**Series 54 Inductive Proximity Sensor**

**SENGER FEATURES**
- 2-wire DC sensor with minimum off-state current
- ATEX-approval for zone 2 and zone 22
- High temp, UV, salt water resistant
- Rugged metal base
- IP66/67/69K
- High impact protection
- Removable plug-in terminals
- Large terminal space for easy wiring

**TECHNICAL DATA**

### General specifications
- **Switching function**: 2 x normally open (NO)
- **Output type**: Two-wire
- **Rated operating distance** $s_o$: 2.5mm
- **Installation**: For non-flush mounting
- **Output polarity**: DC
- **Assured operating distance** $s_a$: 0 ... 2.05mm
- **Output type**: 2 x 2-wire

### Nominal ratings
- **Operating voltage** $U_o$: 6 ... 30V
- **Switching frequency** $f$: 0 ... 100 Hz
- **Hysteresis** $H$: Typical 0.5 mm
- **Reverse polarity protection**: Reverse polarity tolerant
- **Short-circuit protection**: No
- **Voltage drop** $U_d$: $\leq$ 6 V
- **Operating current** $I_o$: 4 ... 100mA
- **Off-state current** $I_r$: 100 ... 200 µA, typical 160 µA

### Functional safety related parameters
- **MTTF$_{a}$**: 684 a
- **Mission Time** $T_m$: 20 a
- **Diagnostic Coverage**: DC 0%

### Electrical specifications - valve circuit
- **Voltage**: 10 ... 32V
- **Current**: Max. 240 mA
- **Ambient conditions**
  - **Temperature**: -40 ... 75°C (-40 ... 167°F), restriction for use in hazardous area, see instruction manual
- **Storage temperature**: -40 ... 85°C (-40 ... 185°F)

### Mechanical specifications
- **Connection (system side)**: M20 x 1.5 cable gland, ground connection w/ earthing screw only for wire cross-section 4mm², use solid wire or stranded wire w/ wire end ferrule
- **Connection (valve side)**: Screw terminal, cable gland M20 x 1.5
- **Housing material**: Rugged polycarbonate (PC) + GF 10%, optimized for outdoor use
- **Housing base**: Powder coated aluminum
- **Degree of protection**: IP67; additional degree of protection IP66/IP69K with 540100-70600533 and 540100-21900533

### Terminal assembly
- **Number**: 10
- **Connection type**: For connection of copper wires with 7 mm dismantle length. Tightening torque 0.5 ... 0.6 Nm
- **Type**: Screw terminal block, pluggable
- **Terminal capacity**: Conductor cross-section 0.25 ... 2.5 mm², flexible/rigid. For Multiple-wire connection: two wires of equal cross-section per 0.25...1 mm²
- **Tightening torque, fastening screws**: 2 Nm
- **Tightening torque, housing screws**: 1.5 Nm
- **Tightening torque, earthing screw**: 1.5 Nm
- **Tightening torque, cable gland**: $\leq$ 4 Nm
- **Tightening torque, stopping plug**: 2 Nm

### General information
- **Use in the hazardous area**: See instruction manuals
- **Category**: 3G; 3D

### Compliance with standards & directives
- **Standards**: EN 60947-5-2:2007
  - IEC 60947-5-2:2007
  - VDI / VDE 3845
- **CCC approval**: Approval and marking not required for products rated $\leq$ 36 V
ACTIVATOR AND MOUNTING ASSEMBLY FEATURES

- High-visibility valve position display
- Protection against contamination and damage
- Three level adjustable
- Suitable for CW or CCW operation
- 30 x 80mm actuator mounting
- 30 x 130mm actuator mounting

TECHNICAL DATA

General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
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<tr>
<td>Housing material</td>
<td>PC</td>
</tr>
<tr>
<td>Activator material</td>
<td>PA</td>
</tr>
<tr>
<td>Protective cover material</td>
<td>V4A/316L</td>
</tr>
<tr>
<td>Valve status indicator</td>
<td>Red = CLOSED, Green = OPEN</td>
</tr>
<tr>
<td>Indicator adjustments</td>
<td>5 degree increments</td>
</tr>
<tr>
<td>Activator adjustment – top level</td>
<td>5 degree increments</td>
</tr>
<tr>
<td>Activator adjustment – bottom level</td>
<td>90 degree increments</td>
</tr>
<tr>
<td>Activator markings</td>
<td>5 degree increments</td>
</tr>
<tr>
<td>Hardware</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>Activator targets</td>
<td>303 stainless steel</td>
</tr>
</tbody>
</table>

