

**VOITH**

# **I/H Converter**

**Type DSG-B03212**

**Type DSG-B07212**

## **Instruction Manual**

**Version 1.0**

Should you have any questions concerning the I/H converter, please contact the Service Department of the product group Electronic Drive Systems, Voith Turbo GmbH & Co. KG, Crailsheim, indicating article number and serial number of the I/H converter.

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This instruction manual describes the technical condition of the I/H converter on delivery from May 2003.  
Any modifications following the delivery are not considered in this operating manual.

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## 1. Technical Data

### Ambient conditions:

Ambient temperature for storage	-40 °C ... +90 °C
Ambient temperature:	
- Normal operation	-20 °C ... +85 °C
- Potentially explosive atmos.	-20 °C ... +60 °C
Explosion protection	EEx d IIC
Temperature class	T4, at Ta = -20 °C ... +60 °C
Device group	II
Category	2G
Protection	IP 65 to EN 60529
suitable for internal installation in industrial air	

### Electric data:

Supply voltage	24 VDC $\pm$ 10%
Power consumption	approx. 0.7 A max. 3 A, for t < 1 sec
Setpoint input	w = 0/4...20 mA input resistor 25 Ohm with suppressor circuit

### Hydraulic data:

Input pressure $P_{in}$ min	1.5 bar more than $P_A$ max
Input pressure $P_{in}$ max	see table
Pressure fluid	mineral oil or hydraulic oil (hardly combustible fluids on request)
Viscosity pressure fluid	ISO VG 32... ISO VG 48 to DIN 51519
Temperature pressure fluid:	+10 °C...+60 °C
Oil purity	recommended purity class: To NAS1638 class 7 To ISO4406 class -/16/13
Leakage	≤ 5 l/min

Type	DSG-BXX212	
	B03...	B07...
Output pressure regulating range $P_A$ [bar]	0..3	0..7
Input pressure $P$ (max) [bar]	40	40
Flow rate line $P \rightarrow A$ Q1 [l/min] at $\Delta P = 1$ bar	17	17
Flow rate line $A \rightarrow T$ Q2 [l/min] at $\Delta P = 1$ bar	18	18
Regulating range approx. $P_A$ max [bar] at setpoint $w = 20$ mA	1..3	5..7
Regulating range approx. $P_A$ min [bar] at setpoint $w = 4$ mA	0..0.8 0..2	1..3 1.5..5

The regulating range of  $P_A$  min depends on the set pressure  $P_A$  max.  
 The regulating range of  $P_A$  min indicated in the first line refers to the minimum adjustable pressure  $P_A$  max .

### Mechanical data:

Dimensions, fitting	see chapter 10
Hydraulic connection	see chapter 10
Mounting position	see chapter 10
Sealing material	FPM
Weight	approx. 12 kg

## 2. Safety Information

### 2.1 Definition of notes and symbols



#### **Danger !**

This symbol signals an imminent danger to the life and health of individuals.  
If this note is not observed, injury to health and even most serious injuries may be the consequence.



#### **Warning !**

This symbol signals a harmful situation.  
If this note is not observed, the product may be damaged.



#### **Note !**

This symbol refers to proper handling of the product. It does not refer to or indicate a dangerous situation.

### 2.2 Proper use

The I/H converter serves to transform an electric set signal into a related hydraulic output pressure reduced to feed-in pressure. This allows, for example, adjusting control pistons at hydraulic cylinders which are used to position the valves of steam turbines.

The I/H converter is suitable for usage in potentially explosive atmospheres according to the explosion protection mentioned in chapter 1.

### 2.3 Important notes

The following notes refer to the entire instruction manual and have to be observed in addition to the individual notes.

#### Accident prevention



- In any case observe the relevant standards and regulations when connecting an I/H converter in ex-design.
- Improper use may cause operating agent under pressure to leak at the sealing surfaces. There is a risk of fire around hot components.
- Isolate the hydraulic supply prior to working on the I/H converter.



- Failure of electric power or disturbance of the control electronics integrated in the I/H converter may cause strong variations of the output pressure when operating the I/H converter. Thus e.g. the piston rod of a hydraulic cylinder may move uncontrolled, causing danger to individuals or equipment.
- During operation, the outer surfaces of the I/H converter may heat up due to the pressure fluid. Contact may cause skin burns. Make sure to cool down the I/H converter prior to working on it.



- Electrical components are installed in the I/H converter. These components can be destroyed by e.g. welding in its surrounding. Therefore make sure to disconnect all electric connections prior to electrical weldings in the surrounding of the I/H converter.

### Environment protection

- During mounting, dismantling or improper use of the I/H converter pressure fluid may leak out. Operating agent reaching the sewage system or the open soil, causes severe environmental damages. Leaking pressure fluid has to be collected and deposited in accordance with the national legal regulations.

### Instruction manual



- The instruction manual contains important information for proper handling of the I/H converter. Prior to installation and commissioning of the I/H converter, read the manual carefully and make sure it is completely understood.
- Keep this manual in a location convenient to the operating staff.
- In addition to this operating manual: Have the relevant regulations for prevention of accidents and environmental protection available and observe these.

### Staff qualification

- Only trained and instructed staff is allowed to perform any work on the I/H converter. This personnel has to be trained and authorized to mount I/H converters professionally.
- Installation, commissioning and operation have to be performed by an electronic expert with experiences and knowledge in explosion protection.

### Constructional modifications

- Mounting and constructional modifications are not permitted.
- The screwing of the cable inlet is secured against distortion. Do not distort or loosen the screwing.

## **2.4 Warranty**

The terms and conditions mentioned in the General Conditions of Sale of Voith Turbo GmbH & Co. KG, Crailsheim, are applicable. Warranty claims are excluded, if these are due to one or several of the following causes:

- Improper transportation, storage, mounting, set-up, commissioning and operation of the I/H converter.
- Not observing the safety instructions and guidelines included in this instruction manual.
- Use of spare parts not approved by Voith Turbo GmbH & Co. KG, Crailsheim.

