## Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Content of Change</th>
<th>Document Pages total</th>
</tr>
</thead>
</table>

## Used Signs

<table>
<thead>
<tr>
<th>Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Stop Sign" /></td>
<td><strong>Warning</strong>&lt;br&gt;Indicates a procedure that has to be strictly followed as contravention may result in injury to personnel or loss of life</td>
</tr>
<tr>
<td><img src="image" alt="Caution Icon" /></td>
<td><strong>Caution</strong>&lt;br&gt;Highlights a procedure which, if not strictly followed, can result in injury to personnel or damage to equipment</td>
</tr>
<tr>
<td><img src="image" alt="Note Icon" /></td>
<td><strong>Note</strong>&lt;br&gt;Is an important element of the procedure and should be observed</td>
</tr>
</tbody>
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In the design and construction of this equipment and instructions contained in this manual, due consideration has been given to safety requirements in respect of statutory industrial regulations.

Users are reminded that these regulations similarly apply to installation, operation and maintenance, safety being mainly dependent upon the skill of the operator and strict supervisory control.
1 INTRODUCTION

The Instromet Turbine Gas Meter is a state of the art precision instrument, which measures the flow of gases by means of a turbine wheel. As an extension to the known lubrication possibilities Instromet has developed an Automatic Lubrication System. With the line pressure and an electrical signal this system is able to lubricate the turbine gas meter independently. It will help to keep the turbine gas meter in the optimum working condition.

The purpose of this manual is to provide a general guide to the installation, operation and care of automatic lubrication system for turbine gas meter. Every effort has been made to ensure that the information contained in this manual is as accurate as possible, however, the continuous improvements which Instromet makes to its products may result in small inconsistencies. Custom manufactured equipment or “specials” may also result in differences.

It is highly recommended to use the Automatic lubrication system in combination with the Instromet Smart-Index providing the required signal.

It is therefore prudent to consult the specific technical data and other documents which accompanies the system. If in any doubt, Instromet should be contacted.
2 GENERAL DESCRIPTION

The automatic lubrication system must be considered a part of the pressure containing system.

2.1 Operating principle

The automatic Lubrication System consists of three main parts, pressure regulator (1), solenoid valve (2) and oil pump (3). The working principle of the pressure regulator and solenoid valve are described in the manuals from the suppliers, see attachments. In this part we will only describe the working principle of the oil pump.

Fig. 1 Automatic Lubrication System

All other parts are described in the attached company manuals. See attachments
2.1.1 Working principle of the oil pump

The oil pump consists of two main parts, as they are pump body and the piston assembly. This assembly consists of a pneumatic piston (2) and a hydraulic piston (3), see figure 2. By means of the 3/2 solenoid valve channel (1) is pressurised and de-pressurised. When pressurised the pneumatic piston is activated its force exceeded the spring setting and pulls the hydraulic piston into the housing. The locked quantity of lubrication in housing is transported through the channel (4) to the turbine gas meter. De-pressurising the pneumatic piston will allow the spring to pull up the hydraulic piston again allowing the pump body to re-fill again for the next stroke. In order to detect a low oil level in the oil reservoir a low-level switch (5) is built in. This switch can be easily changed from NO (normally open) into NC (normally closed) by means of reverse mounting of the lever. For description see attachment Reverse Contact
2.1.2 Flow chart of the oil pump

From the pressure tapping point the gas or compressed air is lead to the pressure regulator which is reducing the (line) pressure up to 130 bar to 6 bar. An additional safety relief valve (3) is built in to protect the system. This relief valve is be connected with the open air in case the line pressure is used. The solenoid valve (4) is also equipped with a button to allow manual lubrication. With this button the pump can be tested also.
3 INSTALLATION

Installation only by authorised skilled people.

International, national, local and company safety rules are to be strictly followed as contravention may result in injury to personnel or loss of life.

Factory settings of pressure regulator and pressure relieve valve are not to be changed.

Recommended way of connecting to a turbine gas meter is described in Technical Note TN-11.368

If the meter is located in a zone classified as hazardous, all connections must be to intrinsically safe circuits.

Connect the (line) pressure or compressed air to the pressure regulator inlet marked with “in”.

Verify if the outlet pressure from the regulator is appropriate to the intended application.

Fill the oil reservoir with the oil delivered with the turbine gas meter.

The oil should be clean and free of liquids, dust or foreign material, which could damage the automatic lubrication system.
3.1 Start-Up

At the first use external oil pipes has to be filled-up with oil. This has to be done by a predicted number of manual strokes using the button on the solenoid.

Each push is one stroke.

