

LARGE DISPLAY OC57- DC

for DC-Signals

Owner's Manual

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 OC57-DC beinhaltet, einschliesslich einer Betriebsanleitung OC57-DC.

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 OC57-DC Large Display.

Operator's Manual OC55-DC.

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

Large Display for DC Signals OC57-DC	page	4
1	KEYBOARD	5
2	SPECIFICATIONS	6
3	MENU STEPS	7
4	CONNECTIONS – Instrument without Options	8
5	LINEARIZING METHODS	9
	5.1 LINTAB	10
	5.2 TABLIN	11
	5.3 TABTAB	12
	5.4 POLYNOM	13
6	H-TEST and CALIBRATION	13
7	BURST TEST and recomendet Connections	14
	7.1 Test Conditions	14
	7.2 Tet Set-up	14
	7.3 Test Results	14
8	DIMENSIONS	15

LARGE DISPLAYS for DC-SIGNALS

OC57-DC

- ✓ 6 digit Display ± 999999
- ✓ $\pm 100\ 000$ true Points
- ✓ 0/4-20mA, 20mV to 200VDC
- ✓ Echt R.M.S. Option
- ✓ Eight Set Points
- ✓ Two Analog Outputs
- ✓ RTD, Thermistor and J,K,E,S,B,T,C
- ✓ Peak and Valley Memory
- ✓ Two Serial Data Ports



OC57-DC are 6 digit programmable large displays with $\pm 100\ 000$ true measuring points. They are designed for connecting of process signals such as 0-20mA, 4-20mA, $\pm 10\text{mV}$, $\pm 100\text{mV}$, $\pm 1\text{V}$, $\pm 10\text{V}$, $\pm 300\text{V}$ DC or true RMS, Pt-100, Pt-200, Thermistor and DIN-Thermocouples J, K, E, S, B, T, C with internal or external cold junction compensation.

The keyboard at the rear panel permits two points direct assignment of the input signal to the any two display values.

The menu contains setting of input signal type, tare, linearizing tables, filter, display refresh rate, display count, resolution, set points and serial data port.

Assignment of the input signal to the required display can be done with the keyboard at the rear of the instrument. The assignment is in two points, e.g. an input signal of 4-20mA corresponds to 0-1500.0 reading at the display. The overrange is indicated at the display when the input signal exceeds 110%.

Eight Set Points can be adjusted across the whole display range. The activate 8 open collector transistors or 4 transistors and 4 mechanical relay. Each set point has a programmable hysteresis.

Display Refresh Rate is selectable between 1 and 16. The selected number determines the number of measurements for one display refresh.

Display Count of the last significant digit can be set for readings of 1,2,3...9,0 or 2,4,6,8,0 or 0,5,0,5... or dummy zero.

Digital Filter has an averaging character. The number of filter samples is selectable between 1 and 99.

Display Resolution can be set for up to five decimal points.

Analog Outputs (Option) 0/4-20mA and -10 ... +10V is derived from the display reading and can be assigned with the keyboard to any two display values. The resolution is 12 bit or 4096 increments.

Tara is activated with the keyboard and resets the display to zero. The tara can be deactivated causing the display to return to the original non-tara value. Once activated, the tara remains memorized also when the instrument is switched-off from the supply.

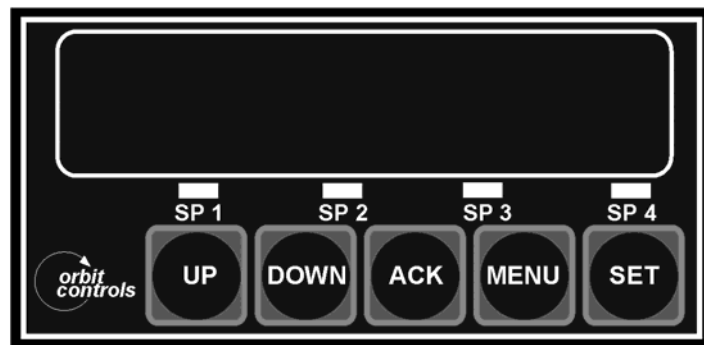
Peak and Valley Memory measures and memorizes the maximum positive and the maximum negative display readings during the measurement. The memorized peaks can be recalled into the display with the keys UP or DOWN. The key SET resets the memory.

