



Instruction Manual

mass flow meter for compressed air

Druckluftbilanzierungssystem

VARIOMASS

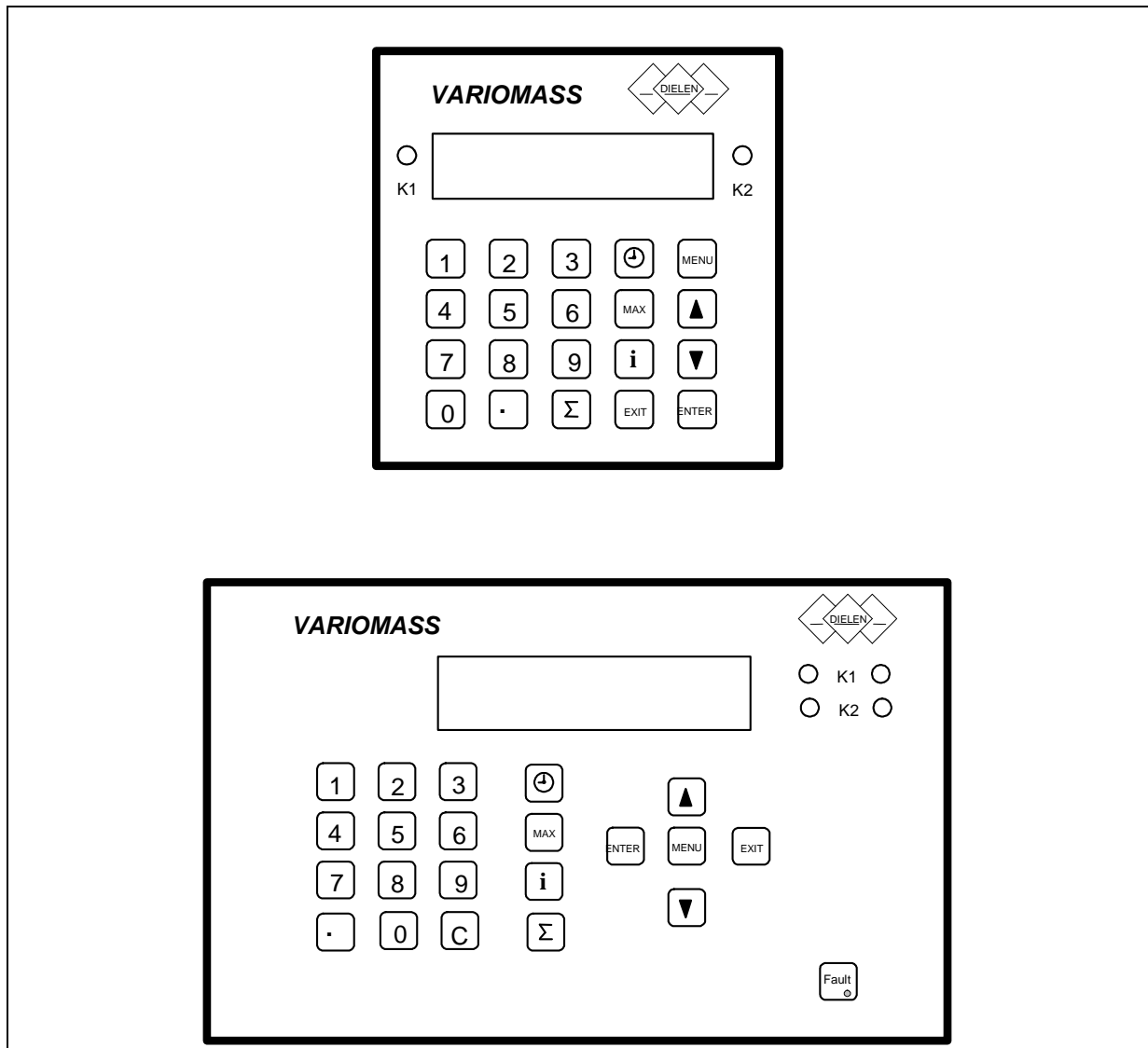


Table of Contents

	page
0. Introduction	3
1. Technical Data's	4
1.1 Transmitter	4
1.2 Sensor	4
2. Mounting	6
2.1 Checking sensor probe length.....	6
2.2 Installation of the sensor	7
2.3 Mounting for insertion meters	9
2.4 Mounting for In-Line meters.....	12
2.5 Installation of the transmitter	12
3. Electrical connection	14
3.1 Transmitter in the DIN enclosure.....	14
3.2 Transmitter in the wall mounting enclosure.....	16
3.3 Sensor	16
4. Power up the system.....	18
4.1 Key function	18
4.2 Check preset value.....	19
4.3 Change preset value.....	20
4.4 Options	24
4.5 Set maximum flow value record	26
4.6 Reading maximum flow value	27
5. Totalizer	29
5.1 totalizer setup	29
5.2 reading totalizer	30
5.3 reading time.....	30
6. Data Logger.....	31
6.1 Introduction	31
6.2 Select time period of saving interval	31
6.3 Programming Data logger	32
6.4 Check preset value of Data logger	33
6.5 Read out Data logger	34
6.6 Technical Data	37
6.7 Data Communication problem	37
7. VARIOMASS model numbering system	38
8. VARIOMASS meter with multiple sensor selection.....	39

0. Introduction

This manual is for all *VARIOMASS* insertion thermal mass flow meter for standard pipe sizes from 62 mm (2 ½ ") up to 500 mm (20") and the In-Line thermal mass flow meter from ½" up to 2" pipe sizes.

Unpacking your instrument:

- The insertion non linear mass flow meter has shaft mounted tube fitting which is bored through and a connecting cable of 6 meter (optional up to 100 meter) length
process option: ball valve retractor assembly (BVR) with or without flange.
- The In-Line non linear mass flow meter has a standard flow body with the thread end of NPT-M according the ordered pipe size from ½" up to 2".
Optional DIN or ANSI flanges are available in the desire sizes
- The remote flow transmitter which is designed for panel mounting (incl. mounting bracket for screw driver) or mounted within a NEMA 4 wall mounting enclosure.

Please note that the serial number of the sensor (SN#) must be combined with the same serial number of the transmitter (SN#)!

Please handle all parts with care.

The Password for the transmitter Menu is: 1 3 7 9

This manual is from the Software-Rev. No.: 2.8 and higher

1. Technical Data's:

1.1 Transmitter (Remote Electronic):

power supply: 230 VAC with 50 Hz./ 60 Hz.(optional 110 VAC or 24 VDC)
 ambient temperature range: 0° to + 45°C
 protection class: IP 54 for panel mounting
 (Option: NEMA 4 (IP 65) with watertight field enclosure)

Display modus: - actual flow rate in Nm³/h, m³/min or L/min or SCFM optional with standard (Norm) conditions of 20°C, 1 bar absolute and 0% relative humidity
 - total flow (since installation) in m³ or L (Liter) or SCF optional
 - 2 flow totalizer (programmable and reset able)
 - date / time
 - flow range
 - pipe diameter
 - output signal (current)

Options: - RS 232 (V.24) interface
 - RS 485 Bus interface incl. Software WINVAR for PCs
 - Pulse output signal
 - 2 Relay alarm contacts
 - Data Logger with 4 MB memory

1.2. Sensor (flow meter)

The insertion flow meter are designed for flow ranges and pipe sizes listed in table 1.1

pipe size (mm)	max. flow range:	min. flow range:	first value:
65	0 - 900 Nm ³ /h	0 - 90 Nm ³ /h	1 Nm ³ /h
80	0 - 1.400 Nm ³ /h	0 - 140 Nm ³ /h	2 Nm ³ /h
100	0 - 2.300 Nm ³ /h	0 - 230 Nm ³ /h	3 Nm ³ /h
125	0 - 3.500 Nm ³ /h	0 - 350 Nm ³ /h	4 Nm ³ /h
150	0 - 5.000 Nm ³ /h	0 - 500 Nm ³ /h	6 Nm ³ /h
200	0 - 9.000 Nm ³ /h	0 - 900 Nm ³ /h	11 Nm ³ /h
250	0 - 14.000 Nm ³ /h	0 - 1.400 Nm ³ /h	18 Nm ³ /h
300	0 - 20.000 Nm ³ /h	0 - 2.000 Nm ³ /h	25 Nm ³ /h
350	0 - 27.000 Nm ³ /h	0 - 2.700 Nm ³ /h	35 Nm ³ /h
400	0 - 36.000 Nm ³ /h	0 - 3.600 Nm ³ /h	45 Nm ³ /h
450	0 - 45.000 Nm ³ /h	0 - 4.500 Nm ³ /h	57 Nm ³ /h
500	0 - 55.000 Nm ³ /h	0 - 5.500 Nm ³ /h	71 Nm ³ /h

Table 1.1. flow range as a function of the pipe size

The In-Line flow meter are designed for flow ranges and pipe sizes listed in table 1.2

Model No	Pipe size:	inside pipe diameter "d":	flow body length "L"	end pipe thread "N"	max. flow range
V-2	½ " (12,7 mm)	15,8 mm	7" (178 mm)	½ " NPT	0 to 20 Nm ³ /h
V-3	¾ " (19,0 mm)	20,9 mm	7" (178 mm)	¾ " NPT	0 to 100 Nm ³ /h
V-4	1" (25,4 mm)	26,6 mm	8" (203 mm)	1" NPT	0 to 150 Nm ³ /h
V-5	1 ¼ " (31,8 mm)	35,0 mm	10" (254 mm)	1 ¼ " NPT	0 to 250 Nm ³ /h
V-6	1 ½ " (38,1 mm)	40,9 mm	15" (381 mm)	1 ½ " NPT	0 to 350 Nm ³ /h
V-7	2" (50,8 mm)	52,5 mm	20" (508 mm)	2" NPT	0 to 600 Nm ³ /h

Table 1.2. maximum flow ranges as a function of the pipe size

process temperature: normal : 0°C up to 70°C max.: 150°C for ceramic or 200°C for SS sensor
ambient temperature: - 10°C up to + 50°C
process pressure: 4 to 12 bar g (other on request)
gas media: pressured air (optional other gases)
Sensor material: Stainless Steel (316 SS) or optional ceramic
process connection: Insertion meters: tube fitting R ½ " or optional flange
In-Line meters: NPT thread or optional flange
accuracy: 2% of reading with optimum up- and downstream area
sensor response time: a) Stainless steel: τ_{63} about 1 second
b) Ceramic: τ_{63} about 0,1 second

2. Mounting

2.1 Checking sensor probe length

2.1.1 Insertion meters

The probe length of the shaft "L" is adequate to the inside diameter of the pipe.

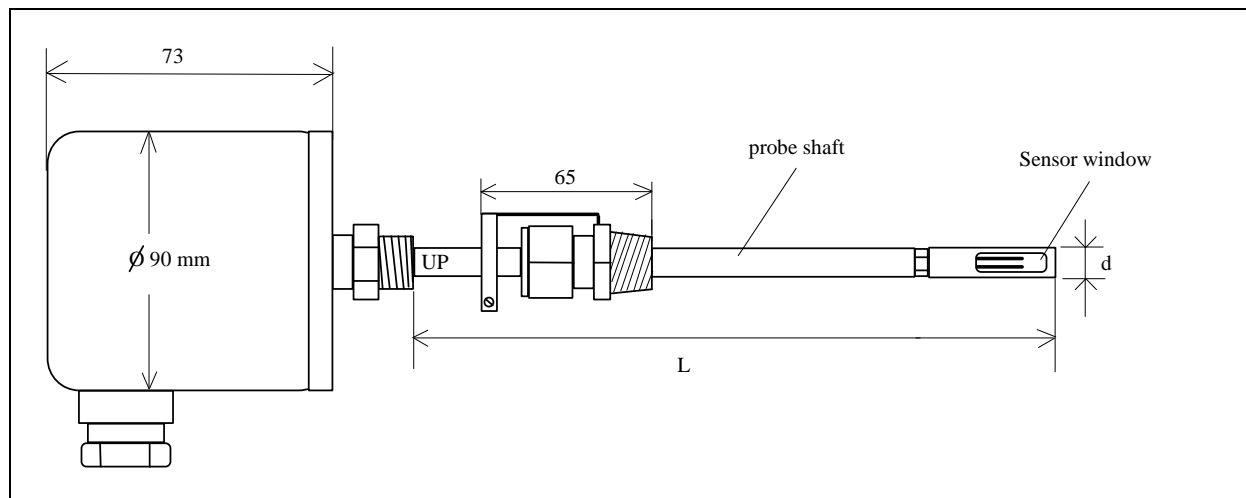


Abb. 1a) insertion flow meter with stainless steel sensor

The probe shaft length "L" is 12" (305 mm) or 16" (406 mm) depending on the pipe sizes diameter from 62 mm up to 500 mm.

