# Absolute encoders – multiturn

| Standard electronic multiturn, magnetic | Sendix M5861 (shaft) | Analog |
|---|---|---|

The Sendix M58 with Energy Harvesting Technology is an electronic multiturn encoder without gear and without battery – in the standard format with 58 mm flange.

High robustness and high resolution make this encoder the ideal device for use in demanding applications.

E1    c UL us    Ex 2/22    RoHS

Safety-Lockplus™ | High rotational speed | Temperature range -40°... +85°C | High protection level IP | High shaft load capacity | Shock / vibration resistant | Reverse polarity protection | Energy Harvesting
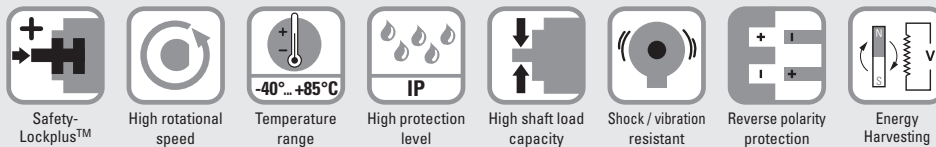
## Highest robustness

- Sturdy bearing construction in Safety-Lockplus™ design for particularly high resistance.
- Extra large bearings.
- Mechanically protected shaft seal.
- Wide temperature range -40 °C ... +85 °C.
- Without gear and without battery, thanks to the Energy Harvesting technology.

## Application oriented

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Measuring range scalable.
- Limit switch function.

## Order code Shaft version

8.M5861 .XXXX.XX12
Type    a b c d  e f

**a  Version**
3 = clamping flange, IP65, ø 58 mm [2.28"]
4 = synchro flange, IP65, ø 58 mm [2.28"]

**b  Shaft (ø x L), with flat**
1 = ø 6 x 12.5 mm [0.24 x 0.49"]
5 = ø 10 x 20 mm [0.39 x 0.79"]

**c  Output circuit [1]**
3 = current output
4 = voltage output

**d  Type of connection**
2 = radial cable, 1 m [3.28'] PVC
B = radial cable, special length PVC *)
4 = radial M12 connector, 5-pin

*) Available special lengths (connection types B):
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
ex.: 8.M5861.3132.3112.0030 (for cable length 3 m)

**e  Interface / resolution / supply voltage**
3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC
4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC
5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC

**f  Measuring range**
1 = 16 revolutions / cw
2 = 16 revolutions / ccw
3 = scalable up to 65,536 revolutions, with limit switch function / cw
4 = scalable up to 65,536 revolutions, without limit switch function / cw
5 = scalable up to 65,536 revolutions, with limit switch function / ccw
6 = scalable up to 65,536 revolutions, without limit switch function / ccw

*Optional on request*
- Ex 2/22 (only for connection type 4)

[1] Output circuit "3" only in conjunction with interface "3",
output circuit "4" only in conjunction with interface "4" or "5".

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| Mounting accessory for shaft encoders | | Order no. |
|---|---|---|
| Coupling | Bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"] | **8.0000.1102.1010** |

| Cables and connectors | | Order no. |
|---|---|---|
| Preassembled cables | M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56'] PVR cable | **05.00.6081.2211.002M** |
| Connectors | M12 female connector with coupling nut, 5-pin, A coded, straight (metal) | **8.0000.5116.0000** |

Further Kübler accessories can be found at: kuebler.com/accessories
Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

## Technical data

### Electrical characteristics current interface 4 ... 20 mA

| | | |
|---|---|---|
| **Supply voltage** | | 10 ... 30 V DC |
| **Current consumption** (no load) | | max. 30 mA |
| **Reverse polarity protection of the supply voltage** | | yes |
| **Short-circuit proof outputs** | | yes [1] |
| **Measuring range** | factory setting optionally scalable | $2^4$ revolutions up to $2^{16}$ revolutions |
| **DA converter resolution** | | 12 bit |
| **Singleturn accuracy,** at 25 °C [77 °F] | | ±1° |
| **Temperature coefficient** | | < 100 ppm/K |
| **Repeat accuracy,** at 25 °C [77 °F] | | ±0.2° |
| **Output load** | at 10 V DC at 24 V DC at 30 V DC | max. 200 Ohm max. 900 Ohm max. 1200 Ohm |
| **Setting time** | | < 1 ms, $R_{Burden}$ = 900 Ohm, 25°C [77°F] |
| **LEDs (green/red)** | | - system status<br>- current loop interruption – input load too high<br>- reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°<br>- status in teach mode |
| **Options** | | - output signal scalable via the teach inputs<br>- output signal scalable via the teach inputs + limit switch function |
| **Teach inputs** | | level = +V for 1 s minimum |
| **PowerON Time** | | < 1 s |
| **Update rate** | | 1 ms |
| **E1 compliant** acc. to | | ECE guideline |
| **UL approval** | | File no. E224618 |
| **CE compliant** acc. to | | EMC guideline 2014/30/EU RoHS guideline 2011/65/EU |

### Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V

| | | |
|---|---|---|
| **Supply voltage** | output 0 ... 5 V output 0 ... 10 V | 10 ... 30 V DC 15 ... 30 V DC |
| **Current consumption** (no load) | | max. 30 mA |
| **Reverse polarity protection of the supply voltage** | | yes |
| **Short-circuit proof outputs** | | yes [1] |
| **Measuring range** | factory setting optionally scalable | $2^4$ revolutions up to $2^{16}$ revolutions |
| **DA converter resolution** | 0 ... 10 V 0 ... 5 V | 12 bit 11 bit |
| **Singleturn accuracy,** at 25 °C [77 °F] | | ±1° |
| **Temperature coefficient** | | < 100 ppm/K |
| **Repeat accuracy,** at 25°C [77°F] | | ±0.2° |
| **Current output** | | max. 10 mA |
| **Setting time** | | < 1 ms, $R_{Load}$ = 1000 Ohm, 25°C [77°F] |
| **LEDs (green/red)** | | - system status<br>- reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°<br>- status in teach mode |
| **Options** | | - output signal scalable via the teach inputs<br>- output signal scalable via the teach inputs + limit switch function |
| **Teach inputs** | | level = +V for 1 s minimum |
| **PowerON Time** | | < 1 s |
| **Update rate** | | 1 ms |
| **E1 compliant** acc. to | | ECE guideline |
| **UL approval** | | File no. E224618 |
| **CE compliant** acc. to | | EMC guideline 2014/30/EU RoHS guideline 2011/65/EU |

1) When the supply voltage is correctly applied.
   But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.
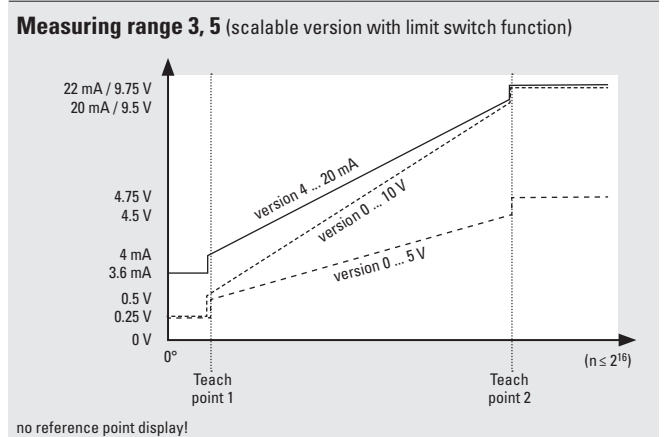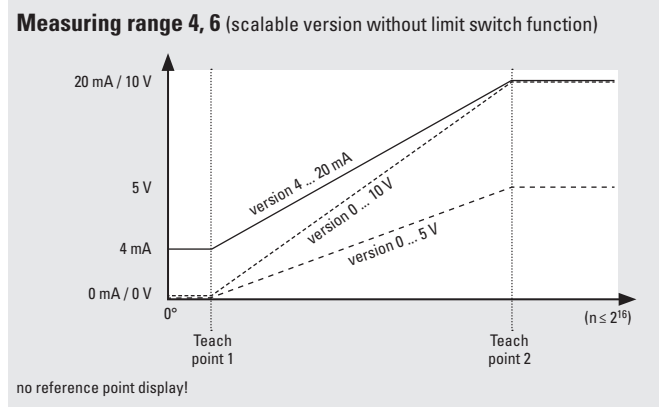
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## Mechanical characteristics

| | | |
|---|---|---|
| **Maximum speed** | | 4000 min⁻¹ |
| | | 2000 min⁻¹ (continuous) |
| **Starting torque** at 20 °C [68 °F] | | < 0.01 Nm |
| **Shaft load capacity** | radial | 80 N |
| | axial | 40 N |
| **Weight** | | approx. 280 g [9.88 oz] |
| **Protection** acc. to EN 60529/DIN 40050-9 | | IP65 |
| **Working temperature range** | | -40 °C … +85 °C [-40 °F … +185 °F] |
| **Materials** | shaft | V2A |
| | flange | aluminum |
| | housing | zinc die-cast |
| | cable | PVC |
| **Shock resistance** acc. to EN 60068-2-27 | | 5000 m/s², 4 ms |
| **Vibration resistance** acc. to EN 60068-2-6 | | 300 m/s², 10 … 2000 Hz |