Serial Data Ports (Option) RS232 and RS485 are programmable with the keyboard. The RS485 has a selectable address 1 - 31. The address 0 activates RS232. One of addresses 1-31 activates RS485.

Set Points (Option) can be programmed with the keyboard. They activate 8 open collector Transistors or 4 transistors and 4 mechanical relay.

1 KEYBOARD

With the keyboard at the rear panel the menu can be opened and the parameters programmed. The menu contains setting of input signal type, tara, linearizing tables, filter, display refresh rate, display count, resolution, set points and serial data port.



2 SPECIFICATIONS OC57-DC

Input	Voltage: $\pm 10\text{mV} \dots \pm 300\text{V}$ DC or true RMS. Current: 0/4-20mA, 100mA, 1A, 5A DC or RMS. RTD: 2 or 4 wire connection. Range -200.0 ... + 650.0 °C. Thermistor: 2 wire connection DIN-T/C: E, J, K, S, B, T and C. Junction: Internal cold junction compensation from 0 to 60 °C.
Accuracy	DC: $\pm (0.02\% + 1\text{digit})$ from range. RMS: DC - 5kHz: $\pm (0.1\% \text{ from value} + 5 \text{ digit})$. RTD: $\pm (1^\circ\text{C} + 1 \text{ digit})$. T/C: $\pm (1^\circ\text{C} + 1 \text{ digit})$.
Tempco	$\pm 25 \text{ ppm/ } ^\circ\text{C}$.
A-D Convertor	ADC with 20 bit resolution is scalable up to ± 999999 . Conversion 10 samples/sec.
Linearity	$\pm (1 \text{ LSB} + 1 \text{ digit})$.
Display	0 ... ± 999999 , 7 segment red LED, 57, 100 or 125mm. The overrange is indicated with the upper display segments oooooo.
Analog Output	0/4-20mA and 0-10V. Resolution 12 bit.
Tara	The TARA function is enabled in the menu step tArA . In the measuring mode the tara is activated with the key SET. The display shows tArA and resets to zero. The tara remains memorized also when the supply voltage is removed from the instrument. When the key SET is pressed again, the tara is switched-off, the display shows notArA and returns to show the original signal value without tara.
Filter	Average filter programmable from 1 to 99.
Excitation	Option: Constant current source adjustable from 0.5 to 3 mA. Option: Voltage adjustable from 2 to 24VDC/40mA.
Set Points	SP1 ... SP8 programmable from 0 to ± 999999 . Ausgang: NPN open collector transistors 60V-100mA. Relay 5A-230VAC Hystereze: programmable from 0 to ± 999999 . The Set Points are optional.
Data Ports	8 bit, no parity, 1 start and 1 stop, baud rate 1200 to 19200 bd. The address 0 activates RS232. One of addresses 1-31 activates RS485.
Supply	230V (115V) $\pm 15\%$, 48-60 Hz, 10VA, T-100mA/230V (T-200mA/115V).
Cabinet	Aluminum cabinet for panel mount, IP65 at the front. Option: Wings for wall mount.
Terminals	Signal: D-SUB. Mains: Plug with a fuse.

