

PROGRAMMABLE CONTROLLER OC 7011

OWNER`S GUIDE

ORBIT CONTROLS AG
Zürcherstrasse 137
CH-8952 Schlieren/ZH
Tel: + 41 1 730 2753
Fax: + 41 1 730 2783

e-mail: info@orbitcontrols.ch
www.orbitcontrols.ch

Vor dem Einschalten

Überzeugen Sie sich, ob Ihre Sendung das richtige Gerät Orbit Controls Modell OC 7011 beinhaltet, einschliesslich einer Betriebsanleitung OC 7011.

Vor dem Einschalten des Gerätes überprüfen Sie die Anschlüsse und die Versorgungsspannung. Ein falsch angeschlossenes Gerät kann beschädigt werden und damit auch die mitverbundene Folgeelektronik. Für falsche Handhabung wird jede Haftung abgelehnt.

ZU BEACHTEN

Dieses Gerät wurde sorgfältig verpackt. Falls es bei Ihnen in beschädigtem Zustand eintrifft, benachrichtigen Sie unverzüglich den Orbit Controls Kundendienst (Tel: +41 1 730 2753 oder Fax: +41 1 730 2783) und nehmen Sie einen Schadenrapport auf, welchen Sie auch von der Transportgesellschaft unterschreiben lassen. Bewahren Sie bitte das Verpackungsmaterial für eventuelle Reklamationen auf.

Unpacking Instructions

Remove the Packing List and verify that you have received all equipment, including the following:
Orbit Controls Model OC 7011 Programmable Controller.
Operator's Manual OC 7011.

If you have any questions about the shipment, please call the Orbit Controls Customer Service Department.

NOTE

When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the Orbit Controls customer service, Phone +411 730 2753 or Fax +411 730 2783 and to the shipping agent.

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in event the reshipment is necessary.

INDEX

Programmable Controller OC7011	Page	4
1 INSTRUMENT`S REAR SIDE		5
2 SPECIFICATIONS		6
3 MENU STEPS		7
4 RANGE SELECTION		8
5 CONNECTION – EXAMPLES		8
5.1 0/4 – 20 mA single ended		8
5.2 2VDC and 2V RMS single ended		9
5.3 20VDC and 20V RMS		9
5.4 Differential Input DC and RMS		9
5.5 Strain Gauge with constant current		10
5.6 Pt-100 and Ohm-Measurement, 2 terminal connection		10
5.7 Pt-100, and Ohm-Measurement, 4 terminal connection		10
5.8 Potentiometer with constant current		11
5.9 True RMS 5A		11
5.10 Pt-100, RTD Thermoemeter		12
5.11 Thermocouples		12
5.12 Internal Cold Junction		13
6 BURST TEST and recomended GROUNDINGS		14

Programmable Controller OC7011

- ✓ 6 digit display ± 999999
- ✓ $\pm 20\,000$ true increments
- ✓ 0/4-20mA, 200mV to 200VDC
- ✓ 20mV full scale option
- ✓ True R.M.S. Option
- ✓ Two Set Point relay
- ✓ Analog Output 0/4-20mA
- ✓ Pt-100 and T/C DIN - J,K,E,S,B,T,C
- ✓ Free programmable



Model OC7011 is a 6 digit programmable controller with $\pm 20\,000$ true measurements and inputs for process signals such as 0-20mA, 4-20mA, $\pm 20\text{mV}$, $\pm 200\text{mV}$, $\pm 2\text{V}$, $\pm 20\text{V}$, $\pm 200\text{V}$ DC or true RMS, Pt-100 and J,K,E,S,B,T and C DIN- Thermocouples with internal or external cold junction compensation. By using a direct assignment of the input signal to the selected display value, the display can be scaled for required process units such as kg, mm, gr, lb, kN, oC etc. The 20000 measuring increments can be scaled to a maximal display value of 999999.

With the keypad at the instrument's front the process parameters can be programmed. The menu contains two set points, password, type of input characteristic and linearizing, filter, conversion speed, display refresh, analog output, tara, countwise of the display and decimal points.

Display Assignment to the range of the input signal can be simply performed with the keypad at the instrument's front. The minimal and the maximal input signal will be assigned to any two display values, e.g. 4-20mA will be displayed as 0-1500.0. The display shows overrange at 110% of the assigned display value.

