
CNV 9101

Digital Panel Meter

for Absolute Encoders with Synchron-Serial-Interface

Instruction Manual



ERMA

Electronic GmbH

Warranty

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All our products are warranted against defective material and workmanship for a period of two (2) years from date of delivery. If it is necessary to return the product, the sender is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit. The warranty does not apply to defects resulting from action of the buyer, such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modification.

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Technical subjects to change

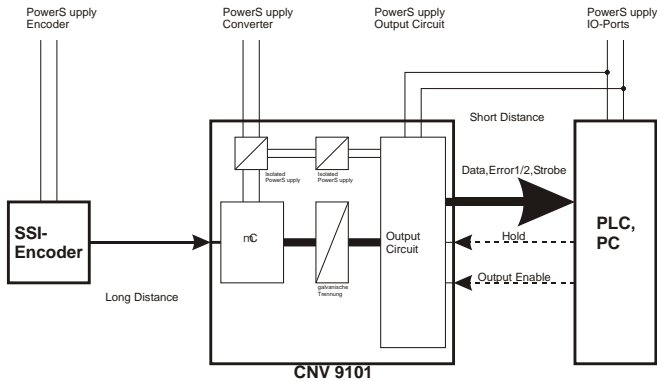
1. Description

The digital converter Model CNV 9101 is used to convert the position of absolute encoders with **Synchronous-Serial-Interface (SSI)** to parallel output. The code of the parallel output can be selected between GRAY, Binary or BCD. In addition the output lines can be switched to a high impedance state for multiplexing.

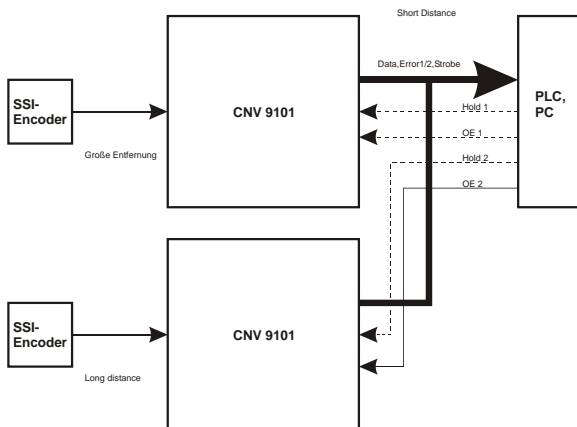
Applications

- Transmission on SSI interface with high immunity against EMI instead of parallel EMI-prone transmission.
- Replacement for parallel absolute encoders.

For example single unit



Example for multiple units using one parallel data bus



2. Safty instructions

This instrument is produced in accordance with Class II of IEC 348 and VDE 0411. When delivered the intrument has been tested to meet all functions described. Before installing the instrument please read the mounting and servicing instructions. We have no liability or responsibility to customer or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by equipment or software sold or furnished by us. Read the installation instruction carefully. No liability will be assumed for any damage caused by improper installation. Inspect the instrument module carton for obvious damage. Be shure there are no shipping and handling damages on the module before processing. Do not apply power to the instrument if it has damaged.

ERMA's warranty does not apply to defects resulting from action of buyer, such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modifications.

2.1. Symbol explanation



Caution



Attention



Instruction



Tip

Caution: Will be used at **dangerous for life and health !**.

