

## Incremental Rotary Encoder G1B



- Housing diameter: 130 mm
- Hollow shaft: Ø 28 ... 60 mm
- Line counts: 64 ... 8192
- Output signals:  
RS422, KS, KI, 1Vpp
- Connector or cable output

### Mechanical Data

| G1B  | Hollow shaft  |
|--|---|
|  | Type W  |
| Ø Hollow shaft                                     | 28, 32, 38, 42, 45, 50, 60 mm   |
| Weight   | ca. 1100 g  |
| Accuracy<br>(up to line count 2500)                | $< \pm \frac{360^\circ}{\text{Line counts} \times 20}$                              |
| Mech. permissible speed                            | max. 3.500 min <sup>-1</sup>  |
| Starting torque (25°C)                             | < 0,5 Nm  |
| Rotor inertia<br>(depends on the specific Version) | 1,1 * 10 <sup>-3</sup> kgm <sup>2</sup> ... 1,6 * 10 <sup>-3</sup> kgm <sup>2</sup> |
| Vibration  | 100 m/s <sup>2</sup> ; higher upon request  |
| Shock  | 1000 m/s <sup>2</sup> ; higher upon request   |
| Operating temperature                              | -25°C ... +85°C;<br>-40°C ... +100°C upon request for KS or KI: RS 422              |
| Protection class                                   | IP 50, IP 64 upon request   |

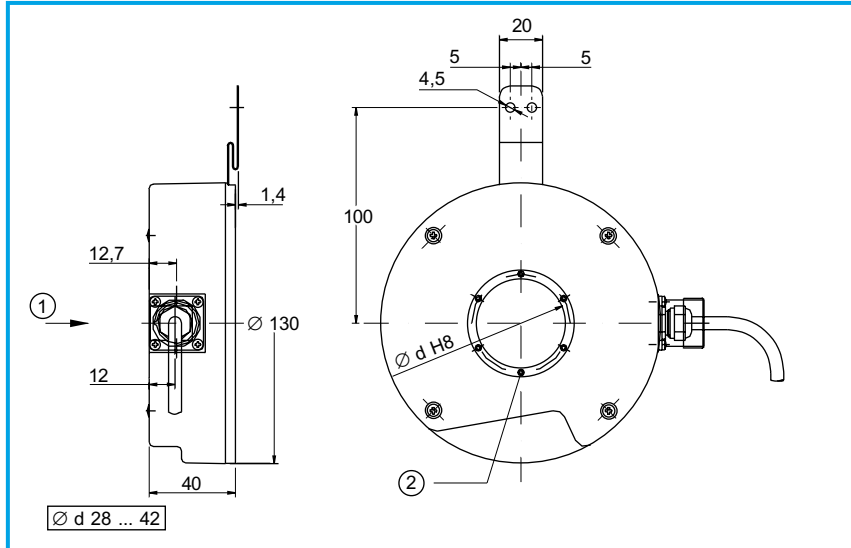
### Line counts

|    |      |      |      |      |      |                     |
|----|------|------|------|------|------|---------------------|
| 64 | 1024 | 2048 | 2500 | 4096 | 8192 | others upon request |
|----|------|------|------|------|------|---------------------|

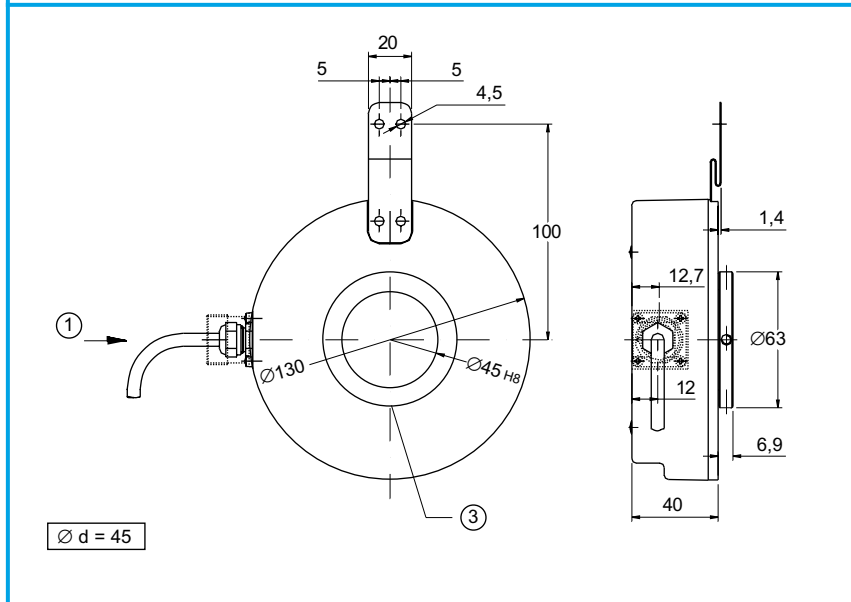
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### Dimensions (mm)

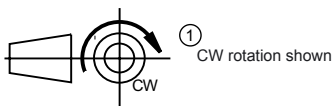
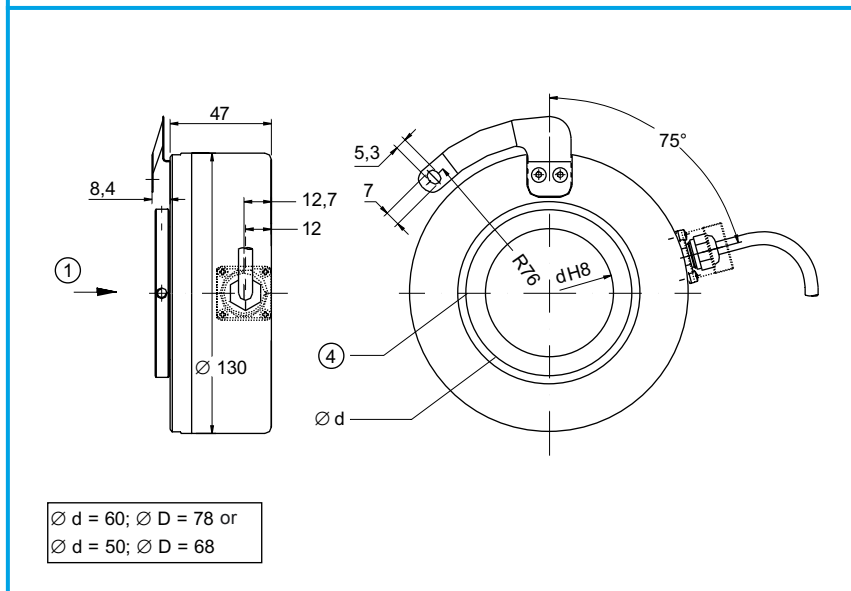
- optional: IP 50 (with felt ring)
- optional: IP 64 (with sealing ring)
- connector or cable output radial
- optional: second torque coupling
- axial backlash (shaft): max.  $\pm 1,5$  mm
- ② set screw 6 x M3; SW 1,5 included



- optional: IP 50 (with felt ring)
- optional: IP 64 (with sealing ring)
- connector or cable output radial
- optional: second torque coupling
- axial backlash (shaft): max.  $\pm 1,5$  mm
- ③ set screw 4 x M5; SW 2,5 included



- optional: IP 50 (with felt ring)
- optional: IP 64 (with sealing ring)
- connector or cable output radial
- optional: second torque coupling
- axial backlash (shaft): max.  $\pm 1,5$  mm
- ④ set screw 4 x M5; SW 2,5 included



### Electrical Data

| G1B                                | Type W  |
|------------------------------------|---|
| Supply voltage                     | 5 V or 8 ... 30 V: LD, SI<br>8 ... 30 V: KS, KI<br>5 V: KI (-40°C ... 100 °C) |
| Current requirement (without load) | max. 150 mA   |
| Output load                        | ± 20 mA (RS422): LD<br>50 mA: KS, KI<br>8 mA: (120 Ohm): SI                   |
| Output frequency                   | 0 ... 160 kHz: KS, KI<br>0 ... 180 kHz (-3dB): SI<br>0 ... 300 kHz: LD        |
| Cable length                       | max. 50 m: KS, KI<br>max. 100 m: LD<br>max. 150 m: SI                         |
| Zero index                         | 5 = Z „high“ if A + B „high“; others upon request                             |