In order to estimate the required number of strokes the equation below can be used.

\[
\text{Number lubrications} = \left( \frac{L}{8} \right) + V
\]

Where:

\[
\begin{align*}
L &= \text{the length of the external oil piping in cm} \\
V &= \text{additional volume inside meter body as a factor depending on size}
\end{align*}
\]

<table>
<thead>
<tr>
<th>Size</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 2”</td>
<td>1</td>
</tr>
<tr>
<td>80 / 3”</td>
<td>1</td>
</tr>
<tr>
<td>100 / 4”</td>
<td>3</td>
</tr>
<tr>
<td>150 / 6”</td>
<td>4</td>
</tr>
<tr>
<td>200 / 8”</td>
<td>4</td>
</tr>
<tr>
<td>250 / 10”</td>
<td>7</td>
</tr>
<tr>
<td>300 / 12”</td>
<td>8</td>
</tr>
<tr>
<td>400 / 16”</td>
<td>10</td>
</tr>
<tr>
<td>500 / 20”</td>
<td>12</td>
</tr>
<tr>
<td>600 / 24”</td>
<td>14</td>
</tr>
</tbody>
</table>

Lubricate the turbine gas meter with the required strokes by pushing the red button on the solenoid valve and checking the hydraulic piston is moving at each strokes.

Close the oil reservoir.

Adjust the right lubrication frequency at the Smart-Index. See manual Smart Index. Lubrication frequency for normal use is given in attachment Oil Frequency
4 MAINTENANCE

It is not allowed to carry out any repair or maintenance during use.

The turbine gas meter operates under pressure and/or at dangerous mediums.

The turbine gas meter can be in operation at high or low temperature.

Due to this fact the turbine gas meter can turn very hot or cold and touching can cause serious injuries.

4.1 Periodic inspections

No inspection (of the lubrication system) can be done while the system is activated.

The gas stream should be clean and free of liquids, dust or foreign material, which could damage the meter rotor and mechanism.

A correct functioning of the piston can be checked by measuring “L”, with a clean slide gauge, the distance between hydraulic piston and the top of the oil reservoir, see figure 4.

![Piston check](image.png)
Operate button manual and measure the distance L again. The difference between the two measurements must be 26 ±1 mm. If the distance is less the system is not working correct and needs maintenance.

5 TROUBLE SHOOTING

Stop

No inspection and or maintenance (of the lubrication system) can be done while the system is activated.

Check the working pressure of the automatic lubrication system. This is the outlet pressure of the pressure regulator it must 6 bar. Measure the distance L again as described above.

If the required distance is not achieved the cylinder inside (1) has to be cleaned and greased again. Remove cable gland (2) from oil-level switch, untighten 4 crews (3) and remove the bottom, see figure 5.

Fig. 5 How to Clean

Clean the cylinder inside and grease with Molykote 55M or equal. Mount all parts and perform 10 manual strokes. At the last stroke the distance L should be measured again. If the distance L is still too small the “back” pressure from the turbine gas meter may be too high. This is to verify by removing the oil pipe (4) at the bottom side of the lubrication system see figure 5. Please collect the released oil and discharge it in the correct way.
Perform a manual stroke again and measure the distance L again. If the distance is correct the check valve of the turbine gas meter is the problem. Otherwise the automatic lubrication system is defect.

5.1 Refilling the oil reservoir

The oil reservoir has to checked and refilled regularly. See attachment 9.2. Before refilling verify the remaining oil is clean. If not, the remaining oil should be discharged in a proper way. To discharge the remaining oil the drain at the bottom of the oil reservoir can be opened or the pump has to be dismantled.

6 DISMANTLING

STOP Before a meter may be dismantled or removed from the installation, the line must be de-pressurised.

It is important that the line is de-pressurised slowly and with care to prevent damage to the turbine and bearings. See manual turbine gas meter

The measuring line should be at ambient temperature before the gas meter is removed.

The oil reservoir has to checked and the remaining oil should discharged on a proper way. To discharge the remaining oil the drain at the bottom of the oil reservoir can be opened or the pump has to be dismantled.

Dismantling the pump by:

Remove (line) pressure or compressed air from the system

Remove the pressure connection

Remove the electrical connection

Dis-assamble the pump from the turbine gas meter by removing the 2 M8 bolts

Remove the remaining oil from the reservoir and discharge it on a proper way
7 FURTHER INFORMATION

7.1 Publications by Instromet

   Turbine Gas Meter Handbook
   P-Meter Handbook: Turbine Meters for Ethylene

7.2 International Reference Material

   International standards:
   ISO 9951: 1993,
   Recommendations of the International Organisation of Legal Metrology:

7.3 OIML R6, General specifications for gas volume meters

7.4 OIML R32, Rotary piston meters and turbine gas meters

   American Gas Association:

