

IV-30

Operating Manual for Pulse Distributor Cassette with potential separation

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" < > " indicates keys on your computer keyboard (such as <RETURN>).

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First release	09/08/06	00

1 Safety

1.1 General Potential for Danger

If you use the cassette in conjunction with a programmable TR Encoder (CE / ZE series), it is possible to output different signal bits. Additional functions such as self-monitoring, detection of standstill and direction of rotation, speed control and soft-limit-switches are provided by means of these signal bits. Therefore it is crucial to **integrate the signal bits into your own safety concept** by means of the PLC's evaluation software.
The cassette provides no diagnostics for errors.

All the persons who are involved in the assembly, commissioning and operation of the device

- must be appropriately qualified
- must follow exactly the instructions in this manual

This is for your own safety and the safety of your equipment!

1.2 Safety Information

This operating manual contains information that you must comply with to ensure your personal safety and to avoid damage to property. The information is emphasized by warning triangles, which have different appearances to match the level of danger:



Warning

Means that if the appropriate safety measures are ignored, death, severe injury or considerable damage to property can occur.



Caution

Means that if the appropriate safety measures are ignored, slight injury or damage to property can occur.



Note

Emphasizes important information about the product, its properties or helpful information for using it.

1.2.1 Installation information

Due to the fact that the cassette is normally used as a component part of a larger system, this information is intended to provide a guideline for safe installation of the cassette in its environment.



