

1. Maximum ratings

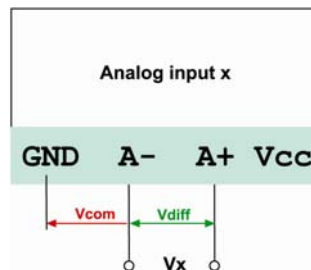
iLOG RTU/data loggers have 4 built in, multirange, differential analog inputs. The analog inputs have **limited** internal overvoltage protection in order to preserve measuring accuracy. The applied input signals must not exceed the maximum ratings listed in the following table:

Analog input signal	Recommended operation conditions	Maximum rating
A+ to A- (Differential voltage, signal floating, no GND reference)	0 – 1V	-10V ... +10V
A- to GND (Signal floating, common mode voltage)	inexistent or 0V	-10V ... +10V
A+ to GND (A- connected to GND)	0 – 1V	-10V ... +10V

Care should be taken to keep the input signals under the maximal ratings. Exposure to absolute maximum rating conditions for extended periods may affect device reliability and lead to permanent device damage.

Potential ground loops caused from common mode voltages should be avoided.

2. Differential vs. common mode voltage



Common mode voltage is rejected during analog input reading. However it causes ground loop currents, which degrade the measurement accuracy and can lead to overstepping of the maximal ratings.

There are two ways to avoid common mode voltages:

- By referencing input signals to common ground (A- is grounded).
- By connecting isolated signals, e.g. signals which do not have common ground with the iLOG power supply ground.

3. Applying 0-20/4-20mA transmitters

3.1 General – Current loop transmitter types

The following was taken from ANSI/ISA-S50.1-1982 (R1992) *Compatibility of Analog Signals for Electronic Industrial Process Instruments*.

“Type numbers with suffix letters are used as transmitter identifiers. Type number is the number of wires necessary to provide transmitter power. Shields and IO wires are excluded. Suffix letters identify the load resistance capability.

- **Type 2** is a 2-wire transmitter energized by the loop current where the loop source voltage (compliance) is included in the receiver.

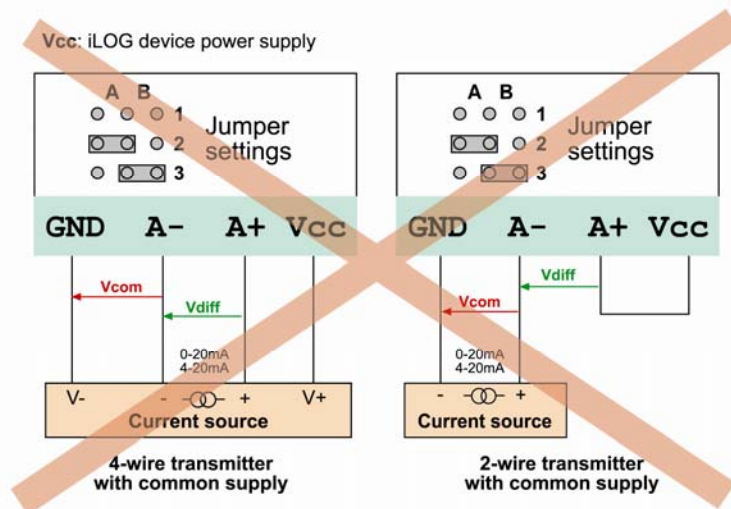
- **Type 3** is a 3-wire transmitter energized by a supply voltage at the transmitter. The transmitter sources the loop current. Transmitter common is connected to receiver common.
- **Type 4** is a 4-wire transmitter energized by a supply voltage at the transmitter. The transmitter sources the loop current to a floating receiver load.”

3.2 Connecting 0-20/4-20mA transmitters with common power supply

Improper connecting of current transmitters to the device analog inputs can lead to overstepping of the maximum ratings.

iLOG evaluates current signals by measuring the voltage drop on a SCT-04 internal shunt resistor of 50Ω.

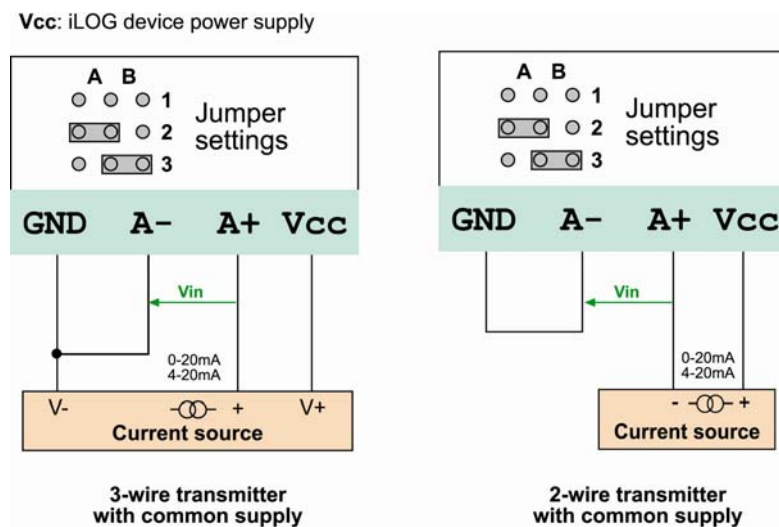
The following two wiring schemes must be avoided:



Both circuits preserve normal operating range for the differential voltage, but can potentially apply the whole supply voltage as common mode voltage to the analog input, which leads to overstepping of the maximum ratings.