The probe shaft diameter "d" is $\frac{1}{2}$ " (12,7 mm) with a sensor window at the end (s. Abb. 1a).

By using the BVR (Ball valve retractor assembly) option the max. pipe size for the 16" sensor shaft length is 305 mm (12") and for the 12" sensor shaft length 102 mm (4").

2.1.2 In-Line Meters

The flow body length "L" for the IN-LINE Meters depends on the ordered pipe size (s. Abb.1b). The pipe sizes are from $\frac{1}{2}$ " up to 2" (s. table 1.2).

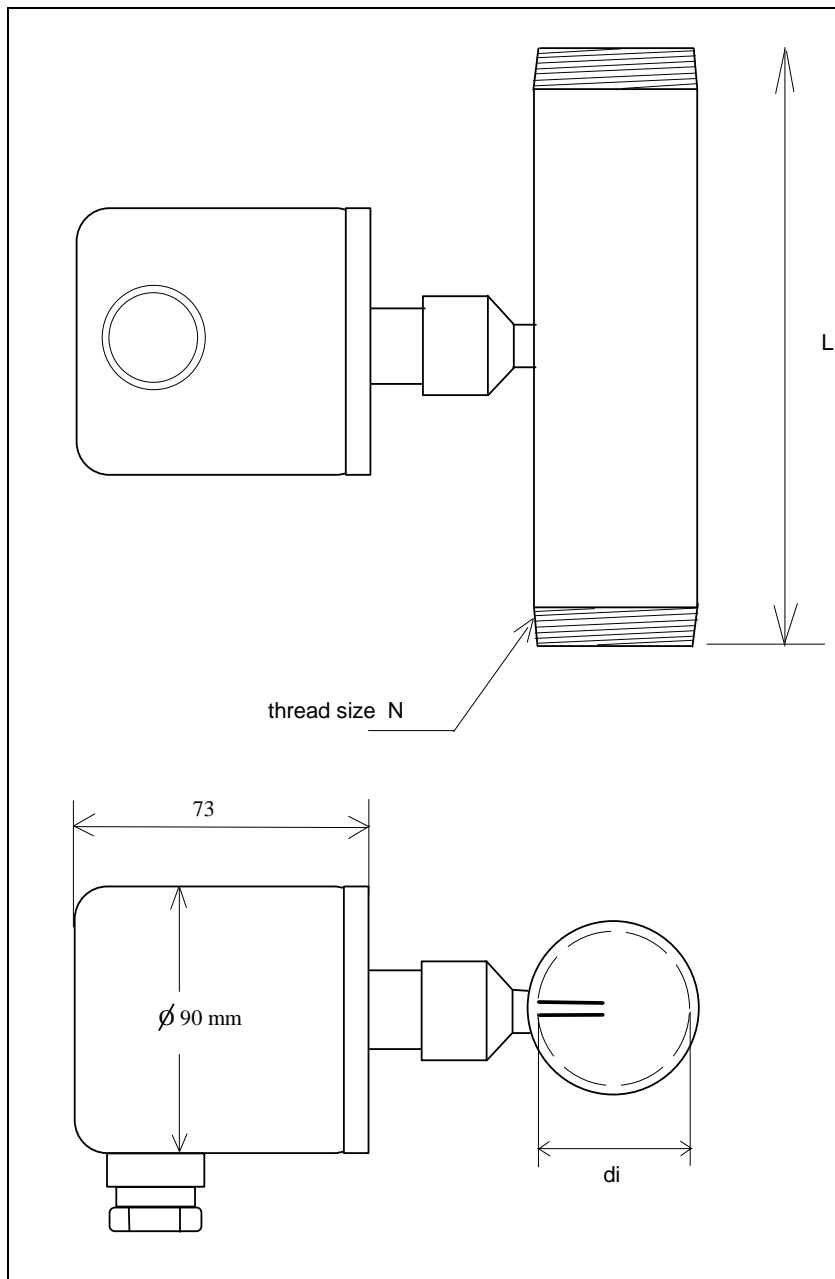


Abb. 1b) dimensions of the In-Line Meters

2.2 Installation of the sensor

Proper installation of the flow section assembly is of great importance. It is important to install the flow meter at a position where the gas is dry or above the dew point temperature.

A minimum of 10 x diameter up- and 5 x diameter downstream area without any equipment which disturb the flow profile are necessary.

The total straight flow section of the pipe should be divided into 2/3 as up- and 1/3 as downstream area (s. Abb. 2).

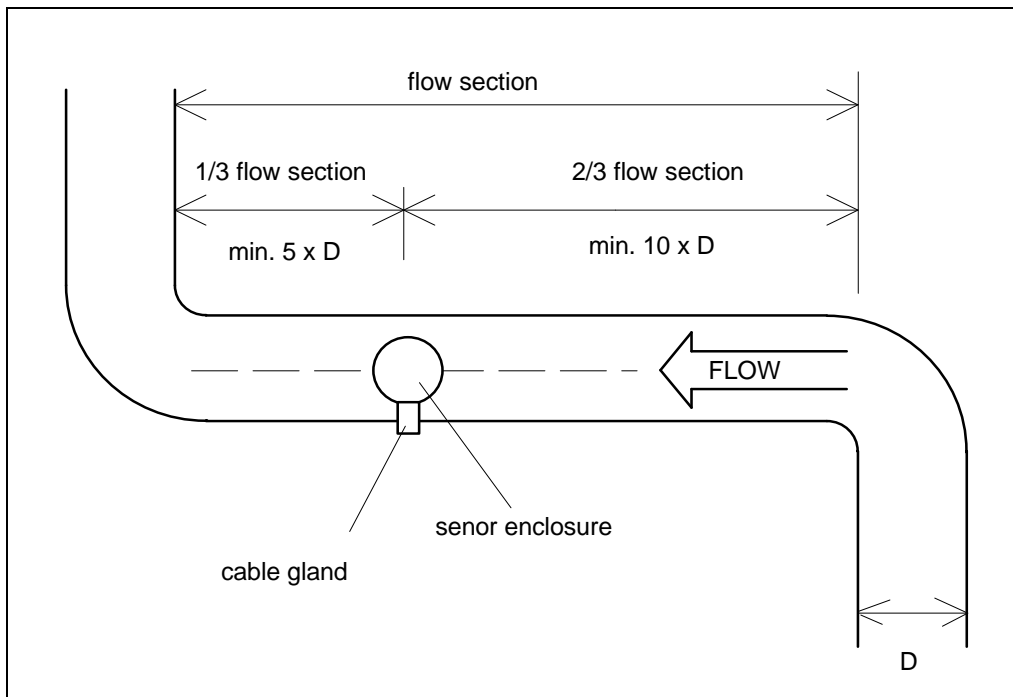


Abb. 2a) Insertion meter: straight flow section with two 90°-elbows

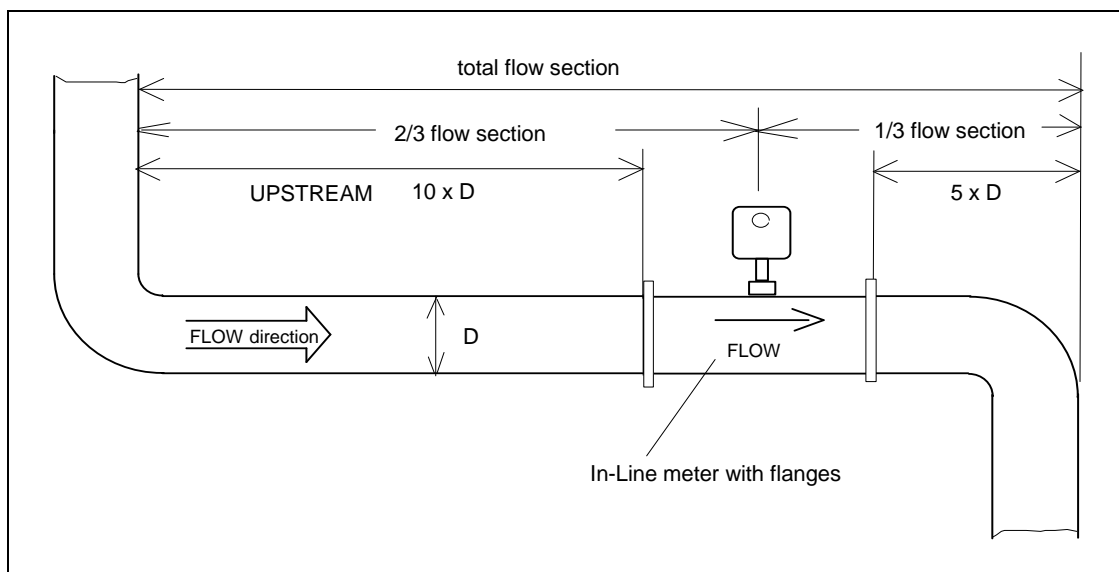


Abb. 2b) In-Line Meter: flow area with two 90°-elbows

The pipe installation can be horizontal or vertical without any effect of the accuracy of the flow meter.

Note:

For In-Line meters with a flow conditioner you only need 2 x D Upstream and 1 x D Downstream area. For different pipe sizes than the flow meter or flexible horse on the inlet side of the flow meter use 3 x d up and 2 x d downstream area.

2.3 Mounting for Insertion Meters

2.3.1 Process connection

The process connection should be a welding socket with 1/2 " inside thread or optional a counter flange. The welding process connection should be in a right angle to the pipe and should match the center of the pipe (s. Abb. 3).

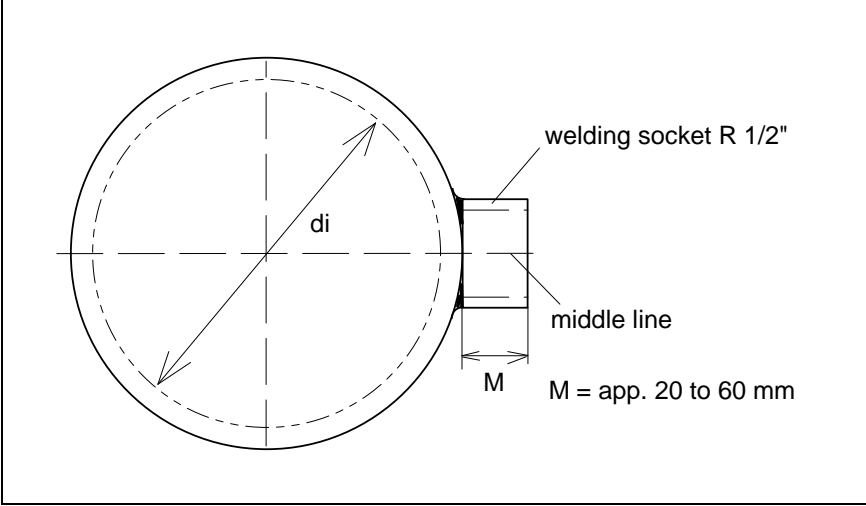


Abb. 3a) process connection with welding socket

As an option we supply the fitting with a flange (DIN or ANSI) which is customer sized.

