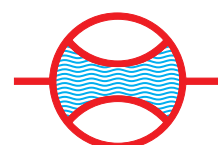


# TDH...-15... TDI...-15...



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## 1 INTRODUCTION

The flowmeters of the TDH.../TDI...series are characterized by reliable function and simple operation. In order to use the advantages of the device in its entirety, please note the following:

**Each person, assigned to work on or operate this device, must have read and understand the Operating Instructions and in particular, the safety references!**

## 2 SAFETY GUIDELINES

### 2.1 General information

To ensure safe operation, the device must be operated only in accordance with the instructions in this manual. Additionally, use of the device requires adherence to all legal provisions and safety standards for the respective application. The same applies also to the use of accessories.

### 2.2 Correct use in accordance with these instructions

The devices of the TDH.../TDI... series serve to measure and monitor the continuous flow of liquids. Any additional or different application, above and beyond the correct use described in these instructions, is deemed as incorrect use. Unless stated otherwise, the information provided regarding these devices, refer to water.

The devices of the TDH.../TDI... series may not be used as the sole monitoring device to avoid dangerous conditions on machinery and systems.

Machines and systems must be designed so that faulty conditions cannot lead to dangerous situations for the operating staff.

### 2.3 Qualified personnel

The devices of the TDH.../TDI... series must only be installed by qualified personnel, who are able to correctly employ the device for its intended purpose. Qualified personnel are persons who are familiar with the setup, assembly, start-up, and correct use of these devices, and who are able to independently carry out the work assigned to them.

## 3 FUNCTIONAL DESCRIPTION

The devices of the TDH.../TDI... series are turbine flow meters used for measuring and monitoring the volume flow of liquids.

The liquid media flowing into the turbine chamber is divided into four separate streams by guide vanes. These streams flow onto the rotor from four different directions and set the rotor in motion. Due to the uniform load on the bearing from four sides, the acting forces cancel each other for the most part, and wear is reduced to a minimum.

Devices of the TDH... series are equipped with magnet-tipped rotors. A Hall sensor detects rotor rotation.

The TDI... series are equipped with stainless steel pin-tipped rotors. An inductive proximity switch detects rotor rotation.

In both cases, a flow-proportional frequency signal (square wave signal) is provided.

## 4 INSTALLATION

### 4.1 Process connection

**Notice!** The upper union nut (red) is sealed! It must not be loosened. If it is loosened nonetheless, it will damage the bearing supports. A factory repair is required!

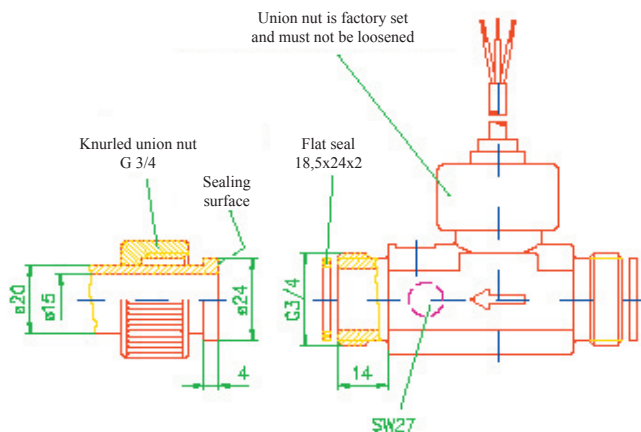
- Prior to installation of the flow sensor, the pipe system must be flushed thoroughly. This will ensure that contamination and foreign particles, stemming from the installation, do not block the turbine.
- A suitable process connection to the device must be present at the site.
- The flow direction must be observed!
- An unimpeded outlet, directly behind the flow sensor, must be avoided.
- Use a suitable sealant (Liquid sealants will damage the turbine and render the device unserviceable).
- Seal properly. It is important to ensure that no fibrous sealants such as hemp or Teflon tape enter the flow.

