MULTIFUNCTIONAL CONTROL FOR GAS BURNING APPLIANCE

Application
Domestic gas appliances: central heating boilers, combi boilers, instantaneous water heaters, space heaters with automatic ignition system.

Main Features
Two automatic shut-off valves. Servo pressure regulator On/Off (840), High/Low control (843) or with full electrical modulation (845).

Normative reference
EN 126. Multifunctional devices for gas burning appliances.

Versions
840 ON/OFF
843 High/Low
845 Modulating

www.sitgroup.it
**CONSTRUCTION CHARACTERISTICS**

- Aluminium body
- Two shut-off gas valves
- Side outlet option
- Inlet filter
- Pilot outlet (optional)
- Outlet and pilot filters (optional)
- Inlet and outlet pressure test point
- Connection for pressure regulator/combustion chamber compensation
- Two mounting holes
- Torsion and bending resistance group 2

**USE SPECIFICATIONS**

- Mounting position: any position
- Gas families: 1st, 2nd and 3rd
- Ambient temperature: 0...60 °C (-20 °C...60 °C on request)
- Maximum inlet pressure: 60 mbar

**MECHANICAL CONNECTIONS**

- Gas inlet and outlet: G 3/4 ISO 228 or M4 (4) (flanges) minimum full thread 6 mm or Rp 1/2 ISO 7 (105 mm version)
- Side Outlet: M5 (3) (flanges) minimum full thread 7 mm
- Pilot: M10x1 for 4 mm, 6 mm or 1/4" tubing
- Pressure test point: ø 9 mm
- Pressure compensation: ø 7 mm

**ELECTRICAL CONNECTIONS**

- Automatic shut-off valves: Male contact 3003 Molex compatible, suitable for female Molex series 3001
- Electrical modulator: male fast-on connector 2.8 x 0.8 mm

**ELECTRICAL DATA**

<table>
<thead>
<tr>
<th>AUTOMATIC SHUT-OFF VALVES</th>
<th>EV1</th>
<th>EV2</th>
<th>EV1</th>
<th>EV2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Supply Voltage (AC)</td>
<td>Current at nominal voltage (mA)</td>
<td>Power at nominal voltage (W)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>230 V 50 Hz Vac</td>
<td>40</td>
<td>12</td>
<td>4.3</td>
<td>2.0</td>
</tr>
<tr>
<td>24 V 50 Hz Vac</td>
<td>390</td>
<td>100</td>
<td>4.6</td>
<td>2.0</td>
</tr>
<tr>
<td>24 V 50 Hz RAC</td>
<td>270</td>
<td>115</td>
<td>6.5</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Protection degree:
- IP 40 with SIT NAC 504 connector. IP 44 with SIT NAC 504 connector and Gasket.
- IP 40 or IP 44 with EV connector Serie 960.4.-
DESCRIPTION

1 On-off solenoid valve EV1.
2 On-off solenoid valve EV2.
3 Inlet pressure test point.
4 Outlet pressure test point.
5 Connection for pressure regulator / combustion chamber compensation.
6 Servo-pressure regulator.
7 Gas outlet pressure modulator.
8 Pilot outlet.
9 Main gas outlet.
10 Side outlet.
11 Slow opening device.

CONNECTION DIAGRAM
**FUNCTIONS**

- Automatic gas shut-off
  - On-off solenoid valve EV1 class A or B
  - On-off solenoid valve EV2 class C or J
  - Closing time ≤ 1 second

- Pressure regulation
  - Servo pressure regulator class B
  - with reference to EN 126

- Slow opening
  - Optional on 840 and 843
  - Adjustable version on request

- Gas outlet pressure electrical modulation

  **843 SIGMA**
  - High/Low modulation (black coil)
  - Modulation Range 3-50 mbar
  - Nominal Supply Voltage 230 V 50 Hz Rectified AC
  - Protection Degree IP40 or IP44 with connector serie 960.4
  - Power 2.8 VA

  **845 SIGMA**
  - Continuous modulation
  - Modulation range 1-37 mbar (modulator in horizontal position)
  - Electric Supply 9 V 310 mA (white coil)
  - 17 V 165 mA (light blue coil)

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**Pressure/current characteristic**

Tolerance band (increasing current). Modulator axis in horizontal position.
SYSTEMS

**84X SIGMA - 579 DBC**
Combined system - gas control/automatic burner control suitable for either an appliance with natural draught or fan assisted.

