Precision Metering
The GRP Flow Control Valve
Unbeatable Repetition Accuracy
Festo’s GRP precision flow control valve allows repeatable flow rate settings. Once made, settings can be read easily from the scale and reproduced.

Uncompromising Precision
The adjusting knob allows the flow rate of a medium such as compressed air to be controlled conveniently, precisely and steplessly. This allows the piston speed of cylinders to be adjusted more accurately than ever before, particularly in the case of very low or varying speeds.

Versatile Product Line
The GRP product line offers more opportunities for versatile applications. This precision flow-control valve with optimized control characteristics is available in two variants, with or without a non-return function. Available world-wide – from stock.

Reduced Installation Costs
The PK fitting means that installation can be carried out in an instant. The valves can be mounted as desired either on a mounting plate or in a panel. Mounting plates for one or two GRPs are available as accessories.

Precision Dosage of Media
The precision flow control valve GRP, offers not only outstanding precision but also unbeatable repetition accuracy.

The GRP opens up previously undreamed of opportunities for the control of the flow rate of compressed air, other neutral gases and neutral liquids. By simply turning the adjusting knob, you can control flow rate steplessly and almost down to the last drop (low flow). This precision is provided by a plastic disk with a variable-depth groove. This allows very precise control of the flow rate of a medium. The current setting can be read easily from a scale and reproduced easily at any time. And at a price which also bears repetition.

GRPs can be found in the food and packaging industry, medical technology, the electronics industry – in other words, everywhere that precision is essential.
Application 1:

**Ultrasound Welding**

On an individual basis which reflects the variety of applications involved, customer-specific ultrasound technology solutions are developed to allow the welding, riveting and cutting of thermoplastic materials and the embedding of other materials.

These intelligent processes produce clean joints with high long-term strength. In the interests of a time-optimized production cycle, it is very important to have accurate control of the air used to obtain the various feed speeds – a fast advance followed by a slow lowering and welding process and a fast return. This demanding task is ideal for the GRP and the precise steplessly adjustable control which this provides.

Application 2:

**Speed Control In The Food Industry**

Sausage filling is carried out to the gram and in a highly flexible way. A single cylinder is used to fill all kinds of different sausages – and in this case weights which are a “little over” are not “all right!”

A filling machine is linked to an automatic double clip device which precisely seals all types of plastic, fibre or natural sausage skins. The GRP valve provides the perfect fine dosing necessary in order to provide the various cylinder speeds required for the different filling consistencies with the appropriate degree of repetition accuracy. The important factors here are precise adjustment and fast changeover from one sausage product to another.

Application 3:

**Measurement of Back Pressure**

Laboratory equipment is required to operate to extremely close tolerances – a matter of microns in the case of the proximity measurement of the profiles of flat and shaped plastic packs using a well-proven air sensing method.

This was the reason why a manufacturer of these products choose GRP precision flow control valves for use in continuous product monitoring to bring references values to the desired settings. The flow control valves are used to create an air cushion under a needle probe, allowing them to travel over the plastic workpieces without touching them. Thickness values are then recorded by a high-resolution displacement encoder system. The back pressure values provide an indication of the thickness of the workpiece material.

Application 4:

**Reference Pressure Measurement for Quality Assurance with Narrow Bores**

Medical technology demands total precision. To allow ultra-low pain injections, the fine hypodermic needles of safety syringes are drilled with microscopic 5 µm holes.

The relevant test station is equipped with numerous GRP precision flow control valves which allow exceptionally precise examination of the flow rate of the compressed air which is fed through each needle. The pressure of this is then compared with a reference needle. The result of this comparison indicates whether the needle in question has been correctly drilled.
The valve allows for precise, reproducible regulation of flow rates, e.g., for controlling cylinder piston speeds. It can also be used as a precision timer in combination with a reservoir. The flow rate for the medium can be infinitely and accurately adjusted by turning the adjusting knob. Settings can be accurately reproduced via the scale. The medium is blocked in the reverse direction with a non-return valve over the entire cross section.

### Accessories

<table>
<thead>
<tr>
<th>Mounting plate for 2n mounting frame</th>
<th>for 1 valve</th>
<th>10 391</th>
<th>APL-2N-GRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part no. / Type</td>
<td>Type 12743</td>
<td>GRP-10-PK-3</td>
<td>10802</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medium</th>
<th>Compressed air, filtered 1 µm, lubricated or unlubricated, or neutral gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Ring channel throttle</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>On mounting plate 2n or panel mount (installation Ø 0.89 in / 22.5 mm)</td>
</tr>
<tr>
<td>Connection</td>
<td>Barbed fitting for 3 mm plastic tubing...for 4 mm plastic tubing</td>
</tr>
<tr>
<td>Nominal size</td>
<td>0.06 in / 1.5 mm...0.10 in / 2.5 mm</td>
</tr>
<tr>
<td>Nominal flow rate</td>
<td>In direction of flow control...Against the direction of flow control</td>
</tr>
<tr>
<td>Pressure range</td>
<td>GRP 1 → 2 0 to 90 psi / 0 to 6 bar 0 to 90 psi / 0 to 6 bar</td>
</tr>
<tr>
<td></td>
<td>GRPO 1 → 2 0 to 90 psi / 0 to 6 bar 0 to 7.25 psi / 0 to 0.5 bar</td>
</tr>
<tr>
<td>Temperature range</td>
<td>15 to 122°F / -10 to 50 °C</td>
</tr>
<tr>
<td>Materials</td>
<td>Housing: black plastic, Al, brass, seals: perbunan</td>
</tr>
<tr>
<td>Weights</td>
<td>Valve: GRP 0.11 lbs / 0.050 kg GRPO 0.11 lbs / 0.050 kg</td>
</tr>
<tr>
<td></td>
<td>Mounting plate: APL-2N-GRP 0.035 lbs / 0.016 kg APL-2N-GRPx2 0.048 lbs / 0.022 kg</td>
</tr>
</tbody>
</table>

