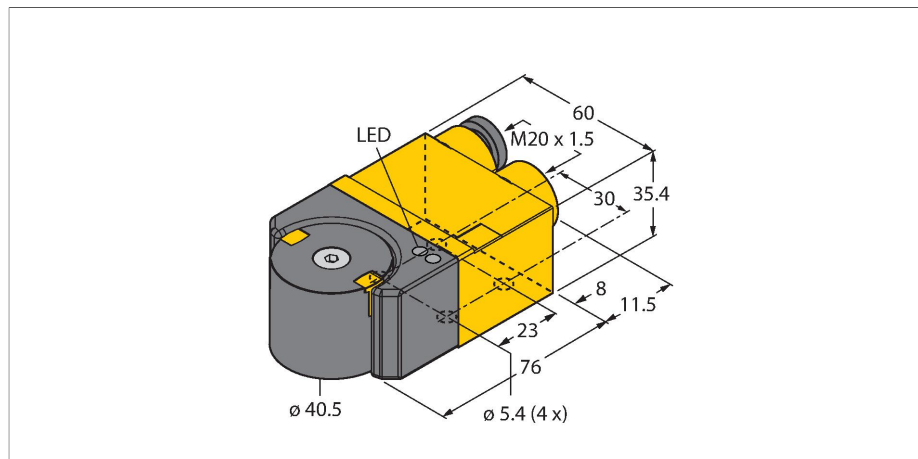


# RI360P1-DSU35TC-ELI-EXI

## Inductive Angle Sensor – With Analog Output

### Premium Line



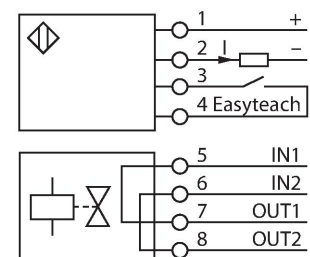
#### Features

- Rectangular, housing DSU35
- Plastic, PP-GF30-VO
- Detecting angular positions of 0° to 360°
- P1-Ri-DSU35 positioning element included in delivery
- Measuring range programmable via switch in the Terminal chamber
- Immune to electromagnetic interference
- Resolution, 12-bit
- 2-wire, 14...30 VDC
- Analog output
- 4 ... 20 mA
- Terminal chamber
- ATEX category II 2 G, Ex Zone 1
- ATEX category II 2 D, Ex Zone 21

#### Technical data

|                                        |                                                                     |
|----------------------------------------|---------------------------------------------------------------------|
| Type                                   | RI360P1-DSU35TC-ELI-EXI                                             |
| ID                                     | 1593015                                                             |
| Measuring principle                    | Inductive                                                           |
| <b>General data</b>                    |                                                                     |
| Resolution                             | 0.09°                                                               |
| Measuring range                        | 0...360 °                                                           |
| Nominal distance                       | 1 mm                                                                |
| Mounting conditions                    | Non-flush                                                           |
| Repeat accuracy                        | ≤ 0.025 % of full scale                                             |
| Linearity deviation                    | ≤ 1 % f.s.                                                          |
| Temperature drift                      | ≤ ± 0.02 %/K                                                        |
| Output type                            | Absolute singleturn                                                 |
| <b>Electrical data</b>                 |                                                                     |
| Operating voltage $U_B$                | 14...30 VDC                                                         |
|                                        | at the connection point of the sensor                               |
| Ripple $U_{ss}$                        | ≤ 10 % $U_{Bmax}$                                                   |
| Isolation test voltage                 | 0.5 kV                                                              |
| Short-circuit protection               | yes                                                                 |
| Wire break/reverse polarity protection | yes/Complete                                                        |
| Output function                        | 2-wire, Analog output                                               |
| Current output                         | 4...20 mA                                                           |
| Diagnostic                             | Positioning element not within detection range: Output signal 22 mA |
|                                        | 22 mA loop current during teach                                     |
| Load resistance current output         | ≤ [( $U_B$ - 14 V) / 20 mA]                                         |
| Sample rate                            | 500 Hz                                                              |

#### Wiring diagram



#### Functional principle

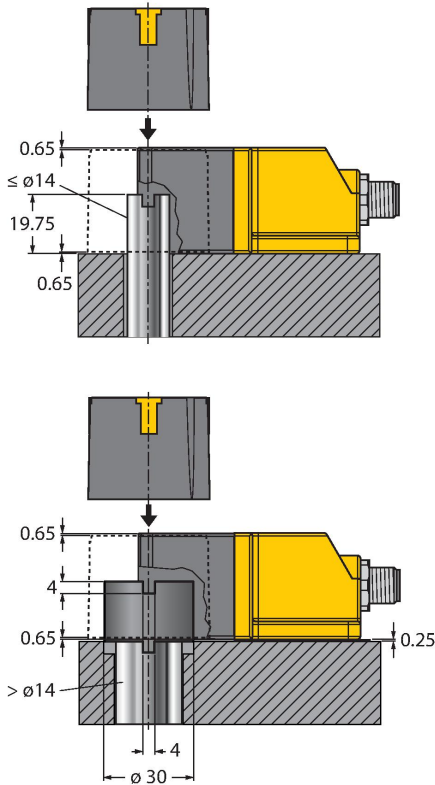
Inductive measuring principle provides more safety  
Based on the functional principle of RLC coupling, the sensor operates absolutely wear-free and is immune to magnetized metal splinters and other interference fields. Owing to the differential analysis, the output signal remains almost unchanged, even if the position of the positioning element deviates from the ideal axis of rotation.