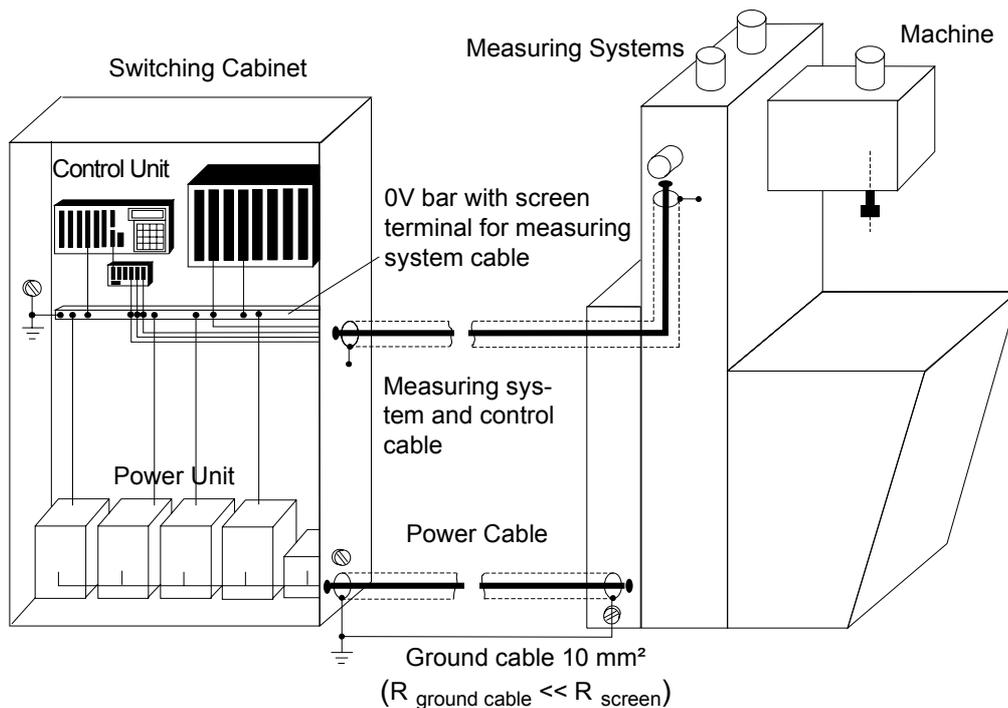
Warning

- Observe the safety and accident prevention regulations that apply to the specific application.
- In the case of equipment with a fixed connection (stationary installations/systems) without all-pole mains switches and/or fuses, you must install a mains switch or a fuse in the system and connect the equipment to a protective earth.
- Before commissioning devices that are run with mains voltage, check whether the set rated voltage range matches the local mains voltage.
- With a 24-V supply, ensure safe electrical isolation of the extra-low voltage. Use only mains units that comply with IEC 364-4-41 or HD 384.04.41 (VDE 0100 Part 410) standards.
- Fluctuations in or deviations from the rated mains voltage may not exceed the tolerances stated in the technical data. If they do, functional failures of the electrical components and hazardous conditions cannot be ruled out.
- You must take precautions to ensure that, following voltage dips and failures, it is possible to restart an interrupted program in an orderly manner. In this context, no dangerous operating status conditions may occur even for a brief period of time. If necessary, you must force an **EMERGENCY STOP**.
- EMERGENCY STOP devices that comply with EN 60204/IEC 204 (VDE 0113) must remain effective in all the operating modes of the automation equipment. Unlocking the EMERGENCY STOP devices must not result in an uncontrolled or undefined restart.
- Install the connecting and signal lines such that inductive and capacitive interference does not adversely affect the automation functions.
- Install automation technology equipment and its operator input elements such that they are sufficiently protected against being operated by mistake.
- Take appropriate hardware and software measures in the I/O link to prevent possible cable or wire breakages on the signal side leading to undefined status conditions in the automation equipment.

1.2.1.1 Screening

The use of electronic sensor active systems in modern machines makes it crucial to enforce a consistent and correctly executed interference suppression and wiring concept. These conditions are the only guarantee that systems containing electronic measuring systems and the cassette will function properly.

Recommended Screened Cable Wiring



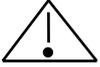
1.2.1.2 Measures for Interference Suppression

- Feed the connecting line to the cassette at a large distance, or separately, from power lines carrying interference.
- Use only completely screened lines for data transfer and ensure they are well earthed. In the case of differential data transfer, (RS422, RS485, etc.), you must additionally use twisted-pair lines.
- Use cables with a minimum cross-section of 0.22 mm² for data transfer.
- Use a ground cable with a minimum cross-section of 10 mm² to avoid equipotential bonding via the screen. In this context, you should ensure that the ground cable's resistance is much lower than the screen's resistance.
- Wire the screen continuously keeping a large area in contact with special screen connecting terminals.
- Avoid crossing cables. If this is not possible, the cables should only cross at right-angles.

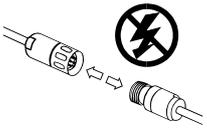
1.3 Appropriate Use

The pulse distributor IV-30 is used in complex plants together with incremental encoders for extending the signal path.

The device allows distribution of the signals K1, /K1 and K2, /K2 as well as K0, /K0 of a single encoder to six outputs with each different output potentials.



Warning

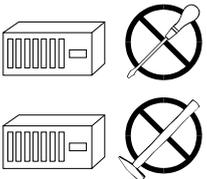


Deenergize the system before carrying out wiring or opening and closing electrical connections!

Short-circuits, voltage peaks etc. can lead to malfunctions and uncontrolled conditions in the system or to serious personal injury or damage to property.

Before switching on the system, check all the electrical connections!

Connections that are made incorrectly can lead to system malfunctions; wrong connections may result in serious personal injury or damage to property.



For safety reasons, mechanical or electrical changes to the axis cassette or to the measuring systems **are prohibited!**



Note

Always keep to the commissioning and operating instructions specified in this manual.

1.4 Danger Due to Particular Types of Use



Caution

A current that is too high will destroy the cassette!

- A maximum current of 300 mA may be taken from the cassette's power supply (encoder connector). If the current is above 300 mA, the encoder must be fed from a separate supply.
- Encoders that have built-in heating must also be supplied separately.

1.5 Danger Due to Accessories



Caution

Mating connectors that are not plugged in correctly can lead to a cassette malfunction!

- Tightly screw the mating connector to its intended connector.

1.6 Authorized Operators

This device may only be commissioned by qualified personnel. In the context of the safety-specific information in this document, qualified personnel are considered to be persons who are authorized to commission, ground and mark circuits, equipment and systems in accordance with recognized safety standards.