---

**GRP Flow Control Valve**

**Technical data**

- **GRP**
  - Precision one-way flow control valve
- **GRPO**
  - Precision flow control valve
- Up to .010 Cv / 10 l/min
  - GRP-10-PK-3
  - GRPO-10-PK-3
- Up to .070 Cv / 70 l/min
  - GRP-70-PK-3
  - GRPO-70-PK-3
- Up to .160 Cv / 160 l/min
  - GRP-160-PK-4
  - GRPO-160-PK-4
- Flow rate: .0001 to .090 Cv / 0.1 to 90 l/min
- Precision infinite regulation of flow rates for neutral gases and compressed air
- Accurate reproduction of set values with 300° rotation angle
- Precision timer in combination with external reservoir
- Barbed fittings for type PU-..., PL-..., PP-... plastic tubing
- Panel mounting or mounting plate

---

**Accessories**

<table>
<thead>
<tr>
<th>Mounting plate for 2n mounting frame</th>
<th>for 1 valve</th>
<th>10 391</th>
<th>APL-2N-GRP</th>
</tr>
</thead>
</table>

---

**Part no. / Type**

<table>
<thead>
<tr>
<th>Medium</th>
<th>Design</th>
<th>Type of mounting</th>
<th>Connection</th>
<th>Nominal size</th>
<th>Nominal flow rate</th>
<th>Pressure range</th>
<th>Temperature range</th>
<th>Materials</th>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air, filtered 1 µm, lubricated or unlubricated, or neutral gas</td>
<td>Ring channel throttle</td>
<td>On mounting plate 2n or panel mount (installation Ø 0.89 in / 22.5 mm)</td>
<td>Barbed fitting for 3 mm plastic tubing...for 4 mm plastic tubing</td>
<td>0.06 in / 1.5 mm...0.10 in / 2.5 mm</td>
<td>In direction of flow control...Against the direction of flow control</td>
<td>GRP 1 → 2 0 to 90 psi / 0 to 6 bar 0 to 90 psi / 0 to 6 bar</td>
<td>15 to 122°F / -10 to 50 °C</td>
<td>Housing: black plastic, Al, brass, seals: perbunan</td>
<td>Valve: GRP 0.11 lbs / 0.050 kg GRPO 0.11 lbs / 0.050 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GRPO 1 → 2 0 to 90 psi / 0 to 6 bar 0 to 7.25 psi / 0 to 0.5 bar</td>
<td></td>
<td></td>
<td>Mounting plate: APL-2N-GRP 0.035 lbs / 0.016 kg APL-2N-GRPx2 0.048 lbs / 0.022 kg</td>
</tr>
</tbody>
</table>
Flow rate in relation to throttle setting where $p = 1$ bar and $\Delta p = 1$ bar

### Flow Data

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Flow Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRP/O-10-PK-3</td>
<td><img src="GRP/O-10-PK-3" alt="Graph" /></td>
</tr>
<tr>
<td>GRP/O-70-PK-3</td>
<td><img src="GRP/O-70-PK-3" alt="Graph" /></td>
</tr>
<tr>
<td>GRP/O-160-PK-4</td>
<td><img src="GRP/O-160-PK-4" alt="Graph" /></td>
</tr>
</tbody>
</table>

### Dimensions (mm)

- **Installation aperture**: 22.5 mm
- **Barbed fitting for plastic tubing**: $x = 1.5 \ldots 10$ mm
- **Mounting plate**: APL-2N-GRPx2

### Conversion Factors

- $\text{mm} \rightarrow \text{inches} = \div 25.4$
- $\text{l/min} \rightarrow \text{Cv} = x \cdot 0.001$
The intelligent solutions which the GRP precision control valve provides result in tangible benefits. The gain in precision with the GRP generates both technical and economical advantages. Make a comparison and prove it to yourself!

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Advantages for designers</th>
<th>Advantages for buyers</th>
</tr>
</thead>
</table>
| 1. Precision stepless adjustment of flow rate | - Precise control opens up wide range of application  
- High accuracy even with low flow rates  
- Choice of variants, with or without non-return function | - Good price/performance ratio combined with exceptional functionality  
- Flexible applications, thanks to product line with choice of three variants |
| 2. Calibrated adjustment knob | - Easy reproducibility of settings, especially at low end of scale | - Time saving thanks to fast and precise changeover of piston speeds |
| 3. Easy installation | - Greater flexibility thanks to choice of mounting options:  
  - Mounting plates  
  - Panel mounting | - PK fitting means simple installation, saving time and money |