Attention: Will cause **damage**

Instruction: If not noticed, **trouble** may occur

Tip: Useful hints for **better operation**

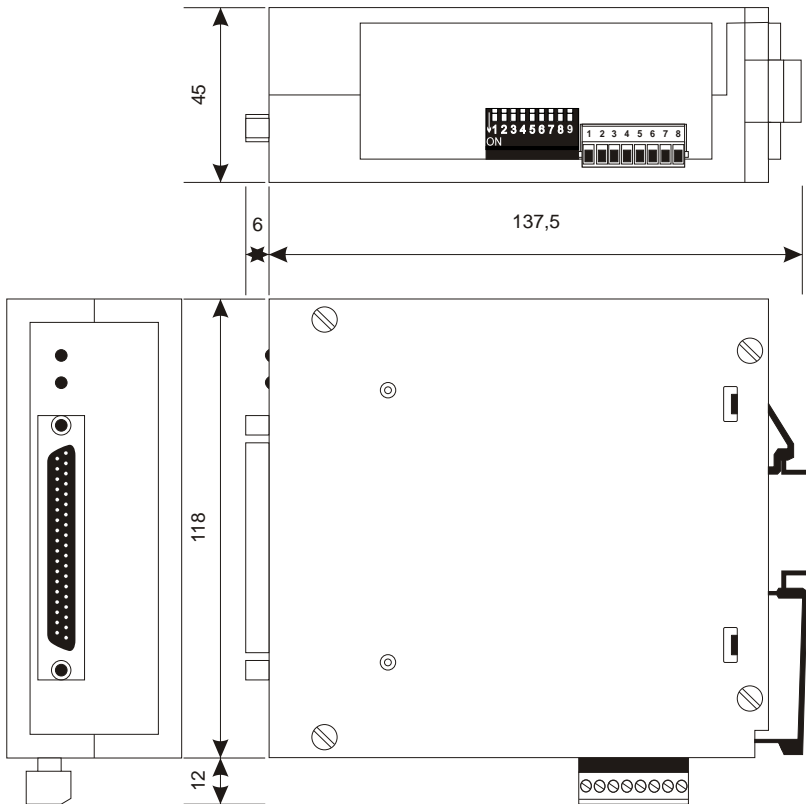
3. Mounting

3.1. Place of operation

Attention must be paid to the protection against humidity, dust and high temperatures at the place of operation.

3.2. Mounting of signal converter

- Through simple snap up at 35 mm rail (DIN EN 50022).



4. Electrical connections

4.1. General instructions



- It is forbidden to plug or unplug connectors with voltage applied.
- Attach input and output wires to connectors only without voltages applied.
- Cords must be provided with sleeves.
- Attention must be paid that the power supply voltage applied will agree with the voltage noticed at the name plate.
- The instrument has no power-on switch, so it will be in operation as soon as the power is connected.

4.2. Hints against noisy environment

All inputs and outputs are protected against noisy environment and high voltage spikes. Nevertheless the location should be selected to ensure that no capacitive or inductive interference can have an effect on the instrument or connection lines.

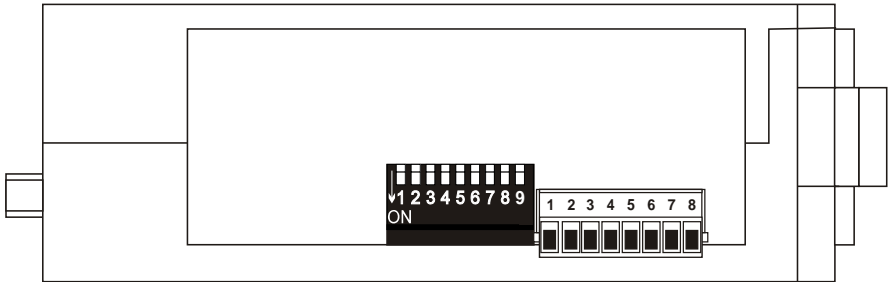
It is advisable:



- To use shielded cables.
- The wiring of shields and ground (0V) should be star-shaped.
- The distance to interference sources should be as far as possible. If necessary, protective screen or metal enclosures must be provided.
- Coils of relays must be supplied with filters.
- Parallel wiring of input signals and AC power lines should be avoided.
- The parallel output lines must be as short as possible.
- It is necessary to use shielded twisted pair cable for the RS422-lines as well as for the SSI signal lines.

4.3. Connection and pin assignment

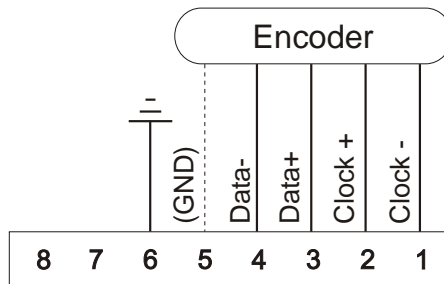
The connection of power supply and SSI encoder ensured by an 8-pole plug-in screw terminal. For the parallel output lines there is a female DB-37 connector provided.



