ADDER / SUBTRACTOR - GALVANIC SEPARATION   S190-1-ST

The S190 complies the electromagnetic compatibility prescriptions based on the 89/366/EEC directive.
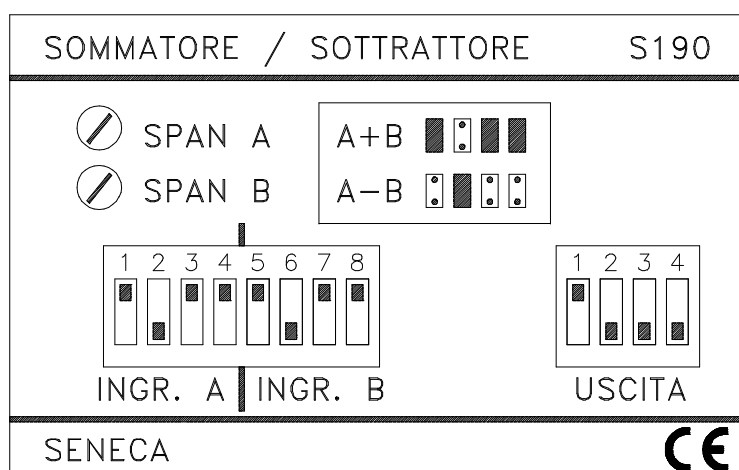
$C\epsilon$ Reference norms: EN 50081-2 Industry environment emission norm
                                     EN 50082-2 Industry environment immunity norm

Module to do sum or subtraction of two analog signals, even if they have different importance, by introducing a galvanig insulation 3500Volt between input signals and and output signal by a linear optocoupler.
Device allows to work with analog signals in input and in output even if they are in different standards.
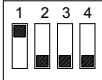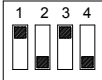
INPUTS' SET
Inputs can be set indipendently, by some DIP-switches on front panel for a serie of presetted standard signals. For inputs' preset refer to the following table:

Input type :	DIP-switch	Input A	Input B
Current 0 - 20 mA		1 2 3 4	5 6 7 8
Current 4 - 20 mA		1 2 3 4	5 6 7 8
Voltage 0 - 5 Vdc		1 2 3 4	5 6 7 8
Voltage 1 - 5 Vdc		1 2 3 4	5 6 7 8
Voltage 0 - 10 Vdc		1 2 3 4	5 6 7 8
Voltage 2 - 10 Vdc		1 2 3 4	5 6 7 8

OUTPUT'S SET

Output can be set, by some DIP-switches on front panel for a serie of prearranged standard signals. For output's set refer to the following table:

Output type :	Output DIP-switch set:
Current 0 - 20 mA	
Current 4 - 20 mA	
Voltage 0 - 5 Vdc	
Voltage 1 - 5 Vdc	
Voltage 0 - 10 Vdc	
Voltage 2 - 10 Vdc	

TECHNICAL FEATURES:

- Power supply   :   S190-1-ST   115/230 Vac $\pm$10% 50/60 Hz
- Consumption   :   3.5 VA
- Input resistance   :   100 ohm in current, 1 Mohm in voltage
- Transmission error   :   <0.5 %
- Temperature coeff.   : $\pm$ 0.005%/°C
- Insulating voltage   :   3500 Volt
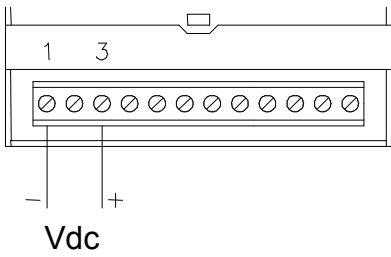- Temperature/Humidity   :   70 x 95 x 69 mm / 300 g approx.

ELECTRICAL CONNECTIONS

POWER SUPPLY   S190-1-ST
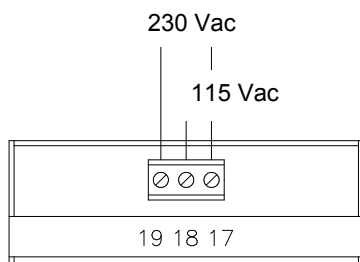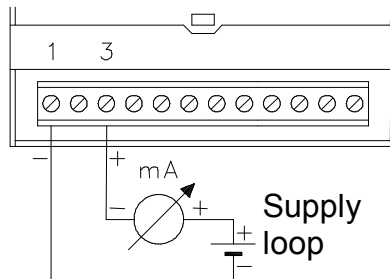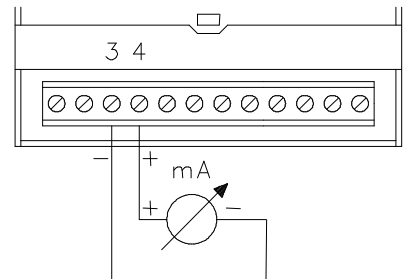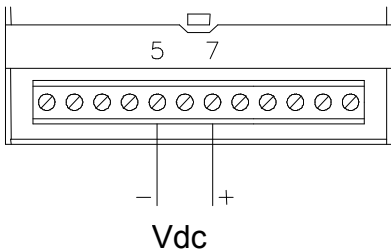
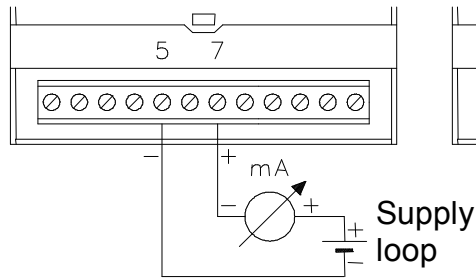**INPUT A**