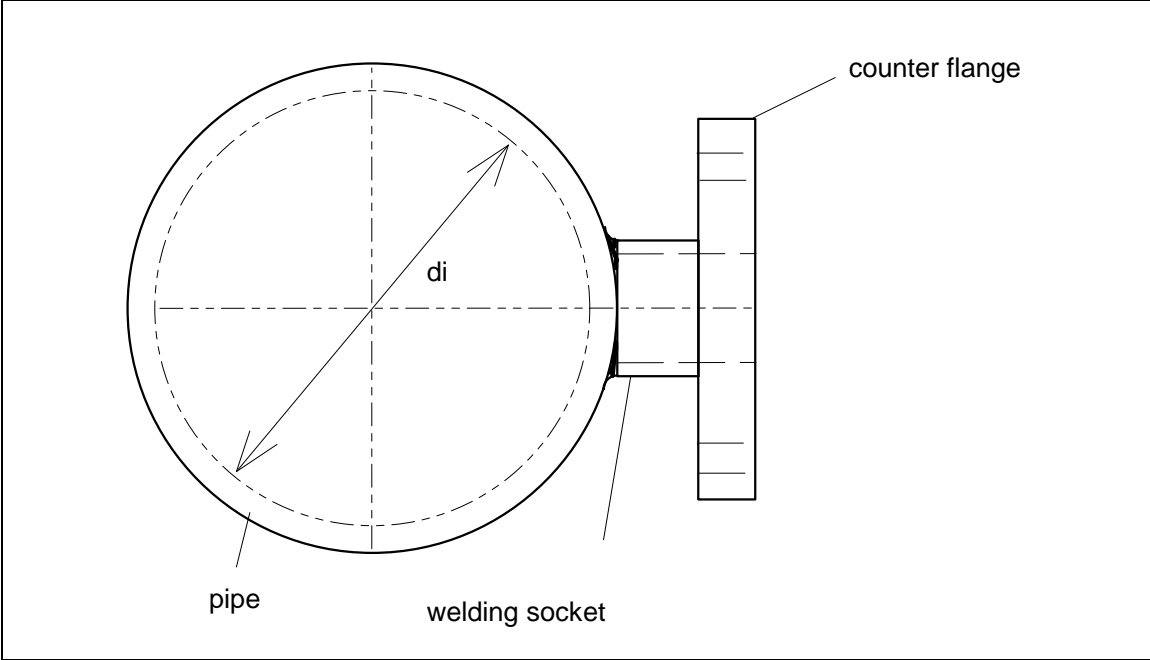


Abb. 3b) process connection with counter flange

2.3.2 tube fitting

The standard process connection for the insertion flowmeter is a shaft mounted tube fitting "SWAGELOK" which is bored through. This fitting can be combined with a flange (DIN or ANSI) with a thread for R 1/2" for the process connection. Use Teflon band to fix the SWAGELOK fitting with the pipe welding socket.

This SWAGELOK fitting has two Teflon ferrules (front and back) which allows to retract the probe shaft without any deformation on the stainless steel shaft. For low pressure the nut can be hand tight and for higher pressure turn the nut additional 1 1/2 round clockwise.

Use an „Inbus“ screw driver on the external adjustment for proper tight (s. Abb. 4).

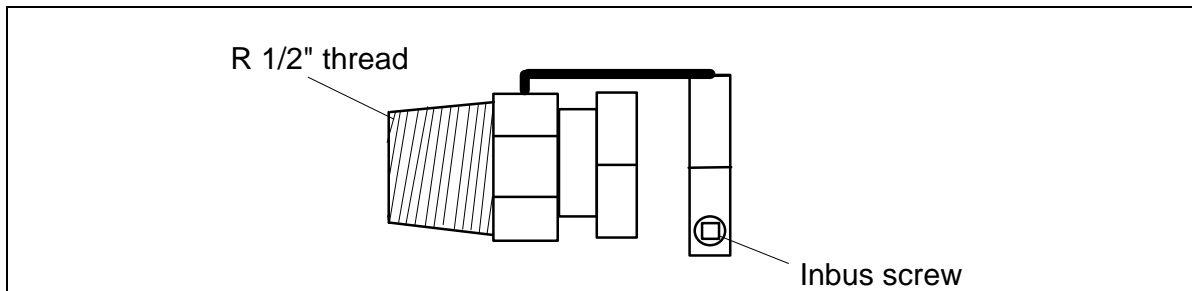


Abb. 4) tube fitting Swagelok

2.3.3 flow direction specification

The window of the sensor has to be open in the flow direction. The UPSTREAM mark on the probe shaft must be located correctly. It faces the direction of the flow. The additional arrow mark on the sticker of the sensor enclosure defines the correct flow direction ("Durchflußrichtung" means Flow Direction). The normal flow direction is from right to left looking from behind of the sensor enclosure (s. Abb. 5) and the cable gland is in an angle of 90° to the flow direction.

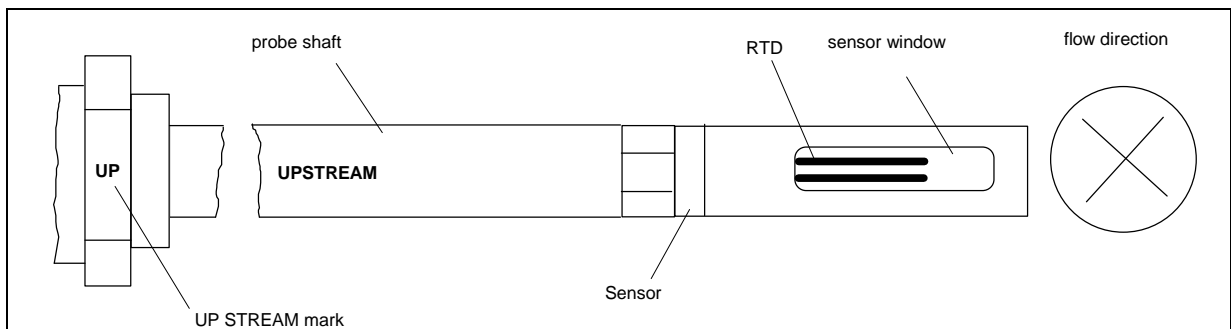


Abb. 5) UPSTREAM mark on the sensor probe

2.3.4 Position of flow

The middle of the sensor window has to be install to the point of the maximum flow velocity. The point of maximum velocity should be in the center of the pipe when using the necessary up- and downstream area (s. Abb. 6).

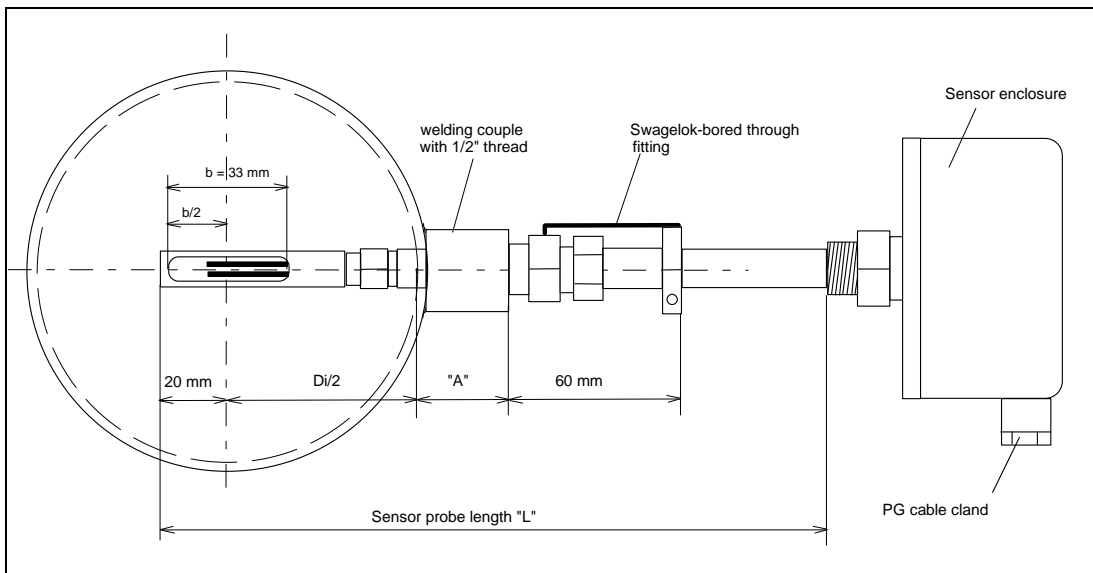


Abb. 6a) Insertion Sensor with standard Swagelok fitting

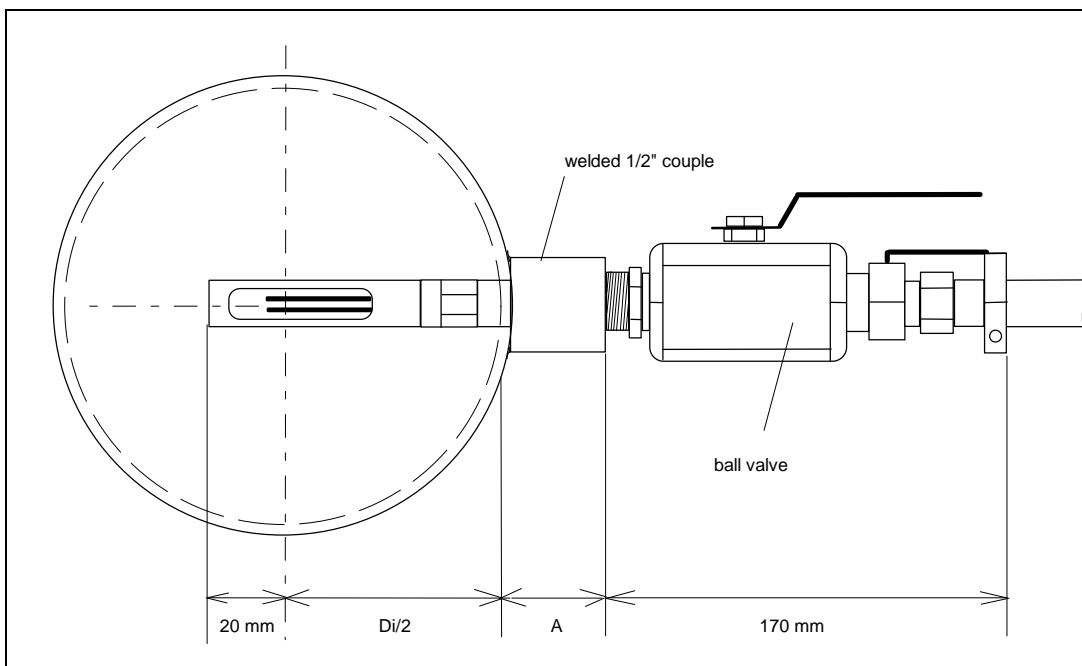


Abb. 6b) Insertion Sensor with BVR (ball valve retractor assembly)

Die minimum probe length (L_{\min}) for Option K (BVR) is (s. Abb. 6b):

$$L_{\min} = 20 \text{ mm} + D_i / 2 + A + 170 \text{ mm}$$

The middle position for the sensor window is as easy to find:

Please insert the probe shaft to the other side of the pipe and retract it for the length:

$$D_i / 2 - 20 \text{ mm}$$

Example:

The pipe inside diameter (D_i) is 100 mm and the probe shaft was inserted up to the other side of the pipe, so the middle position for the sensor window you have to retract the probe for 30 mm (100/2 mm - 20 mm).

2.4. Mounting for In-Line Meters

The standard process connection for the In-Line Meters is NPT - M thread and the thread size is depending on the pipe size of the flow body.

Note:

The necessary upstream area is $10 \times D$ (Diameter) and the downstream area is $5 \times D$ (Diameter) with from the beginning and end of the flow body. No elbow or reduction are allowed within the flow section area.

As an Option DIN or ANSI-flanges are available.

The flow direction (example from left to right or right to left) on the flow body (see the arrow) must be the same as the flow direction of the gas (s. Abb. 7).

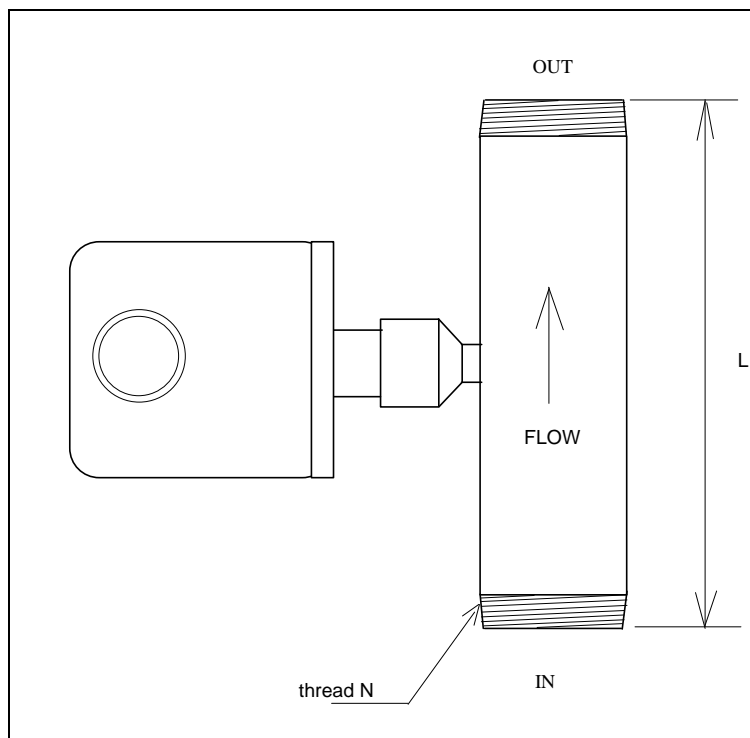


Abb. 7) In-Line Sensor with NPT thread

2.5 Installation of the transmitter

The transmitter of the VARIOMASS can be a DIN enclosure for panel mounting or a wall mounting enclosure with the protection class IP 65 (NEMA 4).