7.5 AGA report No. 7, Measurement of fuel gas by turbine meters.


8 TECHNICAL SPECIFICATION & PART IDENTIFICATION

8.1 Technical specification Oil pump

Materials

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body material</td>
<td>Aluminium anodized</td>
</tr>
<tr>
<td>Piston and Spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Seals</td>
<td>NBR</td>
</tr>
<tr>
<td>Temp. range</td>
<td>263.15 – 333.15 K (-10 / +60° C)</td>
</tr>
<tr>
<td>Max. oil pressure</td>
<td>10 M pa (100 bar)</td>
</tr>
<tr>
<td>Content reservoir</td>
<td>175 cc</td>
</tr>
<tr>
<td>Capacity / stroke</td>
<td>1.5 cc</td>
</tr>
<tr>
<td>Connection</td>
<td>6mm Swagelock</td>
</tr>
</tbody>
</table>

8.2 Technical specification Solenoid Valve

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24V ± 10%</td>
</tr>
<tr>
<td>Power consumption</td>
<td>0.5 W</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td>Ex approval class</td>
<td>II 2G EEx ia IICT5 or T6 ( Old - EEx ia IIC6T)</td>
</tr>
<tr>
<td>Min. puls</td>
<td>3 sec</td>
</tr>
<tr>
<td>Min. delay time</td>
<td>5 sec (resting time)</td>
</tr>
</tbody>
</table>

For further informations and instructions see:
- Operating Instructions Bürkert
- Function descriptions Solenoid valve Type 6106

8.3 Technical specification Level-switch

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Polyamide</td>
</tr>
<tr>
<td>Switch</td>
<td>Reed switch</td>
</tr>
<tr>
<td>Execution</td>
<td>NC (standard) or NO</td>
</tr>
<tr>
<td>Max. current</td>
<td>0.5A</td>
</tr>
<tr>
<td>Max. voltage</td>
<td>200V</td>
</tr>
</tbody>
</table>

8.4 Technical specification Pressure Regulator

For further information and instructions see:
- Tescom technical information
- Tescom operating and service manual
- Tescom safety, installation & operation precautions
9 ATTACHMENTS

9.1 Reverse Contact

If required the oil-level switch, which is Normaly Open, can be changed into Normaly Closed version.

---

Fig. 6 Detail lever-switch

- Prepare your tools to be clean
- Open the reservoir by removing the reservoir cap.
- Remove ring (1) figure 7
- Take the level-body (2) from the pilar
- Place the level-body upside down
- Replace ring (1)
- Test the sensor
- Close the reservoir with the cap again
9.2 Oil Frequency

Lubricating frequency of Instromet turbine gas meters

<table>
<thead>
<tr>
<th>Size</th>
<th>Lubrication 1 x per .... Days</th>
<th>Lubrication quantity (cc)</th>
<th>Reservoir refill 1x per .... year</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 2&quot;</td>
<td>60</td>
<td>1.5</td>
<td>5</td>
</tr>
<tr>
<td>80 / 3&quot;</td>
<td>60</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>100 / 4&quot;</td>
<td>60</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>150 / 6&quot;</td>
<td>60</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>200 / 8&quot;</td>
<td>60</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>250 / 10&quot;</td>
<td>60</td>
<td>7.5</td>
<td>3</td>
</tr>
<tr>
<td>300 / 12&quot;</td>
<td>60</td>
<td>7.5</td>
<td>3</td>
</tr>
<tr>
<td>400 / 16&quot;</td>
<td>60</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>500 / 20&quot;</td>
<td>60</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>600 / 24&quot;</td>
<td>60</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>
9.3 Connection diagramm
9.4 Description Solenoid type 6106

**Advantages/Benefits**

- Ex-EC IIC T6 approved
- Simple design, robust and frictionless
- Long service life, under absolute non-lube conditions
- Compact size
- PLC-compatible: low power and high drop-out voltage
- Suitable for technical vacuum

**Applications**

- **Fluids**
  - Lubricated, non-lubricated
  - Dry air
  - Neutral gases
  - For technical vacuum

- **Actuators**
  - Direct-acting single valve
  - Pilot valve
  - Actuator control
  - Logic control circuits
  - Manifold assembly

---

**Design/Function**

The valve consists of a plastic body, a frictionless rocker armature with spring and a DC coil. A stainless steel plate hermetically isolates the fluid from the actuator.

The innovative rocker alternately opens or closes two connections when switched. At 3/2 circuit functions can be achieved by pressurizing or exhausting a further outlet connection via them. The de-energized position is spring set.

The simple design ensures that the valves can be switched with a minimal rocker movement combining low wear under absolute non-lube conditions.

The external surfaces of the valve are smooth preventing dirt particles from adhering. The valves can be driven by a PLC with their low power consumption.

