GS-01

Compressed Air Counter with Switching- and Analogue-Output

Description:

The GS-01 series compressed air counter is a thermal mass flowmeter for gases according to the principle of hot-wire anemometer that is equipped with an electronic unit that has been developed specifically for applications in the field of industrial compressed air. A calorimetric measuring unit consisting of a heated and a temperature measuring resistor form the sensor component of the GS-01. A volume of compressed air passing through the measuring tube carries off the heat from the heated resistor that is proportional to the velocity. The resulting electrical change of the heated resistor is evaluated by means of the measuring bridge and the effect of media temperature is compensated by the measuring resistance. The extremely user-friendly designed electronic unit has two outputs which can be adjusted optionally as a PNP transistor output for incorporating a limit value switch or an impulse output or as an analogue output for transmitting a 4...20 mA signal. Thus, the possible combinations of outputs for the GS-01 are:

- 2 x NO-contacts / NC-contacts, adjustable with regard to position and hysteresis of the setpoint or as Window function
- 1 x NO-contact / NC-contact and an additional analogue output (scalable) or
- 1 x NO-contact / NC-contact and an additional impulse output (programmable).

The rotatable 4-digit digital display on the GS-01 displays either the accumulated sum of the compressed air flow (consumption of compressed air) in Nm³ or the current value of the flow in Nm³/min or in Nm³/h optically. The maximum value that can be displayed is 4000 * 10³m³ where at such high values a yellow LED indicates that the displayed 4-digit value must be multiplied by the factor 1000. On pressing a button, the device can display the current media temperature and the accumulated sum after the last counter reset. Using a programming device, the display can be adjusted to let it remain switched off in RUN mode. An automatic Reset function of the totalizer can be programmed to different time intervals. In addition, the GS-01 has a minimum and a maximum memory that can store the lowest and the highest value measured until its next resetting.
Application:

Today, consumption of compressed air in machines and equipment is a cost factor that cannot be ignored at all. Due to this fact the consuming industry increasingly demands measuring devices which, on the display, help satisfactorily monitor consumption of compressed air and, on the other hand, do not cause additional pressure drop within the system which in turn would further escalate costs. The new compressed air counter GS-01 is our answer to this problem. It enables visual check of current consumption on a clearly readable display and, it can display the volume of compressed air consumed up to a point like a „water clock for air“ and store the value. Two programmable switching contacts trigger an alarm in the event of exceeding or falling short of a defined volume flow and, optionally, they can be programmed using window technology. It means that a defined range is considered as „good“ and, on escaping this Window alarm is sounded. Optionally, the user may avoid one of the switching outputs and, instead, opt for an impulse or analogue output or program the switching output as the preselection counter. The fact that the GS-01 is a mass flowmeter based on the thermal principle also underlines the advantages of measuring volume flow largely regardless of pressure and media temperature and implies a pressure drop in the range of only few millibars.

The accuracy of 3% of measured value + 0.3% of full scale value and the option of operating range up to 700 Nm³/h round off a device that pays off within the shortest span of time, not the least, due to its excellent price to performance ratio.

Orders Codes:

<table>
<thead>
<tr>
<th>Order number</th>
<th>GS-01. 1. 3. 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS-01 Compressed Air Counter with Switching-and Analogue-Output</td>
<td></td>
</tr>
<tr>
<td>Size /</td>
<td></td>
</tr>
<tr>
<td>0 = operating range 0.04 to 15 Nm³/h, connections in G1/4”-female</td>
<td></td>
</tr>
<tr>
<td>1 = operating range 0.2 to 75 Nm³/h, connections in R1/2”-male</td>
<td></td>
</tr>
<tr>
<td>2 = operating range 0.7 to 225 Nm³/h, connections in R1”-male</td>
<td></td>
</tr>
<tr>
<td>3 = operating range 1.3 (1.5) to 410 Nm³/h, conn. in R1 1/2”-male</td>
<td></td>
</tr>
<tr>
<td>4 = operating range 2.3 (3) to 700 Nm³/h, connections in R2”-male</td>
<td></td>
</tr>
<tr>
<td>Medium /</td>
<td></td>
</tr>
<tr>
<td>0 = compressed air (all sizes)</td>
<td></td>
</tr>
<tr>
<td>1 = argon, CO₂, N₂ switchable (only GS-01.0 and GS-01.1)</td>
<td></td>
</tr>
<tr>
<td>Option /</td>
<td></td>
</tr>
<tr>
<td>0 = no option</td>
<td></td>
</tr>
<tr>
<td>1 = counter plug 4-pole series 713</td>
<td></td>
</tr>
</tbody>
</table>