2.5.1 Installation of the DIN enclosure

The transmitter electronic of the flow meter is in a DIN rack enclosure for panel mounting with the outline dimensions of 96 mm x 96 mm x 140 mm (s. Abb. 8).

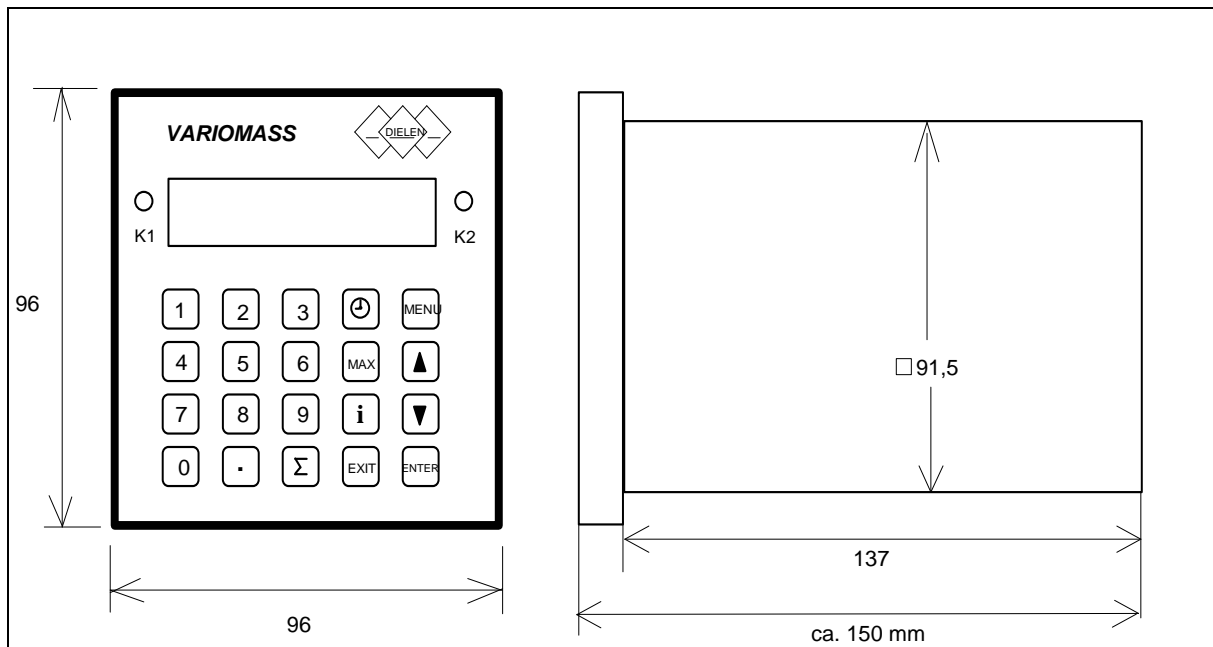


Abb. 8a) dimensions of the DIN transmitter enclosure

The panel cutout should be 92 mm x 92 mm. Use a crew driver for the installation of the mounting bracket to fix the enclosure with the panel.

2.5.2 Installation of the wall mounting enclosure

This optional wall mounting enclosure has the protection class NEMA 4 (IP 65) (s. Abb. 8b). Use the 4 mounting wholes on the bracket to fix the enclosure with the wall.

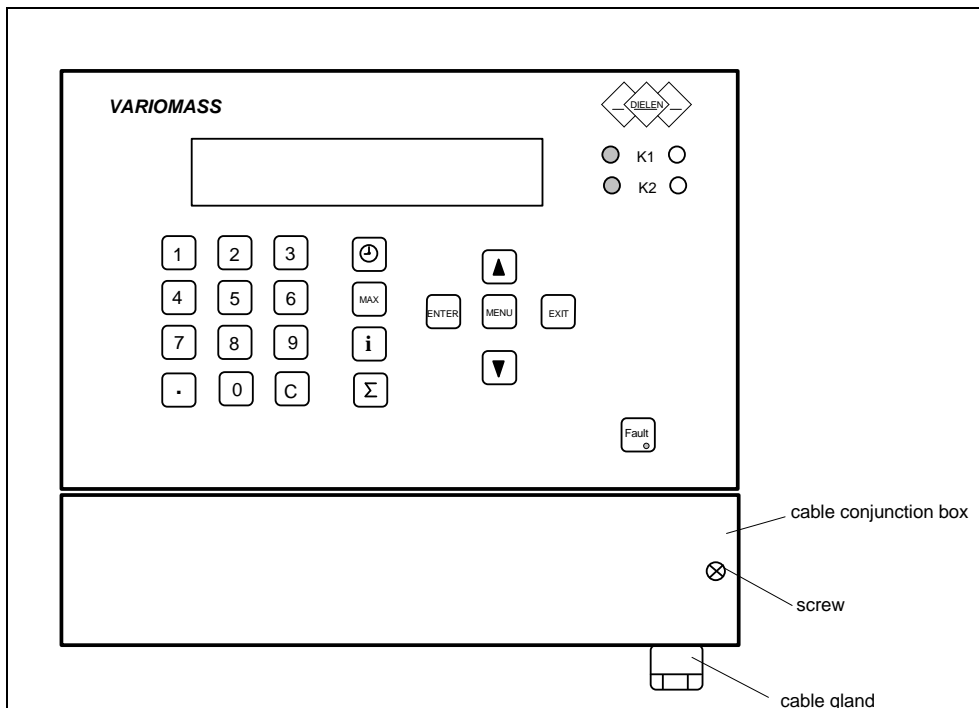


Abb 8b) wall mounting enclosure

3. Electrical connection

3.1 Transmitter in the DIN enclosure

Please keep the electronic dry and clean and install all wiring without power supply. The ambient temperature of the electronic should not go above 45°C.

3.1.1 Power supply

On the back side of the electronic are the terminal blocks for input and output signals (s. Abb. 9). The power supply for the remote transmitter electronic is 230 VAC / 50 Hz. (220 VAC and 60 Hz. is also possible) or optional 110 VAC or 24 VDC with a maximum current of 1 Ampere. Only the terminal description "L1" and "N" is for the power supply and the "PE" is the power supply ground (Earth). See a special note (sticker) on the back side of the electronic for other power supply than 230 VAC. Only for the 24 VDC version "L1" is for + 24 VDC and "N" is Ground (minus) and "PE" is the "Earth" connector.

3.1.2. Sensor cable

The interconnecting cable between the sensor and the transmitter is a 4 wire conductor overall shield cable (AWG 18) and must be connected to the terminal block with the 5 PINS called "SENSOR".

PIN description for the sensor cable:

- PIN# 1: (P) 24 VDC power supply (+) output for the sensor
- PIN# 2: (I) non linear mA signal input (+)
- PIN# 3: (R) (Return) ground power supply (-) for the sensor
- PIN# 4: (G) ground input sensor signal (-)
- PIN# 5: (PE) shield of the sensor cable

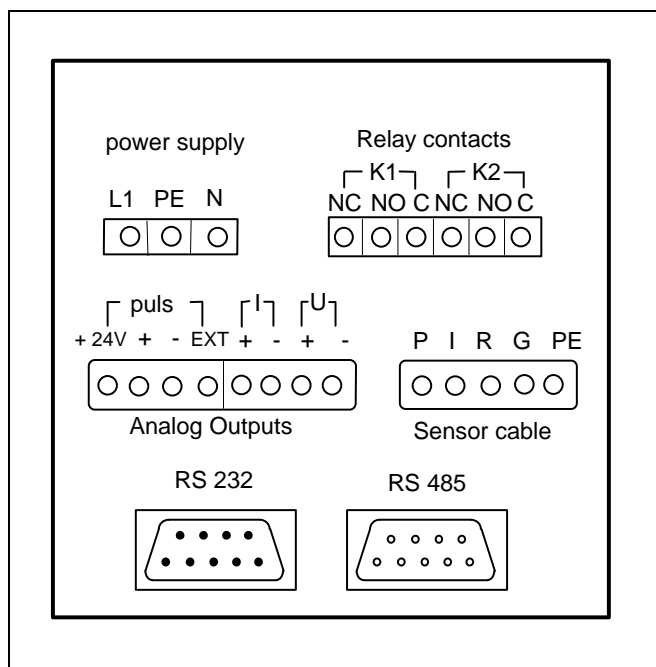


Abb. 9) back side of the transmitter layout

3.1.3 Analog output

The linear analog output (voltage & current) of the transmitter is on the 8-PIN terminal block with the following description:

- | | | |
|-------------|-----------------------------|-----------|
| PIN# 5 (+I) | current output 0/4 to 20 mA | Plus (+) |
| PIN# 6 (-I) | current output ground | Minus (-) |
| PIN# 7 (+U) | voltage output 0 to 10 VDC | Plus (+) |
| PIN# 8 (-U) | voltage output (Ground) | Minus (-) |

3.1.4 Serial output RS 232 (Option)

On the 9 pin sub D connector with the male connector you find the messages RS232 on the back side of the transmitter.

<u>Signal</u>	<u>PIN-No.</u>	<u>Description</u>
RXD	2	Receive Data
TXD	3	Transmit Data
CTS	8	Clear To Send
DTR	4	Date Terminal Ready
GND	5	Ground

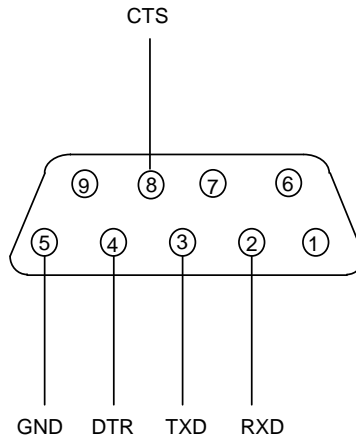


Abb. 10) RS 232 as a 9 PIN Sub-D-connector

For a matrix printer we have tested the following configuration:

Baud rate No. 1: 9600 baud
 Bit muster No. 2: 8 Data and 1 Stop bit
 Data protocol No. 1: No Handshake (No Parity)
 print every 10 Seconds

We have use the following cable configuration for a Matrix printer (EPSON):

transmitter (VARIOMASS):	TXD	GND	CTS
PIN 9 connector:	3	5	8
receiver printer (EPSON)	RXD	GND	DTR
PIN 25 connector:	3	7	20

Note:

For you printer cable configuration see your printer manual section serial input port

For a PC with a Terminal program we use the following cable configuration:

transmitter (VARIOMASS):	RXD	TXD	GND	CTS
PIN 9 connector:	2	3	5	8
receiver (PC) at COM 1	TXD	RXD	GND	DTR
PIN 9 connector:	3	2	5	4

3.2 Transmitter in the wall mounting enclosure

When you open the conjunction box of the wall mounting enclosure with a screw driver you find the following terminal strip:

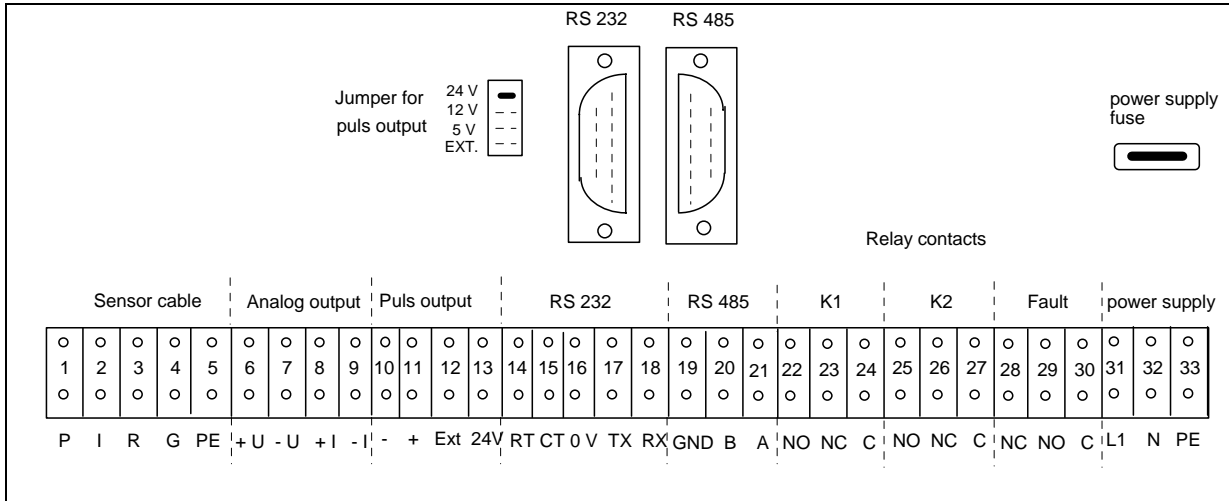


Abb. 11) Terminal strip of the wall mounting enclosure

On the terminal strip with the name "L1" and "N" connect the power supply of 230 VAC (or optional 110 VAC or 24 VDC) and on pin "PE" the ground of the power supply. The sensor connecting cable has a plug in connector which has to be turn clockwise until it is tighten.