3 MENU STEPS

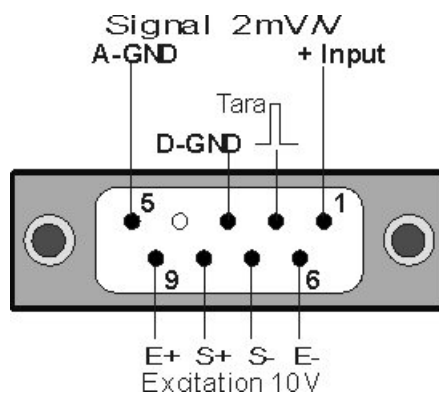
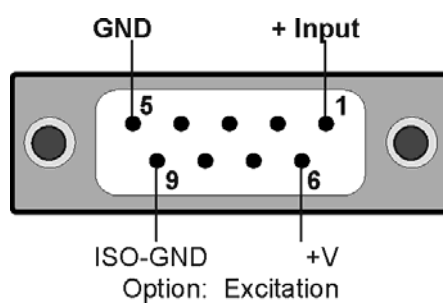
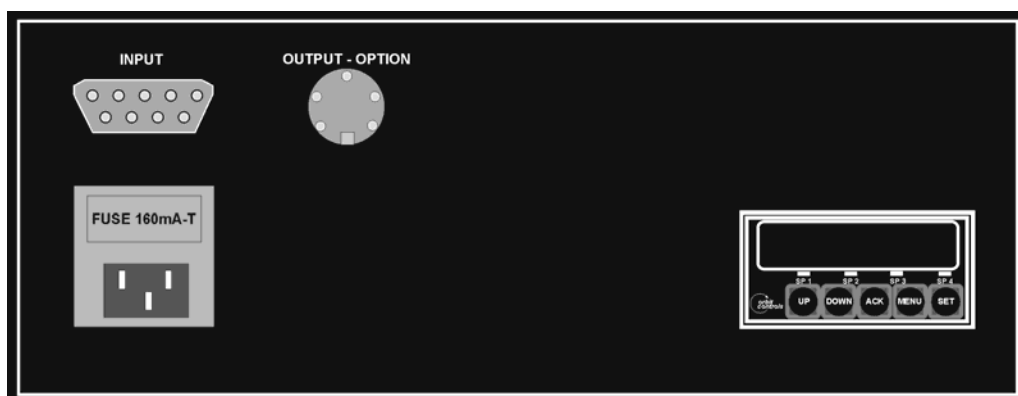
The key *MENU* opens the menu of parameters. The required parameter can be confirmed with *ACK*. The keys *UP* or *DOWN* adjust the value. The flashing digit - Cusror - can be positioned with *ACK*. The sign and the decimal point can be set when non of the digit is flashing, when the cursor is moved outside the display range. The key *UP* selects the decimal point, *DOWN* the sign.

The 6 digit display shows the menu in full words. At a 4 digit display are the words abbreviated as shown below.

Key	Display 6 Digit	Display 4 Digit	Function
MENU	SEt SEn	SEtS	Input function
	LinEAr	LInE	Linear charakteristic for DC- and AC signals.
	POLYn	POLY	Polynom fifth degree
	LintAb	LtAb	Linearizer Typ 1
	tabLin	tLin	Linearizer Typ 2
	tabtab	ttab	Linearizer Typ 3
	Pt 100	P100	RTD Thermometer with 100Ω at 0°C
	tC E	tCE	Thermocouple E with external compensation
	tCC E	tCCE	Thermocouple E with internal compensation
	tC J	tCJ	Thermocouple J with external compensation
	tCC J	tCCJ	Thermocouple J with internal compensatio
	tC L	tCL	Thermocouple K with external compensation
	tCC L	tCCL	Thermocouple K with internal compensation
	tC S	tCS	Thermocouple S with external compensation
	tCC S	tCCS	Thermocouple S with internal compensation
	tC b	tCb	Thermocouple B with external compensation
	tCC b	tCCb	Thermocouple B with internal compensation
	tC t	tCt	Thermocouple T with external compensation
	tCC t	tCCt	Thermocouple T with internal compensation
	tC C	tCC	Thermocouple C with external compensation
	tCC C	tCCC	Thermocouple C with internal compensation
	Cold	COLd	Temperature of the cold junction
MENU	Set inP	SEtI	Input Signal Type
	0.0 1	0.0 1	Selection of unipolar signals, e.g. 0...20mA,
	0.2 1	0.2 1	Selection of signals with offset, e.g. 4-20mA.
	-1 1	-1 1	Selection of bipolar signals, e.g. -20 ... +20V.
MENU	Set LO	SEtI	Required display for min. input signal, e.g. 0V.
MENU	Set HI	SEtH	Required display for max. input signal, e.g. +2V.
MENU	bAr LO	bArL	Bargraph value for min. input signal e.g. 4mA = 0
			Only when Bargraph is activated
MENU	bAr HI	bArH	Bargraph for max. input signal e.g. 20mA = 50
			Only when Bargraph is activated
MENU	tAra	tArA	Activation of the TARA function On or OFF.
			On=activated, Off=disabled
MENU	OrdEr	OrdE	Display resolution C.ddddd to CCCCCC.
MENU	Count	Coun	Display count: 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	dISP	dSP 1 ... 16. Display refresh
MENU	FILtEr	FILt	OFF, 1 ... 99. averaging filter constant
MENU	SP Fn	SPFn	Activation of Set Points On/OFF
			On=activated, Off=disabled
MENU	SP 1	SP1	Set Point 1. Selection range -999999 to +999999
MENU	HSt 1	HSt 1	Hystereze 1. Selection range -999999 to +999999
 for SP2, HSt2	to SP8, HSt 8	
MENU	An Fn	AnFn	Analog Output On or OFF
MENU	Aout L	OutL	Display value for Analog Output 0/4mA, 0V.
MENU	Aout H	OutH	Display value for Analog Output 20mA, 10V.