*579 DBC Characteristics:*
- Specifically designed for SIGMA gas control.
- Direct burner ignition (DBI) or by intermittent pilot (IP).
- Manual or non-volatile lockout with reset and indicator integrated or fitted remotely.

*For further information see the specific technical sheet 579 DBC code 9.955.059*

**84X SIGMA - 504 NAC**
Combined system gas control, connector with integrated igniter.

*504 NAC Characteristics:*
- Connector with integrated igniter specifically designed for SIGMA gas control.
- Protection degree IP40. IP44 available on request.

*For further information see the specific technical sheet 504 NAC code 9.955.457*

ACCESSORIES

*Main voltage electric supply connector (Z)*
- 3 or 4 wires power versions available.
- Protection degree IP40 or IP44.

*843 Modulator supply connector*
- Integrated rectified circuit
- Protection degree IP40 or IP44

*845 Modulator supply connector (V)*
Flow rate $Q$ as a function of pressure drop $\Delta p$.

<table>
<thead>
<tr>
<th>Solenoid Valves Class</th>
<th>Q [m$^3$/h]</th>
<th>d=0.55</th>
</tr>
</thead>
<tbody>
<tr>
<td>B+J</td>
<td>3.0 m$^3$/h</td>
<td>2.5</td>
</tr>
<tr>
<td>B+J</td>
<td>2.5 m$^3$/h</td>
<td>2.5</td>
</tr>
<tr>
<td>B+J</td>
<td>2.0 m$^3$/h</td>
<td>2.5</td>
</tr>
<tr>
<td>B+J</td>
<td>1.5 m$^3$/h</td>
<td>2.5</td>
</tr>
<tr>
<td>B+C</td>
<td>4.5 m$^3$/h</td>
<td>4.5</td>
</tr>
<tr>
<td>B+C</td>
<td>4.0 m$^3$/h</td>
<td>4.5</td>
</tr>
<tr>
<td>B+C</td>
<td>3.5 m$^3$/h</td>
<td>4.5</td>
</tr>
<tr>
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<td>B+C</td>
<td>2.5 m$^3$/h</td>
<td>4.5</td>
</tr>
<tr>
<td>B+C</td>
<td>2.0 m$^3$/h</td>
<td>4.5</td>
</tr>
<tr>
<td>B+C</td>
<td>1.5 m$^3$/h</td>
<td>4.5</td>
</tr>
</tbody>
</table>

845 HC: High Capacity Version

Flow rate at $\Delta p = 5$ mbar:

<table>
<thead>
<tr>
<th>Gas Family</th>
<th>5.2 m$^3$/h</th>
<th>4 m$^3$/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>840-843-845</td>
<td>4.6 m$^3$/h</td>
<td>4.4 m$^3$/h</td>
</tr>
<tr>
<td>840-843-845</td>
<td>4.4 m$^3$/h</td>
<td>4.2 m$^3$/h</td>
</tr>
<tr>
<td>840-843-845</td>
<td>4.2 m$^3$/h</td>
<td>4.0 m$^3$/h</td>
</tr>
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<td>4.0 m$^3$/h</td>
<td>3.8 m$^3$/h</td>
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<td>3.6 m$^3$/h</td>
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<td>3.6 m$^3$/h</td>
<td>3.4 m$^3$/h</td>
</tr>
<tr>
<td>840-843-845</td>
<td>3.4 m$^3$/h</td>
<td>3.2 m$^3$/h</td>
</tr>
<tr>
<td>840-843-845</td>
<td>3.2 m$^3$/h</td>
<td>3.0 m$^3$/h</td>
</tr>
</tbody>
</table>
**CAPACITY**