Plug-in screw terminal assignment:

8	Power supply voltage DC (+)	2	SSI-signal line, clock (+)
7	Power supply voltage DC (-)	1	SSI-signal line, clock (-)
6	Power supply ground	3	SSI-signal line, data (+)
		4	SSI-signal line, data (-)
		5	SSI-GND (not necessary)

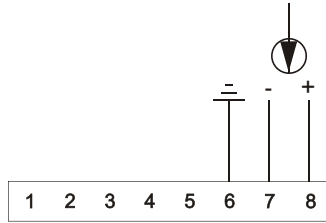
4.4. Connection of absolute encoder



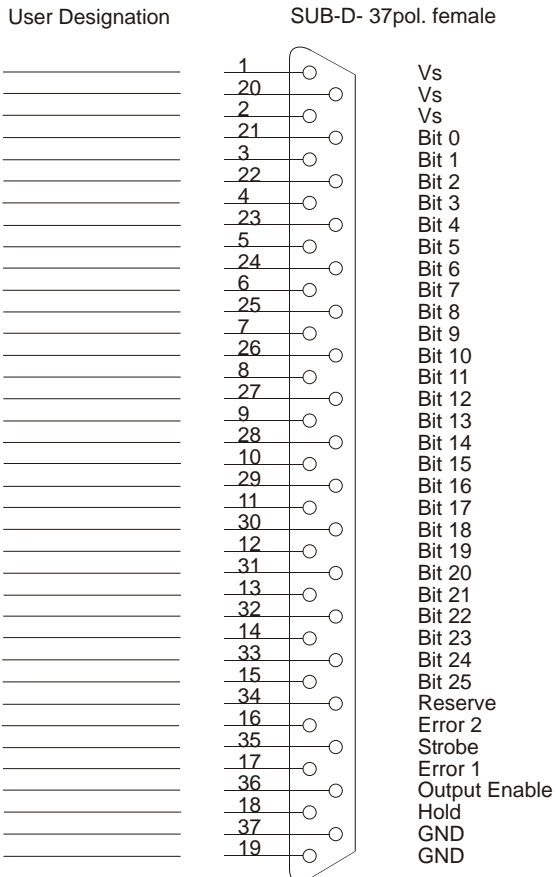
Some manufacturers of SSI encoders are using different signal designation. By this reason it is possible that clock or data lines must be exchanged (+/- of clock and/or data). The CNV 9101 will not be damaged by reversed connections on SSI signals.

4. Electrical connections

4.5. Connection of power supply



4.6. Pin assignment of parallel outputs



Signal description

Vs

Power supply for output drivers. Outputs are supplied by this voltage. The input circuits of the CNV 9101 are switching approximately with $1/2 V_s$.

Bit 0 - Bit 25

Multiplexed, high side switching outputs.

Reserve

These multiplexed output line is provided for extension in future and should not be used.

Error 1

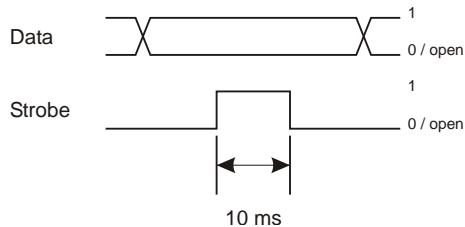
This multiplexed output is an alarm output for failure on the SSI signals.

Error 2

This multiplexed output is an alarm output for failure on the output lines.

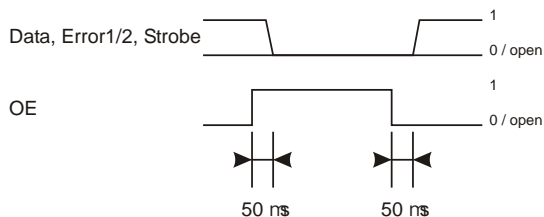
Strobe

This multiplexed output will send an output pulse (high signal of a duration of 10 ms), when output data is valid (not changing). If this output line is not used, it can be left open.



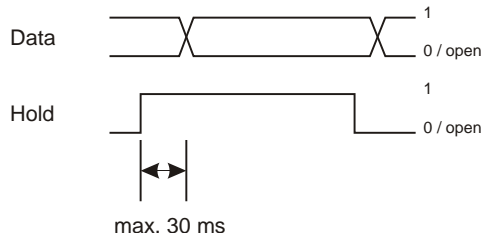
Output Enable

This is an input line which is controlling the state of the multiplexed output lines. If the input "output enable" is low (connected to GND or left open), output lines are active. If the input level of this input is high, the multiplexed output lines are inactive. If not used this input line can be left open or connected to GND.



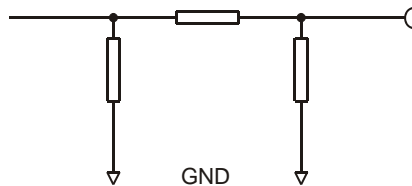
Hold

This input is used to freeze the actual output data. It is useful if the receiving unit is very slow. Datas will not change if the input level of the “hold” input is high. If not used this input line can be left open or connected to GND.



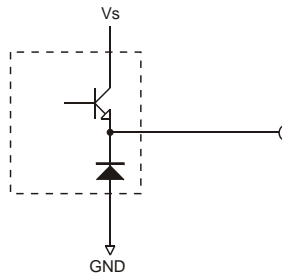
Input Circuit

The input channels of the CNV 9101 require positiv voltage levels. The threshold level of the input channels is about $1/2 V_s$.



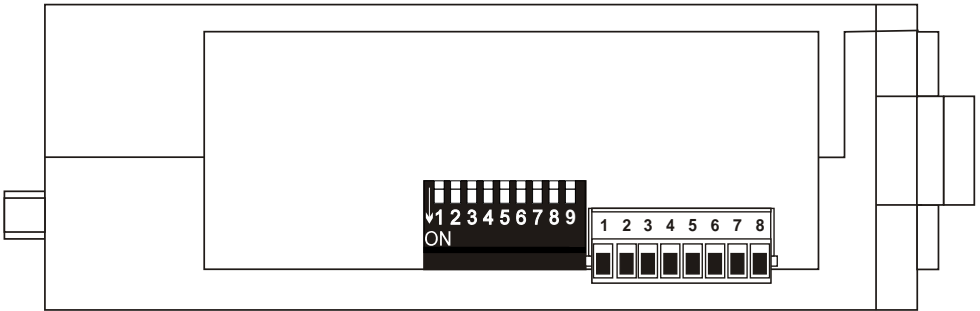
Output Circuit

The multiplexed output channels of the CNV 9101 are high side switching and short circuit protected. In addition these outputs can be switched off by an “output enable” signal.



To increase output frequency and to reduce the influence of disturbance and noisy environment it is advantageous to connect additional resistances from the output lines to GND. Resistances of 10 k are recommended.

5. DIP-switch configuration



Meaning of DIP-switches

DIP 1	Master/Slave-Selection
DIP 2	Code of the SSI-encoder
DIP 3-5	Resolution of the SSI-encoder
DIP 6	Direction of rotation
DIP 7 - 8	Code of parallel output
DIP 9	Reserve

Adjustment of Modes

DIP 1	Function
OFF	Master-Mode
ON	Slave-Mode

In Master-Mode the SSI-Clock is generated by the CNV 9101. In Slave-Mode the SSI-Clock must be generated by an external device.

! Attention must be paid that only **one** Master may be used. All other devices have to be in the Slave-Mode.

Selection of SSI encoder code

DIP 2	Function
OFF	SSI-Encoder - Gray-Code
ON	SSI-Encoder - Binry-Code

6. Startup Procedure

Adjustment of the resolution of the encoder

DIP 3	DIP 4	DIP 5	Function
OFF	OFF	OFF	Resolution 10 Bit
OFF	OFF	ON	Resolution 12 Bit
OFF	ON	OFF	Resolution 13 Bit
OFF	ON	ON	Resolution 24 Bit
ON	OFF	OFF	Resolution 25 Bit
ON	OFF	ON	Resolution 26 Bit

Adjustment of the Direction of Rotation of the encoder

DIP 6	Function
OFF	Normal Direction
ON	Reverse Direction

Adjustment of the output code of the CNV 9101

DIP 7	DIP 8	Function
OFF	OFF	Gray Code
OFF	ON	Binary Code
ON	OFF	BCD Code

6. Startup Procedure

Attention must be paid that power supply voltage applied will agree with the voltage noticed at the name plate.

