K23-SSI/R2/25B-C

Universal Converter

SSI ➔ parallel
RS232 ➔ parallel
SSI ➔ RS232

- Suitable for operation with sensors and encoders using SSI interface
- Converts SSI data as well as serial RS232 data into parallel data format
- Parallel output 25 bits (push-pull, short-circuit proof)
- RS232 interface for serial readout of the sensor data
- SSI Master or Slave operation
- Linearisation facilities by freely programmable input-output curves
- Additional facilities like bit-blanking, round-loop-operation etc.
- 18–30 volts DC power supply

Operating Instructions

Safety Instructions

- This manual is an essential part of the unit and contains important hints about function, correct handling and commissioning. Non-observance can result in damage to the unit or the machine or even in injury to persons using the equipment!
- The unit must only be installed, connected and activated by a qualified electrician
- It is a must to observe all general and also all country-specific and application-specific safety standards
- When this unit is used with applications where failure or maloperation could cause damage to a machine or hazard to the operating staff, it is indispensable to meet effective precautions in order to avoid such consequences
- Regarding installation, wiring, environmental conditions, screening of cables and earthing, you must follow the general standards of industrial automation industry
- - Errors and omissions excepted –

Table of Contents

1. Introduction

K23-SSI/R2/25B-C represents a small and low-cost, but highly performing converter for industrial applications, where the information of a sensor or encoder with SSI interface needs to be converted to a parallel signal or a serial RS232 data format. Also it is possible to convert serial RS232 data to a parallel format.
The unit has been designed as a compact module with 12 screw terminals, a 9-position and a 25-position SUB-D connector (both female). The housing is suitable for standard DIN rail mounting.

1.1. Applicable Encoders and Sensors

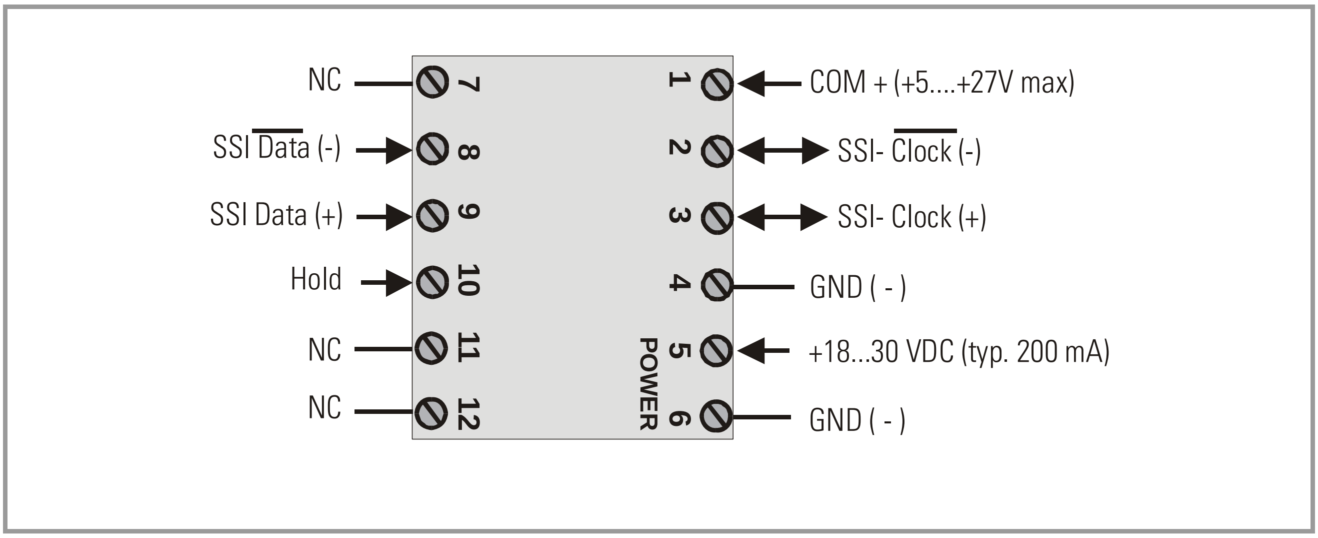
The unit accepts signals from all Single-Turn or Multi-Turn Absolute Encoders and all similar sensors using a standard SSI interface (6 to 25 bits of resolution, with binary or Gray code). The unit can operate in either master mode (clock signal generated by the unit), or in slave mode (clock signal generated by a remote device)

1.2. Encoder Resolution

The unit provides settings for the standard resolutions of 13 bits, 21 bits and 25 bits. In general, for sensors with other resolutions you can use the next higher setting
(i.e. set the unit to 21 bits with a sensor of 16 bits).
Depending on brand and specification of the encoder, in some cases it may be necessary to blank out the surplus bits by using the bit blanking function described later. In general however, the unit should work perfectly also without special bit blanking.

2. Terminal Assignment

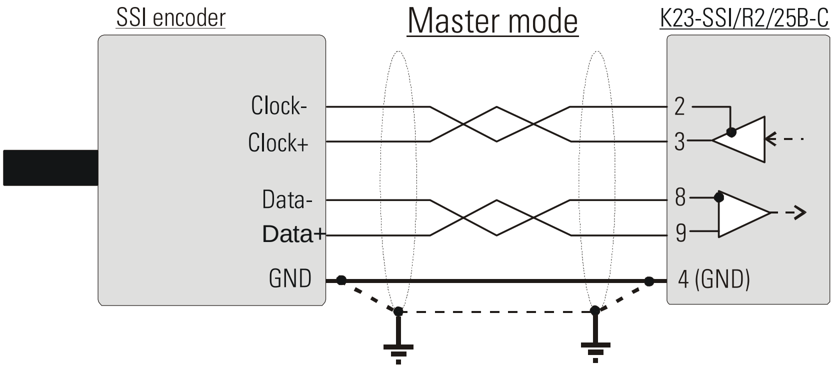
The subsequent diagram shows the assignment of the screw terminals.
We recommend connecting the Minus wire of the power supply to earth potential.
GND terminals 4 and 6 are connected internally. Depending on input voltage and load of the auxiliary voltage output, the total power consumption of the unit is about 200 mA.