A manual override allows easy maintenance and commissioning of the valve.
Direct-acting rocker Solenoid Valve, sub-base mounting 16 mm wide

### Type 6106
(3/2-way)

#### Technical Data

**Circuit Functions**
- **3/2-way valve, when de-energized, port A exhausted**

**Specifications**

<table>
<thead>
<tr>
<th>Office DN</th>
<th>Flow QNM-value air</th>
<th>Manifold</th>
<th>Pressure range</th>
<th>Weight</th>
<th>Electr. power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>F → A</td>
<td>B → C</td>
<td>[bar]</td>
<td>[g]</td>
<td>[kW]</td>
</tr>
<tr>
<td>0.6</td>
<td>8.5</td>
<td>9.5</td>
<td>0 - 8</td>
<td>60</td>
<td>0.5</td>
</tr>
</tbody>
</table>

1. All pressures quoted are gauge pressures with respect to the prevailing atmospheric pressure.
2. Measured with 6 bar supply pressure and 1 bar pressure drop across the valve at +30 °C.

<table>
<thead>
<tr>
<th>Valve Specification</th>
<th>Solenoid Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body material</td>
<td>PA (polyamide)</td>
</tr>
<tr>
<td>Seal material</td>
<td>FPM (Viton)</td>
</tr>
<tr>
<td>Isolating plate</td>
<td>stainless steel</td>
</tr>
<tr>
<td>Fluids</td>
<td>lubricated, unlubricated, dry air, neutral gases, for technical vacuum</td>
</tr>
<tr>
<td>Max. viscosity</td>
<td>approx. 21 mm²/s</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-10 up to +55 °C</td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>-10 up to +55 °C</td>
</tr>
<tr>
<td>Port connection</td>
<td>BURKERT-interface with connection through the bottom</td>
</tr>
<tr>
<td>Response times</td>
<td></td>
</tr>
<tr>
<td>Opening</td>
<td>70 ms</td>
</tr>
<tr>
<td>Closing</td>
<td>70 ms</td>
</tr>
</tbody>
</table>

5. The response times of a 3/2-way valve are determined using an end volume of approx. 1 cm³. The times are measured at outlet A from switching at until pressure rise to 90% (pressure drop to 10%). Delay time: Time from electrical switching on until the beginning of the pressure change.

<table>
<thead>
<tr>
<th>Electrical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply only from certified intrinsically safe circuits with following max. values:</td>
</tr>
<tr>
<td>Explosion group</td>
</tr>
<tr>
<td>Max. safety voltage</td>
</tr>
<tr>
<td>Max. safety current</td>
</tr>
<tr>
<td>Consumption of energy</td>
</tr>
<tr>
<td>for block mounting</td>
</tr>
<tr>
<td>Consumption of energy</td>
</tr>
<tr>
<td>for single mounting</td>
</tr>
</tbody>
</table>
Direct-acting rocker Solenoid Valve, sub-base mounting 16 mm wide

Type 6106 (3/2-way)

Dimensions [mm]

Type 6106 with Burkert-flange, tag connectors above

Single manifold for Burkert sub-base

Multiple manifold for Burkert sub-base

Module for plug-in coupling
Direct-acting rocker Solenoid Valve, sub-base mounting 16 mm wide

### Ordering Chart (Other Versions on Request)

Version with tag connector on top, polyamide body and FPM-seal.
Supply package includes 2 mounting screws M2.5 x 16; without cable plug (see accessories)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.6</td>
<td>8.5</td>
<td>9.5</td>
<td>BURKERT</td>
<td>24</td>
<td>0.5</td>
<td>139 272 D</td>
</tr>
</tbody>
</table>

### Accessory Ordering Chart

<table>
<thead>
<tr>
<th>Unit</th>
<th>Characteristics</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable plug Type 2516</td>
<td>no wiring, 0-250 V</td>
<td>606 253 P</td>
</tr>
<tr>
<td>Single manifold BURKERT</td>
<td>width 16 mm, port connection M5</td>
<td>623 873 V</td>
</tr>
<tr>
<td>Single manifold BURKERT</td>
<td>width 16 mm, port connection G1/8</td>
<td>624 871 L</td>
</tr>
</tbody>
</table>

### Manifolds Ordering Chart

Multiple manifolds (material: aluminium), for Bürkert sub-base, cell spacing 16 mm

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Station</td>
<td>44</td>
<td>629 500 J</td>
</tr>
<tr>
<td>3 Station</td>
<td>64</td>
<td>629 509 R</td>
</tr>
<tr>
<td>4 Station</td>
<td>82</td>
<td>629 501 F</td>
</tr>
<tr>
<td>5 Station</td>
<td>100</td>
<td>629 502 G</td>
</tr>
<tr>
<td>6 Station</td>
<td>118</td>
<td>629 503 H</td>
</tr>
<tr>
<td>7 Station</td>
<td>136</td>
<td>629 504 A</td>
</tr>
<tr>
<td>8 Station</td>
<td>154</td>
<td>629 505 B</td>
</tr>
<tr>
<td>9 Station</td>
<td>172</td>
<td>629 506 H</td>
</tr>
<tr>
<td>10 Station</td>
<td>190</td>
<td>629 509 H</td>
</tr>
<tr>
<td>11 Station</td>
<td>208</td>
<td>007 110 X</td>
</tr>
<tr>
<td>12 Station</td>
<td>226</td>
<td>629 500 E</td>
</tr>
<tr>
<td>Connection kit</td>
<td>258</td>
<td>629 254 N</td>
</tr>
<tr>
<td>DIN call</td>
<td>35 x 7.5 mm</td>
<td>629 327 F</td>
</tr>
<tr>
<td>Blanking plate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.4.1 Operating Instructions Solenoid type 6105/6106