MENU	bAUd	bAUd	Baud Rate 1200 to 19200
MENU	Adr rS	AdrS	Address of the data port
MENU	SELbAr	SELb	Select no bAr/nbAr with digits displays
MENU	Fn bAr	FnbA	HALF or FULL with bargraph-digit combination
MENU	StArt	Art	Measuring Mode

4 CONNECTIONS – Instrument without options



5 LINEARIZING METHODS

The implemented software permits selection of four linearizing methods. In the menu step **Set Sen** they are listed as POLYN, LINTAB, TABLIN and TABTAB.

POLYNOM

Non linear functions which can be described with a polynomial, can be linearized with a fifth degree polynomial method. The coefficients are 6 digit with decimal point and sign, the exponents can be selected from 0 to ± 5 .

The polynomial can be entered via the keyboard or via the serial data port.

$$DISPLAY = \pm Coef\ 0 \times 10^{\pm 0} \pm Coef\ 1 \times 10^{\pm 1} \pm Coef\ 2 \times 10^{\pm 2} \pm Coef\ 3 \times 10^{\pm 3} \pm Coef\ 4 \times 10^{\pm 4} \pm Coef\ 5 \times 10^{\pm 5}$$

LINTAB

This linearizing method can be used when a linear input signal has to be transformed into a non-linear display. Up to 38 points are available for the linearizing.

TABLIN

This linearizing method can be used when a non-linear input signal has to be transformed into a linear display. Up to 38 points are available for the linearizing.

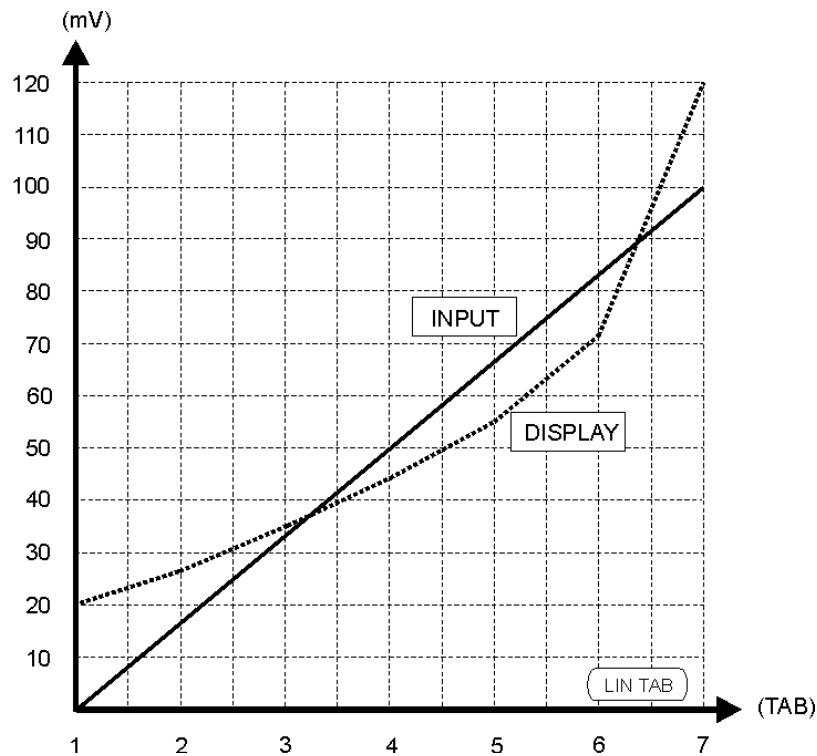
TABTAB

This linearizing method can be used when a non-linear input signal has to be transformed into a non-linear display. The input signal is measured and displayed. The display can be modified via the keyboard in order to show the required value. Up to 19 points are available for the linearizing.

