Gas pressure sensors DG smart

TECHNICAL INFORMATION

- Digital connection facilities for smart gas sections
- Pressure gauge and pressure transmitter in a single device
- Minimum installation effort
- Predictive maintenance
- Analyses for trends/system optimization
- Local and remote monitoring (Thermal IQ™)

CE

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Contents

1 Application

The pressure sensor DG smart is a relative and differential pressure sensor and monitors the MIN/MAX and/or differential pressure for gas, air, flue gas or other non-aggressive gases.

DG smart meets the current requirements of DIN EN 1854:2010-10 (Class A and C) and international standards which require the safety function of MAX/MIN monitoring and shut-down.

As a measuring transducer and pressure transmitter, the sensor supplies precise, reliable measurements and can be used for low-pressure combustion air and fuel gas applications which require precise, accurate pressure monitoring.

HMI interface and LED display

The pressure measurements can be supplied to monitoring systems in real time using a Modbus TCP bus protocol and a 4–20 mA NAMUR analog output. The transfer of analog signals to higher-level control systems allows the pressure to be monitored continuously.

Voltage supply, 4–20 mA signal and communication interface using M12 connector

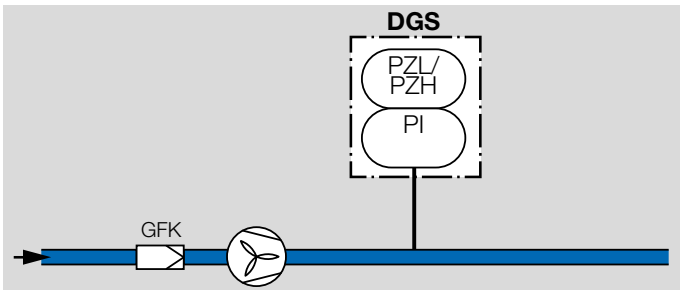
The DG smart can be used for remote monitoring (e.g. using Thermal IQ™), local monitoring or for controlling Scada/cloud software-supported smart production lines.

Permanent monitoring using the pressure sensor DG smart and digital connectivity for networked systems also enable predictive maintenance to be used, for example. That means less downtime (prevention of unnecessary safety shut-downs of the burner system).

Parameter settings using a local HMI interface or a web server reduce the time required for the commissioning process. The DG smart allows predictive analyses for trends or system optimization in gas and air applications.

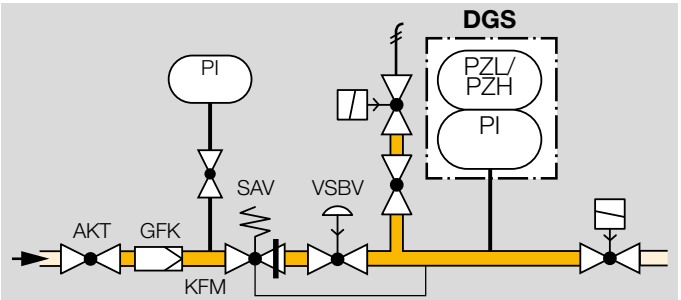
2 Application examples

2.1 Air line with MIN, MAX pressure monitoring



The static pressure is monitored by the MIN, MAX monitoring (PZL, PZH). If the supply air pressure is exceeded or undershot, the fan is switched on or off via the control unit.

2.2 Low and high gas pressure protection at the gas inlet section



If the pressure is either too high or too low (PZL/PZH), the gas pressure sensor prevents the system starting or triggers a safety shut-down.

3 Certification

3.1 Certificate download

Certificates – see www.docuthek.com

3.2 EU certified

CE

- 2014/35/EU (LVD), Low Voltage Directive
- 2014/30/EU (EMC), Electromagnetic Compatibility Directive
- 2011/65/EU, RoHS II
- 2015/863/EU, RoHS III

Regulation:

- (EU) 2016/426 – GAR

Standards:

- EN 1854:2010

4 Function

4.1 Transmitter-, MIN-/MAX function

The pressure is detected by a sensor, processed and communicated via an analog value on the display and made available for signal processing to the higher-level control system.

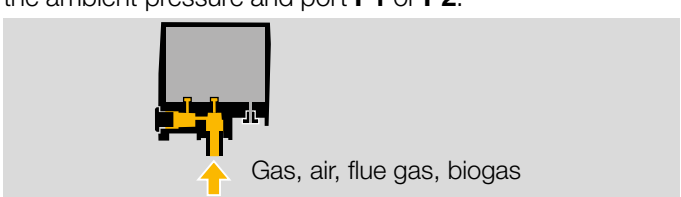
The transmitter function is set as the factory default. The function can be extended by MIN, MAX monitoring. See parameter page 12 (6.2.1 Sensor function).

The MIN-/MAX function detects small pressure differences via the sensor system. If a MAX or MIN switching value is reached, it is processed and communicated to the higher-level control system via a safe 4-20 mA signal and/or a safety bus protocol.

4.2 Relative pressure sensor (positive pressure)

Relative pressure measurement is used to monitor the MIN/MAX switching pressure, e.g. in a blower application.