Type 6105/6106

Manual Automatic Lubrication System Eng. Rev.0 en
### Seguridad

**Utilización con arreglo a las disposiciones**

Se ruega observar las indicaciones contenidas en este Manual de instrucciones así como las condiciones de uso y datos admisibles con arreglo a la hoja de servicio Tipo 6105/6106, de modo que el aparato funcione impecablemente y permanezca durante largo tiempo apto para el empleo. La incumplimentación de estas indicaciones así como las intervenciones inadmisibles en el aparato suponen la denominación por nuestra parte de toda clase de responsabilidad, incluida la de la extinción de la garantía de los apartados y de las piezas de los accesorios. El aparato sirve exclusivamente como válvula maestra de seguridad 22/32 por los medios autorizados según la hoja de datos. Cualquier otra utilización que no cumpla con las disposiciones. El fabricante/suministrador no es responsable de los daños que de ello pudieran resultar. El riesgo corresponde únicamente al usuario.

- ¡ATENCIÓN!
  - Para la planificación y operación del aparato atenerse a las correspondientes reglas generales y reconocidas de la técnica de seguridad.
  - Tomar las medidas apropiadas para evitar accidentes en caso de intervenciones de las conexiones eléctricas.
  - Antes de proceder a intervenciones en el sistema desconectar la tensión.
  - En las ejecuciones con protección debe tenerse adicionalmente en cuenta los datos de la declaración de conformidad PTB n° Ex95.D.2180.

- ¡AVISO!
  - Peligro de lesiones! En caso de funcionamiento permanente, la bobina puede ponerse muy caliente.

### Safety / Sécurité / Seguridad

<table>
<thead>
<tr>
<th>1</th>
<th>Spannungsfreie Montage / Voltage-free assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Elektrischer Anschluß / Electrical connection</td>
</tr>
</tbody>
</table>

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**Sécurité**

**Utilisation conforme aux prescriptions**

Afin que l'appareil puisse fonctionner parfaitement et pendant longtemps, veuillez observer les instructions contenues dans cette notice d'utilisation ainsi que les conditions d'utilisation et les données admisibles mentionnées dans la fiche technique du type 6105/6106. En cas d'inobservation de ces instructions et d'interventions non autorisées dans l'appareil, nous déclinons toute responsabilité et la garantie couvrant l'appareil et les accessoires s'éteint. L'appareil est uniquement d'évacuation 22/32 pour les fluides admis selon la fiche technique. Une autre utilisation ou une utilisation excluant ce contexte sera considérée comme non conforme aux prescriptions. Pour les dommages qui en résulteraient, le fabricant/nous déclinons toute responsabilité. L'utilisateur seul en assume le risque.

**ATTENTION!**

- Pour la planification de l'utilisation et l'exploitation de l'appareil, veuillez vous en tenir aux régles applicables et généralement reconnues en matière de technique de sécurité.
- Prenez les mesures nécessaires pour exclure tout accident involontaire ou d'altérations inadmissibles.
- Notez qu'il n'est pas permis de desserrer des conduites ou des vannes se trouvant sous pression dans des systèmes!
- Avant d'intervenir dans le système, coupez l'alimentation électrique dans tous les cas!
- Dans les exécutions antideflagrantes, les indications de l'affidation de conformité PTB n° Ex95.D.2180 doivent être observées en plus.

**AVERTISSEMENT!**

- Risque de blessure! En cas de fonctionnement permanent, la bobine peut devenir très chaude.
Niederlassungen / Branch Offices

BÜRKERT GERMANY
Chr. Schott-Straße 13-17
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Fax: (0 70 44) 10-204
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Fax: (02) 746 16-67