Two Set Points can be programmed within the whole display range. They activate two open collector output transistors or two mechanical relay. Each set point has a programmable HYSTEREZE and a DELAY. A function LATCH is available. When used, the activated Set Point remains active also when the display returns bellow the set value. To release the latched set point, the key ACK has to be pressed or an external logic signal (option) has to be applied.

Display Refresh is programmable from 1 to 16. The display will be refreshed after the selected number of measurements.

Countwise of the last significant display digit can be selected for counting by 1, 2 or 5 or showing dummy zero.

Digital Filter calculates the average value of preselected number of measurements prior the result is shown at the display. The filter is selectable from 1 to 99 and can be used for noisy input signal in order to assure steady readings.

Decimal Point can be set with the keypad for the required resolution of the reading.

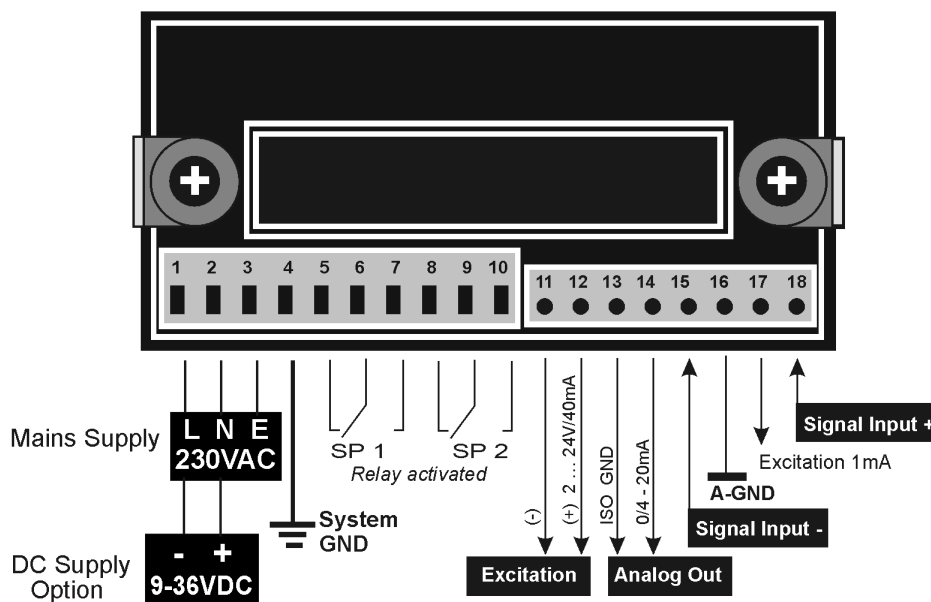
Analog Output 0/4-20mA is generated during the measurement and can be assigned with the keypad to any two display values. It permits a resolution of 12 bit or 4096 increments over the selected range. The output can be selected as direct or reverse acting.

Tara is activated with the keypad and sets the display to zero. The tara remains memorized also when the power is switched-off. It can be canceled at any time in order to display the original input signal.

Peak & Valey memory stores the maximal and the minimal display value during the measurement. By using the keys *UP* and *DOWN* the memorized values will be shown at the display. The stored values can be errased at any time with the key *SET*.

Password is available to protect the parameter settings against unauthorized manipulation. Without entering the password only the two set points can be adjusted. During programming the *PRG* at the front panel is illuminated.