1.7 Safety Measures at the Place of Assembly



Warning

Do not carry out welding if the cassette has already been wired-up or is switched-on!
Potential fluctuations can destroy the cassette or adversely affect its function.

Do not touch connector contacts with your hands!
Static charges could destroy the electronic components in the cassette.

Inputs that are not being used may not be connected (refer to the pin assignments)

Keep to the supply voltage range: 24 V DC $\pm 20\%$ (including residual ripple)



Note

Ensure that the area around the place of assembly is protected from aggressive media (acid, etc.).

2 Transportation / Storage

Transportation Information

Do not drop cassette or subject them to excessive jolting!
The device contains sensitive electronic components.

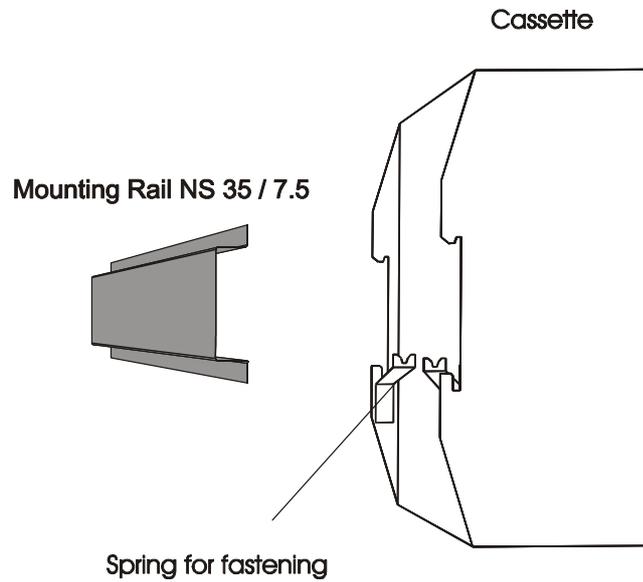
Use only the original packaging material!
Incorrect packaging material can cause damage to the device in transit.

Storage

- Storage temperature: -30 to +80°C
- Store in a cool place.

3 Assembly instructions

The cassette are designed to be mounted on rails in the switch cabinet. No extra assembly accessories are required for mounting the cassette on the rail.



The cassette housing is placed on the mounting rail from below and pushed upwards with the tension springs (Fig. 1). Simply push the cassette housing against the mounting rail until it snaps into place (Fig. 2).

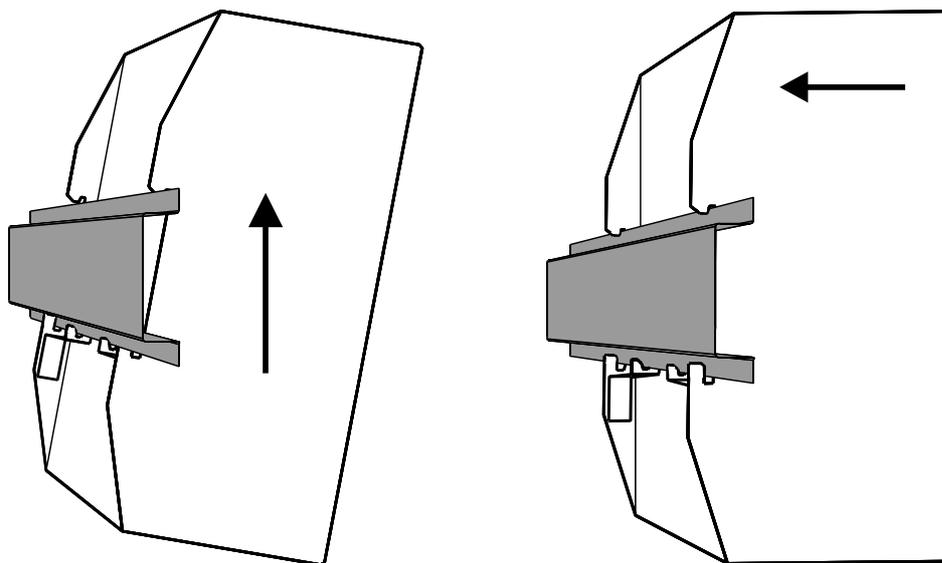


Fig. 1

Fig. 2

4 Commissioning

4.1 General information about the device

The impulse divider IV 30 is used in complex plants together with incremental encoders for extending the signal path.

All signal inputs and outputs are designed potential separated. That means there is no connection of the signals to the supply voltage (0V) between the channels.

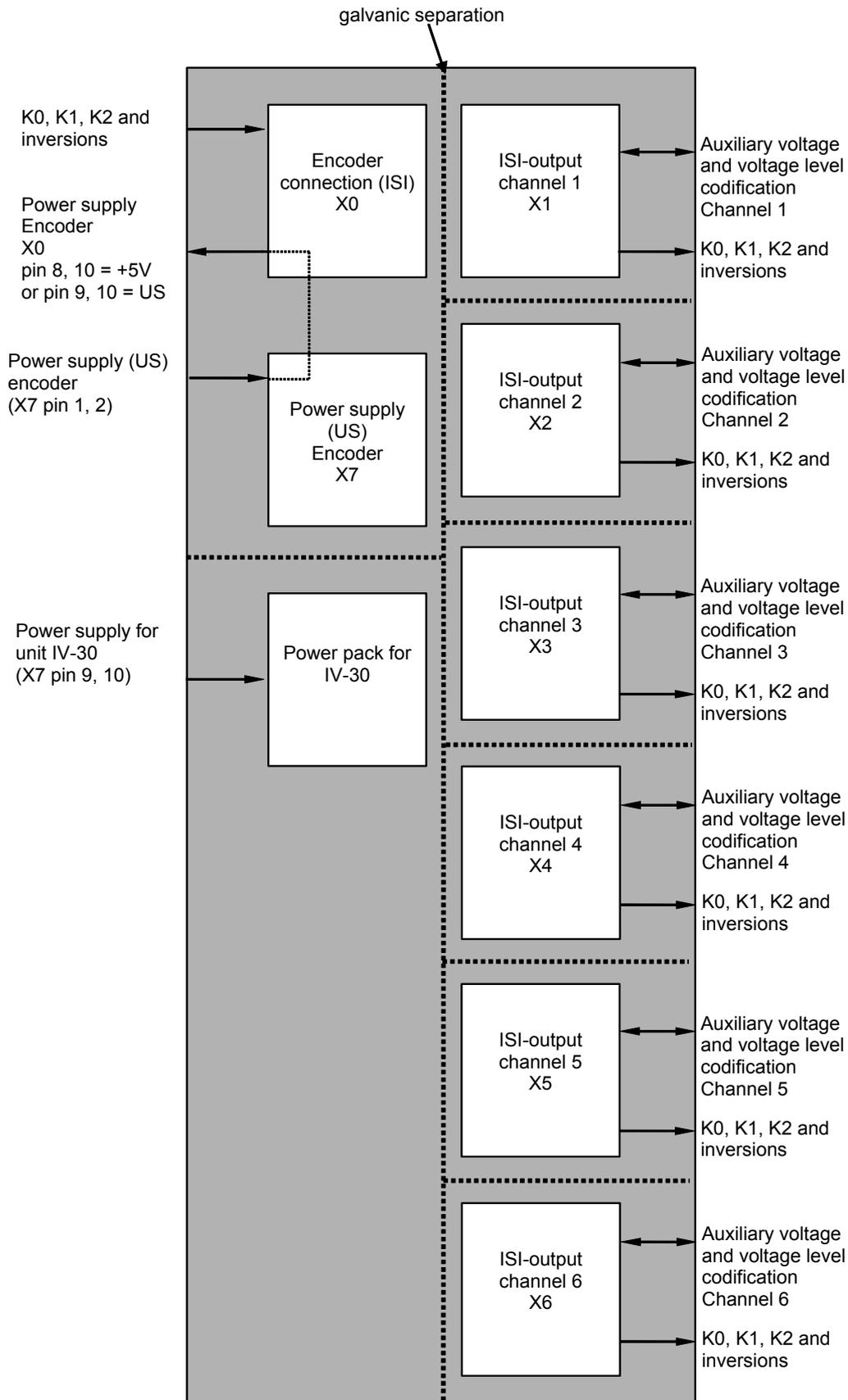
The unit allows distribution of the signals K1, /K1 and K2, /K2 as well as K0, /K0 of a single encoder to six outputs with each different output potentials.