B
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Fax: (03) 325 80-21

BRA
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Fax: (01) 11 16 02-00

CDN
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Fax: (00) 847 55-66

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Fax: (041) 785 66-66

CN
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Fax: (048) 16 61-80

DK
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Fax: (044) 50 75-00

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Fax: (01) 48 10-31-10

GB
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Fax: (0143) 73 13-33

HKG
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Fax: (02) 24 81 12-12

IE
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Fax: (02) 80 50-71

IRE
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Fax: (02) 80 50-71

J
Ph: (03) 33 05-36-10
Fax: (03) 33 05-36-10

KOR
Ph: (03) 46 28-92-92
Fax: (03) 46 28-92-92

MAL
Ph: (05) 832 12-12
Fax: (05) 832 12-12

N
Ph: (06) 244 41-10
Fax: (06) 244 41-10

NL
Ph: (034) 59 10-10
Fax: (034) 59 10-10

NZ
Ph: (09) 570 25-39
Fax: (09) 570 25-39

PL
Ph: (02) 827 02-00
Fax: (02) 827 02-00

RC
Ph: (02) 27 59 31-99
Fax: (02) 27 59 31-99

S
Ph: (040) 584 11-00
Fax: (040) 584 11-00

SA
Ph: (01) 307 20-00
Fax: (01) 307 20-00

SF
Ph: (02) 54 07 00-00
Fax: (02) 54 07 00-00

SIN
Ph: 383 21 12
Fax: 383 21 12

TR
Ph: (031) 459 53-35
Fax: (031) 459 53-35

USA
Ph: (04) 23 31-31
Fax: (04) 23 31-31

Betriebsanleitung-Nr. 392 214 - ind 03/701 01
0701/1M
**Montage / Assembly / Montage / Montaje**

- Anschluß / Connection / Conexión / Conexión
- 2P → 2A

**Störungen**

- Spannung prüfen / Check the voltage / Vérifier la tension / Comprobar tension
- Druck prüfen / Check the pressure / Vérifier la pression / Comprobar presión
- Rohrlieferungen prüfen / Check the pipe unit / Vérifier les conduites / Comprobar tuberías

**Spare parts**

**Type 6105/6106**

<table>
<thead>
<tr>
<th>Spannung</th>
<th>Volts</th>
<th>Leistung</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>1</td>
<td>131.250 P</td>
<td>131.250 E</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>131.355 M</td>
<td>131.250 Z</td>
</tr>
<tr>
<td>110-240</td>
<td>3</td>
<td>131.307 P</td>
<td>131.307 T</td>
</tr>
<tr>
<td>230-400</td>
<td>3</td>
<td>131.305 Y</td>
<td>131.302 U</td>
</tr>
</tbody>
</table>

**Wichtige Angaben**

- C: 0.9 120-150 Q 131.301 A
- C: 1.2 125-180 J 131.301 Y
- D: 1.2 125-185 K 131.307 Z

Bitte geben Sie bei der Bestellung von Ersatzteilen zusätzlich zur Bestellnummer der Ersatzteile auch die Bestellnummer Ihrer Kompaktgeräte ein. 

When ordering replacement parts, please also quote the order number of your complete appliance in addition to the order number of the replacement parts.

Lors de la commande de pièces de rechange, indiquez en plus de leur numéro de commande celui de commande de votre appareil complet.

Dan ocasión del pedido de las piezas de repuesto, regístre indicar además del número de pedido de la pieza de recaudo también el número de pedido de su aparato completo.
9.5 Product information Pressure regulator type BB-1

HIGH PRESSURE / MINIATURE
PRESSURE REDUCING REGULATOR

Tescom’s BB Series miniature pressure reducing regulators are designed to control pressures up to 6000 PSIG. BB regulators are compact and economical, lightweight and able to control both hydraulic and pneumatic media.

The BB Series miniature regulators feature an adjustable or preset pressure mechanism and a choice of outlet pressure ranges up to 1800 PSIG maximum. A spring loaded, piston sensed design offers reliability, durability and high cycle life. BB regulators are constructed of aluminum with aluminum and stainless steel trim parts. Minimal soft goods are used in BB regulators. Seat material is PTFE, PEEK or Vespel®.

BB Series miniature regulators are available in two versions - three pressure ranges each. The pressure ranges can be varied by simply exchanging load springs from the control knob side of the regulator. This can be accomplished under full inlet pressure without removing the regulator from the system.

- 6000 PSIG maximum inlet pressure
- Outlet pressure ranges:
  - 0-220 PSIG (low pressure model), 0-1800 PSIG (high pressure model)
- Durably piston sensed design
- Outlet pressure ranges are field adjustable
- Unbalanced main valve
- Two or four 1/4" NPT or SAE ports standard
- Minimal soft goods
- Non-venting
- Back pressure, two-stage and cartridge versions available
- 316 SST wetted construction available

TYPICAL APPLICATIONS
- Portable Pneumatic Equipment
- Calibration Kits
- Manufacturing Processes
- Low Flow Purge Systems
- Industrial Controls
- Gauge Protection
- Research & Development Laboratories

TESCOM CORPORATION
INDUSTRIAL CONTROLS DIVISION
12016 Industrial Boulevard
Elk River, Minnesota 55330-2491
1-800-447-1250 (612) 241-3238
Fax: (612) 241-3224
email: icd@tescom.com
www.tescom.com
Safety, Installation, & Operation Precautions

TECOM
INDUSTRIAL CONTROLS DIVISION

9.5.1 Safety Instructions Pressure Regulator

Do not attempt to select, install, use, or maintain this regulator, valve, or accessory until you have read and fully understand these instructions.