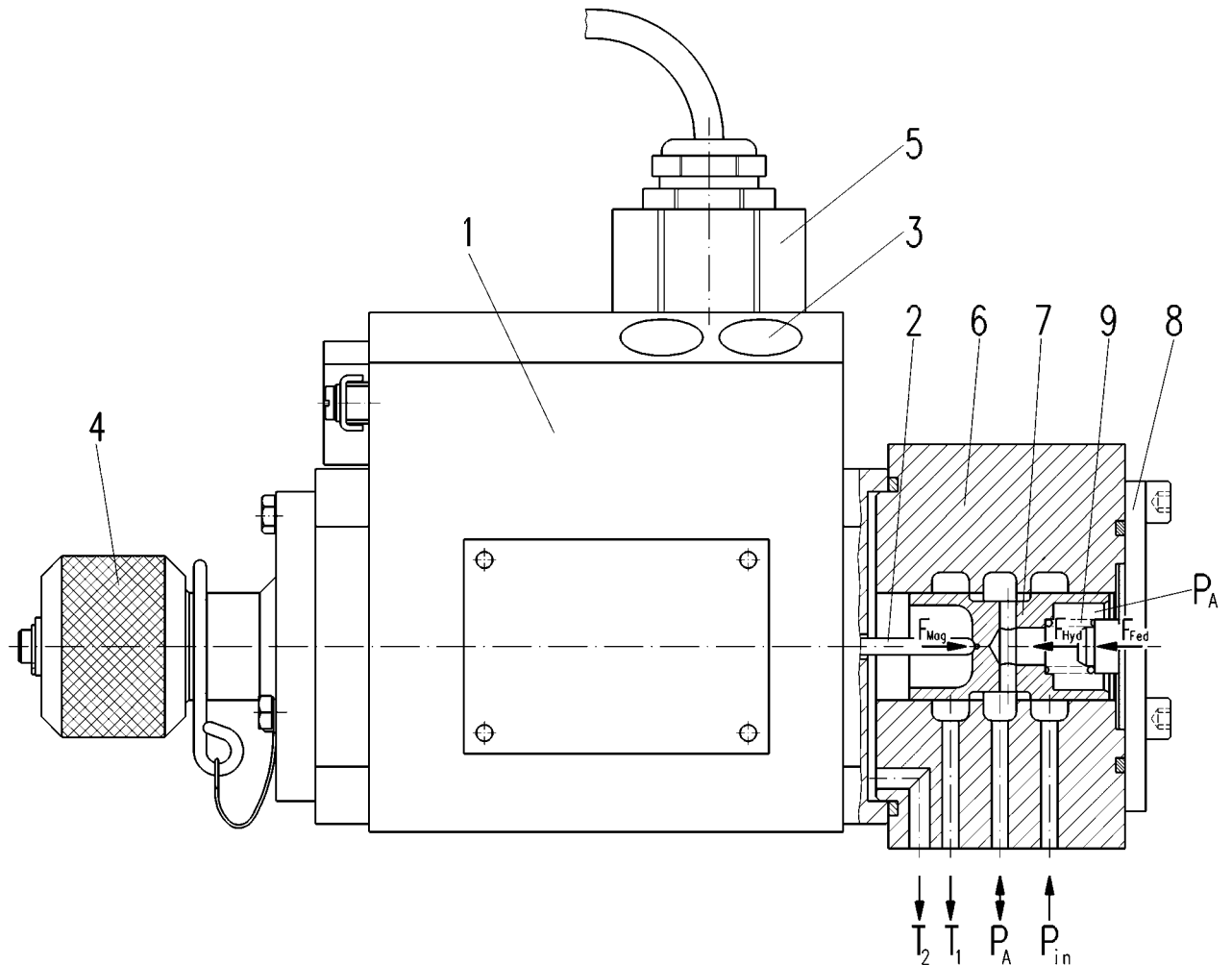


Repair works on the I/H converter are to be performed or approved by Voith Turbo GmbH & Co. KG, Crailsheim.



### 3. Function

#### 3.1 Design



cet3-000047

Fig. 3.1.1

- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| 1 – Control magnet VRM            | P - Input pressure                    |
| 2 – Tappet for power transmission | $P_A$ - Output signal pressure        |
| 3 - Potentiometer X0 und X1       | $T_1$ - Tank return line              |
| 4 – Manual operation knob         | $T_2$ - Tank return line int. leakage |
| 5 – Electric connection           | $F_{Mag}$ - Magnetic force            |
| 6 – Control housing               | $F_{Hyd}$ - Hydraulic force           |
| 7 – Control piston                | $F_{Fed}$ - Spring force              |
| 8 - Cover                         |                                       |
| 9 - Control spring                |                                       |

### 3.2 Operating characteristics (see fig. 3.1.1)

A set signal  $w = 0/4...20$  mA generates a magnetic force  $F_{Mag}$  in the VRM, the limits of which can be adjusted by means of the X0 and X1 potentiometers and which is then transmitted onto the control piston via tappet.

The hydraulic force  $F_{Hyd}$  being proportional to the output signal pressure  $P_A$  acts against this force.

In the case of the two forces being equal, the control piston is positioned in the "hydraulic center" as shown in fig. 3.1.1 and the output signal pressure  $P_A$  corresponds to the set signal. In the "hydraulic center" position the control piston performs minimum oscillating movements in the area of the guiding edges  $P \rightarrow P_A$  and  $P_A \rightarrow T$ , in order to keep the output pressure  $P_A$  on the value set by  $F_{Mag}$ .

When increasing the set signal and thus  $F_{Mag}$  from this condition, the control piston position changes and thus connects the output pressure  $P_A$  to the feed pressure  $P_{in}$  and blocks  $P_A$  towards the tank return line T1. Now the pressure  $P_A$  will increase until the control piston returns to the "hydraulic center" and  $P_A$  corresponds to the new set signal.

The spring force  $F_{Fed}$  of the control spring generates a force-offset in order to guarantee the I/H converter function for output pressures of approx. 0 bar, too.

The internal leakage is fed back via tank return line T2.

#### Function of manual operation knob

The control magnet of the I/H converter is provided with a manual operation knob, by means of which an adjustable spring force can be set instead of the magnetic force  $F_{Mag}$ . This spring force affects the control piston via magnet armature and tappet. The hydraulic force  $F_{Hyd}$ , being proportional to the output signal pressure  $P_A$  also acts against this spring force here. Thus adjustment of output pressure is possible without electric connection.

## 4. Packing, Storage and Transport

### Packing

The I/H converter is delivered in a special packing.

The openings for the hydraulic connections are sealed with plugs to prevent penetration of impurities and humidity.

## Storage and preserving



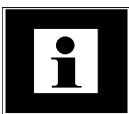
The outer surfaces of the I/H converter are protected by means of a preserving surface coat.

The internal parts are preserved by oil.

Within Europe the anticorrosion protection is sufficient for approx. 8 months in industrial air, presuming storage of the I/H converter in a dry location.

In case the I/H converter is supposed to be stored for a longer period of time, special precautions will have to be taken.

In each specific case, these precautions have to be agreed with Voith Turbo GmbH & Co, KG, Crailsheim.



The storage ambient conditions have to be within the limits as indicated in chapter 1.

## Transport



Improper transport may cause personal injuries and damages to property.

Pack the I/H converter in a way that prevents housing damages during transport. In particular make sure that no compulsive forces affect the electric cable fitting and the electric feed in cable are not kinked or damaged. Do not hold the I/H converter at the electric feed in cable for transport.

## 5. Installation



- Improper installation of the I/H converter may cause malfunctions and premature failure of the operation of the I/H converter.
- Cleanliness is imperative during installation and connection. Prevent that any impurities ( dust, metal chips etc.) can get into the I/H converter or pipe system which may cause damage to the I/H converter.



Cover and protect the I/H converter and in particular the electric lines during construction time.

## 5.1 Mounting



Perform any work on the I/H converter only when it is in deenergized condition and with switched off oil supply system.  
Protect oil and power supply against unintentional switching-on during mounting.



Install the I/H converter in accordance with the permissible installation position as shown in chapter 10.

### Recommended fastening bolts:

2 pieces hexagonal screws M10, strength category 8.8.  
tightening torque MA=35 Nm, thread slightly oiled.  
Select screw length according to mounting situation.

## 5.2 Hydraulic connection

The hydraulic connection on the I/H converter is made by means of connection bores at its bottom. The connection flange is sealed with o-rings. Please refer to chapter 10 for position and dimensions of the connections.

### **Surface roughness of connecting flange:**

**Ra = 1.6 µm, Rmax = 6.3 µm**



Only pressure-less return of the operating medium through the return line T2 to the tank, ensures proper work of the I/H converter.

In practise the tank lines for the connections T1 and T2 are joined together and laid downgrade towards the tank in one common pipe line.  
Requirements to this pipe line:

Nominal size 20 mm or bigger for I/H converters with an output pressure up to 10 bar.

Nominal size 30 mm or bigger for I/H converters with an output pressure of more than 10 bar.



Observe the correct pressure range when selecting pipes, hoses, screwings and flanges.  
Immediately replace damaged pipes and hose lines.

When assembling the pipe lines, ensure that it is fastened to fixed structures, free from vibration and not to moving equipment. Temperature variations of the piping (thus alterations in length) must not apply constraining forces to the I/H converter.

Clean pipe lines from dirt, cinder, sand, chips etc. prior to installation.  
Pickle or flush welded pipes.  
Clean and flush carefully all pipe and hose lines prior to attaching the I/H converter.

=> For flushing, a flushing plate (Art. No. 43.8565.10) is available.  
See chapter 11.

=> To connect the I/H converter to the piping system an adapter (Art. no. 43.9300.11) is available. See chapter 11.



- Residual oil may leak when removing the plug (max. 0,1 l). Collect the oil in a suitable container and deposit it properly.
- Do not use fibrous or hardening sealing compounds, such as e.g. hemp or mastic to seal the connections and screwings.

### 5.3 Electric connection



The electric system has to be connected in accordance with electrical engineering standards and legal regulations of the manufacturing country. The works have to be performed by an electric specialist with experience and knowledge in explosion protection.  
When connecting the I/H converter within the explosion hazardous area , the electric feed in line have to be connected in housings according to protection type EN 50014, section 1.2.



When connecting customer´s lines, avoid parallel run of the I/H converter lines with the lines of current converter assemblies.  
The customer´s signals and supply lines running to the I/H converter must be screened.

Please refer to chapter 10 for the wiring diagram.

## 6. Commissioning



The I/H converter was adjusted and tested at Voith Turbo's works by means of the potentiometers X0 and X1. The test result is documented in an attached test certificate.

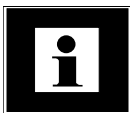
The potentiometers are provided with a protective cap to avoid unintentional maladjustment and impurities.

### 6.1 Test run



Make sure that pipe lines and hydraulic system are cleaned prior to performing a test run. The operating fluid has to be in accordance with the purity class as indicated in chapter 1. Do not flush or clean the pressure fluid with the I/H converter being hydraulically connected. Operation of the I/H converter with contaminated pressure fluid is not permitted, the I/H converter may be damaged.

- Check the line mounting, connection and flow direction to and on the I/H converter.
- Check the electric connection.
- Switch on the 24 VDC power supply.
- Switch on the oil supply and check input pressure.



The minimum input pressure has to be 1.5 bar more than the maximum output pressure required at 20 mA.

- Set the signal  $w = 0/4.. 20\text{mA}$  and check output pressure.

During the test run, check all hydraulic connections for leakages. In case of leakage, immediately switch off the hydraulic supply and eliminate leakages.

### 6.2 Parameter setting



Due to unintentional maladjustment of the parameters or changed operating conditions, new setting of one or both parameters may become necessary.

We recommend to document adjustment of the parameters as well as the set values.

The parameters are adjusted by means of potentiometers X0 and X1. Please refer to chapter 10 for the position of the potentiometers.

### Potentiometer effects:

- X0 - With help of potentiometer X0 the minimum output pressure  $P_A$  min is adjusted at a setpoint of 0 mA or 4 mA.  
Pressure increase by turning the potentiometer clockwise.
- X1 - With help of potentiometer X1 the maximum output pressure  $P_A$  max is adjusted at a setpoint of 20 mA.  
Pressure increase by turning the potentiometer clockwise



X1 should be adjusted before X0.  
The X1- adjustment influences the adjustment of X0.

### Manufacturer-provided adjustments:

At the works, the I/H converter has been adjusted as indicated in the order.

## 7. Operation

### 7.1 Operation with manual knob

Operation with manually controlled rotary knob is possible without electric energy.