For each channel the RS422 output level must be selected separately by a corresponding jumper coding in the mating connector.

If other output levels are used, these must be adjusted by feeding of a separate voltage to UP-I and 0V.

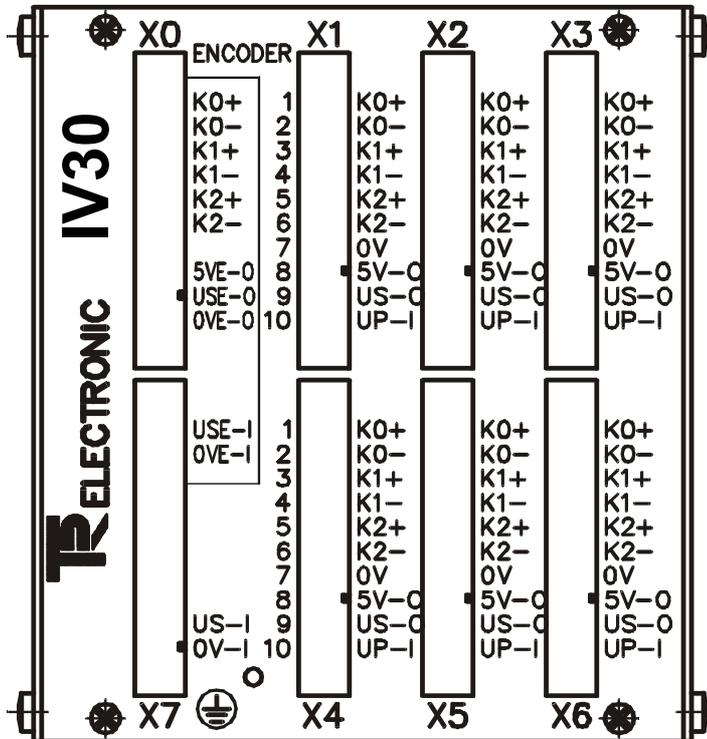
The input needs differential 5V signals.

4.2 Block diagram



4.3 Cassette design

Front view



Input connector X0

Supply of the incremental signals K0, K1, K2 and their negated signals as well as an optional supply of the signal source with +5VDC / 300mA or with +24VDC \pm 20%.

Supply voltage X7

About this connector the supply voltage for the device and signal source (encoder) must be connected.

Output connector X1 - X6 for the channels 1 to 6

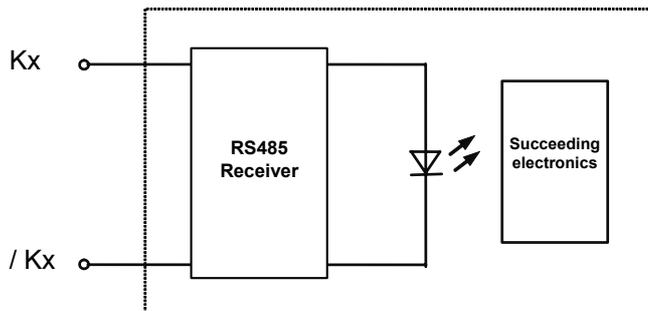
According to the jumper codings in the mating connectors the incremental signals at the channels 1 to 6 with RS422-level or optionally with 24V \pm 20% can be picked off.

The 0V-Signal at X1 to X6 is reference potential of the respective output. Under each other it exist a galvanic separation.