Be sure this information reaches the operator and stays with the product after installation.

Do not permit untrained persons to install, use, or maintain this regulator, valve, or accessory.

Improper selection, improper installation, misuse, or abuse of regulators, valves, or related accessories can cause death, serious injury, and/or property damage.

Possible consequences include but are not limited to:

- High velocity fluid (gas or liquid) discharge
- Parts ejected at high speed
- Contact with fluids that may be hot, cold, toxic, or otherwise injurious
- Explosion or burning of the fluid
- Lines/hoses whipping dangerously
- Damage or destruction to other components or equipment in the system

Safety Precautions:

1. Inspect the regulator, valve, and accessories before each use.
2. Never connect regulators, valves, or accessories to a supply source having a pressure greater than the maximum rated pressure of the regulator, valve, or accessory.
3. Refer to product label (modification specific) for maximum inlet pressures. If this rated pressure cannot be found, contact your local TECOM representative for the rated pressure prior to installation and use. Verify the designed pressure rating of all equipment (e.g., supply lines, fittings, connections, filters, valves, gauges, etc.) in your system. All must be capable of handling the supply and operating pressure.
4. Clearly establish flow direction of the fluid before installation of regulators, valves, and accessories. It is the responsibility of the user to install the equipment in the correct direction.
5. Do not tighten fittings, gages, or components in pressurized systems.
6. Never turn regulator or valve body. Instead, use regulator or valve body and turn fitting nut.
7. If a regulator or valve leaks or malfunctions, take it out of service immediately.
8. Do not modify equipment or add attachments not approved by the manufacturer.
9. Apply pressure to the system gradually, avoiding a sudden surge of fluid or pressure shock to the equipment in the system.
10. Regulators are not shut-off devices. Install a pressure relief device downstream of the regulator to protect the process equipment from operating pressure increases. Shut off the supply pressure when the regulator is not in use.
11. Periodic inspection and scheduled maintenance of your equipment is required for continued safety operation.
12. The frequency of servicing is the responsibility of the user based on the application.
13. Never allow problems or lack of maintenance to go unreported.
14. Read and follow precautions on compressed gas cylinder labels.
15. It is important that you analyze all aspects of your application and review all available information concerning the product or system. Obtain, read, and understand the Material Safety Data Sheet (MSDS) for each fluid used in your system.
16. Oxygen service requires special expertise and knowledge of system design and material compatibility in order to minimize the potential for death, serious injury, and/or property damage.
17. Never use materials for regulators, valves, or accessories that are not compatible with the fluids being used.
18. Users must test under normal operating conditions to determine suitability of materials in an application.
19. Vent fluids to a safe environment, and in an area away from employees. Be sure that venting and disposal methods are in accordance with Federal, State, and Local requirements. Locate and...
SAFETY PRECAUTIONS (continued)

- Construct vent lines to prevent condensation or gas accumulation. Make sure the vent outlet is not obstructed by rain, snow, ice, vegetation, insects, birds, etc. Do not interconnect vent lines; use separate lines if more than one vent is needed.

- Do not locate regulators, valves, or accessories using flammable fluids near open flames or any other source of ignition.

- Some fluids when burning do not exhibit a visible flame. Use extreme caution when inspecting and servicing systems using flammable fluids to avoid death or serious injury to employees. Provide a device to warn employees of these dangerous conditions.

- Many gases can cause suffocation. Make certain the area is well ventilated. Provide a device to warn employees of lack of oxygen.

- Never use oil or grease on these regulators, valves, or accessories. Oil and grease are easily ignited and may combine violently with some fluids under pressure.

- Have emergency equipment in the area if toxic or flammable fluids are used.

- Upstream filters are recommended for use with all fluids.

- Do not bleed system by loosening fittings.

- Prevent icing of the equipment by removing excess moisture from the gas.

- Always use proper thread lubricants and sealants on tapered pipe threads.

INSTALLATION

Inspect the regulator, valve, and accessories for physical damage and contamination. Do not connect the regulator, valve, or accessory if you detect oil, grease, or damaged parts. If the regulator, valve, or accessory is damaged, contact your local TESCOM representative to have the regulator cleaned or repaired.

Make sure that the components and materials used in the fluid handling system are compatible with the fluid and have the proper pressure rating.