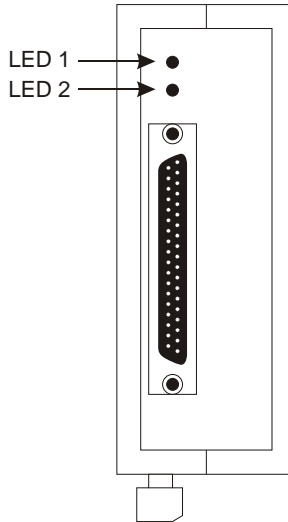


When delivered, the instrument is adjusted with a standard configuration (default values). By changing the adjustment the customer can alter the standard configuration according to his measuring task.



Attention ! When the instrument is built in a machine and the customer wants to change the configuration, attention must be paid, that no damage will occur to the machine!

7. LED-Functions

**LED1**

off	no supply voltage applied or internal defect
lights green	it's all right
lights red	failure on the SSI-inteface
flashes red/green	Info: CNV 9101 didn't receive any new value from SSI-inteface within the last minute

LED 2

The illumination of LED 2 shows, that a failure on the parallel output channels has occurred. In the case of a short circuit at one of the parallel output lines, this output channel will be switched off and LED 2 is shining.

If the short circuit is removed there are two solutions to return to normal operation. Either the input "output enable" will change his state or the supply voltage will be switched off and on.

8. *Handling of misfunctions*

All devices of ERMA-Electronic GmbH are tested for perfect function during production as well as when delivered. Nevertheless it is possible that a device won't work. That is not always a reason by the new device. There are many small reasons that will result in misfunctions. If the CNV 9101 won't work properly, please check the following points.

8.1. *LED 1 remains dark*

- Look for proper supply voltage
- Look for proper wiring of supply

If all tests are all right, the device must be send back for repair.

8.2. *LED 1 lit red*

- Look for proper wiring between SSI-encoder and CNV 9101(see hints on page)
- Look for proper power supply of the SSI-encoder
- Look for proper configuration (only one Master on the SSI-interface? Parameters of encoder corresponding the parameters on CNV 9101?)
- Clock of the SSI-master must be less than 125 kHz (only Slave-Mode)

If all tests are all right, the device must be send back for repair.

8.3. *LED 2 lit red*

- Look for the wiring of the parallel output lines.
- Look if technical datas of the parallel outputs are exceeded (also for a short time)
- Look if high voltage spikes are existing and have an influence to the device.

If all tests are all right, the device must be send back for repair.

8.4. *Other failures*

If any other misfunction occurs please have a look to all tests above. If all tests are all right, the device must be send back for repair.

9. Technical Datas

9.1. Elektrical Datas

SSI-Input	: Singelturn or Multiturn
Resolution	: 10 .. 26 Bit
Clock output	: Interface RS422/RS485
Clock input	: Receiver RS422/RS485
Data input	: Transmitter RS422/RS485
Master-Mode	
Clock frequency	: internal, 100 kHz
Conversion rate	: appr. 28 value/sec
Slave-Mode	
Clock frequency	: external, max. 125 kHz
Break of clock brushes	: min. 500 µs
Conversion rate	: appr. 28 values/sec
Parallel Output Channels	
Logic	: high side switching, 8 .. 30 V 100 mA, short circuit protected
Isolation voltage	: 3 kV / 1 min
Supply Voltage DC	: 18 .. 36 V DC
Power consumption	: max. 200 mA
Isolation voltage	: 500 V / 1 min

9.2. Mechanical Datas

Case	: DIN rail mounting DIN EN 50022
	: 35 mm
Dimensions (W x H x D)	: 45 x 118 x 137,5 mm
Weight	: appr. 300 g
Connection	: plug-in screw terminals and SUB-D-37-female

9.3. Environmental Conditions

Operating temperature	: 0 .. 50 °C
Storage temperature	: -20 .. 70 °C
Humidity	: < 80 %, not-condensing
SProtection	: class II
Field of application	: class 2
	: overvoltage protection II
CE	: in conform with 89/336/EWG
	: NSR 73/23/EWG

10. Ordering information

CNV 9101 -	0		0	0	
				Reserve	
			Reserve		
		Power Supply			
		0	5 V DC, $\pm 10\%$, not isolated		
		1	12 V DC, $\pm 10\%$, isolated		
		2	18 .. 36 V DC. isolated		
	Reserve				

11. Notices

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