1 INSTRUMENT'S REAR SIDE



2 SPECIFICATIONS

Input Voltage	$\pm 20\text{mV} \dots \pm 2\text{V}$ DC differential input. Gain selectable with plugged-in resistor in a socket. 2V, 20V or 200V DC or true RMS, differential input.
Input Current	0/4-20mA, $\pm 20\text{mA}$, 200mA, 2A, 5A DC or RMS, differential input
Input Pt-100	2- or 4-wire. $-200 \dots + 650\text{ }^{\circ}\text{C}$.
DIN-Thermocouples	E, J, K, S, B, T and C.
Cold Junction	Compensation $0 - 60\text{ }^{\circ}\text{C}$ ambient temperature.
Accuracy DC	$\pm (0.02\% + 1\text{ digit})$ from full scale.
Accuracy true RMS	DC - 5kHz: $\pm (0.1\%$ from value + 5 digit).
Accuracy Pt-100, T/C	Pt-100: $\pm (1^{\circ}\text{C} + 1\text{ digit})$. T/C: $\pm (2^{\circ}\text{C} + 1\text{ digit})$. Tempco: $\pm 25\text{ ppm/ }^{\circ}\text{C}$.
A-D Convertor	ADC with 20 000 true measuring increments scalable up to 999999. Sampling Rate of 2,5 or 7 Samples/sec.
Linearity	$\pm (1\text{ LSB} + 1\text{ digit})$.
Temperature Coef.:	$\pm 25\text{ ppm/}^{\circ}\text{C}$
Display	$0 \dots \pm 999999$, 7-segment red 14,7 mm LED with decimal point a sign. The display shows overload with all six upper part segments lighted.
Analog Output	0-20mA or 4-20mA direct or reverse acting can be assigned to any two display values. The resolution is 12 bit, the max. load is 300 Ohm.
Tara	The key <i>SET</i> forces the display to zero. After the key is pressed for the first time the display answers notArA and shows the input signal. When the key is pressed for second time, the display shows tArA and turns to zero. The tara remains activated also when the power is switched-off.
Filter	Averaging filter programmable from 0, 1 to 99.
Excitation	Constant Current Source adjustable from 0,5 to 2.0 mA. Voltage 2V ... 24V/40mA adjustable and isolated.
Set Points	SP1 and SP2: selectable from 0 to ± 999999 . Output: Two NPN open collector transistoren 60V-100mA Option: Relay 5A-230VAC Hystereze: selectable from 0 to ± 999999 , Delay: Response time selectable from 0 to 3900 ms. Latch function: ON: to be confirmed with ACK. <i>Option:</i> external positive logic signal 5-28V at the rear terminal. OFF: Standard Set Point function without Latch.
Supply	115V/230V $\pm 15\%$, 48 - 60 Hz. Option: 9-32VDC.
Cabinet	DIN 48x96x150 mm (HxWxD), Panel cut-out 45 x 93 mm. Plugable screw terminals.

3 MENU STEPS

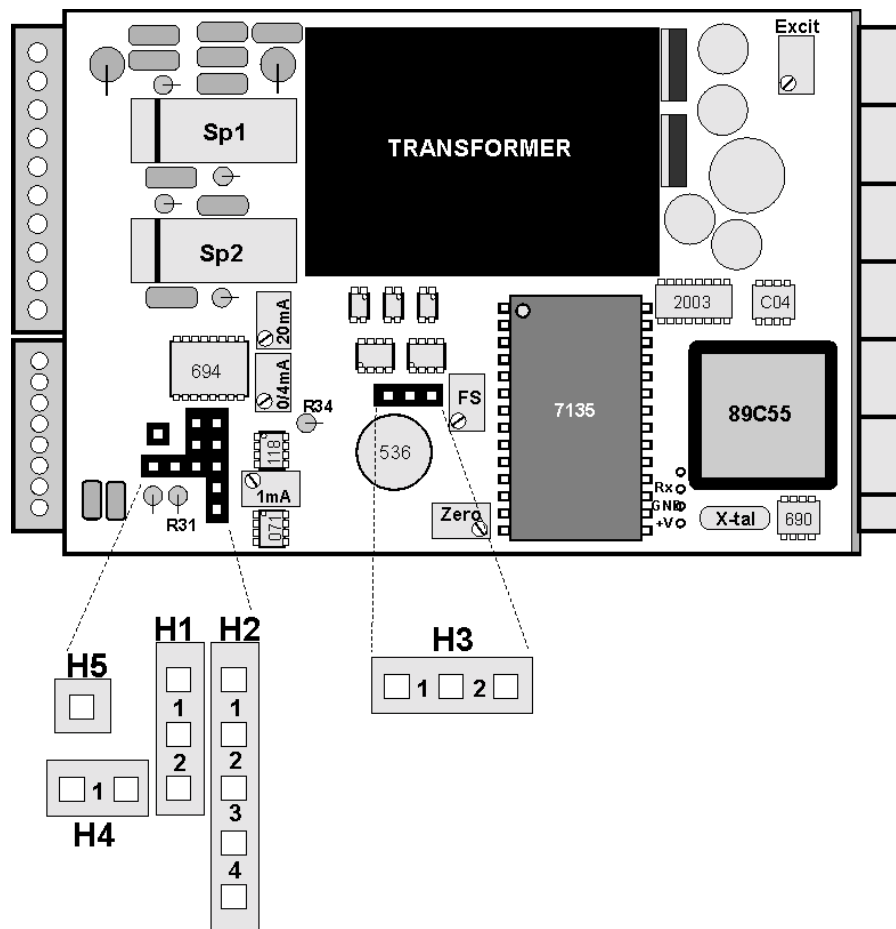
With the keypad the menu can be open and the parameters programmed. To open the menu, press *MENU*. To confirm the required parameter, press *ACK*.