REPAIR SERVICE

If a regulator or valve leaks or malfunctions, take it out of service immediately. You must have instructions before doing any maintenance. Do not make any repairs you do not understand. Have qualified personnel make repairs. Return any equipment in need of service to your equipment supplier for evaluation and prompt service. Equipment is restored to the original factory performance specifications, if repairable. There are flat fee repair charges for each standard model. The original equipment warranty applies after a complete overhaul.

Safe Component Selection

1. Consider the total system design when selecting a component to ensure safe, trouble-free performance.

2. The user is responsible for assuring all safety and warning requirements of the application are met through his/her own analysis and testing.

WARNING

3. TESCOM may suggest material for use with specific media upon request. Suggestions are based on technical compatibility resources through associations and manufacturers. TESCOM does NOT guarantee materials to be compatible with specific media -- THIS IS THE RESPONSIBILITY OF THE USER!

4. Component function, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system user.

Do not modify equipment or add attachments not approved by the manufacturer.

ASSEMBLY/INSTALLATION DRAWINGS & BILLS OF MATERIAL Drawings and parts lists for your product may be obtained by calling the number below. TESCOM will provide these by fax or mail. Your local TESCOM representative can provide additional assistance.

Call (800) 447 - 1250 for assembly/installation drawings & bills of material. Be sure to have your complete model number ready.
Piston Sensed Pressure Reducing Regulators

9.5.3 Operation and Service manual pressure regulator

1. Operation and Service manual pressure regulator

1. The valve parts can now be removed from the regulator body by turning the seat retainer and back cap counter-clockwise until its free of the regulator body.

NOTE: The necessary valve seat may be removed from the seat retainer using a sharp instrument.

CAUTION: When removing valve parts from a regulator that has a brass core, care must be taken to ensure the brass valve stem remains vertical. If the main valve stem is not removed correctly, parts may remain in the regulator.

2. To disassemble main valve assembly and/or valve, clamp valve in sharpened jaw vice or hold with pliers. Clamping should be done on flats.

CAUTION: Care must be used not to damage valve. A special file may be ordered from the factory to aid in the disassembly of the main valve assembly found in Tecom Regulator Models 56-1000 and 44-1100.

NOTE: Several Tecom's regulator's are supplied with internal flats. They will be located either in the flat post or in the main valve area of the regulator. In such case, they should be removed and replaced before reassembly.

Reassembly

The regulator is reassembled in the reverse order of disassembly, observing the following precautions. Please reference the BIL of Material and assembly drawings for the correct locations of replacement parts and routed torque specifications.
Reassembly (continued)

5. Inspect all parts and replace those worn or damaged with Tescor replacement parts.

6. All parts should be cleaned to the cleanliness level required for safe operation with the motor and system they will be used in. All parts in the flow path must be free of particles which could cause poor sealing of the main valve.

3. Apply a thin uniform coating of fluid to the entire surface of all of the following parts: inlet orifice of spring button, threaded plug of adjusting screw, entire threaded area of the bonnet, all O-rings, all threaded parts external to regulator.

4. Valve seats must be installed with the chamfered side towards the main valve.

5. Standard Regulator with Control Knob - The body and bonnet are fastened by holding the bonnet assembly open end up and dropping all required items into place one at a time. The last item to be placed in the body of most of all Tescor regulators is the piston sensor. Place all O-rings and back-up rings that are external to the piston sensor in the body before placing the sensor in place. O-rings should always be installed before back-up rings. The bonnet and body may now be assembled. This is best done by holding the body in one hand and the bonnet in the other. Till the body to a 45° angle and then attach the bonnet by screwing it into the body firmly and tight. Regulator should then be placed in case and bonnet radioed to correct specifications. See print.

6. Dome/Spring Combination and Dome Loaded Regulators are more easily reassembled by holding regulator firmly in case and reinstalling dome.

7. Self-Venting Regulator - If your regulator has an adjustable relief valve mechanism, it is set on final assembly at the factory and usually will not require further adjustment. If adjustment becomes necessary use the following procedure after regulator has been installed:

Step 1. Remove hole plug located in control head.

Step 2. Using control knob, apply 10 to 15 lbs on downstream side.

Step 3. Turn venting adjusting screw CW (clockwise under hole plug) until media can be heard escaping through relief valve.

Step 4. Turn screw CCW until media flows, plus 1 1/2 turn. Replace hole plug.

8. Reinstalling wire mesh inlet filter - Insert filter into primary inlet port. It must then be expanded to fit correctly. This can be accomplished by inserting a metal tool the same size as the port and then lightly tapping it with a hammer.

AFTER REGULATOR HAS BEEN REASSEMBLED, IT SHOULD BE CONNECTED TO A PRESSURE WAXING SOURCE IN MANDA COMPARABLE WITH THE USE OF THE REGULATOR AND PRESSURIZED TO CHECK FOR INTERNAL AND EXTERNAL LEAKAGE AND OPERATING CHARACTERISTICS.

Manual Automatic Lubrication System Eng. Rev. 0