3. Connections

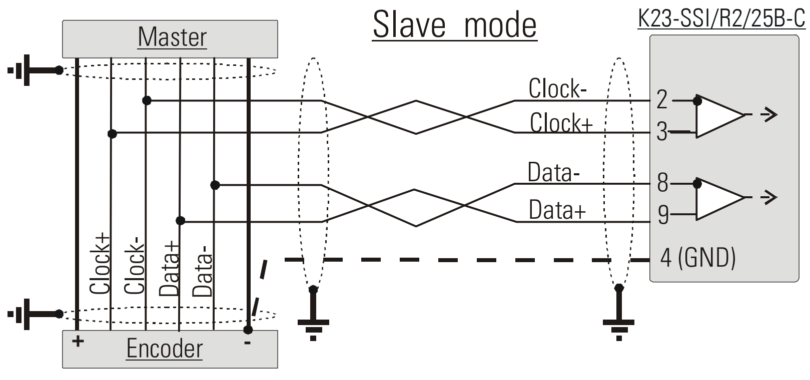
3.1. SSI Encoder, Master Operation

We recommend connecting the screen to GND and earth potential on both sites.



3.2. SSI Encoder, Slave Operation

With this mode, the K23-SSI/R2/25B-C converter operates in parallel to another unit, acting as a „listener“ to the existing data communication.
Quite according to need, the common potential of the master can be connected to terminal 4 (GND), or remain open for fully differential operation.

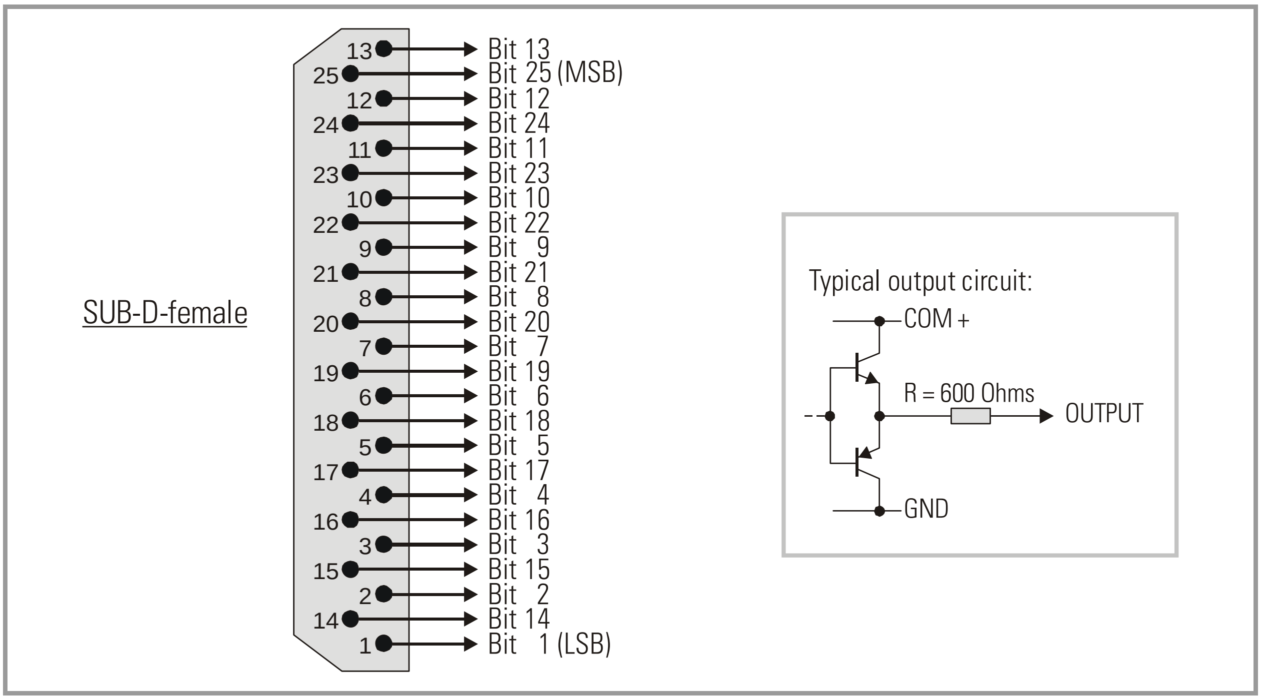


3.3. Hold Input

A High signal on this input freezes the parallel output data.
The Hold function becomes active 500 μsec after the rising edge of the signal and remains active for the duration of the signal. With PC setup, the polarity of the signal can be inverted (Falling edge, active low, see register "Hold polarity").
The Hold input provides PNP/HTL characteristics (Low = open or 0-3V, High =10-30V)

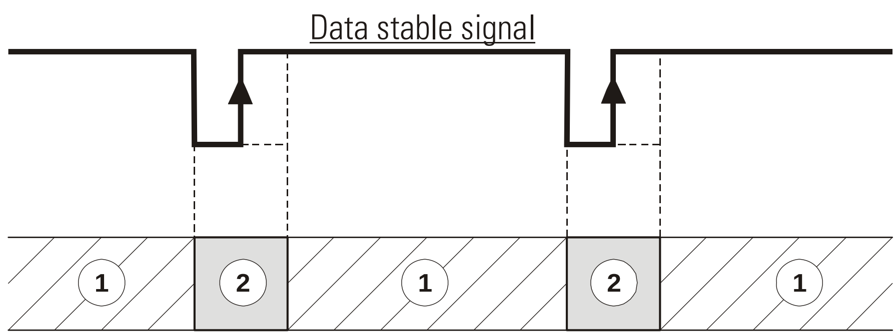
3.4. Parallel Outputs

The unit provides 25 push-pull outputs which are short-circuit proof. The separate, common output voltage for the outputs must be applied to screw terminal 1 (COM+)
The maximum voltage to COM+ must not exceed +27 volts, otherwise no continuous short-circuit proof of the outputs can be guaranteed.
The voltage drop between COM+ and High output signal is approx. 1 Volt (unloaded)



3.5. Data-Stable-Output

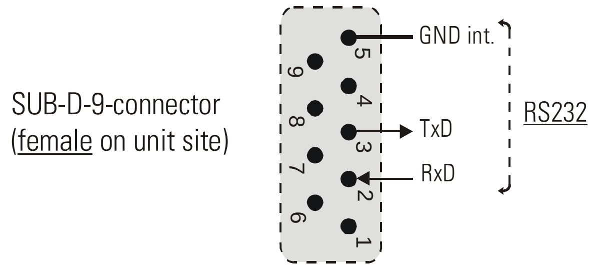
Output Bit 25 can be configured as a Data-stable signal by means of the DIL-switch. In this case a Low state indicates that data are stable and will not change.
The rising edge of the signal still guarantees stable data and can be used for remote Latch of the parallel data. The Low duration of the signal is at least 1/3 of the SSI Wait Time setting.