## Technical data

|                                                                     |                                                                                                                                                   |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Valve control                                                       | Exi (max. 30 V)                                                                                                                                   |
| Approval acc. to                                                    | KEMA 03 ATEX 1122 X Issue no. 2                                                                                                                   |
| Internal capacitance (C <sub>i</sub> )/inductance (L <sub>i</sub> ) | 0 nF/0 µH                                                                                                                                         |
| Device marking                                                      | EX II 2 G Ex ia IIC T6 Gb/II 2 D Ex ia IIIC T85 °C Db                                                                                             |
|                                                                     | (max. U <sub>i</sub> = 30 V, I <sub>i</sub> = 120 mA, P <sub>i</sub> = 600mW)                                                                     |
| <b>Mechanical data</b>                                              |                                                                                                                                                   |
| Design                                                              | Dual sensor for rotary actuators, DSU35                                                                                                           |
| Dimensions                                                          | 76 x 60 x 35.4 mm                                                                                                                                 |
| Flange type                                                         | Flange without mounting element                                                                                                                   |
| Housing material                                                    | Plastic, PP-GF30                                                                                                                                  |
| Housing material, positioning element                               | plastic, PA66 + PA6I/6T-GF40                                                                                                                      |
| Electrical connection                                               | Terminal chamber                                                                                                                                  |
| <b>Environmental conditions</b>                                     |                                                                                                                                                   |
| Ambient temperature                                                 | -25...+70 °C                                                                                                                                      |
|                                                                     | For explosion hazardous areas see instruction leaflet                                                                                             |
| Vibration resistance                                                | 55 Hz (1 mm)                                                                                                                                      |
| Shock resistance                                                    | 30 g (11 ms)                                                                                                                                      |
| Protection class                                                    | IP68<br>IP69K                                                                                                                                     |
| MTTF                                                                | 138 years acc. to SN 29500 (Ed. 99) 40 °C                                                                                                         |
| Included in delivery                                                | Positioning element P1-Ri-DSU35, countersunk screw M6 × 25, 2x cylinder screws M5 × 12, 2x lock washers A5, 2x cable glands (blue), 1x dummy plug |

Mounting instructions

Mounting instructions/Description



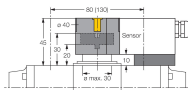
Ri-DSU35 for mounting on rotary actuators  
The Ri-DSU35 angle sensor and the well-established Ni4-DSU35 inductive dual sensor are identical in construction. The user also profits from the enormous mounting flexibility of the device. The sensor can be mounted on all standard rotary actuators with a shaft diameter of max. 14 mm thanks to an extensive range of available accessories. For larger shaft diameters use the BTS-DSU35-Z02 accessories.

Teaching with positioning element  
The teach-in process can be carried out simply and reliably using the switch installed in the terminal chamber.  
The increased current required during the teach-in process can be provided by an IMX12-DO01-1U-1U-0/24VDC, 7580101, for example.

| Teach pulse                       | LED 1                                                        | LED 2                                                                                            |
|-----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Approx. 3 s – start value         | Lights up green, easy teach starts, fast flash on completion | Flashes 1 x, then stop teach pulse => start value set                                            |
| Approx. 5 s – end value           |                                                              | Flashes 2 x, then stop teach pulse => end value set                                              |
| Approx. 8 s – change of direction |                                                              | Flashes 3 x, then stop teach pulse => change of CW/CCW direction                                 |
| Approx. 12 s – factory setting    |                                                              | Flashes 4 x, then stop teach pulse => factory setting reset (360° measuring range, CW direction) |

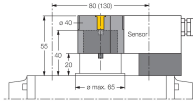
Accessories

BTS-DSU35-Z01 6900229



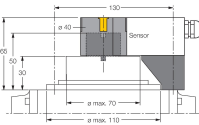
Mounting kit for dual sensors for larger rotary actuators; Ø spacer plate and snap ring: max. 65 mm; hole pattern on receptacle surface: 30 x 80 mm (30 x 130 mm); connection shaft (shaft extension) height: 20 mm/ Ø: max. 30 mm

BTS-DSU35-Z02 6900230



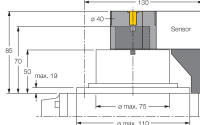
Mounting kit for dual sensors for larger rotary actuators; Ø spacer plate and snap ring: max. 65 mm; hole pattern on receptacle surface: 30 x 80 mm (30 x 130 mm); connection shaft (shaft extension) height: 20 mm (30 mm)/Ø: max. 40 mm