The relative pressure sensor records the difference between the ambient pressure and port **P1** or **P2**.

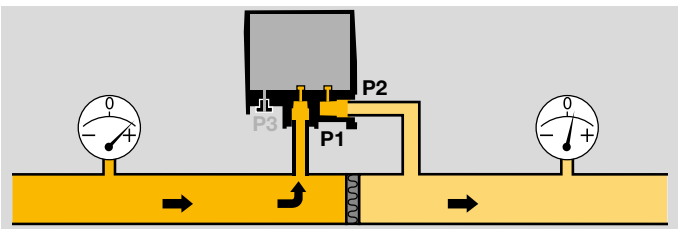


The relative pressure is measured at port **P1** or **P2**. The unused port remains closed.

4.3 Differential pressure sensor

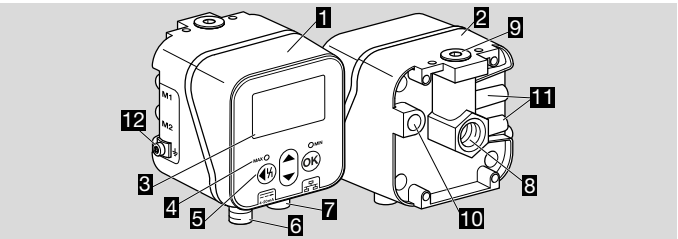
Differential pressure measurement is used, for example, to safeguard an air flow rate or to monitor filters and fans.

The sensor records the difference between ports **P1** and **P2**.



Use port **P1** for the higher absolute pressure (relative pressure) and **P2** for the lower pressure.

4.4 Part designations

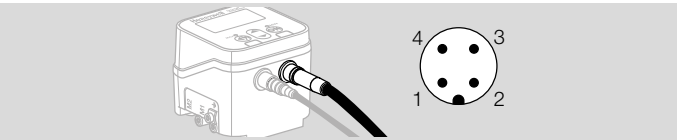


1 Upper housing section
2 Lower housing section
3 Display
4 Status display
5 User keys
6 Voltage supply/4–20 mA signal
7 Ethernet
8 P1, Rp 1/4 (1/4" NPT) gas/air connection
9 P2, Rp 1/4 (1/4" NPT) gas/air connection
10 Breather orifice
11 M1, M2 pressure test nipples
12 M4 screw terminal for device grounding

4.5 Electrical connection

4.5.1 Voltage supply and 4–20 mA signal

Connect the 24 V DC voltage supply using the M12 connector (plug/plug, 4-pin, A-coded).



Pin	Function
1	+24V=
2	4–20 mA
3 and 4	GND

4.5.2 Communication interface (Fast Ethernet))

Connect the Ethernet using the M12 connector (socket/coupling, 4-pin, D-coded).

Pin	Function
1	TD+
2	RD+
3	TD-
4	RD-

4.6 LEDs (colour/flash code)

Two changing colour LEDs show the status of the MAX/MIN function or a message.

» If the MAX/MIN function is disabled, the LEDs remain off during normal operation.

Colour and flash code

» The details refer to values which are parameterized, see page 11 (6 Parameter).

Colour	Meaning	Mode	Description
MAX LED			
Red	Alarm	Permanent	The pressure is greater than or equal to the setting value for the “MAX alarm” NFS parameter.
Yellow	Warning	Permanent	The pressure is greater than or equal to the setting value for the “MAX warning” NFS parameter.
Green	OK	Permanent	The pressure is less than the setting values for the “MAX alarm”, “MAX warning” and “MAX switching value” NFS parameters.
Red	Record	Flashing (1 Hz)	The pressure is greater than the setting value for the “MAX switching value” NFS parameter.
MIN LED			
Red	Alarm	Permanent	The pressure is less than or equal to the setting value for the “MIN alarm” NFS parameter.
Yellow	Warning	Permanent	The pressure is less than or equal to the setting value for the “MIN warning” NFS parameter.
Green	OK	Permanent	The pressure is greater than the setting values for the “MIN alarm”, “MIN warning” and “MIN switching value” NFS parameters.
Red	Record	Flashing (1 Hz)	The pressure is less than the setting value for the “MIN switching value” NFS parameter.
MAX LED and MIN LED			
Yellow	Initialization	Permanent	The unit is in Initialization mode.
Yellow	Setting the zero point	Flashing (5 Hz)	Ready for zero point adjustment (no fault may be active)
Red	Alarm	Permanent	Internal device error
Red	Overpressure detected	Flashing (1 Hz)	Overpressure has been detected and the pressure is now back below the limit value (the unit must be reset and checked)
Red	Overpressure active	Flashing (5 Hz)	Overpressure active. The pressure must be shut down.
Yellow	Permanent remote reset	Flashing (1 Hz)	Permanent remote reset (a warning is issued only if remote reset is parameterized)
Red	Too many remote resets	Flashing (1 Hz)	Too many remote resets (a fault lock-out occurs only if remote reset is parameterized)

