Multifunctional Sample Gas Conditioning System

PSG-GSU

Application

The compact and multifunctional sample gas conditioning systems series PSG-GSU are used for continuous extractive gas analysis. These solutions ensure an accurate and constant reduction of the outlet dew-point, filtration of remaining dust, control and monitoring of the sample gas flow rate and finally feeding of test- and calibration gas according to legal requirements. In addition to this scope of functions the integrated temperature control allows the operation of the gas sampling probe and the heated sample line. In combination with AGT-PSG gas sampling probes PSG Basic resp. PSG Plus and heated sample line PSG Extruded Hybrid these systems series PSG-GSU represent complete cost-optimized „Plug and Play“ sample gas analysis systems, that only have to be expanded by a gas analyser. The flexible design of all single components and its combinations enables a perfect adaption to every sample gas application.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The hydrophobic corrosion resistant PTFE coating and the very short retention time in the heat exchanger ensure a lowest possible gas dissolution rate.

Functions

An electronic system controls dew point and cooling air temperature. Potential free alarm contacts allow remote monitoring of the device. An operation hours counter controls the service intervals. Cool- and moisture sensor control the gas sample pump. The steering and control of the Gas Sampling Probes and the heated sample line are fully controlled by PSG-GSU.

✓ Complete „Plug & Sample“- gas conditioning system
✓ Seamless integration with PSG Basic, PSG Plus and heated sample line PSG Extruded Hybrid
✓ High performance compressor cooler with long lasting hot-gas bypass system without switching the compressor
✓ Corrosion resistant PTFE / PVDF heat exchanger
✓ Digital display for temperature, alarms, logbook, operating hours counter and service interval indication
✓ Integrated filter, flow meter, flow alarm, liquid sensor, gas pump, test gas valve and 2 temperature controllers
✓ Pre-separators and flow alarm optional
✓ Wall mounting or 19“-rack housing
### Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>PSG-GSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>PSG-GSU-1101-7-1U-F</td>
<td></td>
</tr>
</tbody>
</table>

#### Operating data

<table>
<thead>
<tr>
<th>Gas flow $V_n$ at 65°C dp</th>
<th>l/hr</th>
<th>1 x 125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas flow $V_n$ at 55°C dp</td>
<td>l/hr</td>
<td>1 x 175</td>
</tr>
<tr>
<td>Gas inlet temperature $^\circ$C</td>
<td>max. 140</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature $^\circ$C</td>
<td>+5 to +45</td>
<td></td>
</tr>
<tr>
<td>Operating pressure bar</td>
<td>0,5 to 2,2</td>
<td></td>
</tr>
<tr>
<td>Outlet dew point $^\circ$C</td>
<td>3,0 ± 0,3 at constant conditions</td>
<td></td>
</tr>
<tr>
<td>Dead space per gas path ml</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Ready for start up min</td>
<td>&lt; 5</td>
<td></td>
</tr>
<tr>
<td>Cooling capacity KJ/hr</td>
<td>792</td>
<td></td>
</tr>
</tbody>
</table>

#### Design data

<table>
<thead>
<tr>
<th>Dimensions (W x H x D) mm</th>
<th>483 x 310 x 321</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight without options kg</td>
<td>22</td>
</tr>
<tr>
<td>Housing</td>
<td>Wall or 19&quot; rack mounting / RAL 7035</td>
</tr>
</tbody>
</table>

#### Electrical data

<table>
<thead>
<tr>
<th>Mains connection</th>
<th>plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital display</td>
<td>temperature (outlet dew point resp. ambient), operating status, alarm and alarm storage, service control, operating hours, condensate pump control</td>
</tr>
<tr>
<td>Alarm set-points $^\circ$C</td>
<td>&lt; +2.0 / &gt; +10.0</td>
</tr>
<tr>
<td>Protection rate</td>
<td>IP 20 EN 60529 / EN 61010</td>
</tr>
<tr>
<td>Conformity</td>
<td>CE / cMETus</td>
</tr>
<tr>
<td>Power supply</td>
<td>230V 50/60Hz or 115V 50/60Hz</td>
</tr>
<tr>
<td>Power consumption W</td>
<td>170 - 195</td>
</tr>
</tbody>
</table>