The Analog output (voltage and current) are on pin # 6 to # 9 as follows:

PIN # 6 (+ V)	voltages 0 to 10 VDC	Plus
PIN # 7 (- V)	voltages ground	Minus
PIN # 8 (+ I)	current 0/4 to 20 mA	Plus
PIN # 8 (- I)	current ground	Minus

The options as Serial Port (RS 232), Relay output or RS 485 BUS are on PIN 5 to 20, see separate wire diagram paper in your terminal strip box of the enclosure.

3.3 Sensor

The sensor gets it power supply (24 VDC) from the transmitter and sends the non linear voltages output to the transmitter. The transmitter lanariies the non linear sensor signal.

Therefore use only the 4 color conductor PVC cable (AWG 18) overall shield which comes with the sensor. It is not necessary to open the sensor enclosure because the interconnecting cable is already fixed on the circuit board.

The sensor enclosure has the protection class IP 65 (NEMA 4) and is design for ambient temperature - 10°C up to +50°C. Inside the sensor enclosure you find the circuit board with the terminal block TB1 (s. Abb. 12). Do not disconnect the inner cable on TB2 which takes the signal from the RTD`s. We use the following PIN on the sensor side and connect it with the transmitter side:

Terminal block TB1 inside sensor:

Terminal block transmitter:

PIN# 1: (P) + 24 VDC power supply input	→	PIN# 1 (P)
PIN# 2: (R) ground (-) power supply input	→	PIN# 3 (R)
PIN# 3: (I) (+) non linear signal output	→	PIN# 2 (I)
PIN# 4: (G) (-) ground output	→	PIN# 4 (G)
PIN# 5: (V) not used		
PIN# 6: (G) not used		

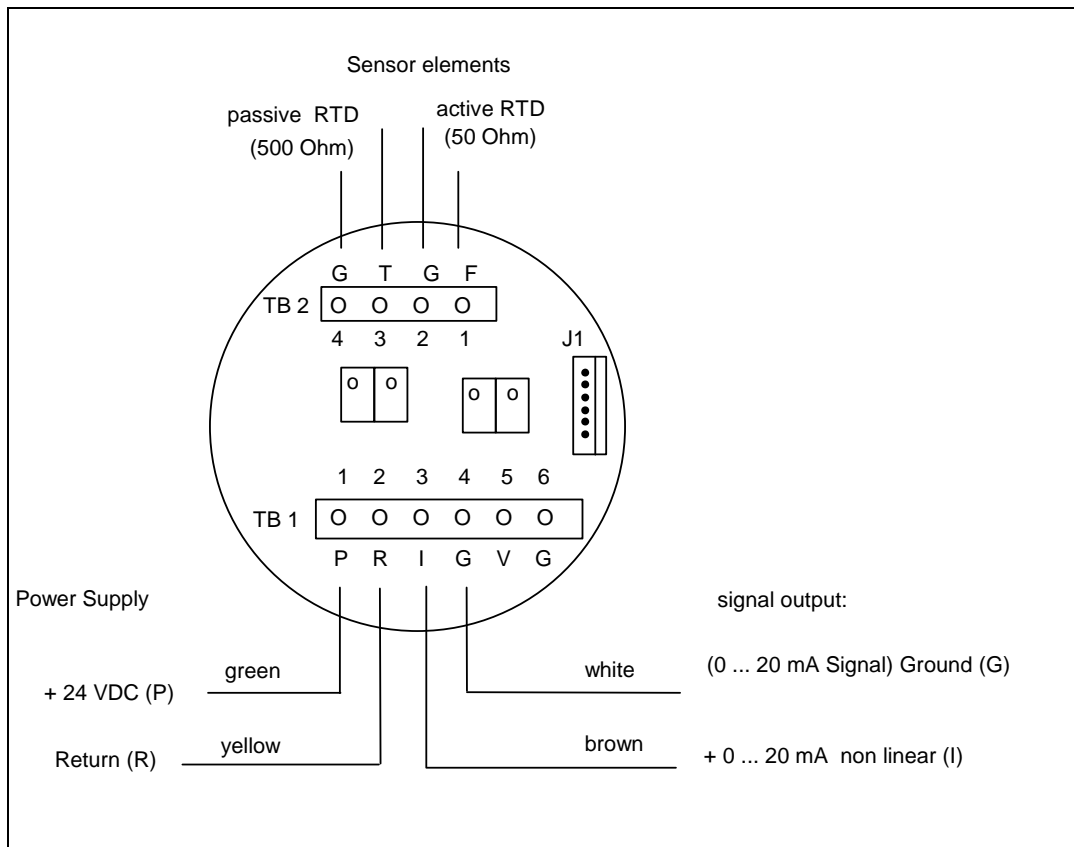


Abb. 12) Sensor circuit board layout

4. Power up the system

Before power up the system be sure that all wiring is correct. Please check the power supply (230 VAC or optional 110 VAC or 24 VDC) is only on the PIN called "L1" & "N" on the terminal block.

Important note:

If you find no sticker on the transmitter enclosure with the optional power supply of 110 VAC or 24 VDC than the standard power supply of 230 VAC is necessary. If you have a 24 VDC version do not apply a power supply of 110 VAC or 230 VDC.

After power up the system the following message should be read on the LCD Display:

V	A	R	I	O	M	A	S	S		R	e	v	2	.	X
T	e	s	t		a	c	t	i	v	e		.	.	.	

This means that the system is doing a Hardware- and Software testing for about 30 seconds after that the following message is only for a second to read:



T	e	s	t		O	.	K	.	!						


After this the systems goes automatically into the standard readout of the flow rate:



f	l	o	w		r	a	t	e							
									0		m	3	/	h	


Now the system has to be configured.


4.1 key function


 · ·  for input numbers from 0 to 9

 "up" key for the behind value/level


 "down" key for the next value/level []

 time key

 Information key (Information modus) or select key

 EXIT key for leaving the program or Information modus

 Enter key for setting O.K. (YES) in the program (MENU)

 Sum key for all totalizer values and for the data logger program



Menu key starts the program level




Maximum key for maximum flow values

Note:


After pressing a key the system went into the standard readout (flow rate) after 30 seconds without pressing any further key (except in the program - MENU). With the [EXIT] key you will go into the standard readout (flow rate) at any time. After programming do not disconnect the power supply for at least 5 minutes to store all changes in the EPROM.

4.2 Check preset value

The actual time will be displayed by pressing the  key:

t	i	m	e							h	h	:	m	m	
d	a	t	e					D	D	.	M	M	.	Y	Y

Press [EXIT] key to go to the standard readout.

Press the  key for reading all preset value:

f	l	o	w		r	a	n	g	e					
0		t	o		X	X	X	X			m	3	/	h

next press the arrow down key [↓] to reach the next step

z	e	r	o		s	h	i	f	t		u	p		
t	o	:					0				m	3	/	h

next press [↓] key

p	i	p	e		d	i	a	m	e	t	e	r		
	X	X	X	.	X								m	m

next press [↓] key

o	u	t	p	u	t			s	i	g	n	a	l		
0		m	A			t	o				2	0		m	A

next press [↓] key

T	a	g		N	o	.								
														0

next press [↓] key

S	e	r	i	a	l		N	o	.						
								X	X	X	X	X	X	X	X

The shown Serial Number (SN) must be the same as the SN of the sensor. With the [EXIT] key you can leave the Information level or automatically after 30 seconds..

4.3 Change preset value

Press the [MENU] key to go to the program level

The following information will be on the display:

e	n	t	e	r		c	o	d	e		a	n	d		
											E	N	T	E	R

Please enter the code (Password): [1] [3] [7] [9] and than press the [ENTER] key

For pressing [ENTER] again you will go into the main program level

or Press [EXIT] for leaving the main program level

4.3.1 Date/time

In the main program level you can set the new time and/or date:

s	e	t		d	a	t	e		a	n	d				
t	i	m	e	?											

For: YES - press [ENTER] or press arrow up key [▲] for changing the menu language:

4.3.1.1) Language selection

L	a	n	g	u	a	g	e								
s	e	l	e	c	t		?								

or alternative if you have a German menu language:

S	p	r	a	c	h	e									
a	u	s	w	a	e	h	l	e	n		?				

Press the [ENTER] to change the language

D	e	u	t	s	c	h									

You will read "Deutsch" for German language or

E	n	g	l	i	s	h									

"English" for English menu language. To change the language from German to English or other way round press the Information [i] key and thanthe [ENTER] key to confirm your selection which will bring you to the previous level:

s	e	t		d	a	t	e		a	n	d				
t	i	m	e	?											

For changing date and time press the [ENTER] key or press the [EXIT] key to leave the menu program.

The time is given in hours (hh) and minutes (mm) and the date is given in day (DD), month (MM) and Year (YY). See the flashing cursor and use the number key from 0 ..9 for inputting new time or date. Press the [ENTER] key after setting new values or

Press arrow down key [↓] for the next level

4.3.2 measurement units

display readout

s	e	l	e	c	t		u	n	i	t	s		o	f	
m	e	a	s	u	r	e	m	e	n	t		?			

Press [ENTER] if you want to change the flow unit from Nm³/h to m³/min or L/min. All units are based on our standard condition of 20°C & 1 bar absolute and 0% relative humidity.

or Press [↓] for the next level

f	l	o	w		r	a	t	e							
											m	3	/	h	

Press the Information key [i] to show the next available measurement unit

f	l	o	w		r	a	t	e							
											L	/	m	i	n

Press the Information key [i] to show the next available measurement unit

f	l	o	w		r	a	t	e								
											m	3	/	m	i	n

Please confirm your choice with the [ENTER] key and you will come to the next level:

4.3.3 flow range

display readout:

i	n	p	u	t		o	r		c	h	a	n	g	e	
f	l	o	w			r	a	n	g	e		?			

YES - press [ENTER] or NO press [↓] key for next level:

Example for selected measurement unit of Nm³/h:

f	l	o	w			r	a	n	g	e					
0		t	o			X	X	X	X			m	3	/	h

This flow range is only for the analog linear outputs of the transmitter and **not** for the display flow value which can go much higher. The flow range starts from zero (0) and the full scale can be set only. Set the end of the flow range by inputting a 2 to 4 digit number - see the flashing cursor. After setting the new value press the [ENTER] key and you will go the next level

Or press [↓] key for the next level

4.3.4 zero shift

the next level is to change or set the zero shift. This means that the value up to the zero shift will set to zero:

z	e	r	o			s	h	i	f	t					
i	n	p	u	t		o	r		c	h	a	n	g	e	?

"YES" - press [ENTER] or "NO" - press [↓] for next level:

z	e	r	o			s	h	i	f	t		u	p		
t	o	:					0					m	3	/	h

Input a value between 0 and 99 and see the flashing cursor. Please confirm your input with the [ENTER] key and go to the next level

Example:

zero shift up to 010 Nm³/h than the flow value from 1 to 10 Nm³/h are set to zero. We recommend to set the value to 0 and only for the case that you do not want to measure low flow values set it > 0.