The key *UP* and *DOWN* set the parameter's value. The flashing digit – cursor – can be positioned with *ACK*. To adjust the decimal point, move the cursor such that non of the digits is flashing. Then select the decimal point with *UP* and the sign with *DOWN*.

KEY	DISPLAY	DESCRIPTION
MENU	SP 1	Set Point 1. Adjustment –999999 to +999999
MENU	HSt 1	Hystereze 1. Adjustment –999999 to +999999
MENU	SP 2	Set Point 2. Adjustment –999999 to +999999
MENU	HSt 2	Hystereze 2. Adjustment –999999 to +999999
MENU	PASS	Password. Enter the correct password to programm parameters.
MENU	SEt SEn	Selection of the type of linerization
		LinEAR linear type of characteristic for DC- and AC inputs.
		Pt 100 RTD thermometer
		tC E Thermocouple E with external could junction
		tCC E Thermocouple E with internal could junction
		tC J Thermocouple J with external could junction
		tCC J Thermocouple J with internal could junction
		tC L Thermocouple K with external could junction
		tCC L Thermocouple K with internal could junction
		tC S Thermocouple S with external could junction
		tCC S Thermocouple S with internal could junction
		tC b Thermocouple B with external could junction
		tCC b Thermocouple B with internal could junction
		tC t Thermocouple T with external could junction
		tCC t Thermocouple T with internal could junction
		tC C Thermocouple C with external could junction
		tCC C Thermocouple C with internal could junction
		Cold Cold junction temperature measured and displayed
MENU	Set in	0.0 1 Setting for bipolar inputs, e.g. 0-20mA, 0-2V etc.
		0.2 1 Setting for shifted inputs, e.g. 4-20mA.
		-1 1 Setting for bipolar input signals, e.g. –20 ... +20V.
MENU	Set LO	Required display value for the minimum input signal.
MENU	Set HI	Required display value for the maximum input signal.
MENU	Aout L	Display value for analog output 4mA.
MENU	Aout H	Display value for analog output 20mA.
MENU	Fn Anl	Type of analog output: 0-20mA, 20-0mA, 4-20mA, 20-4mA.
MENU	OrdEr	Display resolution from C.ddddd to CCCCCC.
MENU	Count	Countwise of the last digit: dsp 1 = 1,2,3...9,0, dsp 2 = 2,4,6,8,0 dsp 5 = 5,0,5,0,... dsp 0 = dummy zero
MENU	dISPL	dSP 1 ... 16. Number of measurement for refreshing the display.
MENU	FILtEr	OFF, 1 ... 99. Averaging filter.
MENU	SPEEd	SLO (2.5 samples/sec) and FAST (7 samples/sec).
MENU	St PASS	Selection of password number combinations memorized.

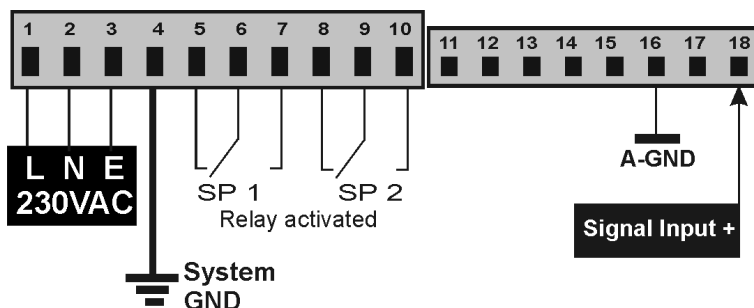
4 RANGE SELECTION

The measuring range of the instrument has been set upon the customer's requirement. If another range is required, open the cabinet and follow the instructions below.