BTS-DSU35-Z036900231



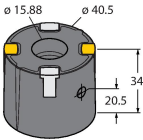
Mounting kit for dual sensors for larger rotary actuators; Ø spacer plate and snap ring: max. 110 mm; hole pattern on receptacle surface: 30 x 130 mm; connection shaft (shaft extension) height: 30 mm/Ø: max. 70 mm

BTS-DSU35-Z076900403



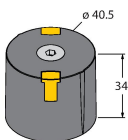
Mounting kit for dual sensors for larger rotary actuators; Ø spacer plate and snap ring: max. 110 mm; hole pattern on receptacle surface: 30 x 130 mm; connection shaft (shaft extension) height: 50 mm/Ø: max. 75 mm

P4-RI-DSU35100002204



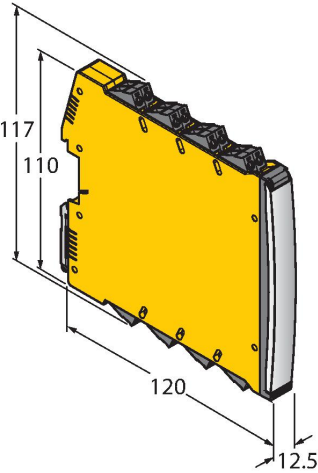
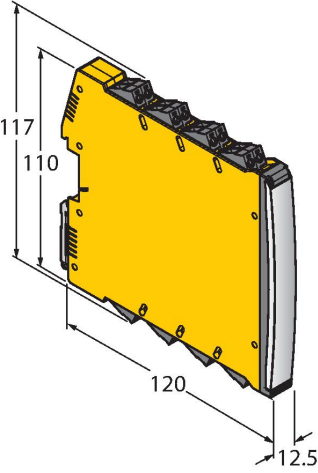
• Mounting on shaft extension 5/8" using set screw

P1-RI-DSU356901086



Positioning element for angle sensors RI-DSU35• Mounted via M6 x 25 countersunk screw

Accessories

| Dimension drawing                                                                   | Type                       | ID      |                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------|----------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | IMX12-AI01-2I-2IU-H0/24VDC | 7580305 | Isolating transducer; 2-channel; power supply of passive 2-wire isolating transducers with HART communication as well as connection of active 2-wire transmitters, SIL2 acc. to IEC61508; Ex-proof version; selectable with either current source/sink or voltage output; removable screw terminals; 24 VDC power supply |
|  | IMX12-AI01-1I-1IU-H0/24VDC | 7580313 | Isolating transducer; 1-channel; power supply of passive 2-wire isolating transducers with HART communication as well as connection of active 2-wire transmitters, SIL2 acc. to IEC61508; Ex-proof version; selectable with either current source/sink or voltage output; removable screw terminals; 24 VDC power supply |

## Instructions for use

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intended use                                                   | This device fulfills the directive 2014/34/EC and is suited for use in explosion hazardous areas according to EN60079-0:2012 + A11 -11:2012. In order to ensure correct operation to the intended purpose it is required to observe the national regulations and directives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| For use in explosion hazardous areas conform to classification | II 2 G and II 2 D (Group II, Category 2 G, electrical equipment for gaseous atmospheres and category 2 D, electrical equipment for dust atmospheres)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Marking (see device or technical data sheet)                   | <p>⊕ II 2 G Ex ia IIC T6 Gb and ⊕ II 2 D Ex ia IIIC T85 °C Db acc. to EN 60079-0, -11</p> <p>⊕ II 2 D and Ex ia IIIC T100°C Db acc. to EN61241</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Local admissible ambient temperature                           | -25...+66 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Installation/Commissioning                                     | <p>These devices may only be installed, connected and operated by trained and qualified staff. Qualified staff must have knowledge of protection classes, directives and regulations concerning electrical equipment designed for use in explosion hazardous areas. Please verify that the classification and the marking on the device comply with the actual application conditions.</p> <p>This device is only suited for connection to approved Exi circuits according to EN 60079-0 and EN 60079-11. Please observe the maximum admissible electrical values. After connection to other circuits the sensor may no longer be used in Exi installations. When interconnected to (associated) electrical equipment, it is required to perform the "Proof of intrinsic safety" (EN60079-14).</p> |
| Installation and mounting instructions                         | Avoid static charging of cables and plastic devices. Please only clean the device with a damp cloth. Do not install the device in a dust flow and avoid build-up of dust deposits on the device. If the devices and the cable could be subject to mechanical damage, they must be protected accordingly. They must also be shielded against strong electro-magnetic fields. The pin configuration and the electrical specifications can be taken from the device marking or the technical data sheet. In order to avoid contamination of the device, please remove possible blanking plugs of the cable glands or connectors only shortly before inserting the cable or opening the cable socket.                                                                                                  |
| Special conditions for safe operation                          | The device must be protected against any kind of mechanical damage, avoid static charging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Service/Maintenance                                            | Repairs are not possible. The approval expires if the device is repaired or modified by a person other than the manufacturer. The most important data from the approval are listed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |