The Sendix multiturn encoders 5862 and 5882, with SSI or RS485 interface and combined optical and magnetic sensor technology, offer a maximum resolution of 25 bits.

These encoders are programmable via the Ezturn software.

The hollow shaft version boasts a minimal installation depth, facilitating use where space is tight.

### Compact
- Hollow shaft version with just 43 mm installation depth
- Hollow shaft version up to 12 mm diameter

### Flexible
- With SSI or RS485 interface
- Programmable via Ezturn
- Numerous connection options due to wide range of connection types

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**Order code**

**Shaft version**

<table>
<thead>
<tr>
<th>Flange</th>
<th>Interface / Power supply</th>
<th>Type of connection</th>
<th>SSI interface 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = clamping flange</td>
<td>2 = SSI / 5 ... 30 V DC, with 4 status outputs</td>
<td>1 = axial cable (1 m PVC)</td>
<td>2001 = 4096 x 4096 (24 bit), Binary</td>
</tr>
<tr>
<td>2 = synchro flange</td>
<td>3 = RS485, half-duplex / 5 ... 30 V DC, internal termination</td>
<td>2 = radial cable (1 m PVC)</td>
<td>2002 = 8192 x 4096 (25 bit), Binary</td>
</tr>
<tr>
<td>Shaft (ø x L), with flat</td>
<td>5 = SSI / 5 ... 30 V DC, with incremental track A, B, φ, 2048 PPR</td>
<td>3 = M23 connector axial, mating connector</td>
<td>2003 = 4096 x 4096 (24 bit), Gray</td>
</tr>
<tr>
<td>1 = ø 6 x 10 mm</td>
<td>7 = RS485, half-duplex / 5 ... 30 V DC, external termination</td>
<td>4 = M23 connector, radial, without mating connector</td>
<td>2004 = 8192 x 4096 (25 bit), Gray</td>
</tr>
<tr>
<td>2 = ø 10 x 20 mm</td>
<td>9 = SSI / 4.75 ... 30 V DC, with 2 status outputs and 2 sensor outputs for monitoring the voltage on the encoder</td>
<td><strong>RS485 interface, half-duplex</strong></td>
<td>3001 = ESC Protocol, half-duplex, 38400 Baud</td>
</tr>
</tbody>
</table>

**Hollow shaft**

<table>
<thead>
<tr>
<th>Flange</th>
<th>Interface / Power supply</th>
<th>Type of connection</th>
<th>SSI interface 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = through hollow shaft torque stop, clamping side flange 2)</td>
<td>2 = SSI / 5 ... 30 V DC, with 4 status outputs</td>
<td>1 = radial cable (1 m PVC)</td>
<td>2001 = 4096 x 4096 (24 bit), Binary</td>
</tr>
<tr>
<td>3 = through hollow shaft torque stop, clamping side flange 2)</td>
<td>3 = RS485, half-duplex / 5 ... 30 V DC, internal termination</td>
<td>2 = M23 connector, radial, without mating connector</td>
<td>2002 = 8192 x 4096 (25 bit), Binary</td>
</tr>
<tr>
<td>Hollow shaft</td>
<td>5 = SSI / 5 ... 30 V DC, with incremental track A, B, φ, 2048 PPR</td>
<td><strong>RS485 interface, half-duplex</strong></td>
<td>2003 = 4096 x 4096 (24 bit), Gray</td>
</tr>
<tr>
<td>6 = ø 10 mm</td>
<td>7 = RS485, half-duplex / 5 ... 30 V DC, external termination</td>
<td>4 = M23 connector, radial, without mating connector</td>
<td>2004 = 8192 x 4096 (25 bit), Gray</td>
</tr>
<tr>
<td>8 = ø 12 mm</td>
<td>9 = SSI / 4.75 ... 30 V DC, with 2 status outputs and 2 sensor outputs for monitoring the voltage on the encoder</td>
<td><strong>RS485 interface, half-duplex</strong></td>
<td>3001 = ESC Protocol, max. 38400 Baud</td>
</tr>
</tbody>
</table>

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1) This factory set (default) resolution (25 bit, Gray, cw) can be changed by using the Ezturn programming software.
2) Clamping side cover available on request.
### Mounting accessory for shaft encoders

**Coupling**
- Bellows coupling ø 19 mm for shaft 6 mm
  - Code: 8.0000.1101.0606
- Bellows coupling ø 19 mm for shaft 10 mm
  - Code: 8.0000.1101.1010

### Mounting accessory for hollow shaft encoders

**Cylindrical pin, long**
For torque stops
With fixing thread
- Code: 8.0010.4700.0000

### Connection Technology

**Connector, self-assembly**
- M23
  - Code: 8.0000.5012.0000

**Cordset, pre-assembled with 2 m PVC cable**
- M23
  - Code: 8.0000.6901.0002.0031

### Programming set

**Including:**
- Interface converter
- Connection cable from interface converter to encoder
- Power supply 90 ... 250 V AC
- DVD with Ezturn® software

**Minimum System Requirements:**
- Operating system: Windows XP SP3 or higher
- Windows XP in preparation
- Processor: 1 GHz
- RAM: 512 MB
- Required disk space: 500 MB
- Code: 8.0010.9000.0004

### Mechanical characteristics

**Speed**  
- Max. 6,000 min⁻¹  

**Rotor moment of inertia**
- Shaft version
  - Approx. 1.8 x 10⁻⁶ kgm²
- Hollow shaft version
  - Approx. 6 x 10⁻⁶ kgm²

**Starting torque**
- Shaft version
  - < 0.01 Nm
- Hollow shaft version
  - < 0.05 Nm

**Load capacity of shaft**
- Radial
  - 80 N
- Axial
  - 40 N

**Weight**
- Ca. 0.4 kg

**Protection**
- ACC. TO EN 60 529
  - IP65

**Temperature range**
- -20°C ... +85°C

**Materials**
- Shaft / Hollow shaft
  - Stainless steel h8

**Shock resistance**
- AC. EN 60068-2-27
  - 2500 m/s², 8 ms

**Vibration resistance**
- AC. EN 60068-2-6
  - 100 m/s², 10...2000 Hz

### General electrical characteristics

**Power supply (Ua)**
- 5.0 ... 30 V DC

**Power consumption (no load)**
- Typ.
  - 89 mA
- Max.
  - 138 mA

**Short circuit proof outputs**
- Yes

**Reverse connection at Ua**
- Yes

**CE compliant**
- AC. EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
- Behaviour under magnetic influence AC. To
  - EN 61000-4-8, Severity level 5