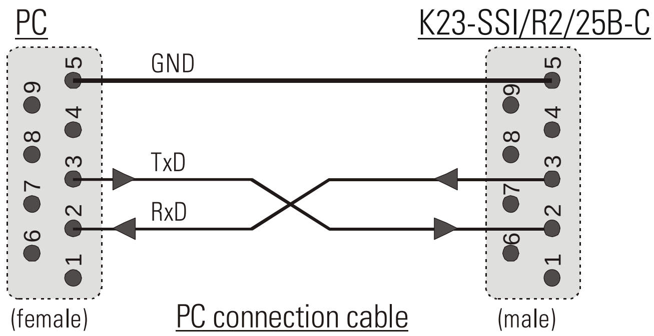


Zone 1: Parallel output data subject to change
Zone 2: Parallel output data are stable

3.6. Serial Interface

For PC setup and for serial readout of the encoder position, a serial RS232 interface is available.

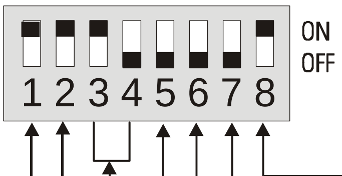




4. DIL Switch Settings

The DIL switch located on the top site of the unit provides customer- specific settings of desired operation modes.

Any changes of the switch settings will become active only after the next power-up cycle!



<u>Set Default:</u>
OFF: Unit loads default settings (p.22) with every power-up cycle
ON : No loading of default settings upon power-up.

<u>Update Mode</u>
OFF: Update of parallel output after every SSI telegram
ON: Update of parallel output in a fixed preset time pattern

<u>Pin 25 Main Function *)</u>
OFF: Pin 25 indicates that output data is stable (LOW)
ON : Pin 25 is normal data output (bit 25)

<u>SSI Code</u>
OFF: Gray Code
ON: Binary Code

<u>SSI Resolution:</u>
3 OFF, 4 OFF : not valid
3 ON, 4 OFF : 25 Bit
3 OFF, 4 ON : 21 Bit
3 ON, 4 ON : 13 Bit

<u>SSI Mode:</u>
OFF : Slave Mode
ON : Master Mode

<u>Pin 25 Sub Funktion (only with switch position 6 ON) *)</u>
OFF : Pin 25 = Error bit output
ON : Pin 25 = normal data output (bit 25)

*) Positions 1 and 6 must not be OFF both at the same time !

The switch settings shown in the example are suitable for Master operation of a 25 bit SSI encoder with Gray coded output. The parallel output updates with every SSI telegram and pin 25 is used to indicate valid and stable output data.

5. Serial Readout of Encoder Data

You can read out the actual SSI position of the encoder at any time from the serial link. For setting of communication parameters (baud rate etc.) you need a PC.

K23-SSI/R2/25B-C uses the DRIVECOM communication standard according to ISO 1745.

The serial access code for the actual encoder position is „ :8 „
(ASCII characters for colon and 8, hex 3A and 38)

To read out the actual position of your SSI encoder, your PLC or PC must send the following request string to the unit:

EOT	AD1	AD2	C1	C2	ENQ
Control character Ctrl D (Hex 04)	Unit address (High byte)	Unit address (Low byte)	Register code (High Byte)	Register code (Low byte)	Control character Ctrl E (Hex 05)

Since the default unit address is always " 11 ", and since the register code of the actual encoder position is always " :8 ", the normal string to request data is

EOT	1	1	:	8	ENQ
Ctrl D Hex code: 04 0000 0100	ASCII code: 1 Hex code: 31 0011 0001	ASCII code: 1 Hex code: 31 0011 001	ASCII code: colon Hex code: 3A 0011 1010	ASCII code: 8 Hex code: 38 0011 1000	Ctrl E Hex code: 05 0000 0101

When the request string has been sent correctly, the unit will respond with the following string:

STX	C1	C2	x x x x x x x x	ETX	BCC
Ctrl B Hex code: 02 0000 0010	ASCII code: colon Hex code: 3A 0011 1010	ASCII code: 8 Hex code: 38 0011 1000	Encoder position, 1 – 8 digits ASCII 30 to 39 Hex 0011 0000 to 0011 1001	Ctrl C Hex code: 03 0000 0011	Block check character: EOR from underlined characters

x x x x x x x are the requested encoder data (high digit first).
Leading zeros will automatically be blanked.
The block check character is calculated from the Exclusive-OR of all characters from C1 to ETX.

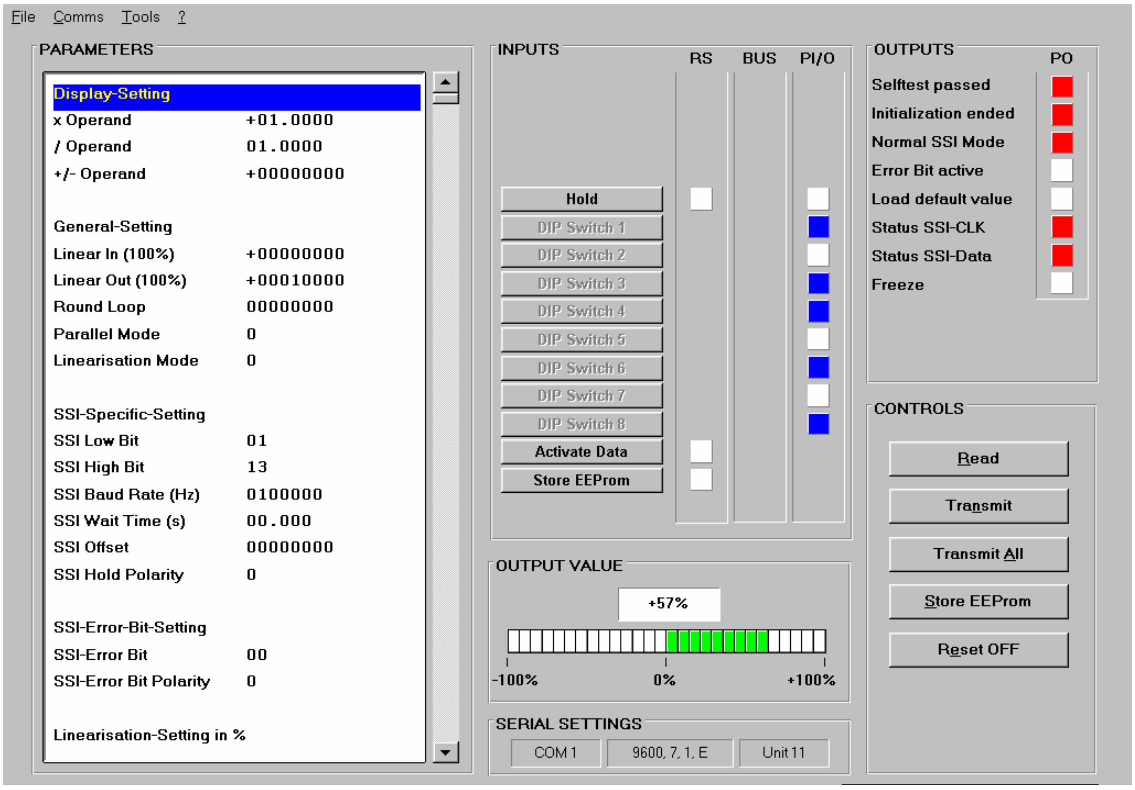
6. Extended Functions with PC Setup

For normal use with **standard applications**, the unit is ready to work after correct wiring and setting of the DIL switches. In this case, **the subsequent sections are not relevant.**

With use of a PC and the OS32 software however, you have full access to useful complementary functions and tests as shown subsequently.

The OS32 PC software is a freeware, available for download from the P+F homepage.
Please visit www.pepperl-fuchs.com , go to the "Product Selector" and select "Downloads".

- Connect your PC to the converter, using a serial RS232 cable like shown in section 5. of this manual.
- Run the OS3.x software and you will see the following screen:



- In case your text and color fields remain empty and the headline says „OFFLINE", you must verify your serial settings. To do this, select „Comms" from the menu bar.

- Ex factory, all units use the following serial standard settings:

  Unit No. 11, Baud rate 9600, 1 start/ 7 data/ parity even/ 1 stop bit

- If the serial settings of the unit should be unknown, you can run the „SCAN“ function from the „TOOLS“ menu to find out.
- Self Test: On your PC screen, in the "Outputs" field, you find several indicator boxes. When the **"Self Test passed"** box is red, this indicates that the unit has correctly initialized and is ready to work. The fields **"Status SSI-CLK"** and **"Status SSI-Data"** indicate that the clock and data lines work correctly (red = o.k.)

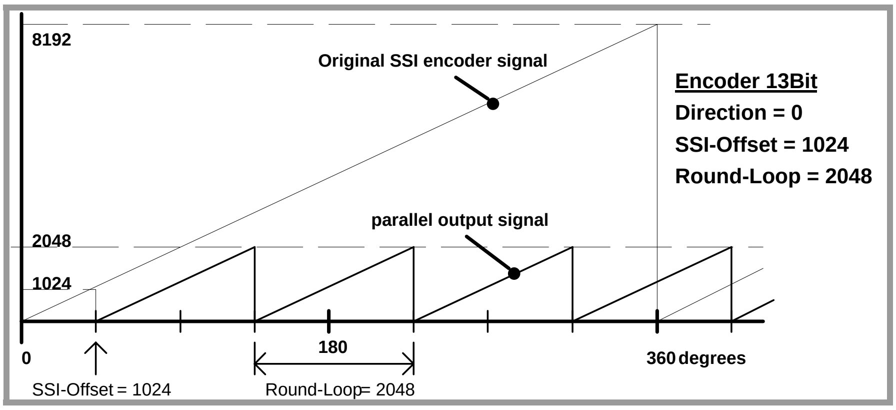
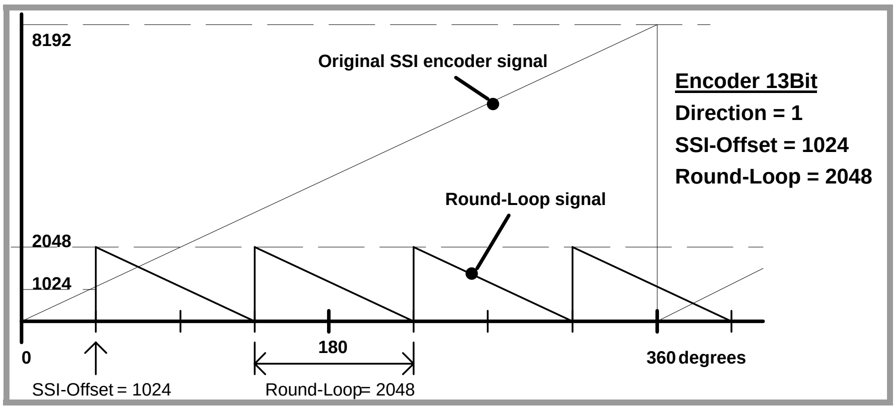
  You may observe that these boxes blink, because of the update cycle of your PC. However, you should see red predominantly with correct operation of the lines.

  Testing the clock lines is primarily useful with Slave operation. Though the test works also in Master mode, the result says only that the internal generation of the clock works fine. However, in Master mode, this test cannot indicate faulty clock drivers or bad wiring of the clock lines.
- Output value

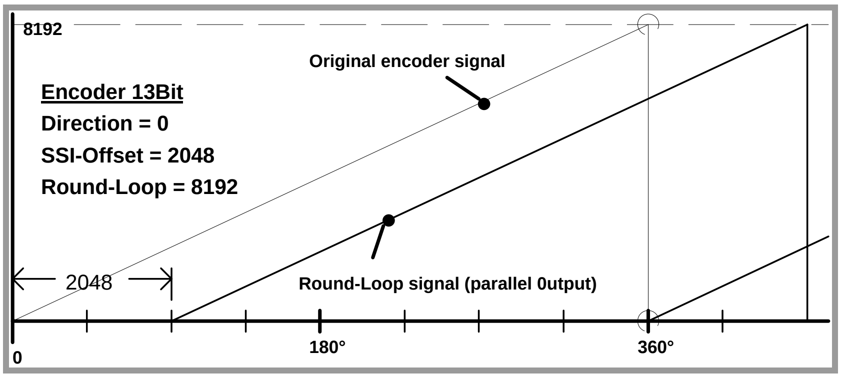
  When you change the Encoder position, this window must show a continuously increasing or decreasing encoder value. Where you find the color bar or the percent display jumping, please check for correct setting of your DIL switches.
- Hold key

  This soft key operates in parallel to the hardware input terminal 10 and freezes the parallel output from the PC screen. Indicator boxes in the RS column indicate that the Hold function is active either by software or by hardware command.

7. Parameters and Settings

Parameter	Description
xOperand /Operand +/-Operand	These operands affect only serial readout of encoder data, but not the parallel data output. $$\text{Serial Readout} = \left(\text{encoder data} \times \frac{\text{xOperand}}{\text{/Operand}} \right) + \text{+/-Operand}$$ With the settings xOperand = 1.0000, /Operand = 1.0000 and +/-Operand = 00000 the serial readout value equals to the encoder value.
Linear In Linear Out	These parameters are used for linear scaling of the parallel output. For their settings and operation see the examples in section 8.
Round Loop	In general, the Round Loop setting should be 00000. Any other setting will substitute the real encoder position by a repeating cycle count. Example: when we set this register to 2048, the internal position register will only move in a range between 0 and 2047. When we underpass zero with reverse direction, again 2047 will appear. When we exceed 2047 with forward direction, we restart at 0 again. The following drawings explain clearly the coherence between original encoder data, Round-Loop setting, SSI-Offset and Direction register.  

- The zero position of the round-loop counter can be set by register "SSI-Offset" which allows settings between 0 and the Round-Loop value.
- Register "Direction" allows to set the counting direction of the round loop counter (0 = up, 1 = down)
- The Round-Loop function is also suitable to suppress the encoder overflow, if you do not like to change the mechanical situation. As shown in the subsequent picture, you need to set the Round-Loop register to the full encoder resolution and then shift the zero transition by setting the SSI Offset correspondingly.
- Every change of the Round-Loop setting requires new entry of the Offset value
- With use of the Round-Loop function it is also possible to change the counting direction of the encoder by setting the Direction bit.

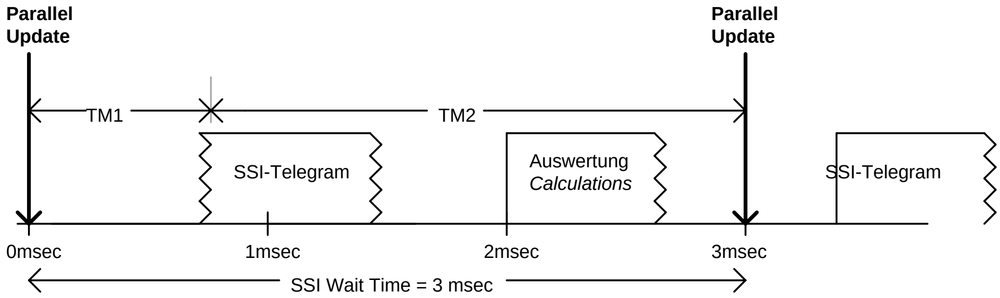


Parameter	Description
Parallel Mode	Sets the output code of the parallel output and the source of input data as follows:

<table>
<tr><th>Parallel Mode:</th><th>Parallel-Ausgangs-Code
Parallel output code</th><th>Daten-Quelle
Data source</th></tr>
<tr><td>0</td><td>Bin Format</td><td rowspan="3">SSI-Encoder</td></tr>
<tr><td>1</td><td>Gray Format</td></tr>
<tr><td>2</td><td>BCD Format</td></tr>
<tr><td>3</td><td>Bin Format</td><td rowspan="3">Serial RS232</td></tr>
<tr><td>4</td><td>Gray Format</td></tr>
<tr><td>5</td><td>BCD Format</td></tr>
</table>

