	R1½	R1½	R2	-	R2	-
Height	H1	mm	87	87	90	-	90	-
Weight without coupling (approx.)		kg	2.42	3.05	3.9	-	3.9	-
Weight with coupling (approx.)		kg	3.62	4.25	5.5	-	5.5	-
Height	H	mm	31	31	41	-	41	-
DIMENSIONS - FLANGE			.	.	.	.	.	.
Flange diameter	D	mm	-	148	163	163	163	163
Hole circle diameter	K	mm	-	110	125	125	125	125
Number of screwholes		pcs	-	4	4	4	4	4
Screwhole diameter	D1	mm	-	18	18	18	18	18
Height	H	mm	-	69	73.5	73.5	73.5	73.5
Height	H1	mm	-	87	90	90	90	90
Width	F	mm	-	138	147	147	147	147
Weight with flanges (approx.)		kg	-	6.67	7.23	7.47	7.23	7.47



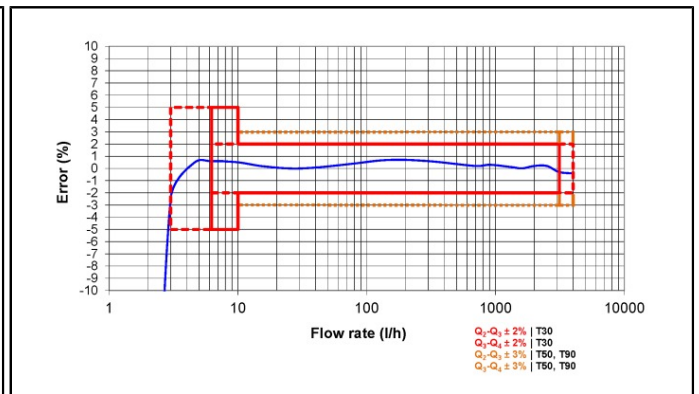
# HYDRUS<sup>DN 25 - 50</sup>

## ULTRASONIC METER

### PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph