User Guide OI/SG2000–EN

SG2000A, SG2000V and SG2000M TORBAR intermittent purge control system

Enhancing reliability and performance of stack emissions measurement systems

Introduction

The Series SG2000 purge control system is designed to provide automatic periodic purging of the TORBAR Averaging Pitot Flow Sensor. A three position Key-Switch allows selection Auto Purge, Manual Purge or Remote. With Remote selected a 'Volt Free' contact input may be used to initiate purging.

Contained in an IP65 rated wall-mounted enclosure, the SG2000 provides clean purge air at a predetermined intervals. The precise purge cycle timing required is dependant on the concentration of suspended contaminants within the flow stream, but is easily adjustable using the keypad to provide the optimum purge sequence.

The Company

We are an established world force in the design and manufacture of measurement products for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

Contents

1 Safety

It is important to read this user guide before installing or operating this instrument.

When in use, this unit is connected to mains supply and care must be taken when configuration of the PLC is carried out and when service or maintenance is performed.

1.1 Health and safety

To ensure that our products are safe and without risk to health, the following points must be noted:

- The relevant sections of these instructions must be read carefully before proceeding.
- Warning labels on containers and packages must be observed.
- Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
- Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and / or temperature.

Safety advice concerning the use of the equipment described in this manual or any relevant Material Safety Data Sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

2 System Overview

The SG2000 series is a flow measurement system with integral purge to be used with the TORBAR for the measurement of gas flow rates in chimneys and stacks where the dust concentration is higher than 30 mg/m^3 or where any moisture content may be a problem. The purge duration and frequency is programmable to keep the TORBAR sensing holes clean of contaminants.

The SG2000 is available with or without a DP transmitter and can be supplied with temperature and pressure compensation of the flow reading and separate stack pressure and temperature outputs when required. Other options and accessories are available.

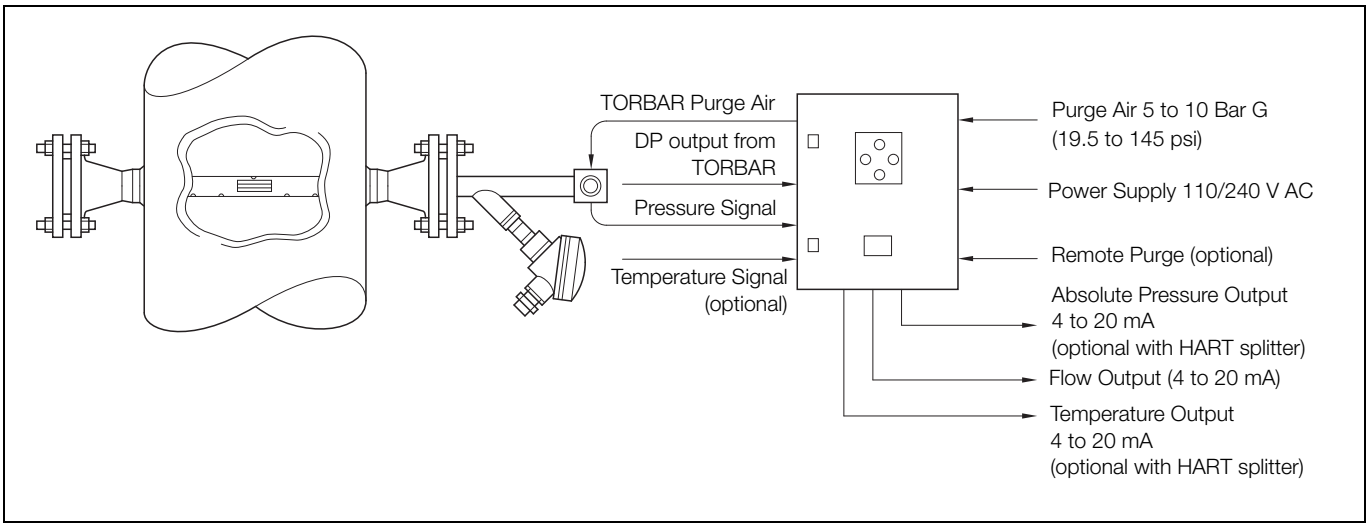

Fig. 2.1 Overview

SG2000 Model	Description
SG2000A	TORBAR + purge for use with a remote mounted transmitter
SG2000V	TORBAR + purge + dp transmitter Output: volumetric flow
SG2000M	TORBAR + purge + multivariable transmitter Output: compensated mass flow Optional Hart splitter available

Table 2.1 SG2000 Model Selection

3 Installation

Although the enclosure is IP65 rated, if possible locate it in a sheltered position that is not in continuous sunlight.

Warning. The system is not suitable for use in hazardous areas.