5 CONNECTIONS - Examples

5.1 0-20mA, 4-20mA single ended



Inputs

18 (+), 16 (GND), single ended

Configuration

R31 = shorted

R34 = 68kOhm

H1 = 1

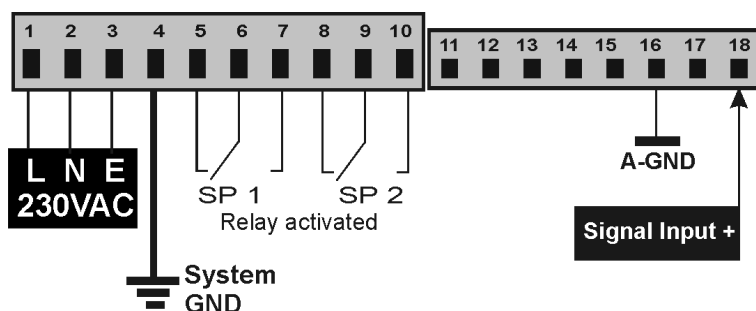
H2 = 3

H3 = 1

Set in = 0.0 1 (0-20mA)

Set in = 0.2 1 (4-20mA)

5.2 2V DC or 2V RMS, single ended



Input

18 (+), 16 (GND), single ended

Configuration

R31 = 1 MOhm

R34 = open

H1 = 1

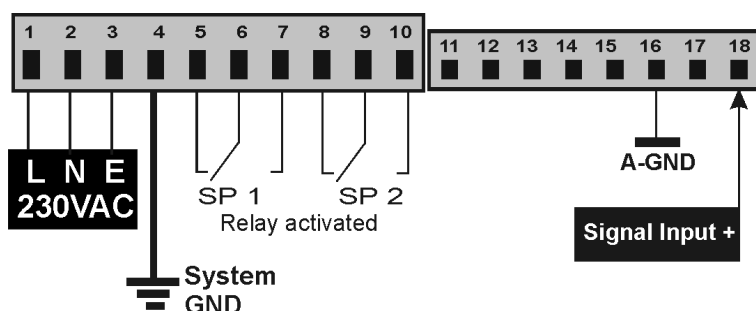
H2 = 1

H3 = 1 for DC,

H3 = 2 for RMS

Set in = 0.0 1

5.3 20V DC or 20V RMS, single ended



Input

18 (+), 16 (GND), single ended

Configuration

R31 = 1 MOhm

R34 = offen

H1 = 1

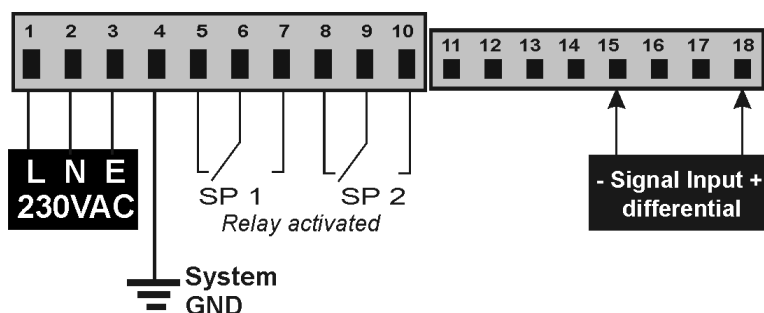
H2 = 1 + 4

H3 = 1 for DC,

H3 = 2 for RMS

Set in = 0.0 1

5.4 Differential Input for Signals $\geq 20\text{mV}$ DC or true RMS



Input

18 (+), 15 (-) differential

Configuration

R31 = shorted

H1 = 1

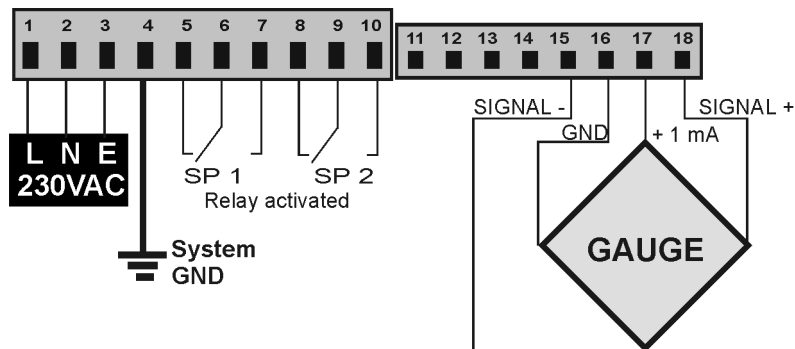
H3 = 1 for DC,

H3 = 2 for RMS

Set in = 0.0 1

Range	R34	Range	R34
20mV	511r	150mV	3k92
50mV	1k3	200mV	5k62
100mV	2k67	250mV	6k98