5.1 LINTAB

The input signal is linear, the display is non linear.

Example: Linearizing in 7 points.



Parameters

Set Lo = 0
Set Hi = 100
TabSet = LinTab
Coef = 7
Tb st = 0
Tb in = 16.6667
Tb1 = 20
Tb2 = 26
Tb3 = 35
Tb4 = 44
Tb5 = 55
Tb6 = 72
Tb7 = 120

Fig. 1

Range settings:

SetLo = 0, SetHi = 100

Type of linearizing:

TabSet = LinTab

Number of linearizing points:

Coef = 7

Position of the first linearizing point:

Tb st = 0

The input signal 0 - 100mV (Fig. 1) is divided into 7 points. This results in **tb in**:

$$\frac{\text{Set Hi}}{\text{Coef} - 1} = \frac{100}{7 - 1} = 16,6667$$

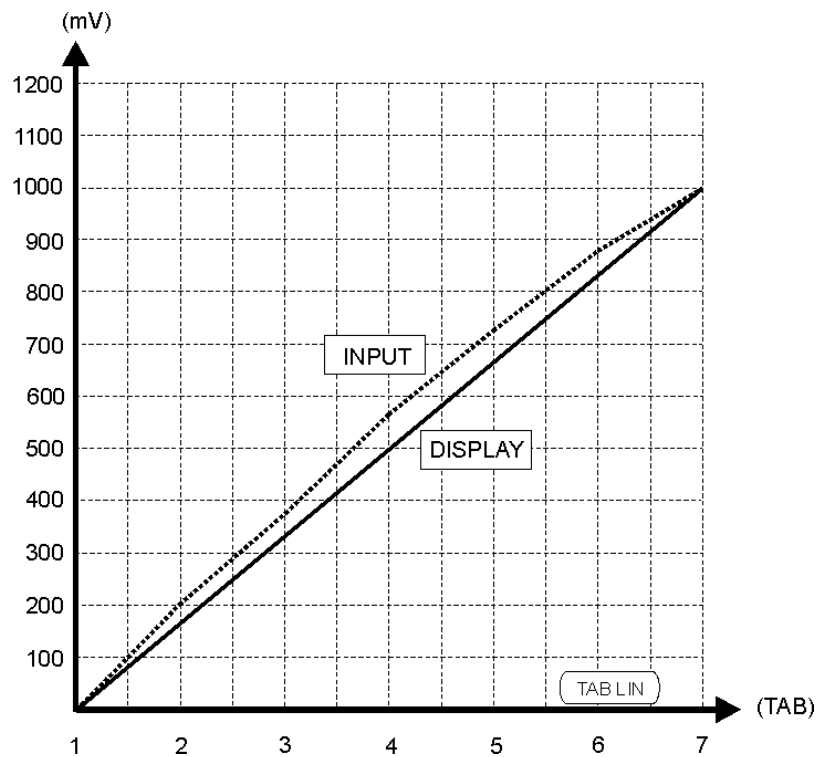
To each point a display value is assigned:

Tb1	for	0mV	→	0
Tb2	for	16.7mV	→	26
Tb3	for	33.3mV	→	35
Tb4	for	50mV	→	44
Tb5	for	66.7mV	→	55
Tb6	for	83.3mV	→	72
Tb7	for	100mV	→	120

5.2 TABLIN

The input signal is non-linear, the display is linear.

Example: Linearizing in 7 points.



