R60722.0002 - Index 3

Analog (U/I)

Manual

Absolute multiturn encoder

Sendix M3661 / M3681

Order code: 8.M36X1.XXXX.XX12

Sendix M3661R

Order code: 8.M3661R.XXXX.XX12

Sendix M5861

Order code: 8.M5861.XXXX.XX12

pulses for automation

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1. Technical details and encoder characteristics

1.1 Mechanical values

Sendix M36x1
Shock resistance acc. to EN 60068-2-27 2500 m/s², 6 ms
Vibration resistance acc. to EN 60068-2-6 300m/s², 10 … 2000 Hz

Sendix M3661R / Sendix M5861
Shock resistance acc. to EN 60068-2-27 5000 m/s², 6 ms
Vibration resistance acc. to EN 60068-2-6 300m/s², 10 … 2000 Hz

1.2 Working temperature range

-40…+85°C

1.3 Supply voltage and current consumption

Output:	4 … 20mA:	10 … 30 VDC max. 30.0 mA
	0 … 10V:	15 … 30 VDC max. 30.0 mA
	0 … 5V:	10 … 30 VDC max. 30.0 mA

1.4 Load at the output / max. output current

Output:	4 … 20mA:	at 10 VDC max. 200 Ohm at 24 VDC max. 900 Ohm at 30 VDC max. 1200 Ohm
	0 … 10V / 0 … 5V:	min. 1kOhm load resistance / max. output current: 10mA

1.5 Hardware characteristics

Singleturn technology	Magnetic 2 axes Hall sensor
Resolution (DA converter)	12 bits
Singleturn accuracy (at 25 °C)	+/-1.00°
Temperature coefficient	< 100 ppm/K
Repeatability (at 25 °C)	+/-0.2°
Update rate	1 ms
Power ON time	< 1 sec.
Settling time	< 1 ms
Multiturn technology	Magnetic revolution counter
Multiturn resolution	Maximum 65536 revolutions
Multiturn range (default)	16 revolutions
Direction of rotation (default)	CW
Smallest measuring range	22.5°

Function display and diagnostics by means of LEDs.

1.6 Supported standards and functions

8.M36X1.XX3X.3X12 / 8.M3661R.XX3X.3X12 / 8.M5861.XXXX.XX12:
Output: 4 … 20mA
Resolution: 12 bits
Max. measuring range: 65536 revolutions
Min. measuring range: 22.5°
Zero point display: 0 … 1°

8.M36X1.XX4X.4X12 / 8.M3661R.XX4X.4X12 / 8.M5861.XXXX.XX12:
Output: 0 … 10 VDC
Resolution: 12 Bit
Max. measuring range: 65536 revolutions
Min. measuring range: 22,5°
Zero point display: 0 … 1°

8.M36X1.XX4X.5X12 / 8.M3661R.XX4X.5X12 / 8.M5861.XXXX.XX12:
Output: 0 … 5 VDC
Resolution: 11 bits
Max. measuring range: 65536 revolutions
Min. measuring range: 22.5°
Zero point display: 0 … 1°

1.7 Optional functions

- Measuring range scaling via scaling inputs (max. 10,000 cycles)
- Limit switch function
- Direction of rotation: CCW (is factory-set and cannot be modified by the user.)

2. Electrical installation

This chapter contains information about the electrical installation, commissioning of the absolute encoder
M36X1 / M3661R / M5861 analog.

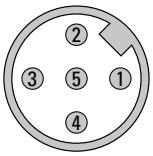
2.1 Electrical installation

Switch off the plant!
Make sure that the whole plant remains switched off during the whole electrical installation.

Electrical installation requires connectors or connection cables (see Sendix absolute M36X1 / M3661R / M5861 data sheet).

2.2 Terminal assignment

Top view of mating side, male contact base



M12 connector, 5-pole

Interface	Connection type	Cable (isolate unused wires individually before commissioning)					
3 (current)	1, 2, A, B	Signal:	0 V	+V	+I	SET 1[1)]	Set 2[1)]
		Cable color:	WH	BN	GN	GY	PK

Interface	Connection type	M12 connector, 5-pole					
3 (current)	3, 4	Signal:	0 V	+V	+I	SET 1[1)]	Set 2[1)]
		Pin:	3	2	1	5	4

Interface	Connection type	Cable (isolate unused wires individually before commissioning)					
4, 5 (voltage)	1, 2, A, B	Signal:	0 V	+V	+U	SET 1[1)]	Set 2[1)]
		Cable color:	WH	BN	GN	GY	PK

Interface	Connection type	M12 connector, 5-pole					
4, 5 (voltage)	3, 4	Signal:	0 V	+V	+U	SET 1[1)]	Set 2[1)]
		Pin:	3	2	1	5	4

+V: Encoder supply voltage +V DC
0 V: Encoder ground GND (0 V)

+U: Voltage
+I: Current

SET 1: Set input for teach point 1
SET 2: Set input for teach point 2

[1)]For scalable variants

Make sure that the shield of the encoder is properly connected to the shield of your plant.
If possible, mount all cables with traction relief.
Check the maximum supply voltage on the device.

3. Function and status LED

The device is equipped with a two-color (**green** / **red**) LED displaying status and errors.

3.1 LED combinations during operation

Display	LED	Meaning	Error cause	Addition
No LED on	○	No encoder operation	Faulty supply voltage Encoder is not operational	Check the power supply and the wiring
Green LED flashes in 250 ms cycles	●	Service mode	Encoder in Service mode	Please contact the service department of the manufacturer.
Green LED constantly on	●	Encoder in operation		
Red and green LEDs flashing alternately in 250 ms cycles	● ●	System error Error	Internal system error.	Please contact the service department of the manufacturer.
Red and green LEDs flashing alternately in 500 ms cycles	● ●	Wire break (only for current output)	Load at the output too low Connection with the control interrupted.	Check the wiring.
Green and red LED constantly on	● ●	Reference point display		

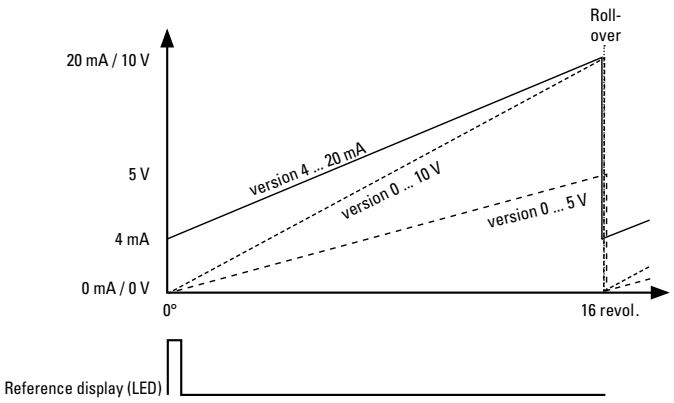
3.2 LED combinations for scaling

Display	LED	Meaning	Error cause	Addition
Green LED flashes 1x	1x	Activation of scaling input 1 detected and confirmed.		
Green LED flashes 3x	3x	Activation of scaling input 2 detected. The new measuring range has been taken over.		
Red LED flashes 3x	3x	Error during the scaling process. The new measuring range has not been taken over.	Selected measuring range < 22.5° or > 65536 rev.	Scale another measuring range.
Green/red/green sequence	1x 1x 1x	Reset of the scaled measuring range. Default measuring range is loaded. Preset is performed at the current position.		

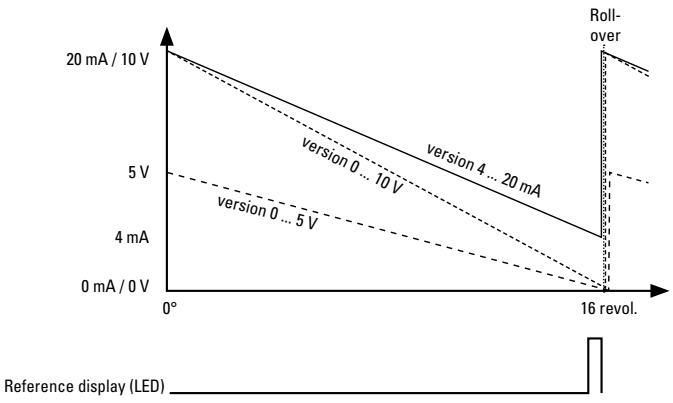
4. Standard function

As a standard, the corresponding desired output signal (4 … 20m A / 0 … 10 V /0 … 5 V) is linearily factory-scaled over 16 revolutions and supplied in the CW or CCW direction of rotation according to customer requirement.
The reference point is indicated by the LED from 0 … 1°.

cw variant



ccw variant



4.1 Scaling function (optional)

The encoder is factory-set to a measuring range of 16 revolutions over which the corresponding output signal is scaled linearily.