5.5 Strain Gauge with Constant Current Supply



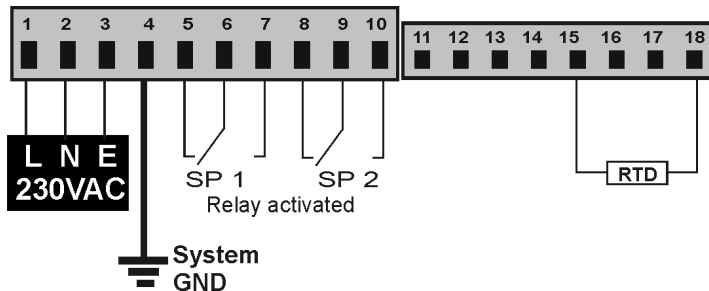
Input
18 (+), 15 (-)

Excitation
17 (+), 16 (-)

Configuration

R31 = shorted
R34 = according to required Gain
R39 = not used (current source has grounded minus terminal)
H1 = 1
H3 = 1
Set in = 0.0 1

5.6 Pt-100 and Ohm- Measurements, 2 terminals



Input
18 (+), 15 (GND)

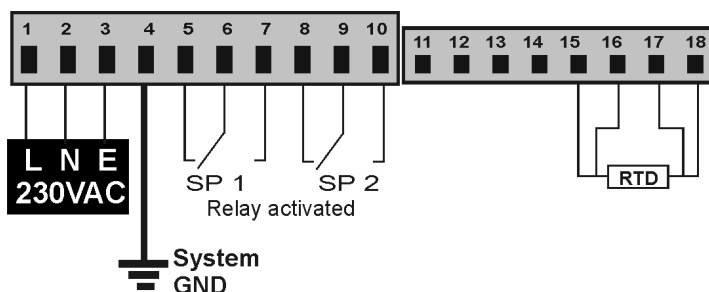
Configuration

R31 = shorted
R34 = 13k3
H1 = 2 H3 = 1
H2 = 1 H4 = 1
H5 = connect to Terminal 16.
Set in = 0.0 1
Set Lo = 0
Set Hi = 400

Pt-100 Two Terminal Connection

Select *LINEAR* in Menu Step *Set Sen*. The Display shows the resistance. Calibrate the FULL SCALE with 309 Ohm for a display of 309.0. Shorten the sensor and set zero with ZERO potentiometer. Select *Pt-100* in the Menu Step *Set Sen*. The Display shows the temperature in °C.

5.7 Pt-100 und Ohm-Messung in Vierleiteranschluss



Input
18 (+S), 15 (-S)

Excitation
17 (+E), 16 (-E)

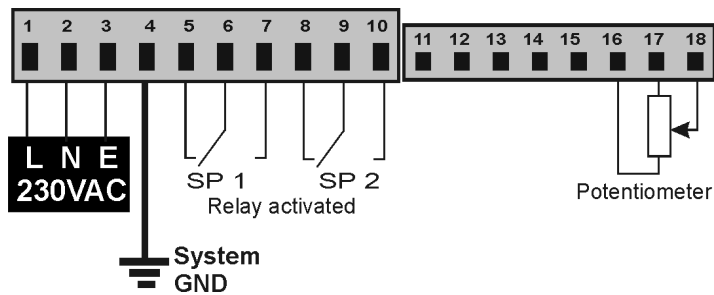
Configuration

R31 = shorted
R34 = 13k3
H1 = 2 H3 = 1
H4 = 1
H5 = connect to Terminal 16.
Set in = 0.0 1
Set Lo = 0
Set Hi = 400

Pt-100 Four Terminal Connection

Select *LINEAR* in Menu Step *Set Sen*. The Display shows the resistance. Calibrate the FULL SCALE with 309 Ohm for a display of 309.0. Shorten the sensor and set zero with ZERO potentiometer. Select *Pt-100* in the Menu Step *Set Sen*. The Display shows the temperature in °C.