### Options

- Pre-separator incl. condensate pump for high inlet dew points >65°C
- Flow alarm with light barrier
- Acid dosing incl. Condensate pump
- Voltage 115V 50/60Hz

For a concrete configuration of a PSG-GSU please contact our sales team in Erkelenz.
Heat-Exchanger System

More efficiency, no energy losses, even at high ambient temperatures

- Coldness transfer through copper and aluminium
- Best thermal conductance values 300/204 W/m°K
- Coldness transferred from the inside outwards
- Extremely compact design
- Optimal shielding from the environment

High and constant dryness rate even at extreme load changes

- PTFE-coated, hydrophobic surface
- Immediate formation of large condensate droplets
- Spiral performing stream goes downwards
- Consistent use of gravity
- Discharge of condensate at the lowest point
- Inner copper rod as cold storage

Exceptionally low gas dissolution rates enable accurate analysis

- Very low dead volume
- Extremely short retention time of the gas in the system
- Small heat-exchanger surface
- Rapid saturation of the surface
- Reduced response-time of gas to condensate
- Minimized contact surface of sample gas and condensate
- On three sides evacuated condensate spiral stream
- Coating reduces electrostatics

Reliability and sustainability reduce time and efforts for maintenance

- Exchangeable heat-exchangers
- Optimum chemical resistance
- No abrasive wear-out
- Self-cleaning effects, no contamination
- Maintenance-free system
- Proven and safe technology
- Monitored quality
- More than 10,000 systems in successful operation
PSG-GSU Model Examples

PSG-GSU
- 1 heat exchanger PTFE / PVDF
- 1 pre-separator
- 1 gas path (1 x 175 l/hr)
- 2 condensate pumps
- 1 sample gas pump
- 1 filter
- 1 test gas valve 3/2-way
- 1 flow meter
- 1 liquid alarm
- 2 temperature controller
- 4 alarm contacts

Configuration Example

PSG-GSU

1. Heat exchanger
2. Condensate pump
3. Condensate pre-separator (option)
4. PTFE depth filter
5. Sample gas pump
6. Flow meter
7. Electronic
8. Liquid sensor
9. Test gas valve
Integrated components / options

Condensate pump
✓ Reliable continuous condensate removal
✓ Low rotation speed, long lasting pump tube

Condensate pre-separator
✓ Separation of free condensate and solid particles
✓ Sample gas pre-cooling for inlet dew points >65°C

PTFE depth filter
✓ Reliable filtration of solid particles
✓ Quick and simple filter change

Flow meter
✓ Exact dosing, with fine adjustment needle valve
✓ Optional with light barrier

Liquid sensor
✓ Protects against condensate break through
✓ Reliable detection of smallest amounts of liquid

Electronic
✓ Control / alarm for liquid sensors / light barriers
✓ Potential free switch contact

Sample gas pump
✓ Pure pumping of sample gases
✓ Perfect integration in the sample gas cooler

Temperature controller
✓ Temperature control gas sampling probes and heated sample lines incl. temperature alarm

Ball valve
✓ Test and calibration gas feeding
Components especially tailor made for PSG-GSU for completion of an analysis system

Gas sampling probes

**PSG Basic** with 0.1µm glass fibre filter, heated to 180°C, with PT100. Power supply, temperature control and alarm are made via PSG-GSU and PSG Extruded Hybrid. Further information in separate data sheet.

**PSG Plus** with 0.3µm ceramic filter, heated to 180°C, with PT100 and back purge options. Power supply, temperature control and alarm are made via PSG-GSU and PSG Extruded Hybrid. Further information in separate data sheet.

Heated sample line

**PSG Extruded Hybrid** shortenable on site, with PT100 and internal line for sample gas, pre-heated back purge and test gas. With looped-through power supply for gas sampling probe and back purge valves as well as lines for control of this valves. Temperature control is made via one of two controllers of the PSG-GSU. Further information in separate data sheet.