ASSEMBLY

INDUCTIVE SENSOR KIT

30 x 80mm mounting pattern, adjustable activator

Description                  Hardware            Kit part number
Bray S92/93 Sizes 63 to 128   Imperial            540102-12600536
Bray S92/93 Sizes 63 to 128 and Series 98  Metric    540102-12650536
NAMUR VDI/VDE 3845 Compliant mounting

Parts List

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Imperial - 540102-12600536</th>
<th>Metric - 540102-12650536</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sensor</td>
<td>540102-71104533</td>
<td>Sensor 540102-71104533</td>
</tr>
<tr>
<td>1</td>
<td>Activator assembly</td>
<td>Activator assembly</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Protective cover - Zone 2/22</td>
<td>Protective cover - Zone 2/22</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Socket head capscrew #10-32X1/2, SS</td>
<td>Socket head capscrew MSX0.8X12, SS</td>
<td></td>
</tr>
</tbody>
</table>

See Series 54 IOM for full mounting details

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Rev. 03-2019
30 x 130mm mounting pattern, adjustable activator

<table>
<thead>
<tr>
<th>Description</th>
<th>Hardware</th>
<th>Kit part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bray S92/93 Size 160</td>
<td>Imperial</td>
<td>540102-12601536</td>
</tr>
<tr>
<td>Bray S92/93 Size 160 NAMUR VDI/VDE 3845 Compliant mounting</td>
<td>Metric</td>
<td>540102-12651536</td>
</tr>
<tr>
<td>Bray Series 92/93 Size 210</td>
<td>Imperial</td>
<td>540102-12602536</td>
</tr>
<tr>
<td>Bray Series 92/93 Sizes 210 to 255</td>
<td>Metric</td>
<td>540102-12652536</td>
</tr>
</tbody>
</table>

**Application**

Note: The connections to this sensor are sealed with stopping plugs to protect against dirt and moisture. If your application does not require the use of all connections, permanently seal stopping plugs onto unused connections or ensure that stopping plugs are secure and impermeable during initial installation and when performing regular maintenance work. If necessary, re-tighten the stopping plugs to a torque of 1 Nm.
### INSTRUCTION MANUAL - Gc (nA)

**Equipment protection level Dc (tc)** Manual electrical apparatus for hazardous areas - Gas Group IIIC

**Device category 3G (nA)** For use in hazardous areas with gas, vapor and mist

**Certificate** BR 17 CERT 1705 X

**CE marking** CE

**ATEX marking** © II 3G Ex nA IIC T6 ... T1 Gc

**Standards** EN 60079-0:2012+A11:2013, EN 60079-15:2010 - Protection by increased safety "nA".

**General** The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The data stated in the data sheet are restricted by this operating instruction! The special conditions must be observed!

**Installation, commissioning** Laws and/or regulations and standards governing the use or intended usage goal must be observed. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again. Seal any openings on the housing not in use, using the stainless steel stopping plugs supplied. No other devices should be used to seal the openings. The stopping plugs made of plastic must no longer be used.

**Maintenance** No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

**Special Conditions**

**Maximum operating current [IL]** The maximum permissible load current must be restricted to the values given in the following list. High load currents and load short-circuits are not permitted.

**Maximum operating voltage [U_max]** The maximum permissible operating voltage U_max is restricted to the values in the following list. Tolerances are not permitted.

**Maximum permissible ambient temperature [T_amb]** Depending on the load current I, the maximum operating voltage U_max, and the temperature class. Details can be found in the following list.

- at U_max=30 V, I = 100 mA, T6 35°C (95°F)
- at U_max=30 V, I = 100 mA, T1 ... T5 57°C (134.6°F)
- at U_max=30 V, I = 50 mA, T6 35°C (95°F)
- at U_max=30 V, I = 50 mA, T1 ... T5 60°C (140°F)

**Maximum values of the valve circuit**

- **UV** = 32 V; **IV** = 240 mA
- **Uv** = 32 V; **Iv** = 240 mA

**Protection from mechanical danger** The sensor must not be exposed to any form of mechanical danger. If you use the protective cover 540100-70600533 and the actuator with protective cover 540100-21900533, it is ensured that the device is sufficiently protected in accordance with IEC/EN 60079-0. If protective cover becomes damaged, replace the protective cover.

**Protection from UV light** The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas. If you use the protective cover 540100-70600533 and the actuator with protective cover 540100-21900533, it is ensured that the device is sufficiently protected in accordance with IEC/EN 60079-0. If the protective cover becomes damaged, replace the protective cover.