**UL certified**
- File 224618

**RoHS compliant**
- EU-guideline 2002/95/EG

### SSI Interface

**Output driver**
- RS485

**Permissible load / channel**
- Max. +/- 20 mA

**Update rate for position data**
- Approx. 1600/s

**SSI clock rate**
- 100 kHz / 500 kHz

**Signal level**
- High
  - Typ. 3.8 V
- Low (ILoad = 20 mA)
  - Typ. 1.3 V

**Rising edge time tr (without cable)**
- Max. 100 ns

**Falling edge time tf (without cable)**
- Max. 100 ns

### Control inputs (V/R, SET)

**Voltage**
- 5 ... 30 V DC = Ua

**Response time**
- 10 ms

**Switching level**
- Low
  - Min. 60% Ua, Max. Ua
- High
  - Min. 25% Ua

**Max. Input current**
- ≤ 0.5 mA

### Control outputs

**Output driver**
- Push-Pull

**Max. Output current**
- ± 9.0 mA

**Signal level**
- High
  - Min. Ua - 3.0 V
  - Max. 1.5 V
- Low
  - Min. 4.5 V

**Rising edge time tr**
- Max. 240 μs

**Falling edge time tf**
- Max. 300 μs

### Incremental outputs (A/B)

**Output driver**
- RS422 compatible

**SSI clock rate min. / max. / pulse frequency**
- 200 kHz

**Signal level**
- High
  - Low (ILoad = 20 mA)
  - Typ. 4.5 V
  - 0.5 V
- Low (ILoad = 20 mA)
  - Typ. 0.5 V

**Rising edge time tr (without cable)**
- Max. 200 ns

**Falling edge time tf (without cable)**
- Max. 200 ns

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1) Hollow shaft version: for continuous operation max. 3000 min⁻¹
2) At shaft end
3) If supply voltage Ua correctly applied
4) Only one channel allowed to be shorted-out:
   - at Ua = 5 V short circuit to channel, 0 V, or +Ua is permitted.
   - at Ua = 5 ... 30 V short circuit to channel or 0 V is permitted.
5) The supply voltage at the encoder input must not be less than 4.75 V (5 V - 5%)
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Control inputs

Up/Down input to switch the counting direction
The encoder can output increasing code values when the shaft is rotated either clockwise or counter-clockwise (when looking from the shaft side).

There are two methods for selecting the appropriate option:
1. Via a hardware configuration of the V/R input BEFORE powering up the encoder
2. By programming the device using the Kübler „Ezturn®“ programming tool.

The following table shows the choice of functions determined by the hardware and software settings:

<table>
<thead>
<tr>
<th>Hardware configuration of the V/R input</th>
<th>Programmed selection using the EzTurn® programming tool</th>
<th>Function: increasing code value when the shaft is in the following direction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>„low“ (0V) on the V/R-input (= cw)</td>
<td>cw</td>
<td>cw</td>
</tr>
<tr>
<td>„high“ (+UB) on the V/R-input (= ccw)</td>
<td>ccw</td>
<td>ccw</td>
</tr>
<tr>
<td>„low“ (0V) on the V/R-input (= cw)</td>
<td>ccw</td>
<td>ccw</td>
</tr>
<tr>
<td>„high“ (+UB) on the V/R-input (= ccw)</td>
<td>ccw</td>
<td>ccw</td>
</tr>
</tbody>
</table>

SET input

This input is used for a one-time alignment (zeroing) of the encoder immediately after installation. A high control pulse (+UB) applied to this input for a minimum of 10 ms will reset the current encoder position to the pre-programmed setpoint value.

The programming of the setpoint can be carried out with Kübler’s EzTurn® programming software or can, on request, be done in advance at the factory. The default value is zero. However any value within the encoder’s measuring range can be defined.

Outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Default-function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>battery control</td>
</tr>
<tr>
<td>A2</td>
<td>not activated</td>
</tr>
<tr>
<td>A3</td>
<td>not activated</td>
</tr>
<tr>
<td>A4</td>
<td>not activated</td>
</tr>
</tbody>
</table>

Functionality of the EzTurn® software

- Configuration function
- Setting of the communication parameters
- Setting of a drive factor by means of the modification of the resolution per revolution, the number of revolutions and the total resolution
- Programming of the direction of rotation and code type
- Setting of a preset/electronic zero point
- Setting of diagnostic functions
- Setting of the outputs A1 ... A4
- Limit switch values, max. 2
- Alarm and status information
- Battery monitoring
- Limiting max. number of bit to interface with PLCs
- Diagnostics and information for the set-up operation

Notes:
- Any hardware configuration of the V/R input must take place BEFORE powering up the encoder!
- If the V/R input is not configured, then a 0 V configuration will apply (default condition!)
- If the direction of rotation is changed due to the V/R configuration, without activating the SET function again, and if the encoder is also then powered up again, a new position value may be outputted, even if the physical shaft position of the encoder has not moved! This is due to internal conversion processes.
- The start-up procedure for the encoder should therefore follow this sequence:
1. Determine the count direction of the encoder either via the V/R input or via programming
2. Apply power to the encoder
3. Activate the SET function, if desired (see SET input below)
- If using a cable wire to configure the V/R input, then for EMC reasons the wire should not remain open but should be tied either to 0 V or UB!
- The response time of the V/R input with UB = 5 ... 30 V DC power supply is 10 ms.