Parameter	Description
<u>Linearisation Mode</u>	Sets the mode of linearisation. 0: Linearisation off, all linearisation registers are irrelevant. 1: Linearisation in a range of 0 – 100% 2: Linearisation over full range –100% to +100% <u>See example under section „Linearisation</u>
<u>SSI Low Bit</u>	Defines the lowest bit (LSB) for evaluation when the bit blanking function is used. Must be set to "01" for full evaluation of the encoder range.
<u>SSI High Bit</u>	Defines the highest bit (MSB) for evaluation when the bit blanking function is used. Must be set to the total number of encoder bits for full evaluation of the encoder range. The following example uses a 13 bit encoder where High Bit is set to 12 and Low Bit is set to 03, resulting in evaluation of bits 03 to 12 only and blanking out positions 01, 02 and 13. Most significant bit ↓ (Hi_bit = 12, Lo_bit = 03) Least significant bit ↓ 13 | 12 | 11 | 10 | 09 | 08 | 07 | 06 | 05 | 04 | 03 | 02 | 01 (MBS) └ used bits ┘ (LBS)
	Bit blanking results in a different evaluation of the encoder information, and you should be fully aware of what happens with the resolution and the number of registered turns when you use this function. The subsequent example uses a 13-bit single-turn encoder to explain various result of bit blanking: • Without blanking, a 13 bit encoder would provide a 0 – 8191 information with a 0-360° turn of the encoder shaft. • This assumes setting of "High Bit = 13" and "Low Bit = 01". • It is easy to understand that there are two different ways how to use only 12 of the 13 bits available: • When we set High Bit to 12 while Low Bit remains 01, we have blanked the high order bit. The result corresponds to an encoder providing information 0 – 4095 while we turn from 0 - 180°, and again the same 0 –4095 information while we turn from 180° to 360°. The resolution remains unchanged with respect to the number of steps per revolution. • We can also leave High Bit to 13 and set Low Bit to 02 instead. This means we blank the low order bit now. As a result, within one turn of 0 - 360°, we receive the encoder information 0 – 4095 one time only, but the total number of steps per revolution has been halved.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td><u>SSI Baud Rate</u></td><td>Sets the communication speed of the SSI interface with SSI encoders.
Setting range: <u>100 Hz to 1MHz</u>.
You are free to <u>set</u> any desired frequency between 0.1 kHz and 1000.0 kHz. For technical reasons however, in the upper frequency range with Master operation, the unit will only <u>generate</u> one of the following frequencies accurately:
<table>
<tr><td>1 000,0 kHz</td><td>888,0 kHz</td><td>800,0 kHz</td><td>727,0 kHz</td><td>666,0 kHz</td></tr>
<tr><td>615,0 kHz</td><td>571,0 kHz</td><td>533,0 kHz</td><td>500,0 kHz</td><td>470,0 kHz</td></tr>
<tr><td>444,0 kHz</td><td>421,0 kHz</td><td>400,0 kHz</td><td>380,0 kHz</td><td>363,0 kHz</td></tr>
<tr><td>347,0 kHz</td><td>333,0 kHz</td><td>320,0 kHz</td><td>307,0 kHz</td><td>296,0 kHz</td></tr>
<tr><td>285,0 kHz</td><td>275,0 kHz</td><td>266,0 kHz</td><td>258,0 kHz</td><td>250,0 kHz</td></tr>
</table>
With Master operation, therefore other settings will result in generation of the next upper or lower value according to above list.
With settings < 250.0 kHz the error between set rate and generated rate becomes negligible. It is mandatory to set the Baud rate also with Slave operation. In this case, however, the setting serves only to determine the pause time for correct synchronization (pause is detected after 4 clock cycles). The unit automatically synchronizes with every remote clock signal within the specified Baud rate range.</td></tr>
<tr><td><u>SSI Wait Time</u></td><td>This register sets the waiting time between two SSI telegrams in a range from 0.001 to 10.000 sec. In normal operation, due to processor cycle times, the real time may vary by 512 µsec. with respect to the preset time. The fastest sequence possible is 1.3 µsec at a setting of 0.000.
With Slave operation mode, the distance of the SSI protocols depends on the remote Master and the SSI Wait Time specifies the distance of evaluation data strings. Setting to 100 msec results in evaluation of one telegram only every 100 msec, even though the Master may have transmitted many telegrams more.
Especially with applications of closed-loop control loops, it may be of advantage to have equidistant updating of the output (DIL switch 7 = OFF). This is possible with Master mode only and the Wait Time setting (must be >0) directly corresponds to the time pattern of updates.
The subsequent drawing explains the timing with use of equidistant update mode with a SSI Wait Time setting of 3 msec.
With equidistant operation mode, the SSI wait time setting is limited to maximum 90 msec.</td></tr>
</table>

Parameter	Description
	
	• The shortest possible time for equidistant updating is 2 msec, due to internal processing times (SSI Wait Time set to 0.002 and parameter "/Operand" set to 00000 which skips the conversion calculations for serial readout) This time can increase to up to 5 msec while you are communicating via serial interface • The time marks TM1 and TM2 shown in above diagram can be displayed with the Monitor function of the PC operator software. It is easy to understand that the sum of both times must be equal to the Wait Time setting; otherwise you must increase the Baud rate or choose a longer update cycle. (The serial access codes are :3 for TM1 and :5 for TM2)
<u>SSI Offset:</u>	Defines the electrical zero position of the encoder with respect to the mechanical zero position. When the Round-Loop function is not active (Round-Loop = 0), the SSI Offset is subtracted from the SSI position reading, which can also cause negative results. When the Round-Loop is active, SSI Offset displaces the mechanical zero position, but always with only positive results.
<u>SSI Hold Polarity</u>	Set the polarity of the Hold signal an terminal 10 **0 : Hold = High,** **1 : Hold = Low,**
<u>SSI Error Bit:</u>	Defines the position of the error bit (if available with the encoder in use). Errors indicated by the encoder can be read out via serial code <u>;9</u> (semicolon nine, error indication = 2000hex). On your PC screen, the "Error Bit active" box appears red. DIL switch S1 also allows using Bit 25 of the parallel output for indication of the error bit. 00: no error bit available 13: bit 13 represents the error bit 25: bit 25 represents the error bit etc.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td><u>SSI Error Bit Polarity:</u></td><td>Defines the polarity of the Error Bit
0: Bit is LOW in case of error
1: Bit is HIGH in case of error</td></tr>
<tr><td>P01 (x), P01 (y) etc.</td><td>Linearisation registers as shown in section 8.3</td></tr>
<tr><td><u>Direction</u></td><td>This parameter changes the internal direction of counting (0 or 1), provided the unit operates in Round Loop mode.</td></tr>
<tr><td><u>Parallel Inv.</u></td><td>Inverting of the parallel data output.
0 = inverted output (Log.1 = LOW), 1 = normal output (Log.1 = HIGH)</td></tr>
<tr><td><u>Parallel Value</u></td><td>This parameter serves to convert serial RS232 data to parallel.
The numerical value of this parameter appears directly at the parallel output, provided the register „Parallel Mode“ has been set to a value greater than 2 before. The serial access code of Parallel Value is “48” and the setting can be changed at any time by serial communication (for protocol details see our separate instruction manual “Serpro”).</td></tr>
<tr><td>Unit Number
Factory setting: 11</td><td>You can choose any serial address number between 11 and 99.
The address must not contain a “0“ because these numbers are reserved for collective addressing</td></tr>
<tr><td>Serial Baud Rate

Factory setting: 0</td><td><table>
<tr><th>Setting</th><th>Baud</th></tr>
<tr><td>0</td><td>9600</td></tr>
<tr><td>1</td><td>4800</td></tr>
<tr><td>2</td><td>2800</td></tr>
<tr><td>3</td><td>1200</td></tr>
<tr><td>4</td><td>600</td></tr>
<tr><td>5</td><td>19 200</td></tr>
<tr><td>6</td><td>38 400</td></tr>
</table></td></tr>
<tr><td>Serial Format