### 4.2 Installing the device in the pipe system

- Install the device into the pipe system, which has been properly prepared by following the instructions provided in chapter 4.1.
- Ensure that the pipe to be connected has a collar. The flat surface of the collar serves as the sealing surface. With the supplied union nut, the collar is pressed onto the flat seal.
- The plastic union nut has a tightening torque of maximally 8 Nm. The brass union nut has a tightening torque of maximally 30 Nm.
- If sealing on an external thread, ensure that no fibrous sealants such as hemp or Teflon tape enter the flow.



# Operating Instructions Flowmeter TDH...-15... and TDI...-15...



## 5 ELECTRICAL CONNECTION

### 4.3 Operating conditions

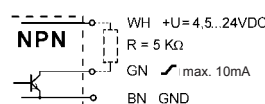
- Do not install the device as a load bearing part within a pipeline system.
- Do not use the device with media containing solids! Particles must not be > 0.5 mm. We recommend the installation of a strainer.
- Check corrosion- and antifreeze agents for material compatibility before use.

**Warning!** The following requirements must be met; otherwise the function of the flow meter will be damaged or impaired.

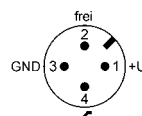
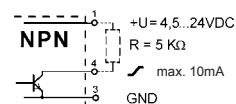
- In order to obtain the specified measuring accuracy, a straight inlet section of min. 10 X DN (TDH...-15/ TDI...-15... = 150 mm), and a straight outlet section of min. 5 X DN must be maintained. (The inner diameter of the inlet and outlet sections must be the same as that of the flow sensor).
- Before and after the unimpeded flow sections, the pipe diameter may be changed.
- The formation of air bubbles in the medium and cavitation must be prevented by appropriate means.

### 5.1 Wiring diagram, Impulse output

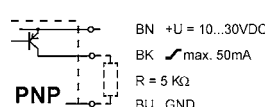
A1: TDHK-15I/PPO (Cable)



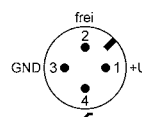
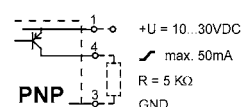
A2: TDHS-15I/PPO (Socket)



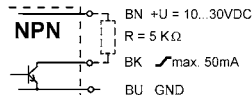
B1: TDIK-15I/PPO (PNP, Cable)



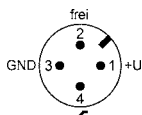
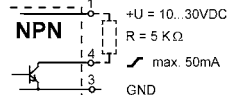
B2: TDIS-15I/PPO (PNP, Socket)



C1: TDIK-15I/PPO (NPN, Cable)



C2: TDIS-15I/PPO (NPN, Socket)



BK = black

BU = blue

WH = white

BN = brown

GN = green

### 5.2 Technical data Impulse output

(TDHK-15I/PPO, TDHS-15I/PPO, TDIK-15I/PPO und TDIS-15I/PPO)		
	Device with Hall sensor TDH...	Device with inductive proximity switch TDI...
Measuring accuracy:	± 1% of full scale	± 0,5 % of full scale
Repeatability:	± 0,2 %	± 0,1%
Output signal:		
Pulsrate / K-Factor	855 Pulses / Liter	1795 Pulses / Liter
Resolution	1,2 ml / Puls	0,6 ml / Puls
Signal form	Square wave	Square wave
	NPN open collector	PNP or NPN open collector
Signal current	max. 10 mA	max. 50 mA
Wiring diagram	A1 and A2 (see above)	B1,B2,C1 and C2 (see above)
Start of signal output:	approx. 0,3 l/min	approx. 0,3 l/min



# Operating Instructions Flowmeter TDH...-15... and TDI...-15...

## 6 SERVICE AND MAINTENANCE

Regularly scheduled functional control and maintenance increases the lifetime and reliability of the flow sensor and the entire plant.

Service intervals depend in large part on the degree of contamination of the medium.