4.3.5 pipe diameter

The next level is to set or change the pipe inside diameter only for the insertion meter. For a In-Line Sensor the necessary pipe diameter of 26.6 mm for the 1" Sensor and 52.5 mm for the 2" Sensor will be automatically preset into this menu and does not allow you to change this values.

Note:

This message will not appear for a In-Line meter

i	n	p	u	t		p	i	p	e						
d	i	a	m	e	t	e	r	?							

"YES" - press [ENTER] or "NO" - press [↓] for next level:

p	i	p	e		d	i	a	m	e	t	e	r			
	X	X	X	.	X									m	m

Input a value and see the flashing cursor. Please confirm with the [ENTER] key

Important note:

Input the exact pipe inside diameter from 65,0 mm up to 500,0 mm of your local pipe which is absolute necessary for the Insertion meter to measure correctly!

4.3.6 Output signal

The VARIOMASS electronic has to two different analog outputs:

The voltage output is: 0 to 10 VDC equal to the flow range and can **not** be changed.

The current output can be chosen between: 0 to 20 mA or 4 to 20 mA

s	e	l	e	c	t		o	u	t	p	u	t			
c	u	r	r	e	n	t		s	i	g	n	a	l		?

"YES" - press [ENTER] or "NO" - press [↓] for next level:

o	u	t	p	u	t		s	i	g	n	a	l		
0		m	A				t	o		2	0		m	A

Press the Information key [i] for changing the output signal from 0 to 20 mA into 4 to 20 mA and reversed:

o	u	t	p	u	t		s	i	g	n	a	l		
4		m	A				t	o		2	0		m	A

Please confirm your choice with the [ENTER] key or press [↓] for the next level:

the next level is the section of the options (see chapter 4.5)

4.3.7 Input Tag #

The next level you can input a TAG Number

e	n	t	e	r		o	r		c	h	a	n	g	e	
T	a	g		N	o	.	?								

Press [ENTER] to input a TAG number or press the down arrow [↓] key to reach the next level

Now you can enter a 1 to 4 digit Tag number

T	a	g		N	o	.	:								
											X	X	X	X	

press [ENTER] for the next level

4.3.8 LCD Filter

L	C	D		f	i	l	t	e	r						
t	y	p	e		c	h	a	n	g	e		?			

press [ENTER] if you want to change the response time for the LC-Display filter or press [EXIT] to leave the program menu level. The standard response time is 1 second and can be changed to 5, 10 or 20 seconds for the case that the value of the display changes are too fast. The changing has no influence for the analog or digital output.

f	i	l	t	e	r						1		s	e	c

Press [i] to show the next filter type. Press [ENTER] to confirm your selection. Now the menu of the program starts with the first level „input date and time?“ which we already had and you can leave this program with the [EXIT] key.

All changes are stored in the EPROM but the power supply must be switched on for the next 5 minutes.

4.4 Options

The transmitter can have optional the following functions:

- a serial output RS 232 port for using a PC with a terminal program or a matrix printer with a serial input port to print the flow rate as a function of the time and date (option code V0)
- the pulse output function to transmit the total flow as a digital signal (example 1 m³/pulse) for a separate pulse counter (option code I0)
- relay contacts for flow alarm (MAX/MIN) or for totalizer alarms (option code K0)

See the model numbering system (last page) to compare with your model number (see the line on the sticker with the word „Model Number“) which functions do you have in your individual flow meter.

4.4.1 Serial Output RS 232

The serial output RS 232 can be configured with the time between two printer lines from 1 second up to 9999 seconds within this menu.

C	o	n	f	i	g	u	r	e		s	e	r	i	a	l
O	u	t	p	u	t		R	S		2	3	2		?	

Note

This display text will only be shown when your electronic is shipped with this option.

Press ENTER to input the serial interface parameter which your printer or Computer use (like: baud rate, bit master, protocol) or press the down arrow [↓] key to go ahead

Press [ENTER] to select one of these baud rates

- No. 1) 19200 baud
- No. 2) 9600 baud (preset value)
- No. 3) 2400 baud
- No. 4) 1200 baud

Press the information key [i] to choose between the different baud rates listed above. Choose one of these rates and press the [ENTER] key to confirm and the next level is to select the data & stop bits format:

- #1) 7 data & 2 stop bits
- #2) 8 data & 1 stop bit (preset)

Press the information key [i] to choose between the different data format listed above. Choose one of these format and press ENTER to confirm.

The next level is to select the data protocol:

- #1) no handshake (preset value)
- #2) hardware handshake (CTS/DTR)
- #3) software handshake (XON/XOFF)

Press the information key [i] to choose between the different data protocol listed above. Choose one of this protocol and press ENTER to confirm.

The next level is to configure the printer output time between two lines:

Press ENTER to reach this level

p	r	i	n	t		e	v	e	r	y	:				
			0							s	e	c	o	n	d

input the 4 digit time for printing between every line from one second (0001) up to one hour (3600 seconds) or more (maximum 9999 Seconds) and press ENTER to confirm. Than press the EXIT key to level the MENU (Program) level.

The serial output is now completed and your printer or PC should print the following messages:

VARIOMASS

Tag No.: XXXX
 Serial No.: XXXXXXXX
 Pipe diameter: XXX.X mm

date: time: flow rate:
 DD.MM.YY hh:mm:ss X Nm³/h
 DD.MM.YY hh:mm:ss Y Nm³/h

and so on...

4.4.2 Pulse Output option

The pulse output can be configured with the m³ per pulse or L per pulse for the fact that you choose the dimensions L/min in section 4.4.2.

p	u	l	s	e											
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

Press ENTER to go to the next level to configure the pulse rate:

For example for the measurement unit Nm³/h or m³/min:

p	u	l	s	e		r	a	t	e						
0								m	3	/	p	u	l	s	e

Input the pulse rate for example 1, 10 or 100 m³/pulse depending on the flow rate.

Press ENTER to confirm your input value

4.4.3 Relay Alarm option

The two relay K1 and K2 can be configured for the high and low flow alarm or for the two totalizer Z1 and Z2.

r	e	l	a	y		a	l	a	r	m				
c	o	n	f	i	g	u	r	a	t	i	o	n		?

Press ENTER to go to the next level to configure the relay alarms:

r	e	l	a	y		#	1		f	o	r			
f	l	o	w		a	l	a	r	m		?			

Press ENTER to go to the next level to set the relay number one for a flow alarm:

s	w	i	t	c	h		p	o	i	n	t		a	t
									0		m	3	/	h

set the low or high flow switch set point for relay #1 and press ENTER

r	e	l	a	y		#	1		f	o	r			
t	o	t	a	l	i	z	e	r		Z	1	?		

Press ENTER to go to the next level to set the relay number one for a totalizer alarm:

s	w	i	t	c	h		p	o	i	n	t		a	t
										0		m	3	

set the switch point for relay #1 and press ENTER

Note:

Do not use the same relay # as a flow switch and totalizer alarm.

R	e	l	a	y		#	2		f	o	r			
f	l	o	w		a	l	a	r	m		?			

Relay #2 can be set as relay #1 for different values number or press [EXIT] to leave this menu section.

Note

The green LED on the wall mounting enclosure K1 will indicate that the relay#1 contact is open and the red LED will indicate that the relays are closed. The DIN enclosure has only one LED which is on when the contacts are closed.

Press the [EXIT] key to leave the program level to go to the flow rate indication.

4.5 Set maximum flow value record

The VARIOMASS electronic allows to record the 3 maximum flow values above a set point within a preset time.

Press the [MENU] key from the standard readout to go to the program level

The following information will be on the display:

e	n	t	e	r		c	o	d	e		a	n	d		
											E	N	T	E	R

Please enter the code (Password): [1] [3] [7] [9] and than press the [ENTER] key

The following message is on the display:

p	r	e	s	s		E	N	T	E	R	,	M	A	X	
o	r		S	U	M		k	e	y						

For pressing the [MAX] key you will go into the maximum flow value program level

or Press [EXIT] for leaving the program level

m	a	x	i	m	u	m		f	l	o	w				
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

Press ENTER to configure the maximum flow record:

s	e	t		s	t	a	r	t	/	s	t	o	p		
t	i	m	e	?											

Press ENTER to configure the start and stop time for the maximum flow record period:

			S	t	a	r	t				h	h	:	m	m
								D	D	.	M	M	.	Y	Y

Input the start time and date and Press ENTER to confirm or press the arrow down key [↓] to set the stop time and date:

			S	t	o	p					h	h	:	m	m
								D	D	.	M	M	.	J	J

Input the stop time and date and Press ENTER to confirm or press the arrow down key [↓] to set the maximum flow limiting value:

m	a	x	.		f	l	o	w		o	v	e	r		
					X	X	X	X				m	3	/	h

Input the normal flow value over this point the electronic should record the maximum flow. This value should not be zero (see the flashing cursor). Please confirm your input with the [ENTER] key.

Press the [EXIT] key o leave this program level to return to the standard readout.

Now the maximum flow value record is completed and the unit will be record the maximum flow value between the start and stop time which is over your max. flow rate (limiting value).

4.6 reading maximum flow value

From the standard readout press the [MAX] key to read the maximum flow value.

Note:

This value will only be shown when the maximum flow is configured with start and stop time in the MENU level (see section 4.5).

n	o	t	i	f	y		m	a	x	i	m	u	m		
f	l	o	w		v	a	l	u	e		?				

Press ENTER to display the maximum flow values and the date and time when it happens:

First the start time of the whole period during the maximum flow value have been recorded is listed:

s	t	a	r	t						h	h	:	m	m
							D	D	.	M	M	.	Y	Y

press the down key [↓] to show the stop time of the recording period

s	t	o	p							h	h	:	m	m
							D	D	.	M	M	.	Y	Y

press the down key [↓] to show the time of the first value starts (up)

1	.	v	a	l	u	e		u	p		h	h	:	m	m
							D	D	.	M	M	.	Y	Y	

press the down key [↓] to show the time of the first value (stops) to

1	.	v	a	l	u	e		t	o		h	h	:	m	m
							D	D	.	M	M	.	Y	Y	

press the down key [↓] to show the maximum flow rate of the first value

1	.	v	a	l	u	e		m	a	x	.				
											m	3	/	h	

press the down key [↓] to show the time of the second value up / to

press the down key [↓] to show the maximum flow rate of the second value

press the down key [↓] to show the time of the third value up / to

press the down key [↓] to show the maximum flow rate of the third value

Note:

There are a maximum of three values and the third one can be the one with the highest peak (flow rate). Please check every 3 maximum values before you leave this program.

Press the EXIT key to leave the reading mode of the maximum flow value and go to the standard readout.

5. Totalizer

VARIOMASS has two independent totalizer (Z1 and Z2). Each totalizer is reset able and has to setup in the program (MENU) with start and stop time. During this time period the flow will be summed in the totalizer in cubic meter (m³) for the flow units Nm³/h or m³/min and in Liter (L) for the unit L/min..

5.1 totalizer setup

Press [MENU] key from the standard readout (flow rate) to go to the program level
Display readout:

e	n	t	e	r		c	o	d	e		a	n	d		
											E	N	T	E	R

Please enter the code (Password): [1] [3] [7] [9] and than press the [ENTER] key

You have to choose between the following keys: [ENTER], [MAX] or [SUM]

Press the Σ (SUM) key to setup the totalizer number one (Z1) or/and two (Z2):
Display readout:

t	o	t	a	l	i	z	e	r		Z	1				
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

YES - press [ENTER] key or NO - press down key [↓] or [EXIT] key:

Z	1		S	t	a	r	t				h	h	:	m	m
								D	D	.	M	M	.	Y	Y

Press [ENTER] key again for setting new start time of the totalizer #1 and input time (hh:mm) and date (DD.MM.YY) and confirm with the [ENTER] key or Press down key [↓] for setting Stop time for totalizer #1 as Start time:

Z	1		S	t	o	p					h	h	:	m	m
								D	D	.	M	M	.	Y	Y

Press [ENTER] or use the down arrow key [↓] for the next level "totalizer reset":

t	o	t	a	l	i	z	e	r		#	1				
r	e	s	e	t		?									

Press the [ENTER] to reset the totalizer Number one or press down key [↓] for totalizer #2 or press [EXIT] for leaving the program level. After reset the totalizer the following display readout is readable:

t	o	t	a	l	i	z	e	r		#	1		i	s	
z	e	r	o												

Press the down key [↓] for setting totalizer number 2 (Z2):

t	o	t	a	l	i	z	e	r		Z	2				
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

Press [ENTER] to setup totalizer number 2 as totalizer number 1

Press [EXIT] after setting totalizer #2 for leaving the program and go to the standard readout. All parameters are saved in EPROM also by disconnecting the power supply after 5 minutes after the last input.