4.4 Input circuit, differential +5V

This complies with the basic configuration of the device for differential signal input levels. The device requires all incremental traces (K0, K1, K2 and their negated signals).

Principle wiring diagram for input circuit

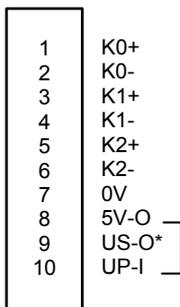


4.5 Adjusting of the output levels

The output level can be selected separately for each channel by a corresponding jumper codification in the mating connector:

1. RS422 – output level

Connector X1 - X6

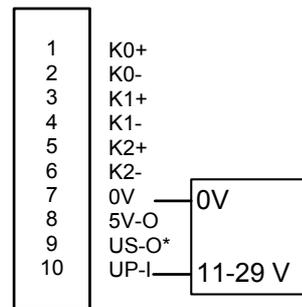


Jumper 1: 8/10

with internal 5V voltage supply

2. (11-29)V – output level

Connector X1 - X6



with external voltage supply
(The supply voltage should be filtered against EMC-disturbances)

* only available in the 24V variant, without galvanic separation

5 Appendix

5.1 Pin assignments

5.1.1 Incremental input X0

Pin number	Pin name	Function	Level
1	K0+	Input reference impulse	5V differential
2	K0-	Input reference impulse, negated	5V differential
3	K1+	Input signal1	5V differential
4	K1-	Input signal1, negated	5V differential
5	K2+	Input signal2	5V differential
6	K2-	Input signal2, negated	5V differential
7	---	---	---
8	5V-O	Encoder supply 5V	5V / 0,3 A
9	USE-O	Encoder supply US	24V \pm 20%
10	0VE-O	Encoder supply 0V	0V

5.1.2 Supply voltage X7

Pin number	Pin name	Function	Level
1	USE-I	Input encoder supply	24V \pm 20%
2	0VE-I	Input encoder supply	0V
3	---	---	---
4	---	---	---
5	---	---	---
6	---	---	---
7	---	---	---
8	---	---	---
9	US-I	Output supply US	24VDC \pm 20%
10	0V-I	Output supply 0V	0V

5.1.3 Incremental outputs X1 - X6

Pin number	Pin name	Function	Level
1	K0+	Output reference impulse	RS422 or ext. 11V..24V
2	K0-	Output reference impulse, negated	RS422 or ext. 11V..24V
3	K1+	Output Signal1	RS422 or ext. 11V..24V
4	K1-	Output Signal1, negated	RS422 or ext. 11V..24V
5	K2+	Output Signal2	RS422 or ext. 11V..24V
6	K2-	Output Signal2, negated	RS422 or ext. 11V..24V
7	0V	Output reference potential	0V
8	5V-O	Output coding Signal supply +5V	+5V / 0,15 A
9	US-O*	Output coding Signal supply +US	+24V \pm 20%
10	UP-I	Input coding Signal supply	+5V...+24V

* only available in the 24V variant, without galvanic separation

5.2 Technical data

Device supply	Power pack for 24VDC $\pm 20\%$
Aux. voltage output (optional).....	Connector X0 galvanically decoupled +5V encoder, max. 300mA Connector X1-6 galvanically decoupled +5V per signal channel, max. 150mA
Reverse battery protection	Yes
Transient voltage protection	ESD
Excess current release	VDE 0113
Filter groups.....	IEC 1000-4-x
Current consumption (unloaded).....	approx. 120 mA
min./max. input current per track.....	1.5mA / 20mA
* Output level	RS422 according to DIN 66 384 or ISO/IEC 8482
max. input impulse frequency.....	250 kHz
Operating temperature range	0 - 60°C
Weight.....	approx. 500g

* The given norm defines the signal levels as follows:

- **Respectively**, reference is the **0V** signal of the receiver.
- The signals may "float" from **-7 V to +12V** (common mode range)
- On the side of the transmitter the difference level must be **> $\pm 1,5$ V**
- On the side of the receiver the difference level must be **> $\pm 0,3$ V**