Versions:

GS-01 Compressed Air Counter with Switching-and Analogue-Output

The GS-01 can be supplied in 5 versions with different nominal diameters and volume flow ranges measurable by them. The available connection sizes are: G1/4”, R1/2”, R1”, R1 1/2” and R2”. The tapping ranges are in the same sequence 0 - 18 Nm³/h, 0 - 90 Nm³/h, 0 - 270 Nm³/h, 0 - 492 Nm³/h and 0 - 840 Nm³/h. The sizes G1/4” and R1/2” are also available for argon, CO₂ and nitrogen.
### Technical Specifications:

<table>
<thead>
<tr>
<th>Values in Nm³/h</th>
<th>GS-01.0.0</th>
<th>GS-01.0.1</th>
<th>GS-01.1.0</th>
<th>GS-01.1.1</th>
<th>GS-01.2</th>
<th>GS-01.3</th>
<th>GS-01.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display-range</td>
<td>0. . .18</td>
<td>Ar/ 0. . .28.84</td>
<td>0. . .90</td>
<td>Ar/ 0. . .146.40</td>
<td>0. . .270</td>
<td>0. . .492</td>
<td>0. . .840</td>
</tr>
<tr>
<td>Operating-range</td>
<td>0.04 . .15</td>
<td>Ar/ 0.08 . .24.04</td>
<td>0.20 . .75</td>
<td>Ar/ 0.40 . .122.00</td>
<td>0.70 . .225</td>
<td>1.3 (1.5) . .410</td>
<td>2.3 (3) . .700</td>
</tr>
<tr>
<td>Setpoint</td>
<td>0.12 . .15</td>
<td>Ar/ 0.22 . .24.04</td>
<td>0.6 . .75</td>
<td>Ar/ 1.0 . .122.00</td>
<td>1.8 . .225</td>
<td>3.5 . .410</td>
<td>5.0 . .700</td>
</tr>
<tr>
<td>Reset point</td>
<td>0.04 . .14.92</td>
<td>Ar/ 0.12 . .23.94</td>
<td>0.2 . .74.6</td>
<td>Ar/ 0.60 . .121.50</td>
<td>0.7 . .223.9</td>
<td>1.5 . .408</td>
<td>2.0 . .697</td>
</tr>
<tr>
<td>Analogue start-</td>
<td>0 . .11.26</td>
<td>Ar/ 0.0 . .19.24</td>
<td>0.0 . .56.3</td>
<td>Ar/ 0.0 . .97.60</td>
<td>0.0 . .168.8</td>
<td>0.0 . .307.5</td>
<td>0.0 . .525.0</td>
</tr>
<tr>
<td>Analogue endpoint</td>
<td>3.74 . .15</td>
<td>Ar/ 4.80 . .24.04</td>
<td>18.7 . .75.0</td>
<td>Ar/ 24.40 . .122.00</td>
<td>56.2 . .225.0</td>
<td>102.5 . .410</td>
<td>175 . .700</td>
</tr>
<tr>
<td>In steps of...</td>
<td>0.02</td>
<td>0.1 (0.2 Ar)</td>
<td>0.1</td>
<td>0.1 (0.2 Ar)</td>
<td>0.1</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Process connection</td>
<td>G¼&quot;-IG</td>
<td>G¼&quot;-IG</td>
<td>R½&quot;-AG</td>
<td>R½&quot;-AG</td>
<td>R¹&quot;-AG</td>
<td>R1 ½&quot;-AG</td>
<td>R2&quot;-AG</td>
</tr>
</tbody>
</table>