Mounting of the unit is by pre-drilled holes located on the back of the enclosure which are easily accessible when the door is open. Ensure that at least 1 bolt is used in each corner.

3.1 Services Required

3.1.1 Air or Inert Gas

It is essential that the supply of purge air (or inert gas) is provided in a dry and grease-free condition at a pressure no greater than 8 bar (115 psi). Set the purge air regulator to 4 bar (60 psi) prior to operation of the system (this is the factory-set condition) and can be verified by the pressure gauge mounted inside the control cabinet.

Purge air consumption is approximately 260 litres/min (9.18 ft^3/min).

The pressure drop across the valves is 1 bar at 20 °C. Set the pressure regulator to suit the process.

3.1.2 Electrical Supply

100 to 240 VAC 50/60 Hz.
Maximum current consumption: 1 A.

When connecting mains to the terminals, use ferrules.

Contact the factory for advice if in doubt about any aspect of the connection of this equipment to live power source.

Caution. Serious damage to the unit can occur if an incorrect voltage is applied.

The base of the unit is provided with 20mm diameter holes for fitting of cable glands, as required.

3.2 Outputs

2 Sets of 'Volt Free' contacts that change over when purge take place.

Analogue 4 to 20mA Flow signal for models SG2000V and SG2000M.

Note. The purge unit has an electronic Sample and Hold facility which maintains the 4 to 20mA output at its last reading prior to purging.

4 Operation

The SG2000 is configured as standard for the following purge control timing:

- TORBAR to DP Transmitter connection normal operation 2 hours
- Display: TORBAR CONNECTED
  SIGNAL CONNECTED

4.1 Purge Sequence

1. Transmitter output held
   Display: SIGNAL HOLD
2. TORBAR isolated from DP Transmitter 20 Seconds
   Display: SIGNAL HOLD
   TORBAR ISOLATED
3. Purge air connection to TORBAR
   (DP Transmitter is isolated) 1 Minute
   Display: SIGNAL HOLD
   TORBAR ISOLATED
   PURGE ON
4. TORBAR isolated from DP Transmitter
   (purge air exhaust) 20 Seconds
   Display: SIGNAL HOLD
   TORBAR ISOLATED
5. Short settling period
   Display: SIGNAL HOLD
6. TORBAR to DP Transmitter connection
   Display: TORBAR CONNECTED
   SIGNAL CONNECTED

After 'switch-on' select MANUAL purge. The purge cycle commences and continues until AUTO position is selected.

MANUAL purge may be selected or REMOTE but the system is run normally in the AUTO mode.

Monitor the operation of the TORBAR closely during the first week of use to determine if the pre-set sequence is sufficient to ensure the TORBAR does not become fouled with contaminants.

If necessary, alter the timing sequence as detailed in Section 4.2, page 5.

The purge status is indicated by front mounted LED indicators.

4.2 Auto Timing Sequence Setup

Warning. When using the key-pad of the PLC to change the configuration, do not touch any other component that may be connected to live mains.

The purge interval time is designated T1 – selected as minutes.

The purging time is designated T2 – selected as minutes.

4.2.1 Changing T1

To change T1:

1. Press ESC. 'Ladder' screen appears
2. Select STOP
3. Press OK 'Stop pro' screen appears
4. Select YES
5. Press OK. 'Ladder' screen appears
6. Select LADDER
7. Press OK Screen shows 'Ladder' diagram
8. Press 'right' key till cursor flashes on T of T1
9. Press OK Screen shows Time T1 (minutes)
10. Press SEL. Screen cursor under first time digit
11. Use 'up' and 'down' keys to change time value
12. Press OK
13. Press ESC three times. Screen shows 'Ladder' diagram
14. Select RUN
15. Press OK. 'Run prog' screen appears
16. Select YES
17. Press OK
18. Press ESC
19. Purge sequence continues.

4.2.2 Changing T2

To change T2:

1. Press ESC. 'Ladder' screen appears
2. Select STOP
3. Press OK 'Stop prog' screen appears
4. Select YES
5. Press OK. 'Ladder' screen appears
6. Select LADDER
7. Press OK Screen shows 'Ladder' diagram
8. Press 'down' key to row T4
9. Press 'right' key till cursor flashes on T of T2
10. Press OK. Screen shows Time T2 (minutes)
11. Use 'up' and 'down' keys to change time value
12. Press OK
13. Press ESC three times. Screen shows 'Ladder' diagram
14. Select RUN
15. Press OK. 'Run prog' screen appears
16. Select YES
17. Press OK
18. Press ESC
19. Purge sequence continues.

If you experience a problem while performing the above sequences. Press ESC to return to the 'Ladder' screen.

4.3 Manual Purge

If required at any time, the AUTO timing sequence can be overridden manually by turning the front-mounted key switch clockwise. The Purge Sequence then starts and remains purging until AUTO or REMOTE operation is selected.