Parameters

Set Lo = 0
 Set Hi = 1000
 TabSet = TabLin
 Coef = 7
 Tb st = 0
 Tb in = 166.667
 Tb1 = 0
 Tb2 = 200
 Tb3 = 380
 Tb4 = 570
 Tb5 = 720
 Tb6 = 870
 Tb7 = 1000

Fig. 2

Range settings:

SetLo = 0, SetHi = 1000

Type of linearizing:

TabSet = TabLin

Number of linearizing points:

Coef = 7

Position of the first linearizing point:

Tb st = 0

The linear display 0 - 1000mV (Fig. 2) is divided into 7 points. This results in **tb in**:

$$\frac{\text{Set Hi}}{\text{Coef} - 1} = \frac{1000}{7 - 1} = 166,667$$

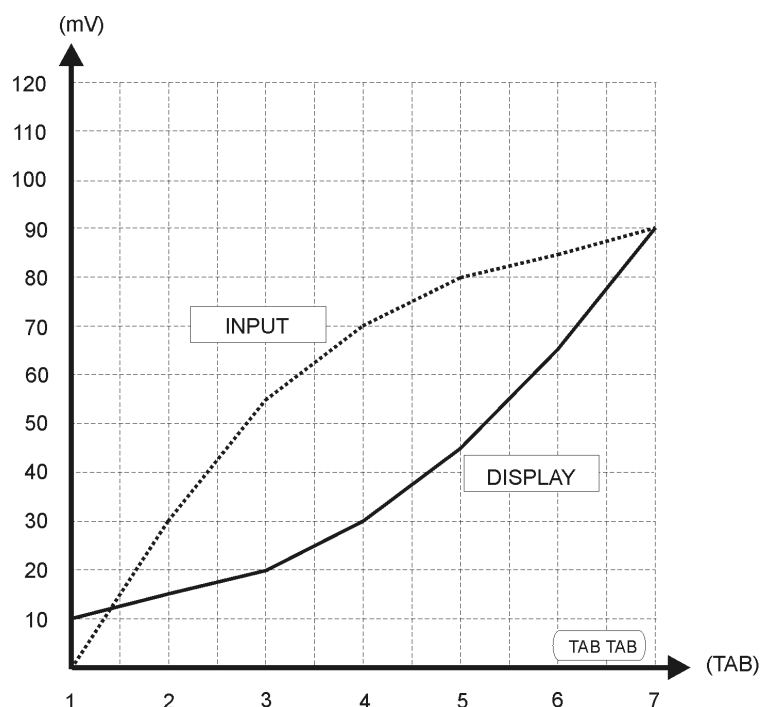
To each point an input value is assigned:

Tb1	for	0 mV	→	0
Tb2	for	200 mV	→	166.7
Tb3	for	380 mV	→	333.3
Tb4	for	570 mV	→	500
Tb5	for	720 mV	→	666.7
Tb6	for	870 mV	→	833.3
Tb7	for	1000 mV	→	1000

5.3 TABTAB

The input signal and the display are non-linear. The instrument measures the input signal. The display readings can be changed with the keyboard.

Example: Linearizing in 7 points (14 coefficients).



Parameters

Set Lo = 0
Set Hi = 100
tabSet = tabtab
CoEf = 14
tb st = 0
tb In = 0
tbi 01 = 10
tbd 01 = 0
tbi 02 = 15
tbd 02 = 30
tbi 03 = 20
tbd 03 = 55
tbi 04 = 30
tbd 04 = 70
tbi 05 = 45
tbd 05 = 80
tbi 06 = 65
tbd 06 = 85
tbi 07 = 90
tbd 07 = 90

Fig. 3

Range settings: **SetLo = 0, SetHi = 100**
Type of linearizing: **TabSet = TabTab**
Number of linearizing points: **Coef = 14**

The parameters **tb st** and **tb In** are not relevant and are set for 0.

Programming Steps (the first two linearizing points as example)

Key	Display	
MENU	SetSEn	
ACK	tAbtAb	Select with UP or DOWN
MENU	CoEF	Number of coefficients
ACK	14 COE	Select with UP or DOWN
MENU	td St , tb In	Both parameters set to zero
MENU	tbi 01	Apply the signal from the calibrator for the first point
ACK	XXXXXX	The memorized value from previous setting is displayed
SET	LinEAr	Display switches to the momentary signal from the calibrator
SET	StorE	The actual signalvalue is memorized and stored
MENU	tbd 01	Recal of the first display value
ACK	XXXXXX	Adjust the required display value with UP, DOWN and ACK
MENU	tbi 02	Apply the signal from the calibrator for the second point
ACK	XXXXXX same for all 14 linearizing points. After all points have been set, press MENU and SET after this. The display returns into the measuring mode.