Factory setting: 0</td><td><table>
<tr><th>Setting</th><th>Data bits</th><th>Parity</th><th>Stop bits</th></tr>
<tr><td>0</td><td>7</td><td>even</td><td>1</td></tr>
<tr><td>1</td><td>7</td><td>even</td><td>2</td></tr>
<tr><td>2</td><td>7</td><td>odd</td><td>1</td></tr>
<tr><td>3</td><td>7</td><td>odd</td><td>2</td></tr>
<tr><td>4</td><td>7</td><td>none</td><td>1</td></tr>
<tr><td>5</td><td>7</td><td>none</td><td>2</td></tr>
<tr><td>6</td><td>8</td><td>even</td><td>1</td></tr>
<tr><td>7</td><td>8</td><td>odd</td><td>1</td></tr>
<tr><td>8</td><td>8</td><td>none</td><td>1</td></tr>
<tr><td>9</td><td>8</td><td>none</td><td>2</td></tr>
</table></td></tr>
</table>

8. Examples for Parameter Settings

8.1. SSI Encoder Data Directly and 1:1 to the Parallel Output:

▪ Linearisation Mode	=	0	
▪ Round Loop	=	0	
▪ Parallel Mode	=	0	(Output Binary)
	=	1	(Output Gray)
	=	2	(Output BCD)
▪ Parallel Inv.	=	1	(Log 1 = „High“, normal output)
	=	0	(Log 1 = „Low“, inverted output)

The settings of the Linearisation register are not important in this case.

8.2. Scaling of SSI Encoder Data before Conversion to Parallel

(Example: encoder 16 Bit = 65536 steps should appear as 0 - 10.000 on the parallel output).

Linearisation Mode	=	1	
Round Loop	=	0	
Parallel Mode	=	0	(Output binary)
	=	1	(Output Gray)
	=	2	(Output BCD)
Parallel Inv.	=	1	(Log 1 = „High“, normal output)
		0	(Log 1 = „Low“, inverted output)
Linear In (100%)	=	65.536	
Linear Out (100%)	=	10.000	
P1 (x)	=	000.0 %	
P1 (y)	=	000.0 %	
P1 (x)	=	100.0 %	
P1 (y)	=	100.0 %	

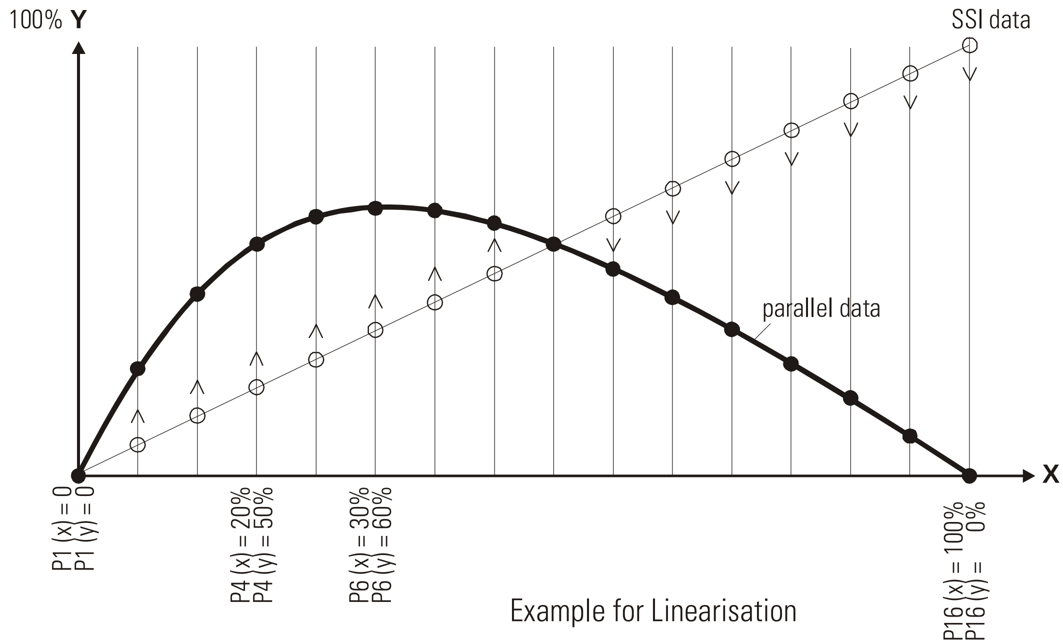
8.3. Transformation of SSI Encoder Data to a Curve (Linearisation)

Example: encoder 16 Bit = 65536 steps to be transformed to a curve.

Linearisation Mode	=	1	
Round Loop	=	0	
Parallel Mode	=	0	(Output binary)
	=	1	(Output Gray)
	=	2	(Output BCD)
Parallel Inv.	=	1	(Log 1 = „High“, normal output)
		0	(Log 1 = „Low“, inverted output)

Use registers **P1(x)** to **P16(x)** to specify the coordinates on the x-axis. These are the original SSI data generated by the sensor. <u>These settings must be in % of full scale.</u>
Now enter the attached values to registers **P1(y)** to **P16(y)**. These are the values that the parallel output will generate instead of the x- values, i.e. P2(y) substitutes P2(x) etc.

- x-register must use continuously increasing settings, i.e. P1(x) must have the lowest setting and P16(x) must have the highest setting
- All entries use a percentage format of xx.xxx% full scale. Setting 0.000% means zero output and setting 100.000% means full scale output.
- With Linearisation Mode set to 1, it is a must to set P1(x) to 0% and P16(x) to 100%. Linearisation is defined in the positive range only and the negative range will be a mirror image of the positive range with reference to zero.
- With Linearisation Mode set to 2, it is a must to set P1(x) to –100% and P16(x) to +100%. This enables the user to set curves which are not symmetric to the zero position.