On operation with manually actuated rotary knob, uncontrolled stroke movements of the hydraulic components controlled by the I/H converter output might occur due to the increase in the output signal pressure.

Manual operation is only possible when the circlip is removed from the manual operation knob.



On completion of operation with manual operation knob, move the manual operation knob in its final position by turning it counter clockwise and pushing in the circlip to its final position.

- Remove the circlip.
- Slowly turn the manual operation knob clockwise and observe the output pressure.

**Effective direction:** Output pressure increase by clockwise rotation.

## 7.2 Operation with set signal

When the supply voltage is switched on, the output signal pressure can be adjusted continuously by the set signal 0/4...20 mA within the limits set by the potentiometers X0 und X1.

## 7.3 Trouble shooting and remedial action



Prior to all works, make sure that the I/H converter was commissioned according to chapters 5 and 6.

### **Malfunction: Pressure variations**

The output signal pressure  $P_A$  may vary now and then or periodically with low or high frequency and amplitude.

- Cause:
1. air inclusions in the hydraulic component
  2. low or considerably varying input pressure.
  3. dirt particles in the hydraulic component
  4. pressure on return line

- Remedy:
1. On first commissioning air inclusions in the VRM may cause pressure variations. Due to periodic setpoint changes (approx. 0.5 Hz) of approx. +/- 6 mA, the air will escape out of the VRM after some minutes causing the hydraulic damping to become effective.
  2. Under load and in particular in case of higher output signal pressure, a lower input pressure may lead to pressure variations.  
Increase and / or stabilize the input pressure by taking appropriate measures (e.g. accumulator). See also chapter 1.
  3. Contaminated pressure fluid results in increased friction at the control piston, thus causing hysteresis and pressure variations.  
Open hydraulic component and clean the inner elements. In case of damaged surfaces and guiding edges replace the I/H converter.
  4. The dimensions of the return line have to be sufficient.  
In case of additional consumers of the output pressure connected to this line, make sure they do not create any pressure in the return line. See also chapter 5.2.



**Malfunction: Output pressure PA → 0 bar or → P (input pressure)**

Due to a defective control valve VRM or blockage of the control piston the output pressure may fall to 0 bar or increase to the input pressure.

Remedy: The function of the hydraulic component can be checked using the manually controlled knob with the supply voltage being switched off. See chapter 7.1.

If the output pressure cannot be adjusted manually, the control piston, e.g., may be blocked by particles.

Open hydraulic component and clean inner parts.

If the surfaces and guiding lines are damaged, exchange the I/H converter.

Should output pressure adjustment be possible with manual operation knob, but not with the control magnet, the control magnet VRM is defective.



Repairs on the control magnet VRM are not allowed, otherwise explosion protection is no longer guaranteed.  
Replace any defective I/H converter completely.

## 8. Maintenance and Repair



For a trouble-free and reliable operation of the I/H converter, it is necessary to perform inspection, maintenance and repair work in certain intervals.

### Routine inspection

Check the pipes, screw connections and connections on the I/H converter for leakage, impurities and damage.

Eliminate any leakage, impurity and damage noticed, if required, during appropriate operating modes.

Monitor the control behavior of the I/H converter for any changes. Analyse and eliminate the causes, if required, during appropriate operating modes.

Inspection after approx. 740 operating hours / max. 1 month

Take an oil sample from the oil tank and analyse it for solid and suspended matters, water content, shadings and air bubbles. Analyse oil purity of the oil sample. Clean or exchange the oil, if required, in an appropriate operating mode.

Inspection after approx. 8000 operating hours / max. 1 year

Take an oil sample from the oil tank and analyse it chemically. If required, clean or change the oil during an appropriate operating mode.

Check and retighten, if necessary, the electric connections of the I/H converter.

## 9. Shutdown

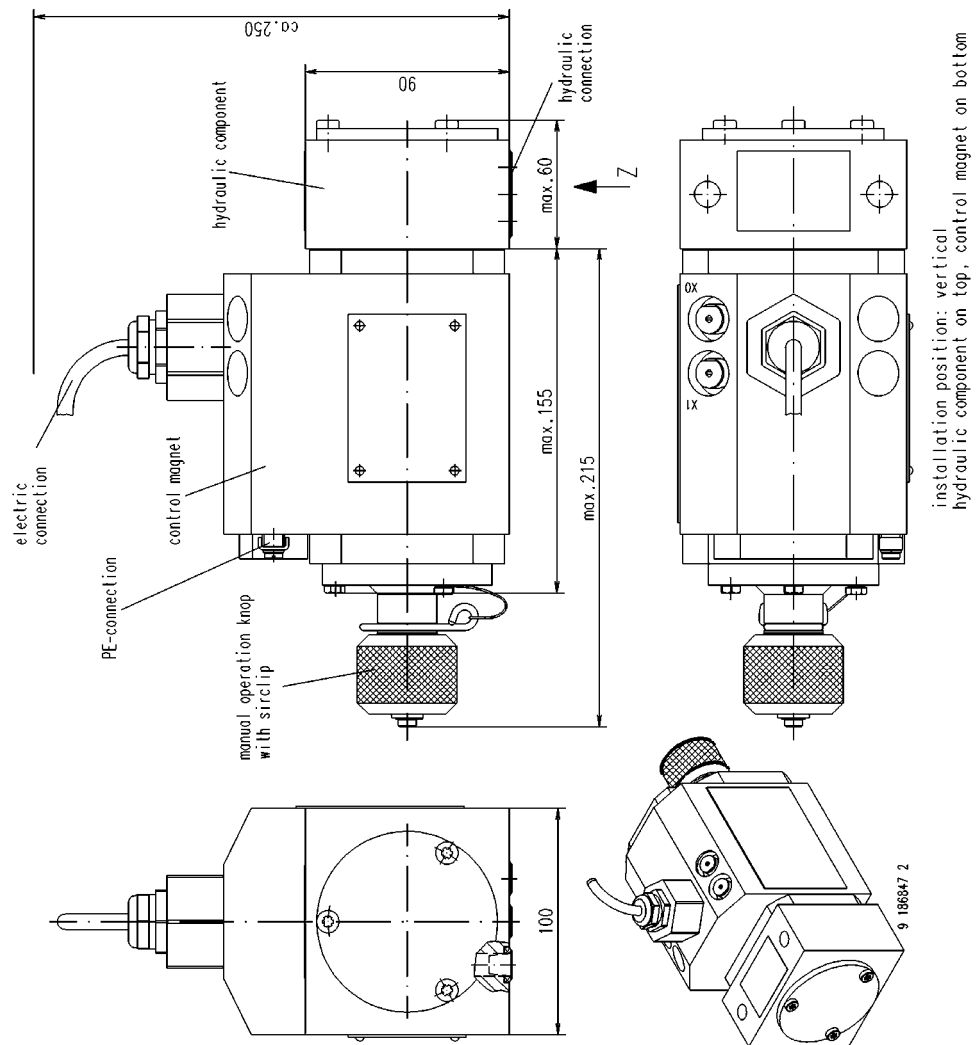
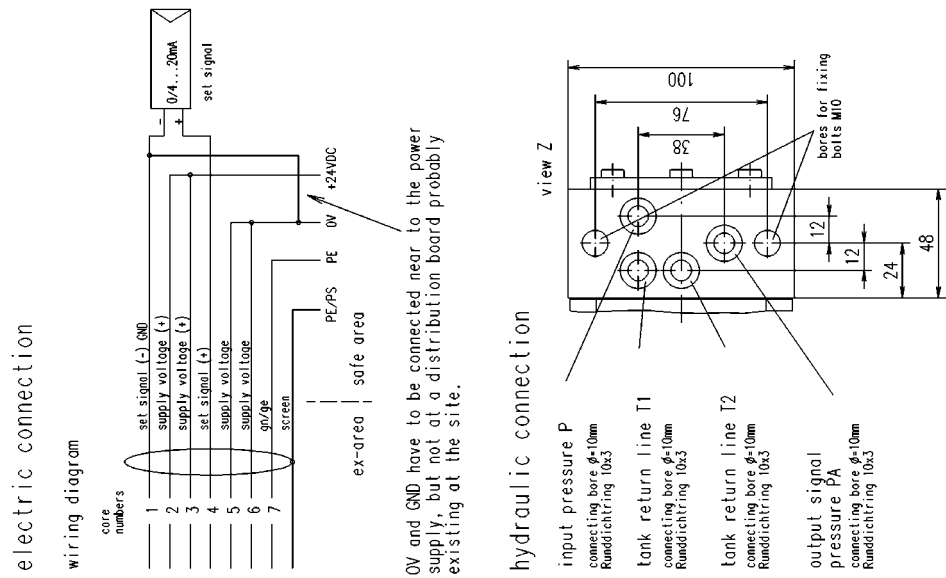