5.4 POLYNOM - Linearisierung

When a non-linear signal can be described with a polynom, a polynom linearizing method can be used. The implemented software offers a fifth degree polynom which can be entered with the keyboard. The coefficients are six digits with decimal point and sign, the exponents can be selected from 0 to ± 5 .

The data can also be entered via the serial data port.

The results are displayed like:

DISPLAY = $\pm \text{coef } 0 \times 10^{\pm 0} \pm \text{coef } 1 \times 10^{\pm 1} \pm \text{coef } 2 \times 10^{\pm 2} \pm \text{coef } 3 \times 10^{\pm 3} \pm \text{coef } 4 \times 10^{\pm 4} \pm \text{coef } 5 \times 10^{\pm 5}$

6 H-TEST and CALIBRATION

For Service purposes and calibration of the analog output is the service menu available. Hold the key SET during switching-on the power until the display shows **HtEst**.

With the key MENU the test steps are advanced forward, with SET backward.

SEGMENT TEST: The sign and all display segments are tested for the function.

SET POINTS: The set points are tested, When the relay option is build-in, the relay function can be checked.

ANALOG OUTPUTS: Further the analog outputs are activated. The display increments Out -10, -5, 0, 5, 10 and the corresponding analog output signals 0/4-20mA and -10 to +10V are generated. When the analog output option is build-in, the output signals can be precisely calibrated.

The next enter MENU switches the display into the measuring mode.

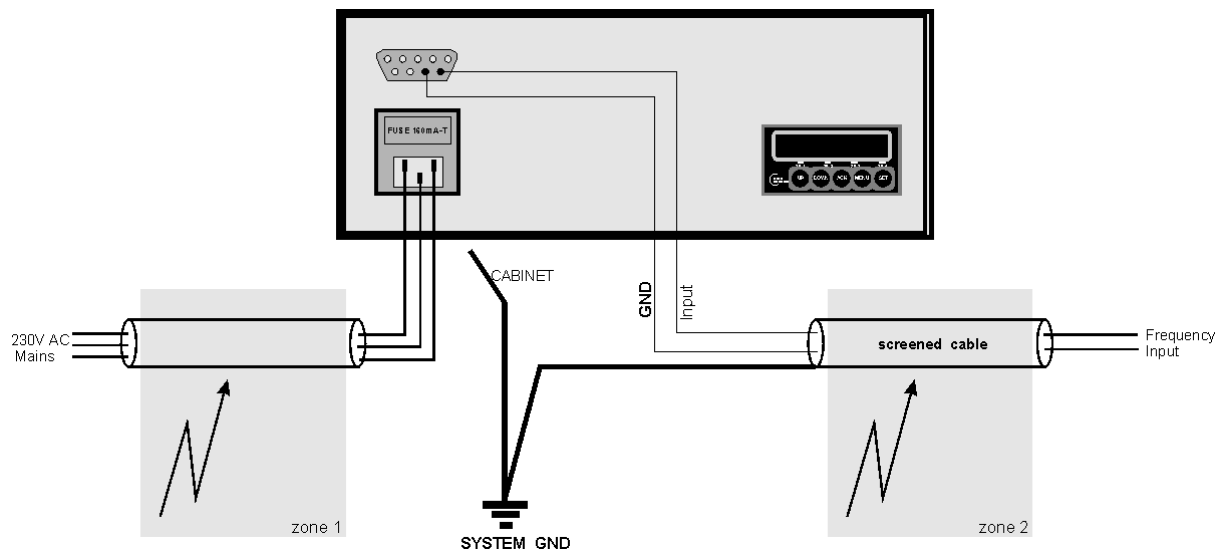
7 BURST TEST and recommended CONNECTIONS

Tester: Burst-Surge Generator HILO, Model CE-Tester
Date: 7.May 2001
E.U.T.: OC55-DC, SN:210507, Supply 230VA
Input: 4-20mA
Display: 0-10 000