5.2 reading totalizer

From the standard readout press the SUM key  to read the total flow since power up the system:

t	o	t	a	l		f	l	o	w						
														m	3

Note:


The total flow value since power up the system is not reset able.

During the total readout is indicating press the key #1 [1] to read the totalizer number one (Z1) or #2 [2] to read totalizer number two (Z2) flow value:

t	o	t	a	l	i	z	e	r		Z	1				
														m	3

After reading the value press the [EXIT] key to go to the standard readout (flow rate) or automatically after 30 seconds.

5.3. reading time

Press the time key  to read the actual time and date:

t	i	m	e							h	h	:	m	m	
D	a	t	e					D	D	.	M	M	.	Y	Y

during this message press the number 1 key [1] to read the Start time of totalizer No. 1:
Start time of totalizer number 1:

Z	1		S	t	a	r	t			h	h	:	m	m	
								D	D	.	M	M	.	Y	Y

and press arrow down key [↓] to read the stop time of totalizer No. 1:

Z	1		S	t	o	p				h	h	:	m	m	
								D	D	.	M	M	.	J	J

For totalizer No. 2 press key number 2 [2] and the up and down key [↓] to switch between start and stop time.

Press [EXIT] key to leave this reading modus.

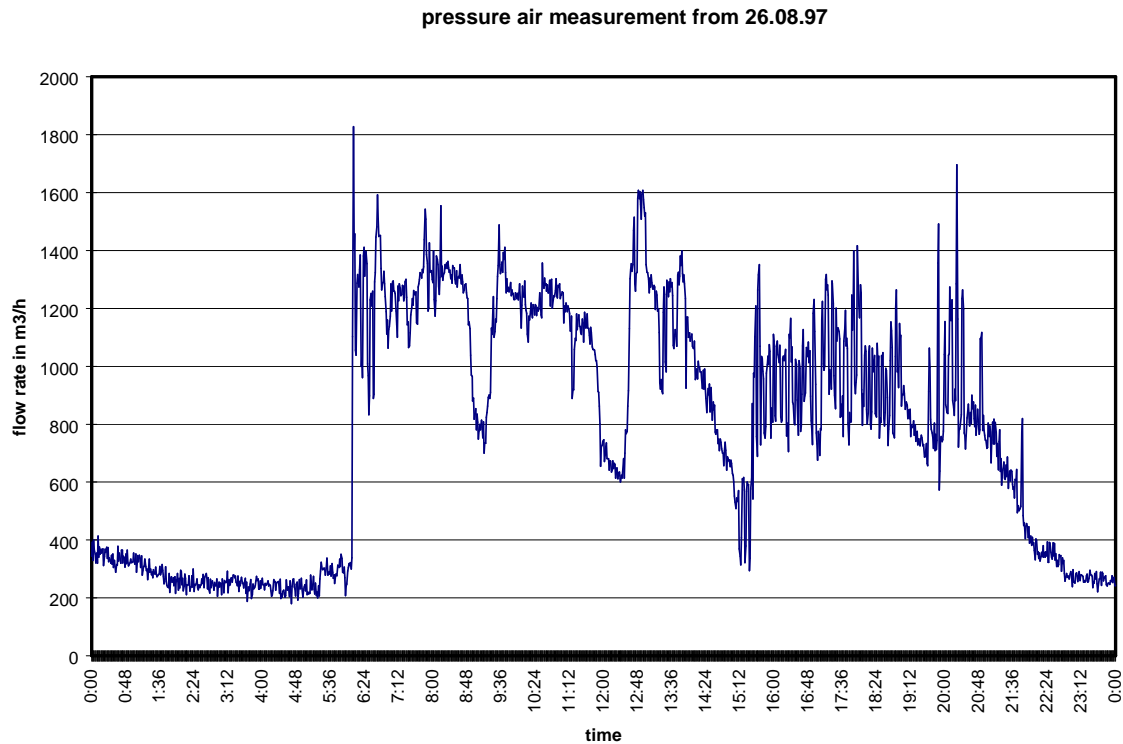
6.0 Data Logger

6.1. Introduction

In case that your VARIOMASS system is equipped with the Data Logger option, you will find a mark inside of electronic enclosure („with data logger“).

This data logger has an internal memory of 4 Mbytes. The electronic saves the actual flow of the pressured air in a programmable time period from one day up to a few years.

The memory can be read out with a special program called VARLOG



Tab. 1) Example MS EXCEL diagram of the data logger file

6.2. Select time period of saving interval

The time period of saving interval can be entered with a value of 1 second up to 999 seconds. Following maximum time of recording can be reach in dependence of chosen time period:

Time period (Seconds)	max. time of recording:	Quantity of savings per day (24 h):	Necessary space on hard disk (total):
1	3 days	86.400	43,2 MB
6	18 days	14.440	43,2 MB
10	1 month	8.640	43,2 MB
60	6 month	1.440	43,2 MB
120	1 year	720	43,2 MB

For every day a file will be made with the following format: „YY_MM_DD“, example „02_03_31“, that means this file includes data from the date 31.03.2002. The data file inside of the electronic is compressed and will be much larger after read out with a PC and the program. If the memory of electronic is full (that means 4 Mega Bytes) a necessary space on hard disk of 43,2 Mega Bytes is needed. Please look at above chart for more information.

Note:

Do not use in the time period of saving 1 second for more than 4 hours per day. For longer period (> 1 day) we recommend to use a time period of 60 seconds.

6.3. Programming Data Logger

The Data logger needs for activating the following pre-set values:

- Time period of saving interval
- Time and date for start the measuring
- Time and date for stop the measuring

These values can be entered in the electronic as follows.

Press key „MENU“ and following text will be displayed:

E	n	t	e	r		c	o	d	e		a	n	d		
											E	N	T	E	R

Input the code [1 3 7 9] and press key [ENTER]

following selection will be displayed:

p	r	e	s	s		E	N	T	E	R	,		M	A	X
o	r		S	U	M		k	e	y						

press the sum key Σ to get into the totalizer and Data logger modus.

T	o	t	a	l	i	z	e	r			Z	1			
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

press key \downarrow two times and following display will appear:

D	a	t	a		L	o	g	g	e	r					
c	o	n	f	i	g	u	r	a	t	i	o	n		?	

If you want to configure the Data Logger (DL) than press key [ENTER] or the [EXIT] key to leave this program. If the data logger is inactive you will get into the next level. If the data logger is active it isn't possible to get in this level until the stop time and date of the program time is reached.

l	n	p	u	t		r	e	c	o	r	d				
f	r	e	q	u	e	n	z		?						

press the key [ENTER] to confirm:

r	e	c	o	r	d		f	r	e	q	u	e	n	z	
X	X	X							s	e	c	o	n	d	s

Please put in the time period for saving interval with value between 1 second up to 999 seconds. Confirm your input value with key [ENTER] and go to the next step

Note :

We recommend to set the time frequency of 60 seconds for records time period of more than one day.

D	L		S	t	a	r	t	:			h	h	:	m	m
								D	D	.	M	M	.	Y	Y

press again key [ENTER] for change the start time and date. Time is given in (hh:mm) hours: minutes and date in (DD.MM.YY) Day . Month .Year

Note:

Please do not input a start time and date which is actual or in the past because the recording will start as soon as you entered the stop value and it isn't possible to change a value while the Data Logger is recording.

Press key [ENTER] and you'll get into the stop values:

D	L		S	t	o	p					h	h	:	m	m
								D	D	.	M	M	.	Y	Y

press again key [ENTER] for input or change the stop time and date.


Please be informed that a active data logger can not be stopped until the stop time and date is reached. During the time while the data logger is active it isn't possible to set the internal clock. A blinking star (*) is on the display beside the word „flow rate“ as long as the data logger is active!

At the end of recording a new start and stop value can be entered for a new recording. The data of each recording will be added to the older data without overwriting.

Press key [EXIT] for leaving the main program level and wait at least 5 minutes before you disconnect the power supply to store all changes in the EPROM.

6.4. Check pre-set value of Data logger

The pre-set start-, stop- and record frequency values can be checked without getting into the Code-Menu as follows:

Please press the key  from the flow rate level and the actual time will be displayed:

T	i	m	e								h	h	:	m	m
D	a	t	e					T	T	.	M	M	.	J	J

During that time press key [3] and the values for data logger will displayed, beginning with start time and start date:

D	L		S	t	a	r	t				h	h	:	m	m
								D	D	.	M	M	.	Y	Y

Press key [↓] for stop time and stop date:

D	L		S	t	o	p					h	h	:	m	m
								D	D	.	M	M	.	Y	Y

Press again key [↓] for displaying the record frequency:

F	r	e	q	u	e	n	c	y							
X	X							s	e	c	o	n	d	s	

With key [EXIT] you can leave the information level (it will be ended automatically after 30 seconds without an input).

6.5. Read out Data logger

In case that the data logger memory data's should be read out with the program VARLOG on the floppy disk connect the RS 232 cable between the VARIOMASS electronic and your PC. This cable has on both ends a 9-pin Sub-D Female connector one black colour and one white colour.

Note:

If your electronic is prepared with the option RS 232 output for a direct connection to a printer, it is necessary that the printing is deactivated. That means „print every: 0 second“ (look into the VARIOMASS manual chapter 5.1) must be entered.

On the attached 3 ½" floppy disk is the VARLOG program with the following files:

Varlog.exe
Dielen.ini
Deutsch.ini
English.ini
Hinweis.txt
Readme.txt

0) general information:

Before you install this program, you should try to set the screen resolution for an optimal representation on your PC's to 1024 x 768 picture points. This software works on operating systems with MS Windows 95, 98, 2000 or NT.

The known of the software revision number of the VARIOMASS field electronic which will be shown when switching the power on after the test period (example Rev. 2.8) is important. If you have a software Rev. less than 2.8, for example Rev. 2.1 to 2.7 (delivered before May 2001), than you must set in the "Dielen.ini" file at the end "Version=1", instead of "Version=0" and than close that file and store the changes. On this occasion the total consumption, the calibration date and the Tag number won't pass out.

I) installation:

Please copy all the files of this disc (example from drive A), into one before aimed directory on the PC hard disc (for example C:/VARIOMAS/Logger) with the MS Explorer.

II) program start:

Start this program through a double-click on the file "VARLOG.exe" of the hard disc of your computer and not from this 3 ½" floppy disc.

III) on-line connection produces:

connect the VARIOMASS field electronics with the enclosed RS 232 cable with the serial port of your computer. The cable has on both end a 9-pin Sub-D plug-in connector: hook up one end to the

PC serial port COM 1 or COM 2 and one end with the black connector to the VARIOMASS field enclosure serial RS 232 port (left side of both sub d connectors) and power up the electronic.

IV) basic setup of the software:

1. Select the right language if necessary (German or English) under "Menu - Select Language"
2. Select the right interface port of your computer: COM 1 or COM 2, under "Serial ports - COM port selection".
3. Select under "data - data generate"? if necessary "MS EXCEL file" and/or "MS WORD file". A chart file of the format "YYMMDD--serial number IST" become generate in each case so additional files are normally not necessary (Y = year, m = month d = day).
4. Switch if necessary the Logbook on, if all activities shall be recorded or switch the logbook off.
5. Give if necessary under "price - price current factor" a current factor which multiple the total flow with the factor to calculate the total amount and the select the currency, (Rev 2.8. and higher is necessary)

V) data-logger start reading

Press the button " data-logger read" and the data's in the data-logger will be transmit to the PC the finishing of the reading will stop automatically after all data are read out. After the data transfer is finished successfully, than you are able the delete the data in the VARIOMASS data-logger. Press the button "Data Logger delete". With the button "Data logger stop" you can stop the data logger from collecting data before the end of the programmed time is reached. Now, you can disconnect the RS 232 interface cable between PC and the electronic and work in the off-line modus. If you want stop the data transfer for any reason you find under "Menu" the option "Stop reading" which will stop the data readout from the data logger at once.