If the I/H converter is switched off for reasons of repair, inspection or unit shutdown, switch off the oil supply system and relieve all pressure reservoirs, if effective. Switch off the 24 VDC supply voltage and remove the lines as well as piping and hose connections. Doing so, an considerable oil quantity may leak out. Collect the oil in a suitable container and deposit it properly. Close all holes. Now clean and pack the I/H converter.

### Disposal

In the event of disposal of the I/H converter, observe the local applicable regulations regarding the environmental protection. The I/H converter essentially contains steel, copper, synthetic materials, electronic components and residual oil.

## 10. Outline and Wiring Diagram

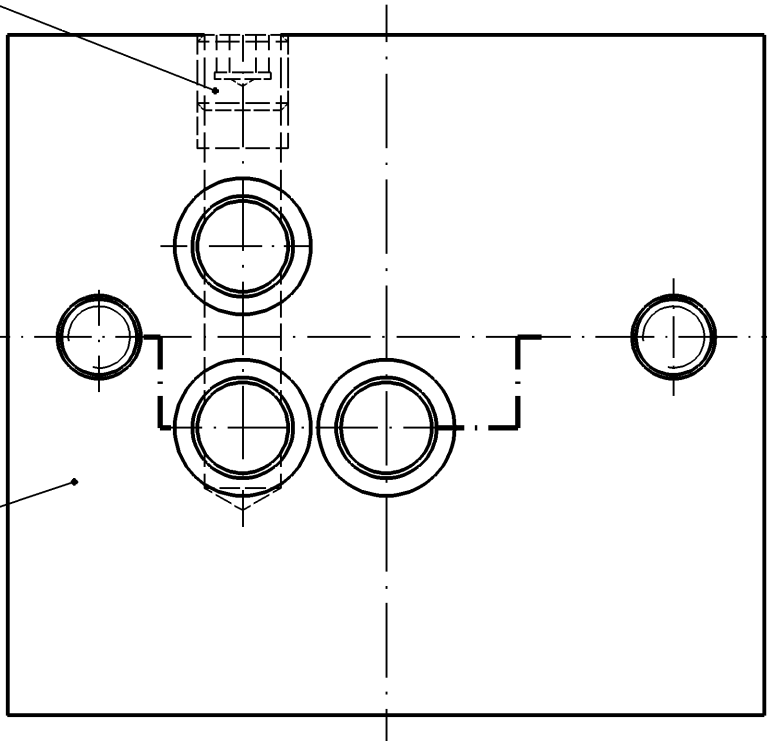


## 11. Annex

Flushing plate	43.8565.10
Adapter plate	43.9300.11

Spuelplatte  
flushing plate

Pos. 10

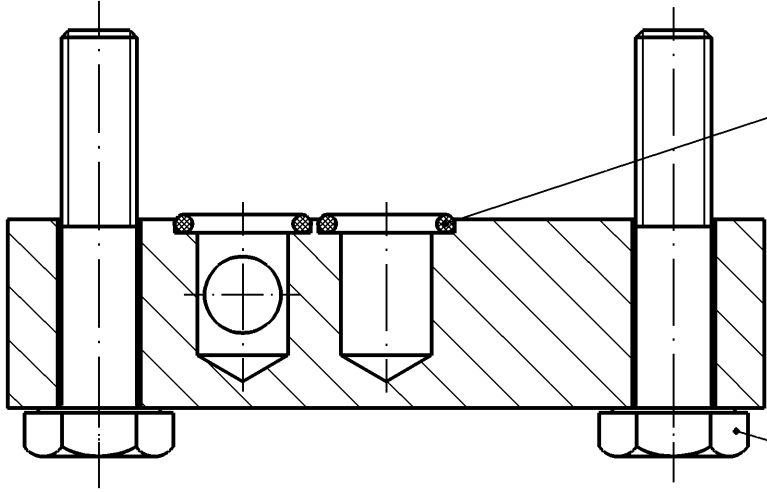


Verschlusschraube  
screw plug

Pos. 20

6kt-Schraube/hex. srew M10x50

Pos. 30



0-ring  $\varnothing 13.3 \times 2.4$

Pos. 40

deutsch/englisch

2	1 x	A7839/01	Sprache hinzugefuegt, Bl. 6 Texte berichtigt	01-05-23	UMR	AMA
1	0 x	A7868/00	Blatt 6 neu hinzugef.	11.10.00	AMA	WSSS
Aend.	kommt vor	Aenderungs-Nr.	Aenderung	Index	Do:um: Gez. Name	Gepr.