Two scaling inputs (set 1, set 2 - see chapter Terminal assignment) allow the user to define himself a desired measuring range. The desired measuring range must be > 22.5° and shall not exceed 65536 revolutions.

The factory-set output range of 4 … 20mA / 0…10V / 0…5V is scaled linearily over the desired measuring range.

To trigger the scaling operation, the corresponding scaling input must be connected with the supply voltage + V for at least 1 second.

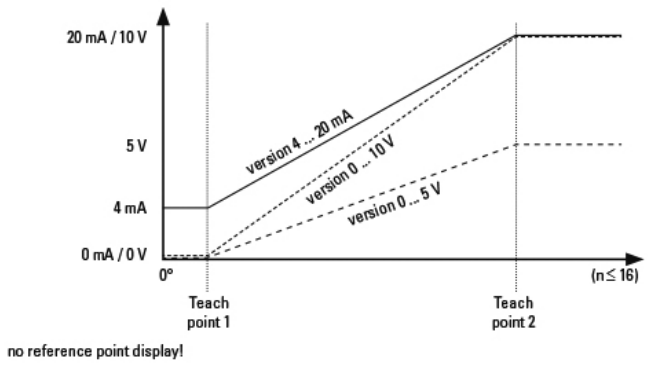
Scaling process:
1. Turn the shaft to the desired start position.
2. Connect scaling input 1 with + V for at least 1 second.
3. Green LED flashes 1x.
4. Turn the shaft to the desired end position.
5. Connect scaling input 2 with + V for at least 1 second.
6. Green LED flashes 3x. The new measuring range is active.

(The output signal assumes the highest state)

Scaling input 1*	Scaling input 2*	Function
0	0	Normal operating mode
1	0	Setting the start position
0	1	Setting the end position
1	1	Resetting to the default measuring range

* 0-GND, 1-mind. 1 sec. + V

Scalable variant without limit switch function



4.2 Reference point display

With the factory-set „default“ scaling, the LED displays the reference point of 0..1°. The reference point display is no longer available if another measuring range is scaled using the scaling inputs.

The scaling function is limited to 10,000 cycles. Beyond this limit, the error-free scaling of the output signal cannot be guaranteed any more.

Actuate the scaling inputs only once the shaft has stopped.. Only this way will it be possible to take over the desired start and end position of the desired signal scaling.

4.3 Resetting the scaled output signal

1. Connect scaling inputs 1+2 with + V for at least 1 second.
2. The LED sequence green / red / green is displayed. The factory-set scaling of the output signal is available again and is set to the central value of the measuring range at the current position.

4.4 Scaling with direction of rotation change

Fixed output levels are assigned to the scaling inputs.

Scaling input 1 = lowest output level (current variant = 4 mA / voltage variant = 0 V)
Scaling input 2 = highest output level (current variant = 20 mA / voltage variant = 5 or 10 V)

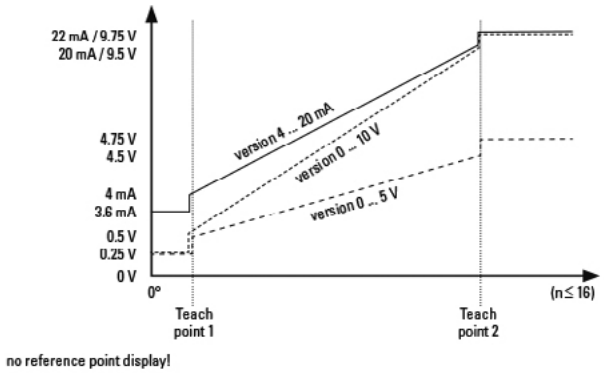
If scaling input 2 is actuated first, followed by input 1, the new measuring range is defined with the reversed direction of rotation.

Inputs sequence	Absolute position	Sign of the curve
1 – 2	1 > 2 (CCW)	Positive
1 – 2	2 > 1 (CW)	Positive
2 – 1	1 > 2 (CW)	Negative
2 – 1	2 > 1 (CCW)	Negative

4.5 Limit switch function (optional)

With the limit switch function, the output signal does not remain at the last final value, but it makes a defined jump. This signal jump can be used by a control as a limit switch. The output levels of the limit switches are factory-set.

Scalable variant with limit switch function



Factory-set measuring range			2^4 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

5. Abbreviations used

CW Direction of rotation: clockwise looking at the shaft.
CCW Direction of rotation: counterclockwise looking at the shaft.
MT Revolution counter.
ST Angle information within a revolution.

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