VI) data convert

Press the button "data convert" and the packed data (FLASH file) will be unpacked. Under the concept "measurement" you will see the start and stop date and time and the time-interval of the recorded measurement in the data-logger. Under the concept "total cost" you will find the total consumption (Rev 2.8) within the indicated measurement time with the corresponding total amount cost with the selected currency. If you want stop the data converting for any reason you find under "Menu" the option "Stop data converting" which will stop the data converting from the collected data at once.

VII) diagram

A diagram for every day (24 hours) as a chart, compressed air quantity (example Nm³/h) over the time (24 hours) can be shown. Go with the mouse on "diagram - show" and the window "data" will be open. Select a file, that consists of the year (JJ), the month (MM) and the day (DD) followed by the serial number (12345678) of the VARIOMASS electronic and the extension "IST" and open this file through a double-click. The indicated day diagram can be printed by your printer therefore press the button "Print". Press the button "customer name" to input an additional name, for example customer name or Tag number. Also the diagram shows besides the date the weekday and the serial number of the unit. If your printer doesn't print, change your printer setups or change the printer driver or use another printer. We recommend to use a color printer.

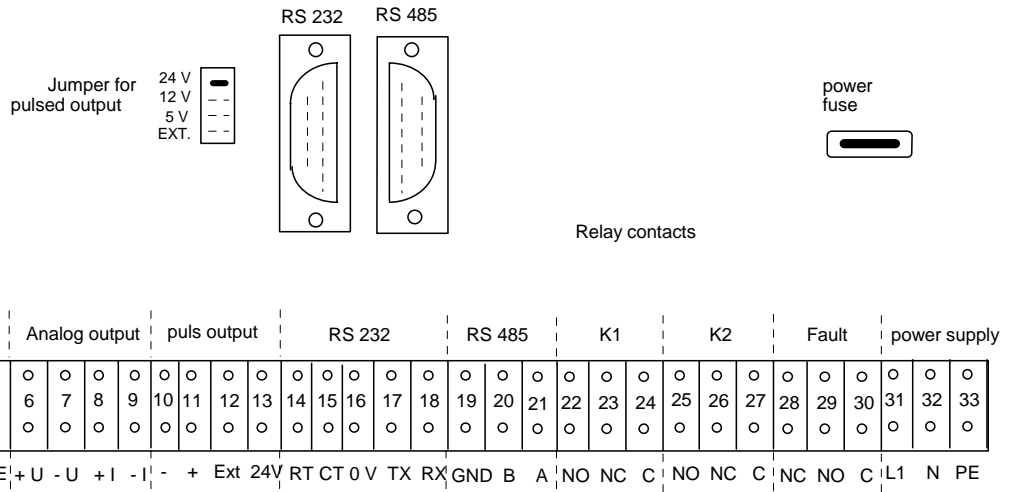
Also several day diagrams (maximum 7 different days) can be shown on one page at one time - use your Shift button pressed and select several diagrams from the data directory starts with below upward, therefore first the diagram with the youngest date (example 01-05-26--SN.IST, and then all other diagrams with older dates (example 01-05-25--SN.IST and 01-05-24--SN.IST and so on) with your mouse and click open. The diagrams for different days becomes different colors. The maximum flow value of all selected diagrams defines the scaling of the Y-axis (Nm³/h). It may not occur however that the flow unit will change, for example from Nm³/h to m³/min. Through pressing the button "file selection" you can change to another day diagram. After completion of the chart close that chart windows with the button "close". In the aimed sub directory "Data - show generated data" all files with the extension "DOC" for MS WORD, or "XLS" for MS EXCEL are stored if activated in the "Data generate". You can use the converted data files for other programs.

VIII) program finishes:

Under the "menu - exit" can leave the data-logger program VARLOG. Finished employment done by you is stored in the program file called "DIELEN.INI" and stands with next call to the disposal.

6.6. Technical Data:

Here is a drawing of the terminal block inside the VARIOMASS NEMA 4 enclosure:



Tab.4) terminal block inside the VARIOMASS enclosure

***) Terminal Block instead of RS 232 Sub-D Male connector:**

The VARIOMASS electronic has a terminal block on the electronic board. It is possible to use this block instead of the Sub-D Male connector.

Wiring between terminal block of VARIOMASS electronic and 9-PIN Sub-D for PC on COM1.

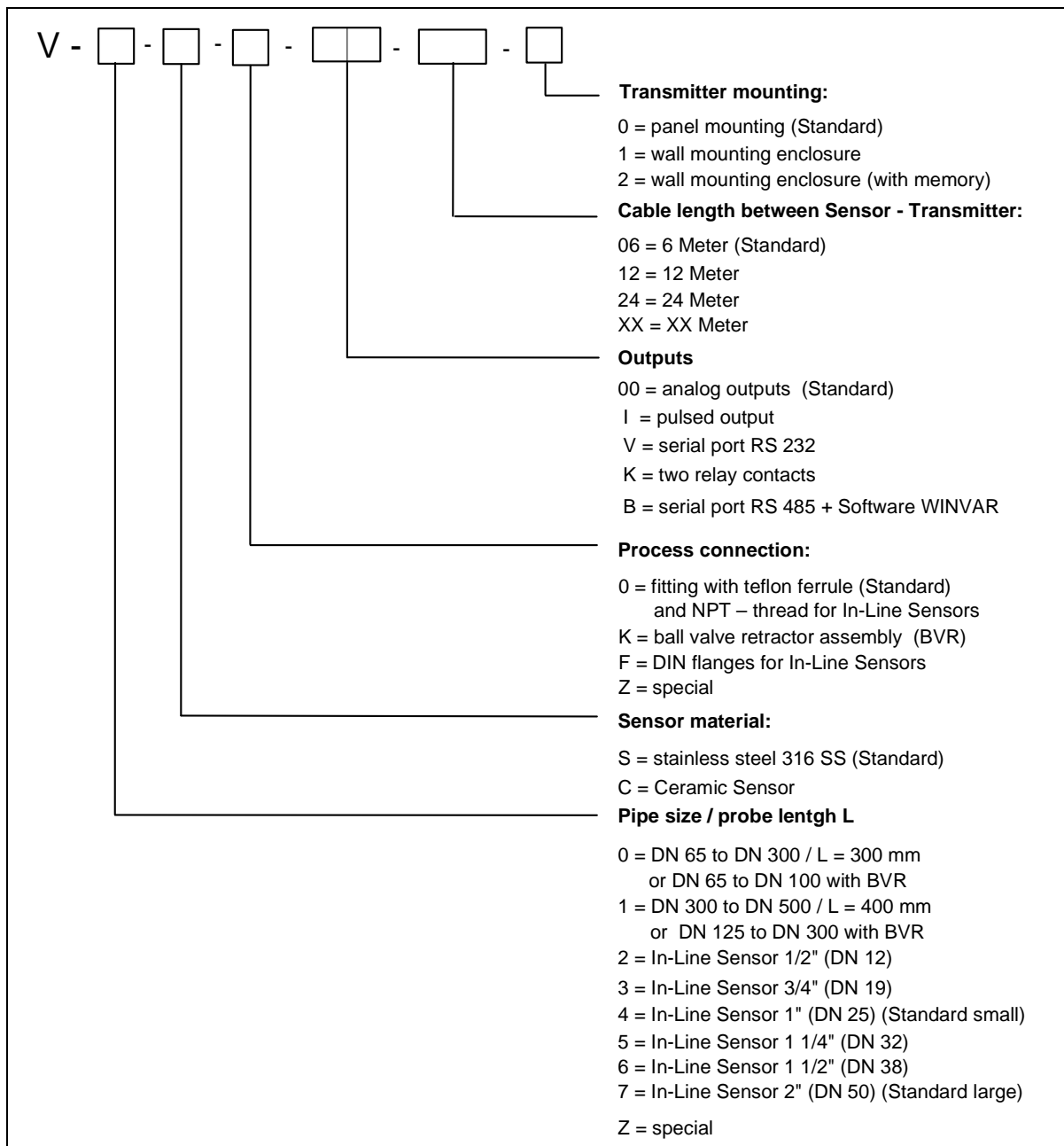
Terminal block No.	Sub-D connector	PIN No.
14	RTS	CTS 8
15	CTS	DTR 4
16	0 V	GND 5
17	TXD	RXD 2
18	RXD	TXD 3

6.7. Data Communication Problems:

In the case that this program will not run check your settings for the serial port COM1 or COM 2. The data logger in the electronic should have data to read out and the power supply of the electronic must be on.

We recommend to use the RS 232 data logger cable which comes with this VARIOMASS system.

7.) VARIOMASS Model numbering system



8) VARIOMASS meter with multiple sensor selection

This additional chapter is for all field electronics (IP 65) with multiple sensor (example one Insertion meter plus one or two In-Line meters) selection

8.1) Change preset value

Press the [MENU] key to go to the program level

The following information will be on the display:

e	n	t	e	r		c	o	d	e		a	n	d		
											E	N	T	E	R

Please enter the code (Password): [1] [3] [7] [9] and than press the [ENTER] key

The following message is on the display:

p	r	e	s	s		E	N	T	E	R	,	M	A	X	
S	U	M		o	R		i		k	e	y				

or for a wrong password:

c	o	d	e		l	n	c	o	r	r	e	c	t		
e	n	t	e	r		n	e	w		c	o	d	e		

than press again [MENU] and input the right Password [1] [3] [7] [9] and than press the [ENTER] key again.

You have to choose between the following keys: [ENTER], [MAX], [SUM] (Σ) or the Information [i] key.

For pressing [i] you will go into the program level for choosing the actual sensor type which you want to use or Press [EXIT] for leaving the program level.

S	e	n	s	o	r		T	y	p	e					
s	e	l	e	c	t	i	o	n		?					

Press the [ENTER] key to change the desire sensor type.

S	e	n	s	o	r		N	o	.	1					
I	n	-	L	i	n	e		1		i	n	c	h		

Press the Information key [i] to show the next available sensor type:

S	e	n	s	o	r		N	o	.	2					
I	n	-	L	i	n	e		2		i	n	c	h		

Press the Information key [i] to show the next available sensor type:

S	e	n	s	o	r		N	o	.	3					
I	n	s	e	r	t	i	o	n							

Press the Information key [i] to show the next available sensor type:

S	e	n	s	o	r		N	o	.	4					
I	n	s	e	r	t	i	o	n		<	3	b	a	r	

Press the [ENTER] key to confirm your selection. Then press the [EXIT] key to leave the program level for the sensor type.

Note:

After you choose the sensor type you must wait 5 minutes before you can switch off the power supply of the system otherwise the changing are not stored in the EPROM. Do not choose a meter which you do not have.

In the main level the „flow rate“ will be showing you the desired Sensor Type with the actual flow rate, for example.:

I	n	s	e	r	t	i	o	n							
						1	2	3	4		m	3	/	h	

or.:

I	n	-	L	i	n	e		1		i	n	c	h		
						1	2	3	4		m	3	/	h	

8.2. pipe diameter

the next level is to set or change the pipe inside diameter only for the insertion meter selection. For a In-Line Sensor the necessary pipe diameter (26.6 mm for 1" Sensor and 52.5 mm for the 2" Sensor) will be automatically preset into this menu. (Note: this will not appear for a In-Line meter)

I	n	p	u	t		p	i	p	e						
D	i	a	m	e	t	e	r	?							

"YES" - press [ENTER] or "NO" - press [↓] for next level:

P	i	p	e		d	i	a	m	e	t	e	r			
X	X	X	X	.	X									m	m

Input value and see the flashing cursor. Please confirm you input with the [ENTER] key. Input the exact pipe inside diameter in "mm" of your local pipe size !

8.3. Check preset value

Press the i key for reading all preset value:

f	l	o	w		r	a	n	g	e					
0		t	o		X	X	X	X	X			m	3	/ h

next press [↓] or [ENTER] key (within 30 sec.)

z	e	r	o		s	h	i	f	t		u	p		
t	o	:			X	X	X					m	3	/ h

next press [↓] or [ENTER] key

p	i	p	e		d	i	a	m	e	t	e	r		
	X	X	X	.	X								m	m

next press [↓] or [ENTER] key

o	u	t	p	u	t			s	i	g	n	a	l	
4		m	A			t	o				2	0		m A

next press [↓] or [ENTER] key

T	a	g		N	o	.								
											X	X	X	X

next press [↓] or [ENTER] key

S	e	r	i	a	l		N	o	.					
							X	X	X	X	X	X	X	X

Note:
The Serial Number shown is the one of the selected sensor type.

With the [EXIT] key you can leave the Information level.