5.8 Potentiometer: Supplied with 1mA constant current



Input
 Potentiometer: 17 (+), 16 (-E)
 Slider: 18 (+S)

Configuration
 R34 = open
 H1 = 1, H3 = 1, H4 = 1

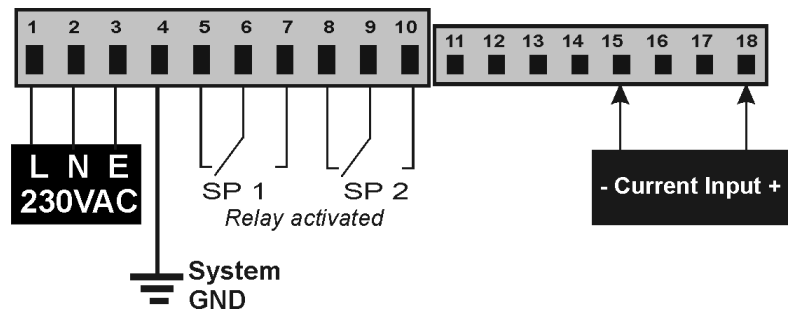
Set in = 0.0 1
 Set Lo = 0
 Set Hi = 400

5.9 True RMS 5A Currents

Input: 0 ... 5A RMS. Internal Shunt 0.01 Ohm.
 Display: Example: 0 ... 400.0
 Output: 4 ... 20mA

Parameters:

Set SEn **LinEAr**
 Set in **0.0 1**
 Set LO **000000**
 Set Hi **000800**
 Aout Lo 000000
 Aout Hi 000400
 Fn Anl 4-20mA
 OrdEr CCCCC.d
 Count dSP 1
 dISPL dSP 1
 FILtEr OFF
 SPEEd SLO
 St PASS 1001

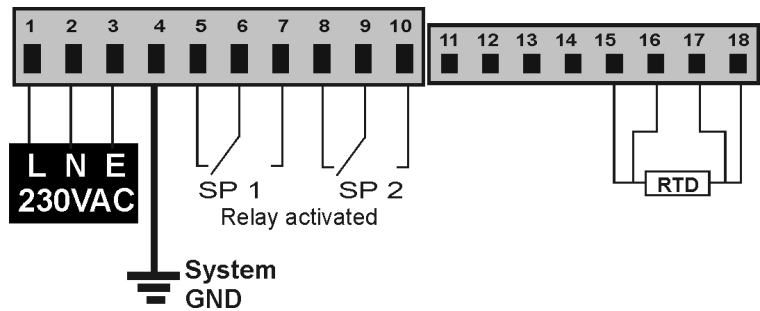


5.10 Pt-100 RTD Thermometer

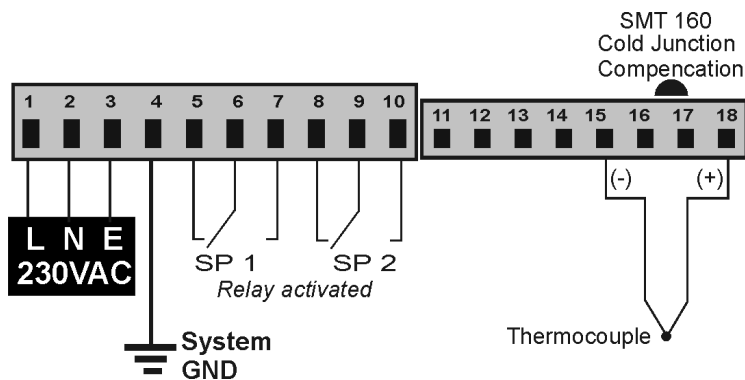
Input: Pt-100, two- or four wire connection. Excitation 1.0 mA
 Display: -200.0 ... +800.0
 Output: Two Relay SP1 and SP2

Parameters:

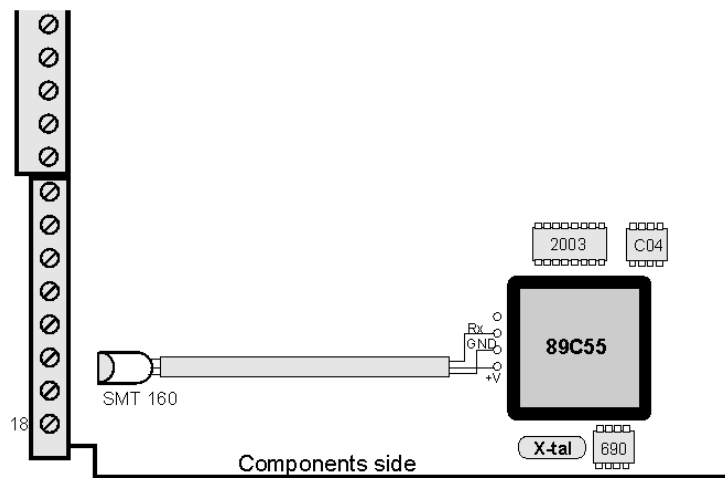
Set SEn **Pt 100**
 Set in **0.0 1**
Set LO 000000
 Set Hi **000400**
 Aout Lo 000000
 Aout Hi 000000
 Fn Anl 4-20mA
 OrdEr **CCCCC.d**
 Count dsp 1
 dISPL dSP 1
 FILtEr OFF
 SPEEd SLO
 St PASS 1001