7.1 Test Conditions

IEC norms: IEC 801-4
IEC 1000-4-4
EN 50052-1

7.2 Test Set - Up

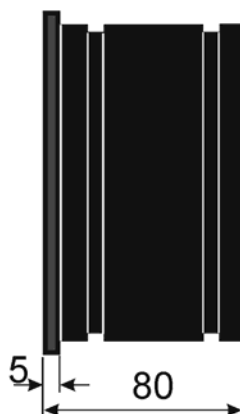
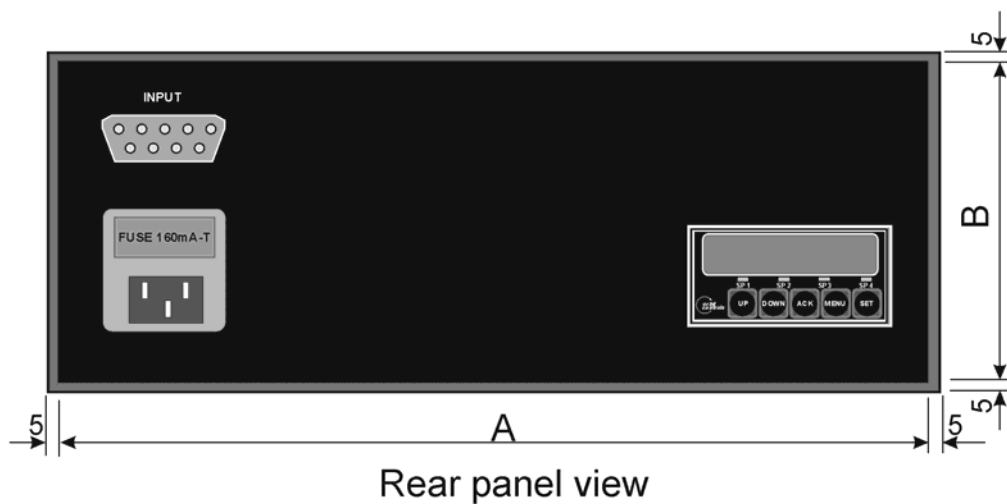
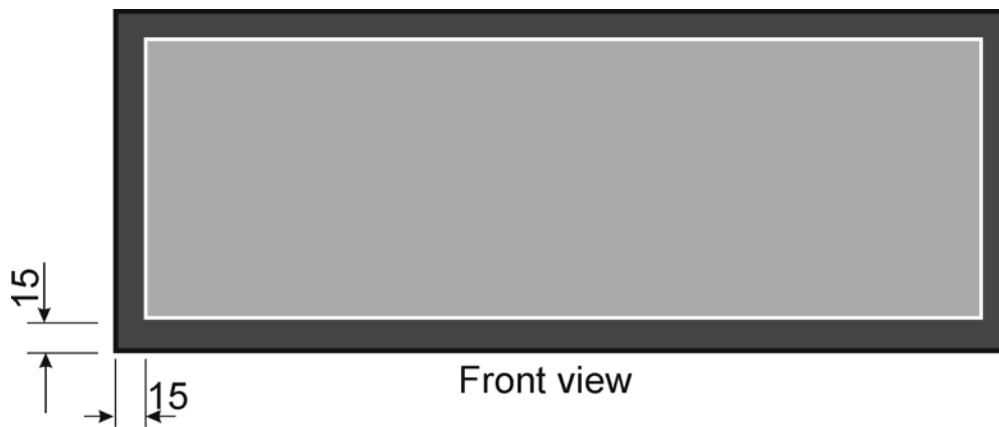


7.3 Test Results

Zone 1:	2kV Burst	Display 10000 without change
Zone 2:	2kV Burst	Display 10000 without change

CE approval: 409/18-30/2001-4568 from 12.6.2001 VUTE Prag

8 DIMENSIONS



Model	A	B
OC57	368	112
OC100-4	458	173
OC100-6	644	173
OC125-4	535	229
OC125-6	748	229

Panel Cut-Out: A x B

ORBIT CONTROLS AG Switzerland		
gezeichnet	AVT/15.3.1998	Remote Large Displays OC57, OC100, OC125 Model OM
Rev.:	AVT/6.6.2002	
not scaled for internal use only		