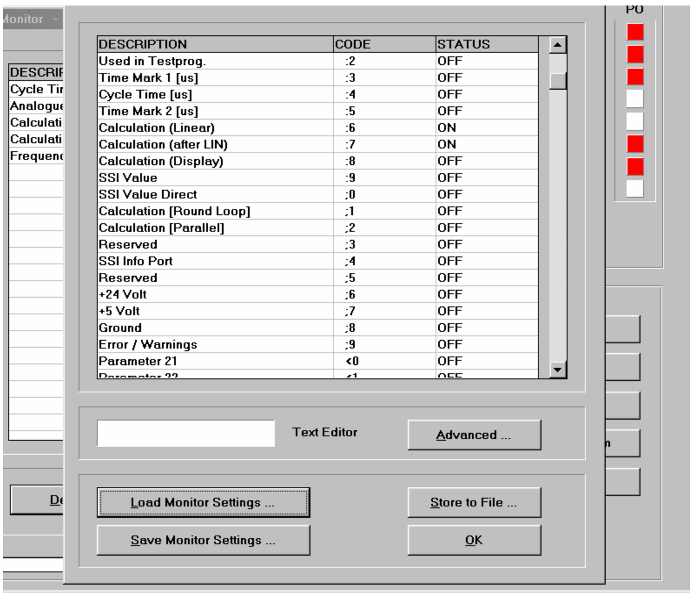
Example for Linearisation

9. Test Functions

When you select TEST from the TOOLS menu, you are able to verify the following data, by clicking into the corresponding field:

- Actual encoder position
- DIL switch settings
- Internal supply voltages
- Parallel output state

Furthermore, the following registers can be recorded by using the monitor function:



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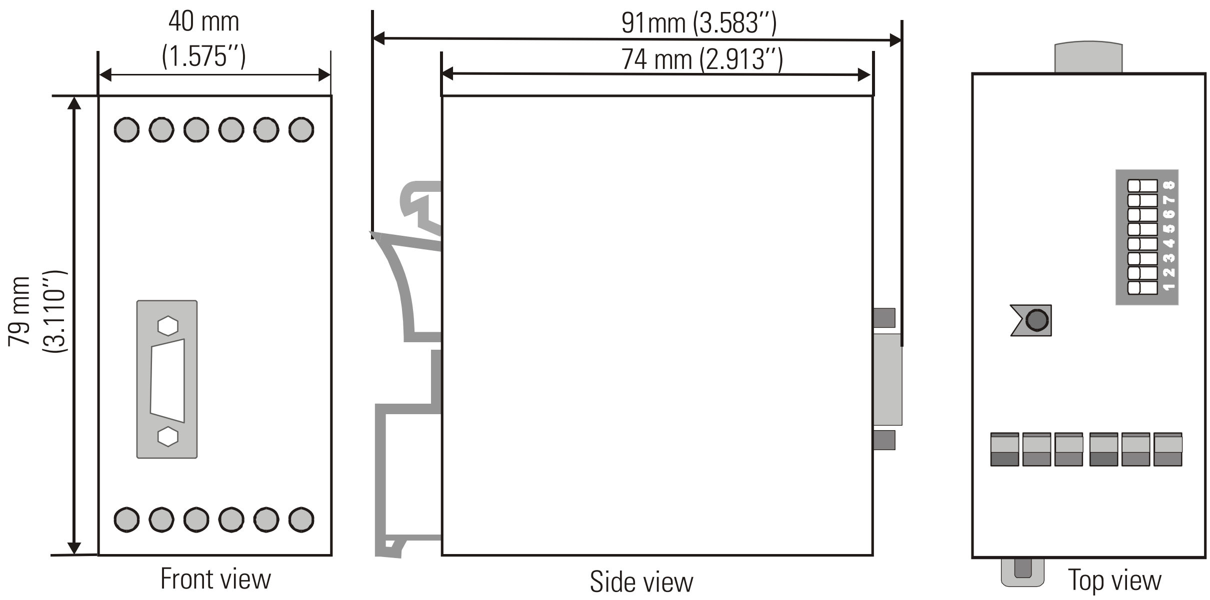
10. Specifications and Dimensions

Power Supply	:	18...30 VDC
Power consumption	:	approx. 200 mA
SSI Inputs	:	TTL differential, RS422 standard (1.0 MHz)
SSI Input Format	:	13, 21 or 25 Bit, Gray Code or Binary Code
SSI break time	:	min. 4 x clock
Input HTL (Hold)	:	High > 10V , Low < 3V (Ri = 5k)
Parallel outputs	:	max. 35V at COM+ *) Load 1.2k at 24V + 10% (Ri = 600 Ohm)
Parallel Output Format	:	Bin / Gray / BCD Code
Temperature-Range	:	0 ... 45°C (32 … 113°F)
Weight	:	approx. 190 g
Conformity and Standards	:	EMC 89/336/EEC: EN 61000-6-2 EN 61000-6-3 LV73/23/EEC: EN 61010-1

*) Short circuit proof guaranteed only up to +27 Volts max.



11. Parameter List, Default Settings

Parameter	Min. value	Max. value	Default	Positions	Serial Code
X Operand	-10.0000	+10.0000	1.0000	+/- 6	00
/ Operand	0	10.0000	1.0000	6	01
+/- Operand	-99999999	99999999	0	+/- 8	02
Linear In	-99999999	+99999999	0	+/- 8	03
Linear Out	-99999999	+99999999	10000	+/- 8	04
Round Loop	0	99999999	0	8	05
Parallel Mode	0	2	0	1	06
Linearisation Mode	0	2	0	1	07
SSI Low Bit	0	25	1	2	08
SSI High Bit	1	25	25	2	09
SSI Baud Rate	100	1000000	100000	7	10
SSI Wait Time	0	10.000	0	5	11
SSI Offset	0	99999999	0	8	12
SSI Hold Polarity	0	1	0	1	13
SSI Error Bit	0	25	0	2	14
SSI Error Bit Polarity	0	1	0	1	15
P1(x)	-100.000	+100.000	100000	+/- 6	A0
P1(y)…..	-100.000	+100.000	100000	+/- 6	A1
P16(x)	-100.000	+100.000	100000	+/- 6	D0
P16(y)	-100.000	+100.000	100000	+/- 6	D1
Direction	0	1	0	1	46
Parallel Inv	0	1	1	1	47
Parallel Value	-999 999	33554431	+/-8	5	48
Unit Number	0	99	11	2	90
Serial Baud Rate	0	6	0	1	91
Serial Format	0	9	0	1	92