5.11 Thermocouples



5.12 Cold Junction



Cold Junction compensating sensor SMT 160 is glued at the cabinet rear side near to the screw terminals.

Range: R34 (Gain) = 34k

R31 shorted

Differential Input 16 (+) and 13 (-), H1 set.

Set LO 0

Set Hi 000100

OrdEr CCCC.dd

Calibrate with Linear characteristic and 100mV DC-Signal:

SEt SEn Linear (100mV input = 100.00 Display)

After this calibration set the required linearizing table:

Set SEn e.g. J

Order CCCCCC.

Attention: Due to the 7 segment readout capability is the thermocouple **K** assigned in the menu as **L**.

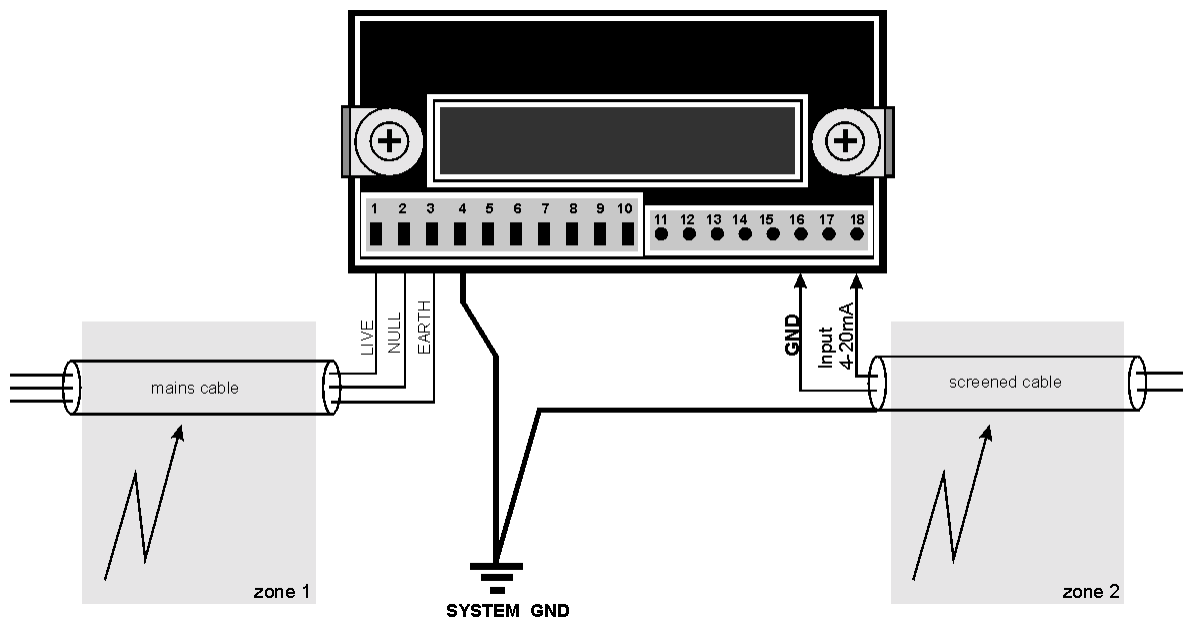
6 BURST TEST and recommended GROUNDING

Tester: Burst-Surge generator HILO, Model CE-Tester
Datum: 18. October 2000
E.U.T.: OC7011, SN:201018, Supply 230VA
Mode: Linear, Set Lo = 000000, Set Hi = 020000
Input: 4-20mA
Display: 20 000

6.1 Test Conditions

According to EU norms: IEC 801-4
IEC 1000-4-4
EN 50052-1

6.2 Test Set - Up



6.3 Test Results

Zone 1:	2kV Burst	Display 20000 without change
Zone 2:	2kV Burst	Display 20000 without change

Technician: Oliver Matthews 18. October 2000
CE-Certification Nr. 409/18-30/2001-4568