### Output Signals

#### Version:

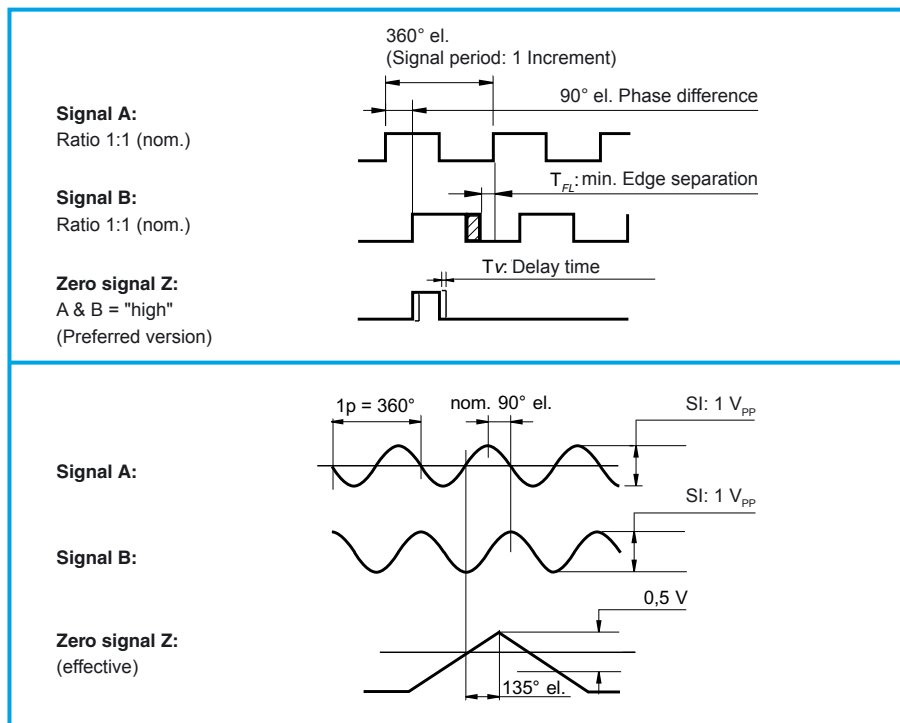
LD = Line driver RS422

KS = Push pull with short-circuit protection

KI = KS with inverted signals

#### Version:

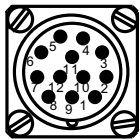
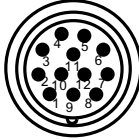
SI = 1 V<sub>SS</sub> at 120 Ohm Load



### Connector-Terminal and Cable Designation

| G1BW                    | Output circuit |                        |         |                        |
|-------------------------|----------------|------------------------|---------|------------------------|
|                         | KS             |                        | LD / KI |                        |
| Function / Signal       | 12-pin         | Cable<br>Pur 12 x 0,19 | 12-pin  | Cable<br>Pur 12 x 0,19 |
| Signal A                | 5              | brown                  | 5       | brown                  |
| Signal $\bar{A}$        | -              | -                      | 6       | green                  |
| Signal B                | 8              | grey                   | 8       | grey                   |
| Signal $\bar{B}$        | -              | -                      | 1       | pink                   |
| Signal Z                | 3              | red                    | 3       | red                    |
| Signal $\bar{Z}$        | -              | -                      | 4       | black                  |
| V <sub>CC</sub>         | 12             | blue                   | 12      | blue                   |
| V <sub>CC Sense</sub>   | 2              | violet                 | 2       | violet                 |
| 0 Volt                  | 10             | white                  | 10      | white                  |
| 0 Volt <sub>Sense</sub> | 11             | yellow                 | 11      | yellow                 |
| Shield                  | 9              | white-blue             | 9       | white-blue             |

| G1BW                    | Output circuit |                        |
|-------------------------|----------------|------------------------|
|                         | SI             |                        |
| Function / Signal       | 12-pin         | cable<br>Pur 12 x 0,19 |
| Signal A +              | 5              | brown                  |
| Signal A -              | 6              | green                  |
| Signal B +              | 8              | grey                   |
| Signal B -              | 1              | pink                   |
| Signal Z +              | 3              | red                    |
| Signal Z -              | 4              | black                  |
| V <sub>CC</sub>         | 12             | blue                   |
| V <sub>CC Sense</sub>   | 2              | violet                 |
| 0 Volt                  | 10             | white                  |
| 0 Volt <sub>Sense</sub> | 11             | yellow                 |
| Shield                  | 9              | white-blue             |