4.4 Reference Drawings

Model	Drawing N°	Description
SG2000	B0890	SG2000 Purge sequence diagram
SG2000A	B0891	SG2000A General arrangement drawing
	B0892	SG2000A Circuit diagram
	B0893	SG2000A Piping diagram
	B0894	SG2000A Terminal connection details
SG2000V	B0895	SG2000V General arrangement drawing
	B0896	SG2000V Circuit diagram
	B0897	SG2000V Piping diagram
	B0898	SG2000V Terminal connection details
SG2000M	B0899	SG2000M General arrangement drawing
	B0900	SG2000M Circuit diagram
	B0901	SG2000M Piping diagram
	B0902	SG2000M Terminal connection details

Table 4.1 Reference Drawings

5 Specification

5.1 Performance

Square root extraction of flow DP.

The purge sequence is programmed by a programmable logic controller (PLC) and can be adjusted to purge once every one minute to once every 24 hours. The length of the purge time can be adjusted from one minute to 100 minutes.

Accuracy (including TORBAR): ± 3 % of reading. Repeatability: 0.5 %.

Long term drift: <0.5 % per year.

Ambient temperature range: 0 to 40 °C (32 to 104 °F) (thermostatically controlled heater is available as an option).

LCD display: Two line showing flow/DP units and alarm.

Averaging: 0 to 60 seconds adjustable.

Optional alarm outputs: Two volt-free contacts selectable NC/No. Rating: 1 A @ 110 V DC.

Optional totalizer: One alarm relay selectable as totalizer. Max. pulse rate 100 pulses/min.

5.2 Physical

Enclosure; Epoxy painted steel. IP65 rated. Not suitable for use in hazardous area.

Weight: Approx. 25 kg (11.34 lb).

Process connections: 1/4 in. BSP Stainless steel.

Supply air connection: 1/4 in. BSP Stainless steel.

Electrical connection: by 20 mm (0.79 in.) knockouts. Glanding by customer.

Optional thermostatic internal heater available. Consult factory.

5.3 System Requirements

Supply voltage: 100 to 240 V AC (50/60 Hz).

Current consumption: <1 Amp.

Purge gas supply: Clean and dry air or inert gas at

5 to 10 Bar g (72.5 to145 psig) pressure.

Gas consumption during purge is approximately

260 litres/min (9.18 ft^3/min).

5.4 Applicable Standards

CE marking (certified 2006) to EN61000-6-2:2001; EN61000-6-4:2001; EN60947-5-1:1997 (where applicable) following the provisions of directive 2004/108/EC, 73/23/EEC.

Notes

Products and customer support

Automation Systems
For the following industries:
- Chemical & Pharmaceutical
- Food & Beverage
- Manufacturing
- Metals and Minerals
- Oil, Gas & Petrochemical
- Pulp and Paper

Drives and Motors
- AC and DC Drives, AC and DC Machines, AC Motors to 1kV
- Drive Systems
- Force Measurement
- Servo Drives

Controllers & Recorders
- Single and Multi-loop Controllers
- Circular Chart and Strip Chart Recorders
- Paperless Recorders
- Process Indicators

Flexible Automation
- Industrial Robots and Robot Systems

Flow Measurement
- Electromagnetic Flowmeters
- Mass Flowmeters
- Turbine Flowmeters
- Wedge Flow Elements

Marine Systems & Turbochargers
- Electrical Systems
- Marine Equipment
- Offshore Retrofit and Refurbishment

Process Analytics
- Process Gas Analysis
- Systems Integration

Transmitters
- Pressure
- Temperature
- Level
- Interface Modules

Valves, Actuators and Positioners
- Control Valves
- Actuators
- Positioners

Water, Gas & Industrial Analytics Instrumentation
- pH, Conductivity and Dissolved Oxygen Transmitters and Sensors
- Ammonia, Nitrate, Phosphate, Silica, Sodium, Chloride, Fluoride, Dissolved Oxygen and Hydrazine Analyzers
- Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity

Customer support
We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

UK
ABB Limited
Tel: +44 (0)1453 826661
Fax: +44 (0)1453 829671

USA
ABB Inc.
Tel: +1 215 674 6000
Fax: +1 215 674 7183

Client Warranty
Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification. Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:
- A listing evidencing process operation and alarm logs at time of failure.
- Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

Contact us

ABB Limited
Process Automation
Salterbeck Trading Estate
Workington, Cumbria
CA14 5DS
UK
Tel: +44 (0)1946 830 611
Fax: +44 (0)1946 832 661

ABB Inc.
Process Automation
125 E. County Line Road
Warminster
PA 18974
USA
Tel: +1 215 674 6000
Fax: +1 215 674 7183

www.abb.com

OI/SG2000-EN 08.2011

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