### Medium /
Operating compressed air process gas

### Air quality
- **(DIN8573-1)** /
- Class 141 (measuring errors value A)
- Class 344 (measuring errors value B)

### Measuring errors /
- **Air quality A:** +/- (3% of mv + 0.3% from full scale)
- **Air quality B:** +/- (6% of mv + 0.6% from full scale)
- **Argon/ CO₂ / N₂:** +/- (6% of mv + 0.6% from full scale)

### Response time /
< 0.1 s (for damping = 0 s)

### Damping /
0 / 0.2 / 0.4 / 0.6 / 0.8 / 1 s

### Measuring dynamics /
1300

### Pressure /
-0.4 . .16 bar max.

### Media-temp. /
0 . .60°C

### Ambient temp. /
0 . .60°C

### Storage temp. /
-20 . .+85°C

### Max. rel. humidity /
90%

### Vibration proof /
5 g (DIN EN 68000-2-6, 55-2000 Hz)

### Housing materials /
- **GS-01.0.x:** PBT-GF 20, NBR, PC (polycarbonate), stainless steel (304S15), brass coated, PTFE, FKM, aluminium powder coated
- **GS-01.1.x:** PBT-GF 20, PC (APEC), Macrolon, stainless steel (304S15), Viton

### Sensor materials /
- **GS-01.0.x:** stainless steel (304S15), FKM, ceramic glass-passivated, PEEK GF30, polyester, aluminium
- **GS-01.1.x:** stainless steel (304S15), ceramics glass-passivated, PEEK (polyether-ether ketone, polyester, Viton, aluminium anodised

### Temperature monitoring /
- **Display range:** -12 . .72°C
- **Measuring range:** 0 . .60°C
- **Accuracy:** ± 2°C (with flow within measuring range)
**Electrical Specifications:**

<table>
<thead>
<tr>
<th>Values in Nm³/h</th>
<th>GS-01.0.0</th>
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<th>GS-01.1.0</th>
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<th>GS-01.2</th>
<th>GS-01.3</th>
<th>GS-01.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulse value /</td>
<td>0.001...1000000</td>
<td>0.001...1000000</td>
<td>0.001...1000000</td>
<td>0.001...1000000</td>
<td>0.003...3000000</td>
<td>0.005...4000000</td>
<td>0.010...4000000</td>
</tr>
<tr>
<td>in steps of (m³)</td>
<td>/ 0.001</td>
<td>/ 0.001</td>
<td>/ 0.001</td>
<td>/ 0.001</td>
<td>/ 0.001</td>
<td>/ 0.001</td>
<td>/ 0.010</td>
</tr>
</tbody>
</table>

Impulse length (s) = 0.1 / 2 = 0.062 / 2 = 0.02 / 2 = 0.012 / 2 = 0.02 / 2 = 0.018 / 2 = 0.021 / 2

Supply voltage / 18...30 VDC
Load capacity / 2 x 250 mA
Protection class / IP65
EMC (GS-01.x.1.x): EN 61000/4/2 ESD: 4 kV CD/ 8 kV AD
EN 61000/4/3 HF radiated: 10 V/m
EN 61000/4/4 burst: 2 kV
EN 61000/4/6 HF guided: 10 V
EMC (GS-01.x.0.x): DIN EN 61000-6-2
DIN EN 61000-6-3
Short-circuit protection / clocked

Polarity-reversal protection / yes
Overload-proof / yes
Voltage drop / < 2 V
Power consumption / < 110 mA
Ready/delay time / 1.0 s
Electrical connection / plug connection M12
Analogue output signal / 4...20 mA
Load for analogue output / < 500 Ohm
Pulse output / consumption volume control
Display / Unit:
5 LED green (GS-01.x.0.x) für Nl/min, Nm³/h, Nm³, Nm³ und °C
4 LED green (GS-01.x.1.x) für Nl/min, Nm³/h, Nm³ und °C
Function display: 1 LED green (yellow)
Connection status: 2 LED yellow
Measured values: 4-digit alphanumeric display
Programming: 4-digit alphanumeric display

### Dimensions in mm:

**GS-01.0**

![Connection diagram:](image)

2 x Switching output
1 x Switching output
1x Analogue output