**REGULATED FLOW RATE Q IN ACCORDANCE WITH EN 126**

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**Second Family Group H, E and L**

**Inlet pressure range (mbar)**

<table>
<thead>
<tr>
<th></th>
<th>Nominal</th>
<th>Max</th>
<th>Min</th>
<th>Relative Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-E</td>
<td>20</td>
<td>25</td>
<td>17</td>
<td>0.555</td>
</tr>
<tr>
<td>L</td>
<td>25</td>
<td>30</td>
<td>20</td>
<td>0.612</td>
</tr>
</tbody>
</table>

Minimum flowrate 0.3 m³/h d=0.55

845 HC: High Capacity Version
SIGMA has two automatic solenoid shut-off valves.

- When the solenoid (EV1) is energised the first gas valve opens.
- The second solenoid (EV2) allows the gas to flow through the servo circuit. The pressure under the main servo diaphragm increases and consequently the servo valve opens.

In case of gas or power supply failure the spring pressure assures the automatic closure of the gas valves.

The outlet pressure regulation is performed by the servo system.

When the outlet pressure is greater than the value driven by the modulator, the pressure regulator valve opens and as a consequence the pressure under the main servo diaphragm decreases closing the main valve. Therefore the outlet pressure goes back to the preset value. Vice versa if the outlet pressure is smaller than the preset level the pressure regulator closes and therefore the servo pressure increases opening the main valve.
SLOW OPENING

An extra chamber with diaphragm and spring are inserted on 840 SIGMA.

When the EV2 opens the servo circuit the gas enters in the slow-opening chamber. The gas pressure under the main valve diaphragm goes to a certain level and partially opens the gas way. The pressure is not increased because of the movement of the slow opening diaphragm.

In the adjustable slow opening version, by using the proper regulating screw, the pressure rise and the opening time can be changed between set limits.

After a certain time, the slow-opening spring is completely compressed and therefore there is no more volume variation and the pressure under the main diaphragm increase rapidly, completely opening the main valve.
**840 OUTLET PRESSURE ADJUSTMENT**

All adjustments must be made on the basis of the specific characteristics of the appliance. Check inlet and outlet pressure using the pressure test points provided. After testing, carefully seal test points with the provided screws. Recommended torque: 1.0 Nm.

Disconnect pressure regulator connection “VENT” (if used).

Remove the protective plug A.

Screw in the screw B to increase the pressure and screw it out to decrease it.

After setting put back the protective plug.

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**843/845 OUTLET PRESSURE ADJUSTMENT**

All adjustments must be made on the basis of the specific characteristics of the appliance. Check inlet and outlet pressure using the pressure test points provided. After testing, carefully seal test points with the provided screws. Recommended torque: 1.0 Nm.

Disconnect pressure regulator connection “VENT” (if used).

Remove the protective plug A.

Screw in the screw B to increase the pressure and screw it out to decrease it.

After setting put back the protective plug.

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**WARNING:** to ensure the correct operation of the modulator it is necessary that the plastic cap E is returned to its original location.
840 DIMENSIONS

Gas connection: G3/4 ISO 228
840 DIMENSIONS

Gas connection: Flanges

105 mm version
Optional Rp 1/2 ISO 7
Inlet and outlet connection

80 mm version
840 DIMENSIONS SLOW OPENING VERSION

Gas connection: G3/4 ISO 228
843/845 DIMENSIONS
Gas connection: G3/4 ISO 228
843/845 DIMENSIONS

Gas connection: Flanges

105 mm version
Rp 1/2 ISO 7 version available on request

80 mm version

Motor connection

19

G315

5.5

Motor connection

5.5

5.5

5.5

20

Motor connection

5.5

5.5

G315

5.5

Motor connection

5.5

5.5

20