**Square flange receptacle 12-pin: Pin plug 12-pin:**  
 RC-12P2N122K00                      Metal: RC-12P2N1280EF  
    Plastic: RC-12P1N12K0EF

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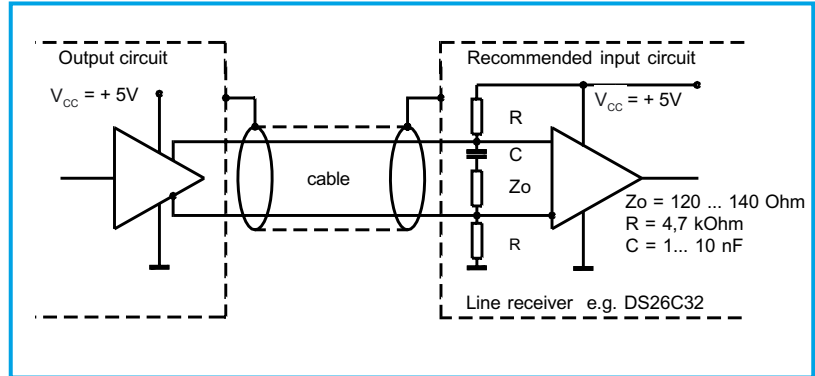
**Mating connector 12-polig:                      Socket coupling for pin plug:**  
 Socket plug for square flange                      Metal: RC-12S1N1290EF  
 receptacle: RC-12S2N1280EF                      Plastic: RC-12S1N12M0EF

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### Recommended input circuitry of subsequent electronics

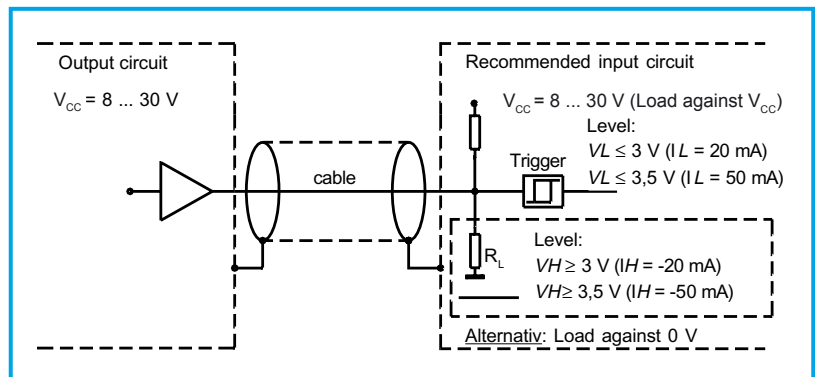
#### LD: Line driver RS 422 A

Operating voltage:  $5\text{ V} \pm 5\%$  or  $8 \dots 30\text{ V}$   
 Current requirement: max.  $150\text{ mA}$  (without load)  
 Output signals:  $\bar{A}, A, \bar{B}, B, \bar{Z}, Z$   
 Max. output frequency:  $300\text{ kHz}$  for LD  
 Min. edge separation:  $T_{FL} \geq 0,25\ \mu\text{s}$  ( $400\text{ kHz}$ )  
 Level (RS422):  $V_H \geq 2,5\text{ V}$  ( $I_H = -20\text{ mA}$ )  
 $V_L \leq 0,5\text{ V}$  ( $I_L = 20\text{ mA}$ )  
 Max. current load cap.:  $I_{max} = \pm 20\text{ mA}$  per output  
 Delay time:  $T_V \leq 50\text{ ns}$   
 Switching times: rise / fall times:  $\leq 100\text{ ns}$   
 Cable length: max.  $50\text{ m}$   
 Operating temperature:  $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$



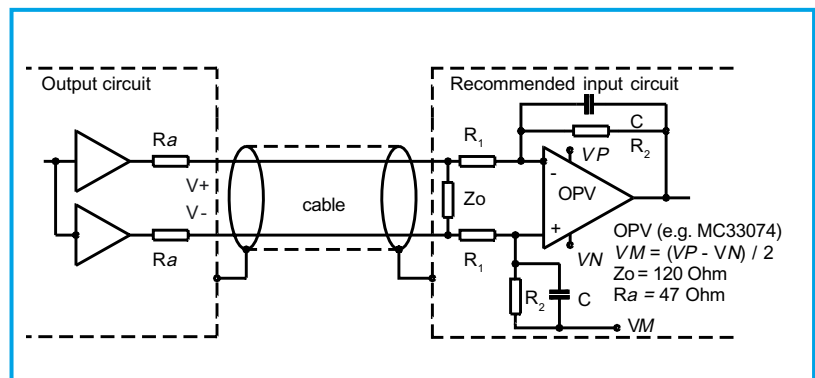
#### KS: Push pull output with short-circuit protection