5 Selection

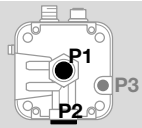
5.1 Selection table

Description	Code	DGS	Condition
Gas pressure sensor	**DGS**	•	
Relative pressure sensor measuring range (positive pressure)			
No sensor	**–**	•	
0–100 mbar (0–39.4 "WC)	**100**	•	
0–350 mbar (0–138 "WC)	**350**	•	
0–1000 mbar (0–394 "WC)	**1000**	•	
Classification			
Not fail-safe (ePSD Cat-A)	**A**	•	
Fail-safe (ePSD Cat-C)	**C**	•	
Differential pressure sensor measuring range			
No sensor	**–**	–	Available soon.
0–5 mbar (0–2 "WC)	**5**	–	Available soon.
0–50 mbar (0–19.7 "WC)	**50**	–	Available soon.
0–100 mbar (0–39.4 "WC)	**100**	–	Available soon.
Pipe connection			
Rp internal thread	**R**	•	
NPT internal thread	**N**	•	
Electrical connection			
2 x M12 connectors	**8**	•	
Communication interface			
10/100 Mbit/s (Fast Ethernet)	**TX**	•	
Bus protocol			
Modbus TCP	**-M**	•	

Order example

DGS 100A-R8TX-M

5.1.1 Connections



1 or **2** for positive pressure Rp ¼ (¼" NPT)

3 Breather orifice

Relative pressure (positive pressure)

Connect	Seal
P1	P2
P2	P1

Differential pressure

For the higher absolute pressure	For the lower absolute pressure
P1	P2

6 Parameter

6.1 General

The “Parameters” menu option is divided into “Safety parameters” (password-protected) and “Non-safety parameters”.

The value ranges of the parameters can be edited on the DG smart or using the integral web server.

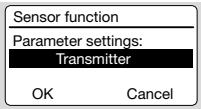
For details of the web server, see page 20 (7 Web server).

6.2 Safety parameters

All safety parameters are password-protected. The user must be logged in to edit them.

Name	Translation	Value range	Factory default settings
page 12 (6.2.1 Sensor function)	Sensor function	Transmitter MIN MAX MAX and MIN function	Transmitter
page 12 (6.2.2 MAX switching value)	MAX switching value	Setting	0 mbar
page 12 (6.2.3 MIN switching value)	MIN switching value	Setting	0 mbar
page 12 (6.2.4 MAX reset)	MAX reset	Automatic Manual Remote	Automatic
page 12 (6.2.5 MIN reset)	MIN reset	Automatic Manual Remote	Automatic
page 12 (6.2.6 MAX delay time)	MAX delay time	Setting	0 s
page 12 (6.2.7 MIN delay time)	MIN delay time	Setting	0 s
page 12 (6.2.8 Overpressure value)	Overpressure value	Setting	100% of the measuring range
page 13 (6.2.9 Zero adjustment)	Zero adjustment	Setting	0 mbar

6.2.1 Sensor function



Value range	Description
Transmitter	The measurement is output using the analog signal. No check on MIN/MAX.
MAX	Transmitter function including checking the set MAX switching point.
MIN	Transmitter function including checking the set MIN switching point.
MAX and MIN	Transmitter function including checking the set MAX and MIN switching points.

6.2.2 MAX switching value

This parameter is used to set the switching point for the MAX check.

6.2.3 MIN switching value

This parameter is used to set the switching point for the MIN check.

6.2.4 MAX reset

Value range	Description
Automatic	Reset logic for the MAX function is set to automatic.
Manual	Reset logic for the MAX function is set to manual. (Only local reset is possible.)
Remote	Reset logic for the MAX function is set to remote control using bus communication. (Local reset is also possible.)

6.2.5 MIN reset

Value range	Description
Automatic	Reset logic for the MIN function is set to automatic.
Manual	Reset logic for the MIN function is set to manual. (Only local reset is possible.)
Remote	Reset logic for the MIN function is set to remote control using bus communication. (Local reset is also possible.)

6.2.6 MAX delay time

This parameter is used to set the delay time from 0–10 s for exceeding the MAX switching value.

6.2.7 MIN delay time

This parameter is used to set the delay time from 0–10 s for falling below the MIN switching value.

6.2.8 Overpressure value

This parameter is used to enter the value for the maximum overpressure at which the pressure sensor DG smart will switch to fault mode.

6.2.9 Zero adjustment

A zero point adjustment must be carried out during setting, commissioning or maintenance work.

The zero point adjustment should be carried out in normal operating temperature to obtain the best possible accuracy and reduce thermal effects.

6.3 Non-safety parameters

Name	Translation	Value range	Factory default settings
page 14 (6.3.1 MAX warning)	MAX warning	Setting	0 mbar
page 14 (6.3.2 MAX alarm)	MAX alarm	Setting	0 mbar
page 14 (6.3.3 MIN warning)	MIN warning	Setting	0 mbar
page 14 (6.3.4 MIN alarm)	MIN alarm	Setting	0 mbar
page 14 (6.3.5 Communication)	Kommunikation	IP address* Subnet* Gateway* Mac address*	192.168.0.200

** Login required.*

6.3.1 MAX warning

This parameter is used to set the switching point for the MAX warning. The colour of the LED then changes to yellow.

6.3.2 MAX alarm

This parameter is used to set the switching point for the MAX alarm. The colour of the LED then changes to red.

6.3.3 MIN warning

This parameter is used to set the switching point for the MIN warning. The colour of the LED then changes to yellow.

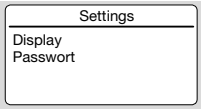
6.3.4 MIN alarm

This parameter is used to set the switching point for the MIN alarm. The colour of the LED then changes to red.

6.3.5 Communication

Value range	Description
IP address	This parameter enables the IP address to be edited.
Subnet	This parameter enables the subnet IP address to be edited.
Gateway	This parameter enables the gateway IP address to be edited.
MAC adress	This fixed parameter displays the MAC address.

6.4 Settings



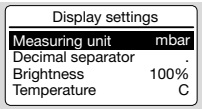
Display

Name	Translation	Value range	Factory default settings
page 16 (6.4.1 Measuring unit)	Measuring unit	mbar, kPa, PSI, inch WC	mbar
page 16 (6.4.3 Decimal Separator)	Decimal separator	Point “.” or comma “,”	Point “.”
page 16 (6.4.4 Brightness)	Brightness	Setting: Display brightness	100%
page 16 (6.4.2 Temperature unit)	Temperature unit	C, F, K	C
page 16 (6.4.5 Language)	Language	English	English

Password

Display	Translation	Value range	Factory default settings
page 16 (6.4.6 Password)	Password	xxxx	0000

6.4.1 Measuring unit



Value range	Description
mbar	mbar is displayed.
kPa	kPa is displayed.
PSI	PSI is displayed.
Inch WC	Inch WC is displayed.

This parameter is used to set the measuring unit to display the pressure. The parameterization and data transfer continue to take place using the specified unit.

6.4.2 Temperature unit

Value range	Description
C	Celsius is displayed.
F	Fahrenheit is displayed.
K	Kelvin is displayed.

6.4.3 Decimal Separator

Display: "." or "," as the decimal separator.

6.4.4 Brightness

This parameter enables the display brightness to be adjusted.

6.4.5 Language

The user and display language is English.

6.4.6 Password

A four-digit numerical password enables the user to restrict access to the unit.

Password-protected parameters can only be edited on the DG smart or using the web server if the user is logged in.

6.5 Statistics

Name	Translation	Value range
page 17 (6.5.1 Event history) page 17 (6.5.2 Device statistics) page 18 (6.5.3 Customer statistics)	Event history Device statistics Customer statistics	Information on the event history, device and customer statistics are display in plain text.
page 18 (6.5.4 Clear event history)*	Clear event history	Resetting the event history
page 18 (6.5.5 Clear customer statistics)*	Clear customer statistics	Resetting the customer statistics

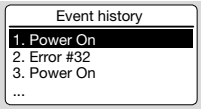
** Login required.*

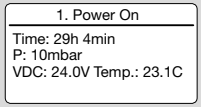
6.5.1 Event history

The event history saves the last 10 events. As soon as an event (for example an error) occurs in the unit, the current status is saved in the history.

The additional information in the history are as follows:

- Time of the event
- Error code (in the event of an error)
- Pressure
- Mains voltage
- Temperature

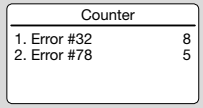


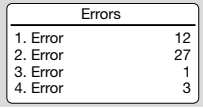


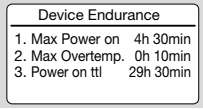
6.5.2 Device statistics

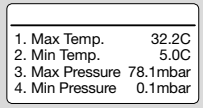
Device statistics are provided for diagnostic purposes and cannot be reset by the customer. They cover the entire service life of the unit as they cannot be reset.

- Counters
- Error
- Duration
- Values









6.5.3 Customer statistics

The same counters are evaluated in the customer statistics as in the device statistics and the statistics can be reset by the customer.

6.5.4 Clear event history

The event history can be reset by the user (login required).

6.5.5 Clear customer statistics

The customer statistics can be reset by the user (login required).

6.6 Information

Name	Translation	Value range
page 18 (6.6.1 Device name) page 18 (6.6.3 Network) page 18 (6.6.2 Firmware)	Device name Network Firmware	The device name, network configuration and firmware are displayed in plain text.

6.6.1 Device name

The device name is displayed.

6.6.2 Firmware

The current software is displayed.

6.6.3 Network

The current network configuration is displayed.

6.7 Service

Name	Value range
page 19 (6.7.1 Firmware)	Firmware upgrade.

6.7.1 Firmware

The Service section can only be accessed via the web server. See page 20 (7 Web server).

7 Web server

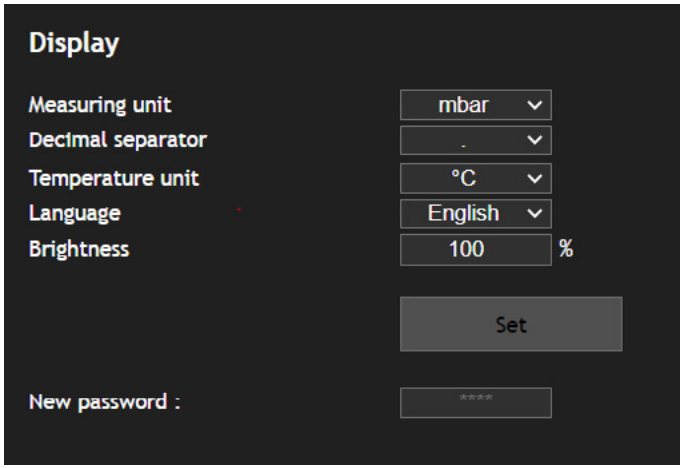
The web server can be accessed using the preset IP address 192.168.0.200 (subnet mask 255.255.255.0). The IP address of the computer must be in the same network as the DGS for the parameterization process.

The IP address can be changed using the “Communication” parameter. See page 14 (6.3.5 Communication).

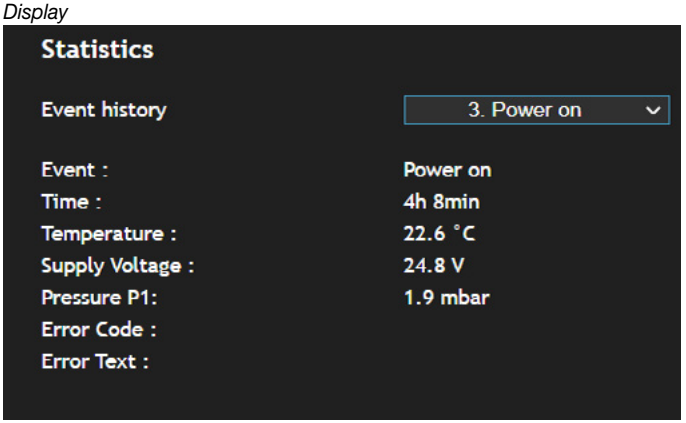
Safety Parameters are password-protected. They can be edited if the user is logged in (the icon at the top right in the following screen).

Safety and non-safety parameters

Each entry must be confirmed using the “SET” button.

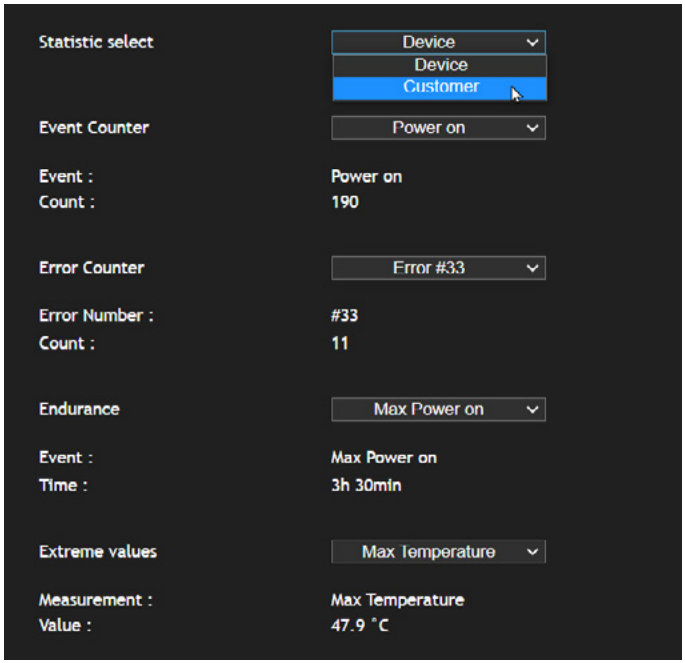


Display



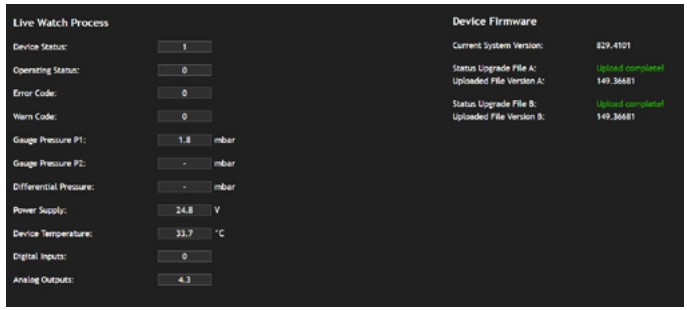
Statistics

Statistics can be displayed without having to log in.



Customer statistics

The event history and customer statistics can be reset if the user is logged in.



Service

Process data are displayed in the “Service” section. A firmware upgrade can be performed if the user is logged in.

8 Modbus TCP

The Modbus protocol is a communications protocol based on a Client/Server architecture. Once the TCP/IP connection between client (PLC) and server (DG smart) has been established, useful data can be transferred via this connection as often and in as great an amount as required. The PLC and DG smart can establish up to 3 parallel TCP/IP connections at the same time. Using the function codes 3, 6 and 16, data can be transferred to and from the DG smart. New data are available every 100 ms.

8.1 Modbus holding registers

Communication with Modbus TCP is achieved using TCP port 502 and the IP address.

All holding registers (16-bit words, read and write) are addressed using an internal register number.

16-bit words, inputs/outputs

Read

101 = Pressure value gauge Port 1 [unit: mbar (signed), factor: 10]

102 = Pressure value gauge Port 2 [unit: mbar (signed), factor: 10]

103 = Pressure value differential [unit: mbar (signed), factor: 10]

104 = Power supply [unit: V, factor: 10]

105 = Device temperature [unit: K, factor: 10]

106 = 4-20mA [unit: mA, factor: 10]

107 = Error code

108 = Warn code

109 = Device status

110 = Operating status

111 = MAX function switching value [unit: mbar, factor: 10]

112 = MIN function switching value [unit: mbar, factor: 10]

113 = Status bits

- Bit 0: MAX warning (yellow)
- Bit 1: MAX alarm (red)
- Bit 2: MAX detection (red)
- Bit 3: MIN warning (yellow)
- Bit 4: MIN alarm (red)
- Bit 5: MIN detection
- Bit 6: Power Supply OK

Read and write

001 = Remote reset

9 Output signal coding

The 4–20 mA output supplies the current pressure in the form of an analog value. The pressure measuring range is scaled to 4–20 mA.

The NAMUR NE43 (standardization of the signal level for the failure information of digital transmitters with an analog output signal) is used as a reference for standardized error information (in addition to the measuring information).

Current range [mA]	Description
22.0	Overpressure detected
21.0	MAX switching pressure detected
21.0	Upper error range
20.5	Upper tech range
20.0	Upper nominal range
4.0	Lower nominal range
3.8	Lower tech range
3.6	Lower error range
3.0	MIN switching pressure detected
2.0	Over-/undervoltage or over-/undertemperature detected
1.0	Underpressure detected
0	Output off (internal or device error)

10 Project planning information

10.1 Installation

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Continuous operation with gases containing more than 0.1 %-by-vol. H_2S or ozone concentrations exceeding 200 µg/m^3 accelerate the ageing of elastomer materials and reduce the service life.

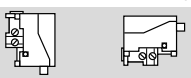
Condensation must not be allowed to get into the housing.

At subzero temperatures, malfunctions/failures due to icing can occur.

Avoid strong impact on the unit.

10.1.1 Installation position

Installation in the vertical or horizontal position, not upside down. The recommended installation position is vertical.

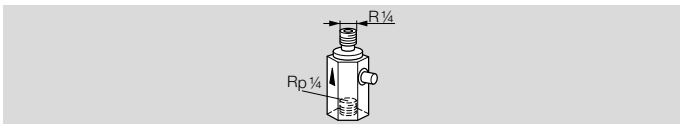


A zero point adjustment must be carried out during the commissioning or maintenance procedure to avoid discrepancies. The pressure value is automatically saved together with the temperature value. The zero point adjustment should be carried out in normal operating temperature to obtain the best possible accuracy and reduce thermal effects.

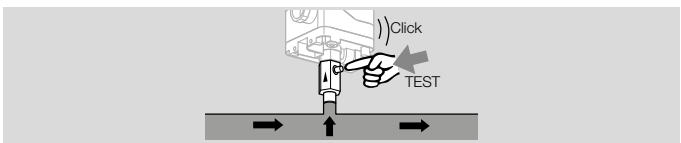
11 Accessories

11.1 Test key PIA

To test the min. pressure switch, the DG smart can be vented in its switched state using the PIA test key (contains non-ferrous metals).

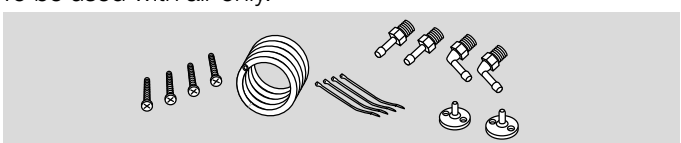


Order No.: 74329466



11.2 Tube set

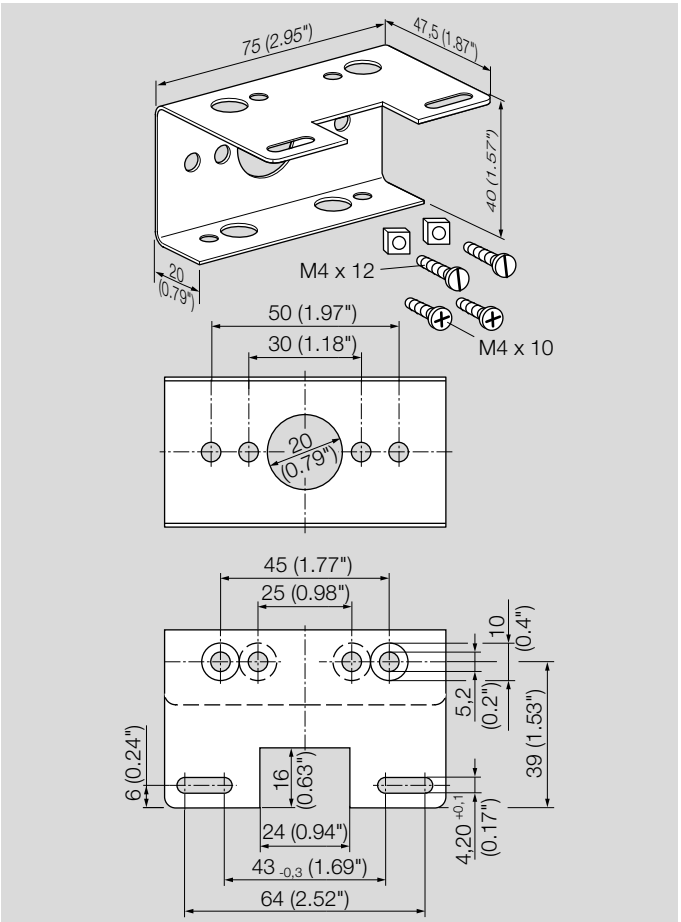
To be used with air only.



Tube set with 2 m PVC tube, 2 duct connection flanges with screws, R 1/4 and R 1/8 connecting nipples.

Order No.: 74912952.

11.3 Fastening set with screws, U-shape bracket



Order No.: 74915387

12 Technical data

12.1 Ambient conditions

Icing, condensation and dew in and on the unit are not permitted.

Permitted ambient temperature in operation: 0 to +60°C (32 to 140°F).
Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Storage and transport temperatures: 20 to 40°C (68 to 104°F).

Medium temperature: 0 to +60°C (32 to 140°F).

Avoid direct sunlight or radiation from red-hot surfaces on the unit. Note the maximum medium and ambient temperatures!

Avoid corrosive influences, e.g. salty ambient air or SO_2.

The unit may only be stored/installed in enclosed rooms/ buildings.

The unit is suitable for a maximum installation height of 2000 m AMSL.

Enclosure: IP 65.

This unit is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

12.2 Mechanical data

Gas types for relative pressure sensor: natural gas, town gas, LPG (gaseous), flue gas, biogas (max. 0.1 %-by-vol. H_2S) and air.

Gas types for differential pressure sensor: air.

The gas must be clean and dry in all temperature conditions and must not contain condensate.

Max. inlet pressure $p_{max.}$ = withstand pressure, measuring range and max. deviations, see page 27 (12.4 Measuring range).

Maximum leakage rate Q_L = max. 20 cm^3/h.

Upper housing section: steel fibre reinforced PBT plastic with low gas release.

Lower housing section: AlSi 12.

Rp 1/4 (1/4" NPT) connecting thread.

Weight: 450 g

12.3 Electrical data

100% duty cycle (continuous operation)

Safety class: 3

Mains voltage: 24 V DC, ±20%.

Overvoltage category III

Communication interface: 10/100 Mbit/s (Fast Ethernet)

Bus protocol: Modbus TCP

Electrical connection

Voltage supply and 4–20 mA signal: M12 plug connector (plug/plug, 4-pin, A-coded).

4–20 mA output signal load impedance: ≤ 500 Ω

Ethernet: M12 plug connector (socket/coupling, 4-pin, D-coded)

Functional earth: ground terminal for connecting fine-strand cables up to 4 mm^2.

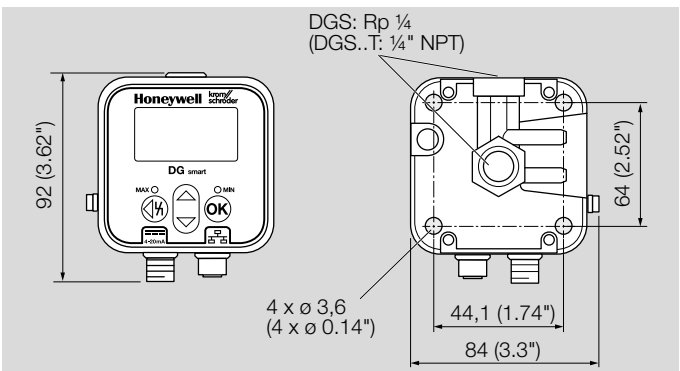
Internal fuse: replaceable fuse (slow-acting, 200 mA)

12.4 Measuring range

Measuring range [mbar]	Withstand pressure [mbar]	MAX/MIN*	Total error band [% FS]Ü*	Max. deviation at 0–70°C [mbar]*	Sensor type
Relative pressure (positive pressure)					
0–100	≥ 500				Stainless steel, media-insulated
0–350	≥ 1000				Stainless steel, media-insulated
0–1000	≥ 1000				Stainless steel, media-insulated
Differential pressure					
0–5	≥ 100				Not media-insulated
0–50	≥ 500				PCB mounted, not media-insulated
0–100	≥ 500				PCB mounted, not media-insulated

** Values will be supplied after the qualification procedure (long-term function test)*

12.5 Dimensions



13 Converting units

See www.adlatus.org

14 Maintenance cycles

In order to ensure smooth operation, check the tightness and function of the pressure sensor every year.

» After carrying out the maintenance work, check for tightness.

A zero point adjustment must be carried out at operating temperature after the maintenance work has been completed to ensure the best possible accuracy.

15 Cyber and IT security

The digitalization of production provides plenty of versatility for collecting and using data. A secure network configuration must be established to provide protection from cyber crime. The following information is designed to describe time-tested practices for cyber and IT security.

15.1 Physical device protection

Only operate the unit in the protected range of a safety zone with (restricted) access for authorized personnel.

Protect the (control) cables for the unit and all externally connected components from access by unauthorized personnel so that the unit cannot be manipulated.

Anti-tampering seal

Only use devices with an undamaged seal. Otherwise, the device may have been opened, tampered or damaged and pose a risk for the system.

Fieldbus interface

To prevent misuse caused by changing security-critical data, for example, protect the fieldbus interface and communication network from unauthorized access.

Secure decommissioning

The unit contains sensitive data and should be kept in a safe, inaccessible location when it is not in use.

Delete all the security-sensitive data when the unit is finally decommissioned or replaced.

15.2 Securing the network

A securely planned, designed and operated network architecture ensures that network access delivers adequate security.

Physical separation

The unit should be installed and connected in a controller network isolated from the company network

This method ensures a high level of security. There is no physical connection between the controller network and the company network/Internet. The use of wireless devices to control the controller network may endanger the security of the network.

Firewall isolation

Only use a connection between the controller and company network which is secured by a firewall (secure gateway). Unknown sources and enquiries from unreliable clients are filtered out.

A secure gateway includes a VPN set-up with defined authorized users.

The requirements for using VPN are as follows:

- Secure VPN service
- Secure configuration of the VPN clients for remote access
- Secure standard settings on the VPN components

Network address translation (NAT)

NAT allows the partial isolation of the external network from the control system network. If NAT is correctly configured, it should not permit any connection from an external system to the control system.

The correct configuration depends on the manufacturer's requirements for the individual system components.

Higher-level PLC/control centre

- Configure the operating system and the relevant software in accordance with the recommendations of the manufacturer. Perform firmware updates. Only use the operating system version supported by the manufacturer.
- Install and enable virus and runtime protection systems.
- Install and enable a firewall.
- Enable a whitelist so that only authorized applications can be run.
- Only use trustworthy software and never install any illegally acquired software.

15.3 Communications protocols

The communications protocols supported in the unit do not support any cyber or IT security functions.

The following recommendations and time-tested methods should be considered.

Ultimately, it is the responsibility of the operator to use the unit in a secure communications environment. "If, for example, insecure communications protocols, encryption algorithms or authentication mechanisms are used for remote maintenance, vulnerabilities may be created. A connected network operated by a third party can also be compromised by remote maintenance interfaces with inadequate security." (IT principles compendium).

15.4 Recommendations and time-tested methods

The following instructions are designed to ensure that the unit is installed safely and operated in a safe communication environment.

Higher-level PLC or control room

Please observe the following to prevent installing harmful software using removable media:

- Only use removable media with an installed virus protection program.
- Restrict or avoid the use of removable media.
- Scan all hard disk drives in full at regular intervals.
- Configure alarms if viruses are detected.

We recommend that the following action be taken before the unit is physically connected to an automation system:

- Update the operating systems and software and configure them as recommended by the manufacturer. It is essential that you use the operating system version supported by the manufacturer. Otherwise, there is a risk of vulnerabilities for the system.
- Install and enable virus and runtime protection systems.
- Install and enable a firewall.
- Enable a whitelist so that only authorized applications can be run.
- Only use trustworthy software. Do not install any unknown applications.
- Change the factory default password immediately. We recommend that secure pass phrases be used to ensure greater security.

Wireless network connection

The use of wireless devices (e.g. Wi-Fi routers or Bluetooth adapters) reduces the security of physical separation.

- Only permit your router to allow defined incoming and outgoing connections.
- Log any security-relevant events.
- The connection between the network and wireless device should not be permanent. Disable the connection as soon as the required data have been exchanged and the connection is no longer required.

15.5 Reporting vulnerabilities

A vulnerability is an error or a weakness in the software. It can be exploited to reduce the software's operability or security functions. Honeywell reviews all vulnerability reports relating to Honeywell products and services.

For further information, see www.honeywell.com/product-security.

Report a vulnerability for a Honeywell product in the Report A Vulnerability Issue section.

16 Open source software licences

Freely available software was used to create the DG smart.

For the terms and conditions of the open source software licences, see www.docuthek.com, OSS Licenses.

For more information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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