Druckstellglied i/p-converter		R <sub>a</sub> in $\mu\text{m}$ ISO 1302		Date		Pruefbedingungen in Zeichnungen nach VN 1631	
Kanten DIN 6784 Innenkanten Auslenkanten		Allg. Toleranzen ISO 2768 mK		Gez. 1997-03-05		VN	
Tolerierung DIN 7167		Tolerierung DIN 7167		Gepr. 1997-11-17		Bestell- und Liefervorschrift	
Freigabevermerk		Name		Abi. cet		Masse (Gewicht)	
F		Klh		Norm		Werkstoff / Werkstoff-Nr.	
CAD		Ochts		Ges. Met		Model-, Gesenk-Nr.	
Abmasse		Name		Rohteil-Nr. mit Rohlz.		Benennung	
Posmass		Name		Rohteil-Nr. mit Rohlz.		SPUELPATTE	
Posmass		Name		Rohteil-Nr. mit Rohlz.		flushing plate compl.	
Posmass		Name		Rohteil-Nr. mit Rohlz.		Zeichnungs-Nr. / Sach-Nr.	
Posmass		Name		Rohteil-Nr. mit Rohlz.		43.8565.10	
Posmass		Name		Rohteil-Nr. mit Rohlz.		Blatt	
Posmass		Name		Rohteil-Nr. mit Rohlz.		1	
Posmass		Name		Rohteil-Nr. mit Rohlz.		6 Bl.	
Posmass		Name		Rohteil-Nr. mit Rohlz.		Lis. d.	

**Pos. 20** ③

Verschlußschr. M12x1.5  
03.0410.52  
mit Loctite 270  
öldicht eingeklebt

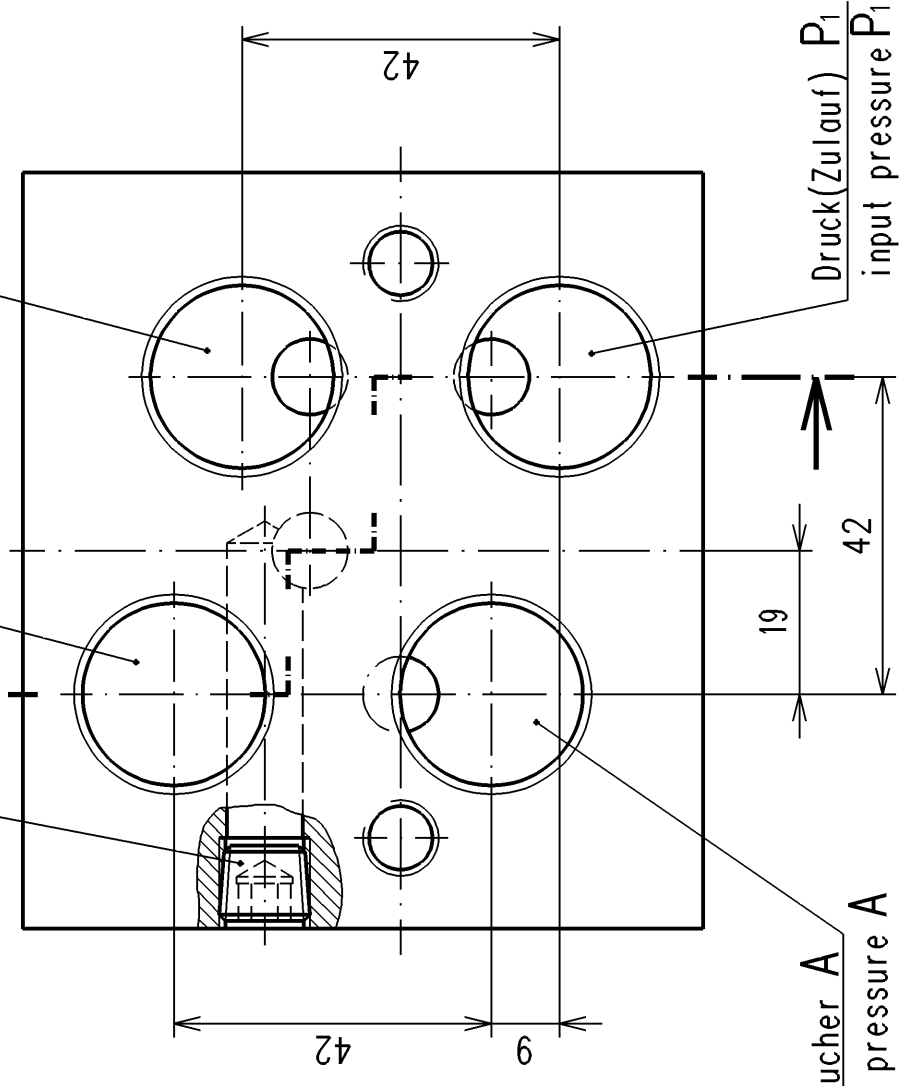
**item 20**  
sealing screw M12x1.5  
03.0410.52  
oilproof sealed  
with loctite 270

Tankrückleitung T2  
return line

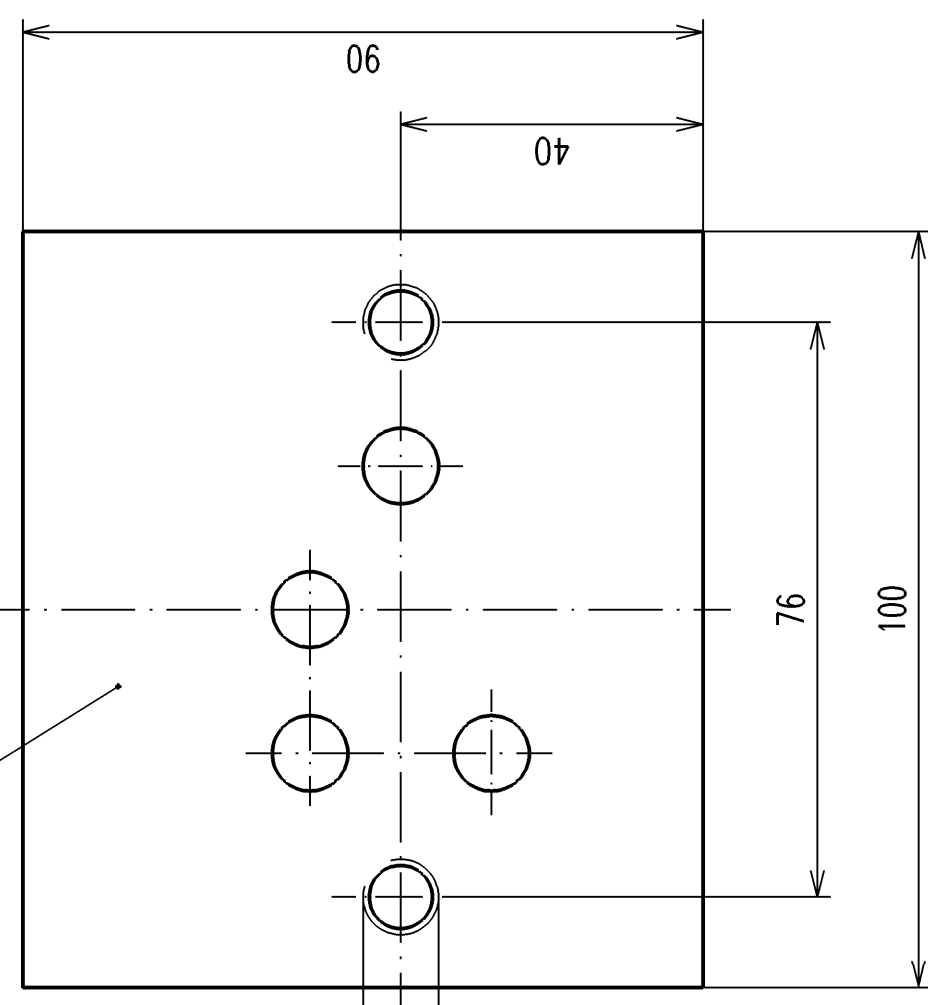
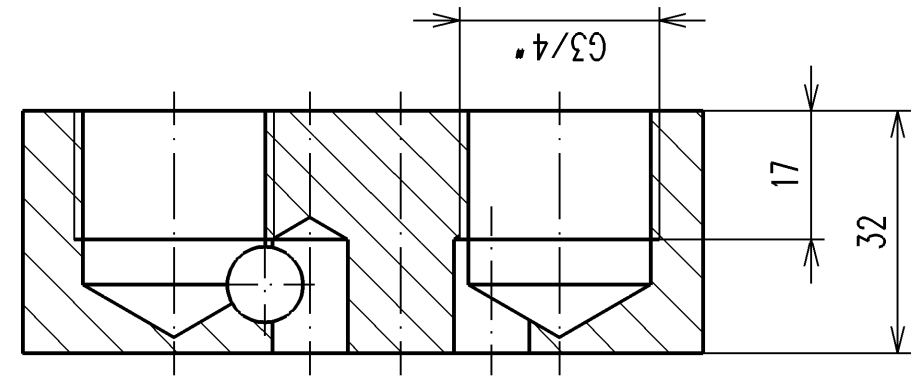
Tankrückleitung T1  
return line

Verbraucher A  
output pressure A

Druck(Zulauf) P<sub>1</sub>  
input pressure P<sub>1</sub>



**Pos. 10** ③  
**item 10**  
Adapterplatte  
connecting plate  
VH43929911



deutsch/  
englisch

5	0x	A7803/02	siehe Blatt 6	WSss
4	--	A7839/01	Blatt 6 Texte berichtigt	AMa
3	3 x	A7901/00	Positionsnr. zugefügt	Met
2	0 x	A7868/00	Blatt 6 neu hinzugefügt	Met
A	1 x	5.4040/96	neue Zeichnung	WSss
Aend.	kommt vor	Aenderungs-Nr.	Index	Gepr.
			Do:um: Gez.	Name
			02-01-14 Hoff	
			01-05-23 UMR	
			08.12.00 Weig	
			19.01.00 AMa	
			10.07.96 KLH	

**Pos. 30** lose beige packt  
**item 30** supplied loose

Prüfbedingungen in Zeichnungen nach VN 1631		Datum	
VN	Bestell- und Liefervorschrift	Ges.	
	Massstab im Orig. 1 : 1	Masse (Gewicht)	
	Werkstoff / Werkstoff-Nr. St50 phosphct.	kg	
	Model-Nr., Gesenk-Nr.	Rohteil-Nr. mit Rohlz.	
Benennung		ADAPTER	
connecting plate			
Zeichnungs-Nr. / Sach-Nr.		Blatt	
43.9300.11		1	
Urspr.		6 Bl.	
Lis. d.			
Allg. Toleranzen		R <sub>a</sub> in µm	
ISO 2768 mK		ISO 1302	
Tolerierung		Name	
DIN 7167		1996-07-10 KLH	
Gez.		1996-07-10 Rit	
Abi.		cet	
Norm		Ges. Met	
Freigabevermerk		F	
Kanten		VOITH TURBO	
DIN 6784		ANTRIEBSTECHNIK	
Innenkanten		Urspr.	
Auslenkanten		CAD	
-0,2		Possmass	
		Abmässe	



(1) **EC-TYPE-EXAMINATION CERTIFICATE**  
(Translation)

(2) Equipment and Protective Systems Intended for Use in  
Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

**PTB 01 ATEX 1130 X**

(4) Equipment: Graduable magnet, type IF-converter / 400

(5) Manufacturer: Voith Turbo GmbH & Co. KG

(6) Address: Voithstraße 1, 74564 Crailsheim, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.


The examination and test results are recorded in the confidential report PTB Ex 02-11105.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50014:1997 + A1 + A2      EN 50018:2000      EN 50019:2000**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

 **II 2 G   EEx de IIC T4 or T5   EEx d IIC T4 or T5**

Zertifizierungsstelle Explosionsschutz

Braunschweig, April 29, 2002

By order:

  
Dipl.-Phys. U. Völkel



## SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 1130 X**

(15) Description of equipment

The graduable magnet of type I/F-converter / 400 is designed to type of protection Flameproof Enclosure "d". Connection is by means of a cable entry with open-ended line or by means of an adapter box designed to type of protection Increased Safety.

The connectors are tested and certified under a separate examination certificate.

### Technical data

Nominal voltage ..... up to 24 V +/-10 %

Rated voltage ..... up to 26.4 V

Rated power ..... max. 25 W

Conductor cross section (open-ended line) ..... 0.5 to 2.5 mm<sup>2</sup>

Connected cross section (adapter box) ..... 0.5 to 2.5 mm<sup>2</sup>

Ambient temperature ..... -25 °C to +60 °C

(16) Test report PTB Ex 02-11105

(17) Special conditions for safe use

If connection of the graduable magnet is by means of the cable entry with open-ended line, the open wires of the cable entry shall be connected within the potentially explosive section of enclosures that comply with a standardised type of protection as specified in EN 50014, section 1.2.

(18) Essential health and safety requirements

The tests and the favourable results these have produced reveal that the graduable magnet, type IF-converter / 400, meets the requirements of directive 94/9/EC as well as those of the standards quoted on the cover sheet.

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, April 29, 2002

  
Dipl.-Phys. U. Völkel



sheet 2/2



## EC Declaration of Conformity

Reg. No. 9 117 394 0 e

We

**Voith Turbo GmbH & Co. KG**  
**Voithstraße 1**  
**74564 Crailsheim, Germany**

herewith declare that the

**I/P-converter type DSG-B07212**  
**Article No. 9 186826 0**

Device group / category:  $\text{Ex}$  II 2G

Type of protection electrical part: **EEx d II C T4** (TA = -20 °C..+60 °C)  
(there are no ignition sources in the non-electrical equipment)

conforms to the following directive:

**Explosion protection directive 94/9/EC**

The basic safety and health requirements of the directive are met in conformity with:

**EN 50014: 97+A1+A2; EN 50018:2000**

Marking: **CE 0123**  $\text{Ex}$  II 2G **EEx d II C T4**

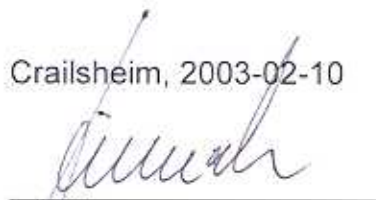
EC model test report number:

**PTB 01 ATEX 1130 X**

Issuing place, date:

Crailsheim, 2003-02-10

Signature:



Particulars as to signer:

W. Zinnecker  
General Manager Electronic Drive Systems

## Manufacturer's Declaration

Reg. Nr. 9 117 393 0 e

We

**Voith Turbo GmbH & Co. KG**  
**Voithstraße 1**  
**74564 Crailsheim, Germany**

herewith declare that the

**I/P-converter type DSG-B07212**  
**Article No. 9 186826 0**

conforms to the following directives:

**EMV- directiv 89/336/EEC**  
**Machine directiv 98/37/EC**

The following directives were considered as helpful and were applied in whole or in part:

EN 61000-4-2/1995+A1/1998	immunity against electrostatic discharge
EN 61000-4-3/1997+A1/1998	immunity against electromagnetic fields
EN 61000-4-4/1995	immunity against fast transient disturbances
EN 61000-4-6/1996	immunity against conducted interferences, induced by HF-fields
EN 1127-1:1997	explosion protection
EN 13463-1:2002	non-electric devices to be used in potentially explosive atmospheres
EN 13463-5:2001	non-electric devices to be used in potentially explosive atmospheres
EN 292-1:1991	safety of machines
EN 982:1996	safety of machines, hydraulics

In case the device is installed in a superior machine the risks resulting from the installation must be evaluated by the manufacturer of the new machine.

Issuing place, date:

Crailsheim, 2003-02-10

Signature:



Particulars as to signer:

W. Zinnecker  
General Manager Electronic Drive Systems

## EC Declaration of Conformity

Reg. No. 9 117 392 0 e

We

**Voith Turbo GmbH & Co. KG**  
**Voithstraße 1**  
**74564 Crailsheim, Germany**

herewith declare that the

**I/P-converter type DSG-B03212**  
**Article No. 9 186827 0**

Device group / category:  $\text{Ex}$  II 2G

Type of protection electrical part: **EEx d II C T4** (TA = -20 °C..+60 °C)  
(there are no ignition sources in the non-electrical equipment)

conforms to the following directive:

**Explosion protection directive 94/9/EC**

The basic safety and health requirements of the directive are met in conformity with:

**EN 50014: 97+A1+A2; EN 50018:2000**

Marking: **CE 0123**  $\text{Ex}$  II 2G **EEx d II C T4**

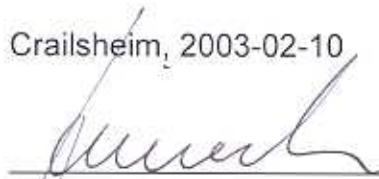
EC model test report number:

**PTB 01 ATEX 1130 X**

Issuing place, date:

Crailsheim, 2003-02-10

Signature:



Particulars as to signer:

W. Zinnecker  
General Manager Electronic Drive Systems

## Manufacturer's Declaration

Reg. Nr. 9 117 391 0 e

We

**Voith Turbo GmbH & Co. KG  
Voithstraße 1  
74564 Crailsheim, Germany**

herewith declare that the

**I/P-converter type DSG-B03212  
Article No. 9 186827 0**

conforms to the following directives:

**EMV- directiv 89/336/EEC  
Machine directiv 98/37/EC**

The following directives were considered as helpful and were applied in whole or in part:

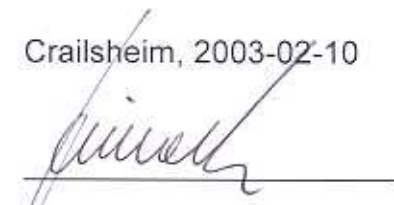
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