Notes:
- The SET function should only be implemented when the encoder shaft is at rest.
- For the duration of the SET pulse the SSI interface does not function and therefore does not output any valid position values! In order to avoid malfunctions, no SSI clock pulse should occur during the SET pulse.
- If a cable wire is used to configure the SET input, then for EMC reasons the wire should not remain open but should if at all possible be tied to 0 V, provided no SET pulse is triggered!
- The response time of the SET input with UB = 5 ... 30 V DC power supply is 10 ms.

The outputs are not activated in the factory setting (default). They can be activated and defined with the optional EzTurn® programming software e.g. limit switch, overspeed and temperature control etc.

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1) Not available for versions with incremental track
2) Programmable with the optional programming software EzTurn®
3) With the order code Interface 9 assigned to the sense outputs.
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Terminal assignment (SSI Synchronous Serial Interface with 12 pin connector)

<table>
<thead>
<tr>
<th>Signal</th>
<th>0V</th>
<th>+U_b</th>
<th>+T</th>
<th>-T</th>
<th>+D</th>
<th>-D</th>
<th>ST</th>
<th>VR</th>
<th>A1</th>
<th>A2</th>
<th>A3 1)</th>
<th>A4 1)</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface 9</td>
<td>0 V sense</td>
<td>+U_b sense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>PH</td>
</tr>
<tr>
<td>Colour</td>
<td>WH</td>
<td>BN</td>
<td>GN</td>
<td>YE</td>
<td>GY</td>
<td>PK</td>
<td>BU</td>
<td>RD</td>
<td>BK</td>
<td>VT</td>
<td>GY / PK</td>
<td>RD / BU</td>
<td></td>
</tr>
</tbody>
</table>

T: Clock signal  
D: Data signal  
ST: SET input. The current position value is stored as new zero position.  
VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.  
PH: Plug housing  
1) With the order code Interface 9 these outputs are assigned to the sense outputs. The sensor circuits are internally tied to the power supply. Special power supply units control the voltage drop in long cable runs via the voltage feedback. If the circuits are not being used, then they should be individually isolated and not connected.

Terminal assignment (RS485 interface 12 pin connector)

<table>
<thead>
<tr>
<th>Signal</th>
<th>0V</th>
<th>+U_b</th>
<th>T/R-</th>
<th>T/R+</th>
<th>Term 3)</th>
<th>Term 3)</th>
<th>VR</th>
<th>7 2)</th>
<th>8 2)</th>
<th>9 2)</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7 2)</td>
<td>8 2)</td>
<td>9 2)</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>PH</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>WH</td>
<td>BN</td>
<td>GN</td>
<td>YE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R: Receive channel  
T: Transmit channel  
VR: Up/down input. As long as this input (High-Level = + U_b) is active, decreasing code values are transmitted when shaft turning clockwise.  
PH: Plug housing  
2) There is no SET input for the P3001 version but it can likewise be implemented using the command „<ESC> QP“ (Write preset).  
3) For the version with external termination:  
If the termination is desired (terminating resistor 120 Ohm), then both connections are to be tied together by means of a jumper (0 Ohm).

Terminal assignment (SSI interface with incremental track (A/B))

<table>
<thead>
<tr>
<th>Signal</th>
<th>0V</th>
<th>+U_b</th>
<th>+T</th>
<th>-T</th>
<th>+D</th>
<th>-D</th>
<th>ST</th>
<th>VR</th>
<th>B</th>
<th>A</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

2) Isolate unused outputs before initial start-up.

Top view of mating side, male contact base
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Dimensions shaft version

Clamping flange

Syncro flange

Dimensions hollow shaft version

Flange type 1

Flange type 13 with stator coupling

Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm

Cable,
– securely installed: 55 mm
– flexibly installed: 70 mm

Cable,
– securely installed: 55 mm
– flexibly installed: 70 mm