

5. Operation and maintenance

- 5.1 Make sure that the seals, sealing surfaces and pressure gauges are in good status.
- 5.2 Pressure regulators need always to be protected against damages through regular visual inspections.
- 5.3 In case of malfunctions, e. g. an increase in the outlet pressure despite non-withdrawal (withdrawal=0), in the case of atmosphere leakage, a defect pressure gauge or activation of the relief valve, put the pressure regulation out of operation and close the gas cylinder valve immediately.

6. Shut-down

- 6.1 Short-term interruption:
Close shut-off valve at the consumer unit.
- 6.2 Longer interruptions or end of work:
Close shut-off valve (1) and the shut-off valve at the consumer unit.
The control valve (4) may not be used as shut-off valve. The result could be an improper function of the valve or a damage.
- 6.3 Before disassembly pay attention that all pressure gauges and flowmeters indicate zero.

7. Repair

- 7.1 Repairs may only be carried out in authorized repair workshops by expert persons.
- 7.2 Only original spare parts must be used. The materials have been adapted to the gas type in each instance. So always specify the gas type.
- 7.3 In case of independent repairs, the use of non-original spare parts or changes on the side of the user or a third party without the approval of the manufacturer, any form of liability for resulting damages will expire as well as the manufacturer's warranty.
- 7.4 After being repaired, the pressure regulator must be checked with respect to proper function, leak-tightness and cleanliness of the gas-wetted surfaces. When the system is used again, a sufficient purging operation must be carried out first.

Instructions for use TORNADO 2000 Pressure regulator for tapping points Flow rate indication by two flowmeters

spectrotec

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1. Application

- 1.1 Designated use
Use the pressure regulator for tapping points TORNADO 2000 with an suitable shut-off valve for gases dissolved under pressure, compressed or liquified gases. The pressure regulator TORNADO 2000 reduces an inlet pressure to an as constant as possible outlet pressure.

- 1.2 Non-designated use
Do not use the pressure regulator for gases in the liquid phase.
Do not use for unsuitable types of gas or corrosive gases.
Do not use at temperatures below -30°C or above +60°C.

The system has to be used according to these instructions for use and especially the safety instructions!

1.3 Technical data

Inlet pressure:	max. 40 bar	} s. name plate
Indication range:	16 l/min	
	30 l/min	
Materials:	- Body: Brass	
	- Diaphragm: EPDM	
	- Seat sealing: EPDM	
Weight:	1,9 kg	
Tightness:	inside and outside: 1 x 10 ⁻³ mbar l/sec	

The pressure regulator for gas cylinders TORNADO 2000 conforms to the latest standard DIN/EN/ISO 2503
For special versions, this standard is taken into account as appropriate.

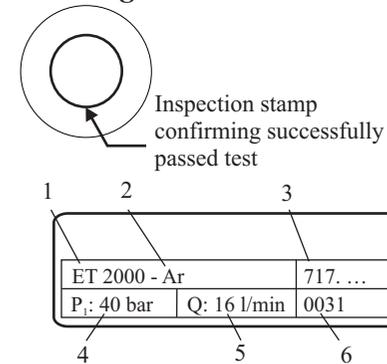
2. Safety instructions

- 2.1 All items of informations marked with  are valid as special safety instructions.
- 2.2 These pressure regulators adhere to state-of-the-art technology and to the demands of the existing standards and regulations.
- 2.3 Changes or modifications are not allowed to be made to the pressure regulator without the prior consent of the manufacturer.
- 2.4 The equipment must be operated by suitable trained personnel only.
- 2.5 The result of improper handling and improper use as intended can involve risks for the user and other persons as well as damage to the device.
- 2.6 Regulations to be adhered to:
 - BGV A1 (VBG 1), "General Specifications"
 - BGV D1 (VBG 15), "Welding, Cutting and Related Procedures"

Special attention has to be paid to the country specific laws, regulations and procedures concerning the use of this type of equipment.

- 2.7 Use only for gas types the pressure regulator is labelled for (see item 3).
- 2.8 Do not use at temperatures below -30°C or above +60°C.
- 2.9 The valve has always to be opened slowly!
- 2.10 All parts coming into contact with oxygen must be kept in oil-free and grease-free condition.
 -  **Fire or explosion hazard!**
- 2.11 Smoking or open fire (e.g. candles) in the vicinity of the gas supply system is strictly prohibited.
 -  **Fire and explosion hazard!**
- 2.12 Do not connect the pressure regulators for tapping points to a gas cylinder.
- 2.13 Protect gas cylinder against falling.

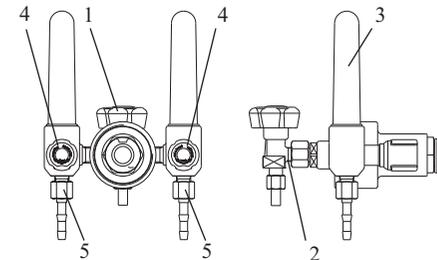
3. Labelling



- 1 Pressure regulator for tapping points TORNADO 2000
- 2 Gas type
- 3 Ordering no.
- 4 max. inlet pressure
- 5 Indication range
- 6 Date of manufacture

4. Start-up

- 4.1 Before starting, read the specifications of this instruction for use and observe it while working.
- 4.2 Check, that the shut-off valve thread, pressure regulator connector and connection seal are without any damage (blow slightly if necessary).
Do not use the pressure regulator if there are damages!



- 1 Shut-off valve
- 2 Shut-off valve-connection
- 3 Flowmeter
- 4 Control valve
- 5 Hose tail conforming to DIN/EN 560

- 4.3 Tighten gas-tight the pressure regulator with a spanner at the shut-off valve (1).
- 4.4 Mount the hose on the hose tail (5) of the pressure regulator and on the consumer unit. Use hoses conforming to DIN/EN 559 and hose tails conforming to DIN/EN 560. Secure hoses with suitable hose clamps.

Hose	Thread	Hose tail Ordering- no.	Hose	Thread	Hose tail Ordering- no.	Union nut Ordering- no.	
6	G 1/4"	700.5005.0	8	G 3/8"	471.4077.0	G 1/4"	700.5003.0
8	G 1/4"	723.1892.8	9	G 3/8"	471.4009.0	G 3/8"	700.5013.0
			10	G 3/8"	722.1703.4	G 3/8" LH	700.5004.0

4.5 Adjustment of flowrate

First close control valve (4) at the pressure regulator. Open shut-off valve (1) slowly. Open control valve (4) and the shut-off valve at the consumer unit. Adjust the desired flow rate with control valve (4) and read off the adjusting flow rate at the flowmeters (3).

Attention: Read-off-point at the top of the sphere.

After termination of the adjustment procedure close shut-off valve at the consumer unit again.