Operating voltage:  $8 \dots 30\text{ V}$   
 Current requirement: max.  $150\text{ mA}$  (without load)  
 Output signals:  $A, B, Z$   
 Max. output frequency:  $300\text{ kHz}$   
 Min. edge separation:  $T_{FL} \geq 0,9\ \mu\text{s}$  ( $400\text{ kHz}$ )  
 Max. current load cap.:  $I_{max} = 50\text{ mA}$  per output  
 Delay time:  $T_V \leq 400\text{ ns}$   
 Switching times: rise / fall times:  $\leq 350\text{ ns}$   
 (1 m cable and  $I_{out} = 50\text{ mA}$ )  
 Cable length: max.  $50\text{ m}$   
 Operating temperature:  $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$   
 Short-circuit protection only at zero speed !



#### SI: Voltage interface 1 Vpp

Operating voltage:  $5\text{ V} \pm 5\%$   
 Current requirement: max.  $150\text{ mA}$   
 Output signals:  $A+, A-, B+, B-, Z+, Z-$   
 Limit frequency (-3dB): max.  $160\text{ kHz}$   
 Signal level at a load of  $Z_o = 120\text{ Ohm}$ :  
 $A, B \sim 1\text{ Vpp}$  ( $0,8 \dots 1,2\text{ Vpp}$ )  
 index signal (effective signal):  
 $Z \sim 0,5\text{ Vpp}$  ( $0,2 \dots 0,85\text{ Vpp}$ )  
 Cable length: max.  $50\text{ m}$   
 Operating temperature:  $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$



| Ordering Information | G   | 1B | X | X | XX XX   | XXXX | - | X X X | - | XX |
|----------------------|---|----|---|---|---------|------|---|-------|---|----|
| Ordering Information | G   | 1B | 3 | 4 | 5.1 5.2 | 6    | - | 7 8 9 | - | 10 |
| <b>G</b>             | <b>Incremental Rotary Encoder</b>   |    |   |   |         |      |   |       |   |    |
| <b>1B</b>            | <b>Model series</b>   |    |   |   |         |      |   |       |   |    |
| <b>3</b>             | <b>Mechanical specification</b><br>W = Type W (Through hollow shaft)  |    |   |   |         |      |   |       |   |    |
| <b>4</b>             | <b>Hollow shaft configuration</b><br>H = 28 mm          7 = 32 mm          J = 60 mm<br>G = 38 mm          6 = 45 mm<br>F = 42 mm          5 = 50 mm  |    |   |   |         |      |   |       |   |    |
| <b>5.1</b>           | <b>Output circuit</b><br>LD = Line driver; RS422          SI = Voltage interface 1 Vss at 120 Ohm Load<br>KS = Push pull with short-circuit protection          KI = KS with inverted signals |    |   |   |         |      |   |       |   |    |
| <b>5.2</b>           | <b>Output channels</b><br>BI = channel A and B<br>IN = channel B only          others upon request  |    |   |   |         |      |   |       |   |    |
| <b>6</b>             | <b>Line counts</b><br>64   1024   2048   2500   4096   8192   others upon request   |    |   |   |         |      |   |       |   |    |
| <b>7</b>             | <b>Zero index Z</b><br>5 = Z „high“ at A + B „high“          others upon request  |    |   |   |         |      |   |       |   |    |
| <b>8</b>             | <b>Flange</b><br>D = IP 50<br>F = IP 64   |    |   |   |         |      |   |       |   |    |
| <b>9</b>             | <b>Connector or cable output</b><br>1 = Connector radial          4 = Cable radial with connector<br>3 = Cable radial (1m)          7 = Leads radial<br>others upon request                   |    |   |   |         |      |   |       |   |    |
| <b>10</b>            | <b>Supply voltage</b><br>05 = 5 Volt          24 = 5 ... 30 Volts   |    |   |   |         |      |   |       |   |    |

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