Service and maintenance must, at a minimum, include inspection of the following:

- Leaks from the device
- Free movement of the turbine

It is the responsibility of the operator to establish appropriate intervals and procedures for servicing and maintenance, depending on the operating conditions, the composition of the medium.

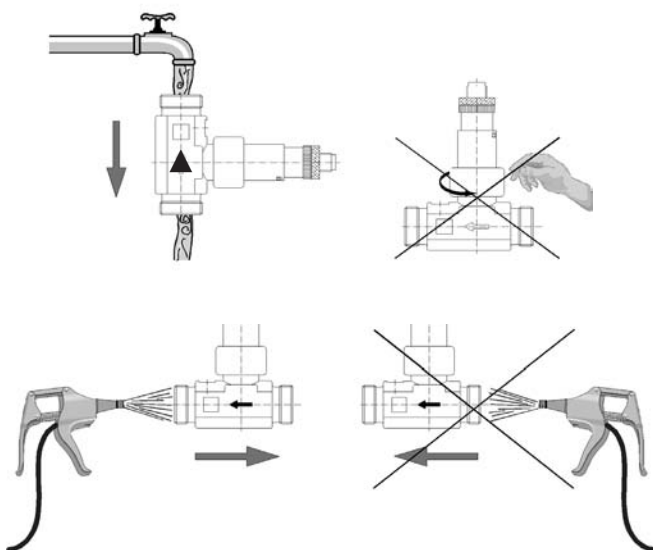
- Free movement of the turbine can be checked by changing the flow rate and monitoring the frequency signal.

For cleaning, the flow sensor should be flushed thoroughly with water. Flush against the direction of flow, only. This applies also if using compressed air – against the direction of flow, to prevent damaging the turbine.

### Notice:

The upper union nut of the sensor is sealed and must not be opened. If it is opened, it will damage the bearing supports.

Reinigung / Cleaning



## 7 TECHNICAL DATA

Technical data		
	Device with Hall sensor TDH...	Device with inductive proximity switch TDI...
Process connection:	G 3/4" ISO 228 external thread with union nuts and flat gaskets	
Nominal diameter:	DN 15	
max. media temperature:	85 °C	
Nominal pressure:	PN 10	
Measuring range:		
standard supports	2 - 40 l/min, at continuous load, max. 20 l/min	
reinforced supports	4 - 40 l/min	
Start of Signal output:	approx. 0,3 l/min	
Maximum size of particles in the medium:	0,5 mm	
Electrical connection:		
Cable connection (TDHK... or TDIK...)	1,5 m shielded PVC cable	2,0 m shielded PVC cable
	$T_{max} = 70\text{ °C}$	$T_{max} = 70\text{ °C}$
Plugs (TDHS... or TDIS...)	4-Pin-plug M12x1	4-Pin-plug M12x1
Power supply (Pulse output):	4,5...24 VDC	10...30 VDC
Ingress protection:	IP 54	
Electrical outputs:	see page 3	
Options:		
Strainer	screen strainer, screen aperture 0,5 mm:	$T_{max} = 60\text{ °C}$ (continuous flow) $T_{max} = 85\text{ °C}$ (max. 1 h)

Materials			
	Wetted parts	Devices with Hall sensor TDH...	Devices with inductive proximity switch TDI...
Measuring tube	yes		
Standard version (.../PPO)		PPO (Noryl GFN3)	
Brass version (.../MS)		Brass (CuZn36Pb2As)	
Sensor	yes	PPO (Noryl GFN3)	
Union nut	no	PA 66	
Turbine chamber and impeller	yes	PEI ULTEM	
O-ring / gasket	yes	NBR, FKM (optional)	
Bearing / Axle	yes	Axle Arcap AP1D with hard alloy pins in sapphire bearings	
Bearing support	yes	Arcap AP1D	
Magnets	yes	hard ferrite magnet	stainless steel pins
Strainer (optional)	yes	POM / stainless steel	