## Example (output signal evolution) – factory setting

### Measuring range 1 (cw version)



### Measuring range 2 (ccw version)
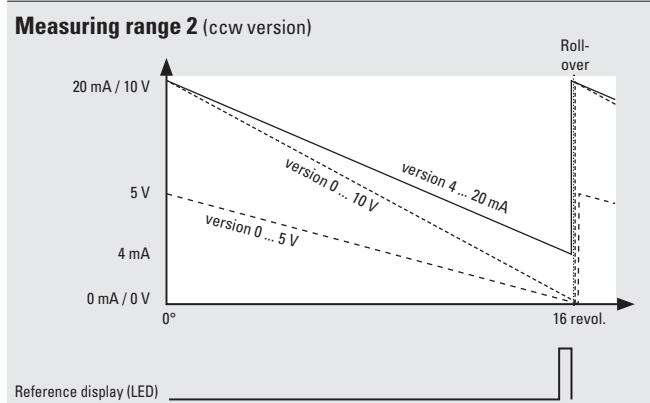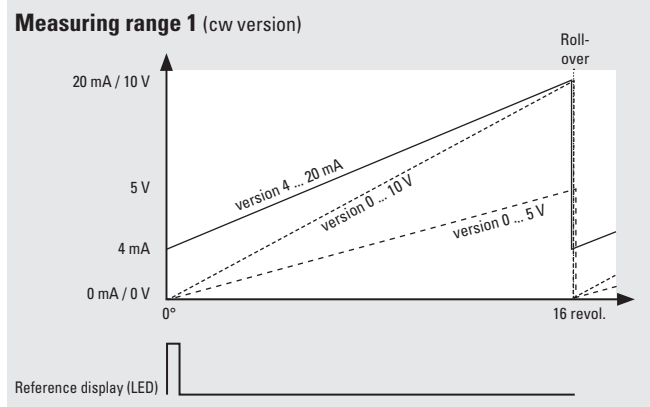


## Example (output signal evolution) – option: scalable

### Measuring range 4, 6 (scalable version without limit switch function)



no reference point display!

### Measuring range 3, 5 (scalable version with limit switch function)



no reference point display!

| **Factory-set measuring range** | | 2⁴ revolutions with roll-over | | |
|---|---|---|---|---|
| **Limit switch function** | version | **0 … 10 V** | **0 … 5 V** | **4 … 20 mA** |
| | limit switch low | 0.25 V | 0.25 V | 3.6 mA |
| | limit switch high | 9.75 V | 4.75 V | 22.0 mA |

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1) For scalable version.

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## Terminal assignment

| Interface | Type of connection | Cable (isolate unused cores individually before initial start-up) | | | | |
|---|---|---|---|---|---|---|
| 3 (current) | 2, B | Signal: | 0 V | +V | +I | SET 1 [1] | SET 2 [1] |
| | | Core color: | WH | BN | GN | GY | PK |

| Interface | Type of connection | M12 connector, 5 pin | | | | |
|---|---|---|---|---|---|---|
| 3 (current) | 4 | Signal: | 0 V | +V | +I | SET 1 [1] | SET 2 [1] |
| | | Pin: | 3 | 2 | 1 | 5 | 4 |

| Interface | Type of connection | Cable (isolate unused cores individually before initial start-up) | | | | |
|---|---|---|---|---|---|---|
| 4, 5 (voltage) | 2, B | Signal: | 0 V | +V | +U | SET 1 [1] | SET 2 [1] |
| | | Core color: | WH | BN | GN | GY | PK |

| Interface | Type of connection | M12 connector, 5 pin | | | | |
|---|---|---|---|---|---|---|
| 4, 5 (voltage) | 4 | Signal: | 0 V | +V | +U | SET 1 [1] | SET 2 [1] |
| | | Pin: | 3 | 2 | 1 | 5 | 4 |

+V : Supply voltage encoder +V DC
0 V : Supply voltage encoder ground GND (0 V)
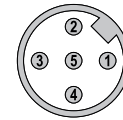+U : Voltage
+I : Current

SET 1 : Set input for teachpoint 1
SET 2 : Set input for teachpoint 2

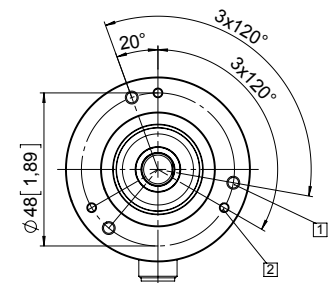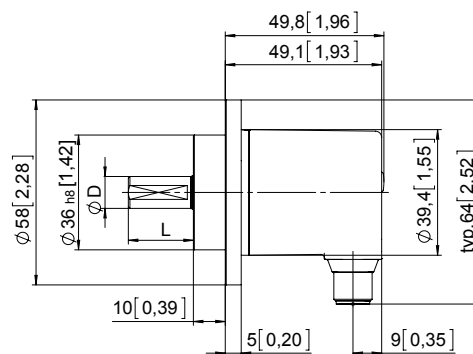**Top view of mating side, male contact base**



M12 connector, 5-pin

## Dimensions
Dimensions in mm [inch]

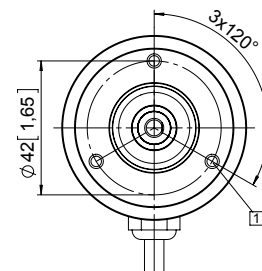**Clamping flange, ø 58 [2.28]**
**Flange type 3**

1 3 x M4
2 3 x M3



| D | Fit | L |
|---|---|---|
| 6 [0.24] | h7 | 12.5 [0.49] |
| 10 [0.39] | h7 | 20 [0.79] |

**Synchro flange, ø 58 [2.28]**
**Flange type 4**

1 3 x M4, 10 [0.39] deep



| D | Fit | L |
|---|---|---|
| 6 [0.24] | h7 | 12.5 [0.49] |
| 10 [0.39] | h7 | 20 [0.79] |