**Electrostatic charge** Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding. Sliding contact discharges must be avoided. Avoid electrostatic charges that can cause electrostatic discharge when installing or operating the device. Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1. Do not attach the nameplate provided in areas where electrostatic charge can build up.

**Lead insertion** If cable glands are required for the installation, then the following points must be observed. The cable glands must be certified in accordance with the application. The temperature range of the cable glands must be selected according to the application. The degree of protection must not be reduced by the cable glands. Seal the housing. Use a seal that meets the requirements of the application.

**Material selection accessories** When selecting accessories, ensure that the material allows the temperature of the enclosure to rise to up to 70°C.

**Plug connector** The plug connector must not be withdrawn under voltage. The proximity switch is identified as follows: “WARNING: DO NOT SEPARATE WHEN ENERGIZED”. With the plug connector disconnected, soiling of the internal area must be prevented. (i.e. the area that is inaccessible when the connector is inserted.)
### INSTRUCTION MANUAL - Dc (tc)

<table>
<thead>
<tr>
<th>Equipment protection level Dc (tc)</th>
<th>Manual electrical apparatus for hazardous areas - Dust Group IIIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device category 3D (tc)</td>
<td>For use in hazardous areas with combustible dust</td>
</tr>
<tr>
<td>Certificate</td>
<td>BR 17 CERT 1705 X</td>
</tr>
<tr>
<td>CE marking</td>
<td>CE</td>
</tr>
<tr>
<td>ATEX marking</td>
<td>© II 3D Ex tc IIIC T80°C Dc</td>
</tr>
</tbody>
</table>

### General
The corresponding datasheets, declarations of conformity, EC-type examination certificates, certifications, and control drawings, where applicable (see datasheets), form an integral part of this document. These documents can be found at www.bray.com. The maximum surface temperature of the device was determined without a layer of dust on the apparatus. Some of the information in this instruction manual is more specific than the information provided in the datasheet.

### Installation, commissioning
Laws and/or regulations and standards governing the use or intended usage goal must be observed. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again. Seal any openings on the housing not in use, using the stainless steel stopping plugs supplied. No other devices should be used to seal the openings. The stopping plugs made of plastic must no longer be used.

### Maintenance
No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

### Special Conditions

#### Maximum operating current [Iₘ]
The maximum permissible load current must be restricted to the values given in the following list. High load currents and load short-circuits are not permitted.

#### Maximum operating voltage [Uₘᵢₙₐₓ]
The maximum permissible operating voltage Uₘᵢₙₐₓ is restricted to the values in the following list. Tolerances are not permitted.

#### Maximum permissible ambient temperature [Tₘᵢₙₐₓ]
Dependant of the load current Iₑ and the maximum operating voltage Uₘᵢₙₐₓ.

<table>
<thead>
<tr>
<th>Value</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>at Uₘᵢₙₐₓ=30 V, Iₑ=100 mA, Tₘᵢₙₐₓ=57°C</td>
<td>57°C (134.6°F)</td>
</tr>
<tr>
<td>at Uₘᵢₙₐₓ=30 V, Iₑ=50 mA, Tₘᵢₙₐₓ=60°C</td>
<td>60°C (140°F)</td>
</tr>
</tbody>
</table>

#### Maximum values of the valve circuit
Uₑ = 32 V, Iₑ = 240 mA

#### Protection from mechanical danger
The sensor must not be exposed to ANY FORM of mechanical danger. If you use the protective cover 540100-70600533 and the actuator with protective cover 540100-21900533, it is ensured that the device is sufficiently protected in accordance with IEC/ EN 60079-0. If the protective cover becomes damaged, replace the protective cover.

#### Protection from UV light
The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas. If you use the protective cover 540100-70600533 and the actuator with protective cover 540100-21900533 it is ensured that the device is sufficiently protected in accordance with IEC/EN 60079-0. If the protective cover becomes damaged, replace the protective cover.

#### Electrostatic charge
Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding. Sliding contact discharges must be avoided. Avoid electrostatic charges that can cause electrostatic discharge when installing or operating the device. Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1. Do not attach the nameplate provided in areas where electrostatic charge can build up.

#### Lead insertion
If cable glands are required for the installation, then the following points must be observed. The cable glands must be certified in accordance with the application. The temperature range of the cable glands must be selected according to the application. The degree of protection must not be reduced by the cable glands. Seal the housing. Use a seal that meets the requirements of the application.

#### Plug connector
The plug connector must not be withdrawn under voltage. The proximity switch is identified as follows: "WARNING - DO NOT SEPARATE WHEN ENERGIZED". With the plug connector disconnected, soiling of the internal area must be prevented. (i.e. the area that is inaccessible when the connector is inserted.)