VOLTAGE

CURRENT
PASSIVE INPUT

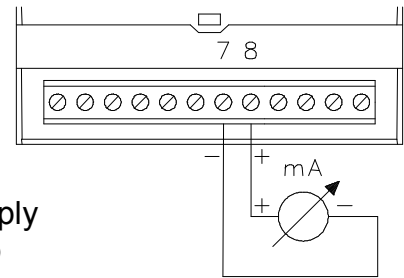CURRENT
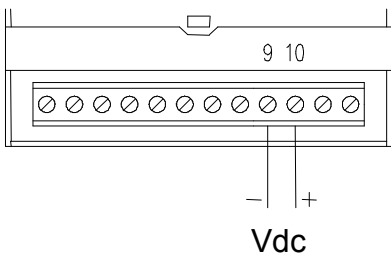ACTIVE INPUT

INPUT B

VOLTAGE

CURRENT
PASSIVE INPUT

CURRENT
ACTIVE INPUT

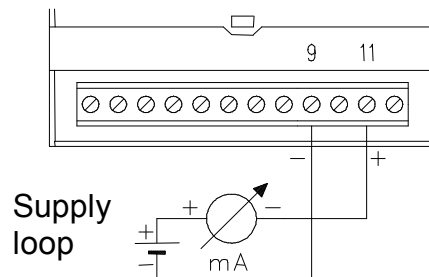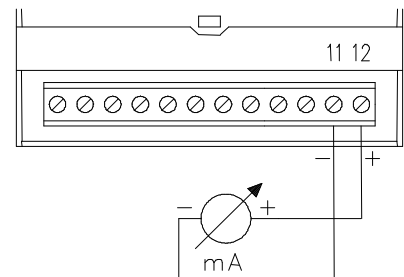**OUTPUT**

VOLTAGE

CURRENT
PASSIVE OUTPUT

CURRENT
ACTIVE OUTPUT

DEVICE SET AS ADDER OR SUBTRACTOR

Device can do both sum (A + B) and difference (A - B) of two signals.
To transform device from adder to subtractor, or vice versa, it is necessary to remove upper panel and move jumpers as indicated on front panel (see figure page 1).

SUM OF INPUT WITH DIFFERENT IMPORTANCE

Most significant input will be input A, the less inportant one will be input B.
Procedure to do device's calibration:
1 Connect a tester (10Vdc) between 2(+) and 1(-) clamps, a signal generator between 3(+) and 1(-) clamps set to give a signal equal to full scale.
2 Move trimmer "SPAN A" till on the tester will appare the voltage given by the following formula:

$$V = 10 * \frac{A}{A + B}$$

(A and B are the full scale in engineering units for inputs A and B).
3 Connect a tester (10Vdc) between 6(+) and 5(-) clamps, a signal generator between 7(+) and 5(-) clamps set to give a signal equal to full scale.
4 Move trimmer "SPAN B" till on the tester will appare the voltage given by the following formula:

$$V = 10 * \frac{B}{A + B}$$

(A and B are the full scale in engineering units for inputs A and B).

Example: sum between two signals 4-20mA corresponding to two flow 150l/h and 50l/h.
At input A will be assigned signal 150l/h and B 50l/h.
Connect a generator between 3 and 1 clamps and generate a current 20 mA, connect a tester between 2 and 1 clamps and regulate trimmer "SPAN A" till you read the following voltage:

$$V = 10 * \frac{150}{150 + 50} = 7,5 \text{ Volt}$$

Connect a tester between 7 and 5 clamps and generate a current 20 mA, connect a tester between 6 and 5 clamps and regulate "SPAN B" till you read the following voltage:

$$V = 10 * \frac{50}{150 + 50} = 2,5 \text{ Volt}$$

DIFFERENCE BETWEEN INPUTS WITH DIFFERENT SIGNIFICANCE

Most significant input will be input A, the less inportant one will be input B.
Procedure to do device's calibration:
1 Connect a tester (10Vdc) between 2(+) and 1(-) clamps, a signal generator between 3(+) and 1(-) clamps set to give a signal equal to full scale.
2 Move trimmer "SPAN A" till on the tester will appare 5Volt
3 Connect a tester (10Vdc) between 6(+) and 5(-) clamps, a signal generator between 7(+) and 5(-) clamps set to give a signal equal to full scale.
4 Move trimmer "SPAN B" till on the tester will appare the voltage given by the following formula:

$$V = 5 * \frac{B}{A}$$

(A and B are the full scale in engineering units for inputs A and B).

Example: difference between two 4-20mA signals corresponding to two pressure 10 bar and 4 bar.
In input A there will be 10 bar signal, in input B there will be 4 bar signal.
Connect a generator to 3 and 1 clamps and generate a 20mA current, connect a tester between 2 and 1 clamps and regulate trimmer "SPAN A" till you will read a 5Volt voltage.
Connect a generator between 7 and 5 clamps and generate a 20mA current, connect a tester between 6 and 5 clamps and regulate trimmer "SPAN B" till you will read the following voltage:

$$V = 5 * \frac{4}{10} = 2 \text{ Volt}$$