Four wire transmitters must always be supplied separately without common ground (isolated, see 3.3)!

The following circuits assure the normal operation conditions:



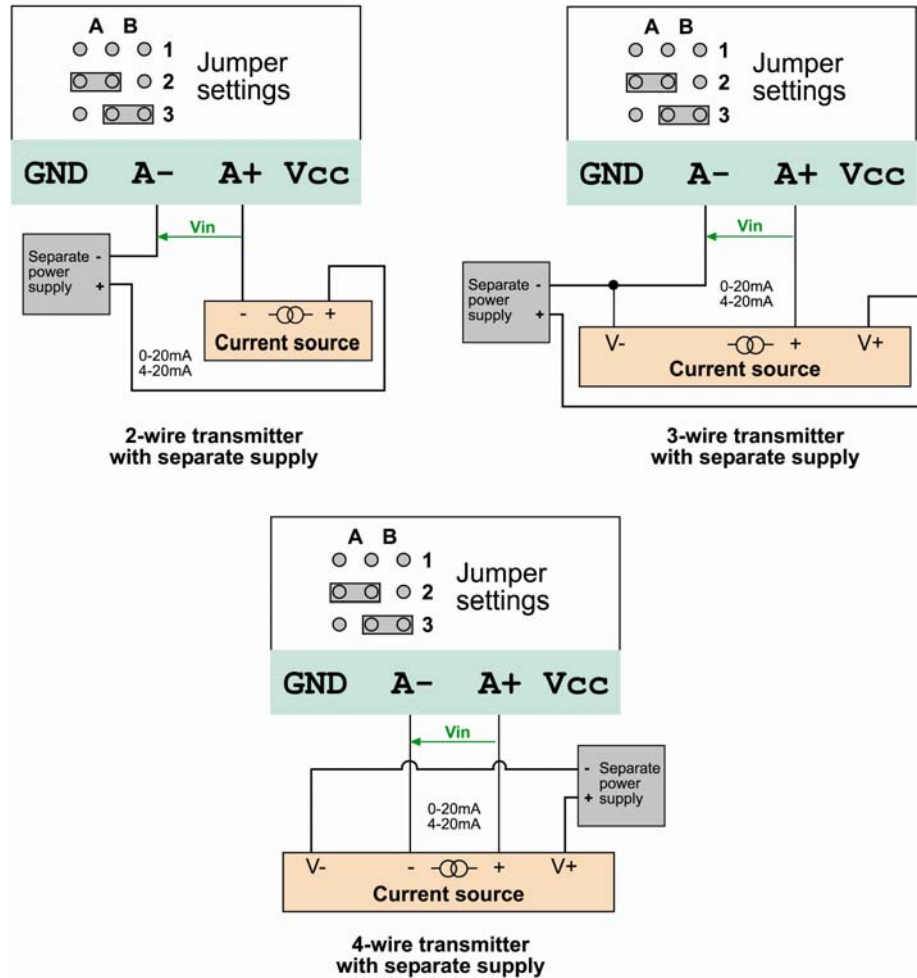
The input voltages (V_{in}) remain in the normal operating range. Common mode voltages do not exist.

Note: The proper jumper settings for current measurement must be set on SCT-04, before applying power, to prevent current loop interruption, which causes rising of the A+ voltage to ground.

3.3 Connecting 0-20/4-20mA transmitters with separate power supply

The easiest way to avoid any trouble with ground loop problems is to use a separate power supply for the current transmitters:

Vcc: iLOG device power supply



Common mode voltages do not exist since there is no common ground between iLOG input and the transmitter output signal (isolated signal).

4. Ensure normal operation conditions by measuring the input signal

If there is a doubt of keeping the normal operation conditions follow the steps below:

- Disconnect the iLOG unit from the SCT-04 by removing the flat cable.
- Connect the transmitter or an equivalent signal simulator to the SCT-04 and select the proper jumper settings.
- Power up the SCT-04 and the transmitter.
- Use a voltmeter to measure the voltage of the A- terminal to the GND terminal in order to identify the existence of a common mode voltage.
- In the case of a ground referenced measurement (A- connected to ground), if possible, set the transmitter signal to the maximal value and measure the voltage of the A+ terminal to GND. The input voltage must not exceed the maximal rating (10V).