PROGRAMMABLE CONTROLLER OC 7015

OWNER'S MANUAL

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Unpacking Instructions

Remove the Packing List and verify that you have received all equipment, including the following:

Orbit Controls Model OC 7015 Programmable Controller.
Operator's Manual OC 7015.

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

NOTE

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The carrier will not honour 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.

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Programmable Controller OC 7015

- ✓ **6 digit Display ± 999999**
- ✓ **± 100 000 true measuring points**
- ✓ **20mV... 250mV ranges**
- ✓ **Option: 0/4 - 20 mA current loops**
- ✓ **Two Set Point Relay**
- ✓ **38 Linearizing points**
- ✓ **Free programmable**
- ✓ **Pt-100 Thermometer**
- ✓ **Thermocouples J,K,E,S,B,T,C**
- ✓ **RS232 and RS485 outputs**
- ✓ **Analogue Outputs 0-10V, 0/4-20mA**
- ✓ **Direct assignment Input - Display**
- ✓ **Excitation**

Model OC7015 is a 6 digit programmable controller with ±100 000 true measuring points. The instrument is suitable to process signals from strain gauges with current or voltage excitation, RTD thermometers Pt-100 and thermocouples J,K,E,S,B,T and C with internal or external could junction compensation. A direct assignment of linear input signals to a desired display reading is available with the keyboard. Apart of this, four linearizing methods can be activated for linearizing of non-linear input signals.
Four scaling constants are memorized and can be selected with the keyboard. They permit displaying results of connected pressure transducers in bar, psi, MPa or mH_2O. The units are indicated with LEDs at the instrument's front.
With the keyboard at the front the menu can be entered and the parameters selected. The menu contains setting of the password, two set points, linearizing tables, the filter, the sampling speed, the display refresh rate, the counting type, the display resolution, two analogue outputs and two serial port parameters.
The instrument can be software calibrated via the keyboard.

Assignment of the inputs signal to the desired display reading can be performed in two points with the keyboard. An input signal of e.g. 20mV from a strain gauge can be assigned to a display reading of 0-1500.0 PSI. The display shows overrange when the input signal is larger than 110%.

Display Resolution can be selected for up to 5 decimal points. An autoranging feature is implemented.

Two Set Points can be selected within the entire display range. They activate two open collector transistors or two mechanical relay. Each set point has programmable hystereze and delay.

Display Rate can be selected for SLOW or FAST. The Fast Rate corresponds to a measuring time of 66ms. The display can be refreshed in selectable measuring cycles.

Display Count of the LSD can be selected for 1,2,3...9,0 or 2,4,6,8,0 or 0,5,0,5.. or dummy zero.

Digital Filter with a programmable constant from 1 to 99 calculates the average value of the measured signal. The filter will be used at noisy environments or disturbed signals in order to show steady readings.

Units bar, psi, MPa and mH_2O constants are memorized and can be recalled with the keyboard. They are indicated at the display with LEDs.

Analogue Outputs (Option) 0/4-20mA and/or 0 ... ±10V are derived from the display and can be assigned with the keyboard to any two desired display values. The resolution is 12 bit. The isolated analogue output can be select as direct proportional or inverted.

RS-Data Ports (Option) RS232 and RS485 with programmable baud rate and address can be selected with the keyboard. The data ports are isolated.

Tara can be activated with the keyboard and sets the display to zero. The Tara remains memorized also when the power supply is switched-off. Three Tara functions are available-see page 7.

Four Linearizing Methods can be selected with the keyboard. Non linear sensors such as strain gauges, pressure transducers, LVDTs, level sensors, inclinometers and many other signal sources can be linearized in up to 38 points. The linearizing tables or Polynom can be entered with the keyboard or via the serial data port. The results at the display can be directly corrected with the keyboard.

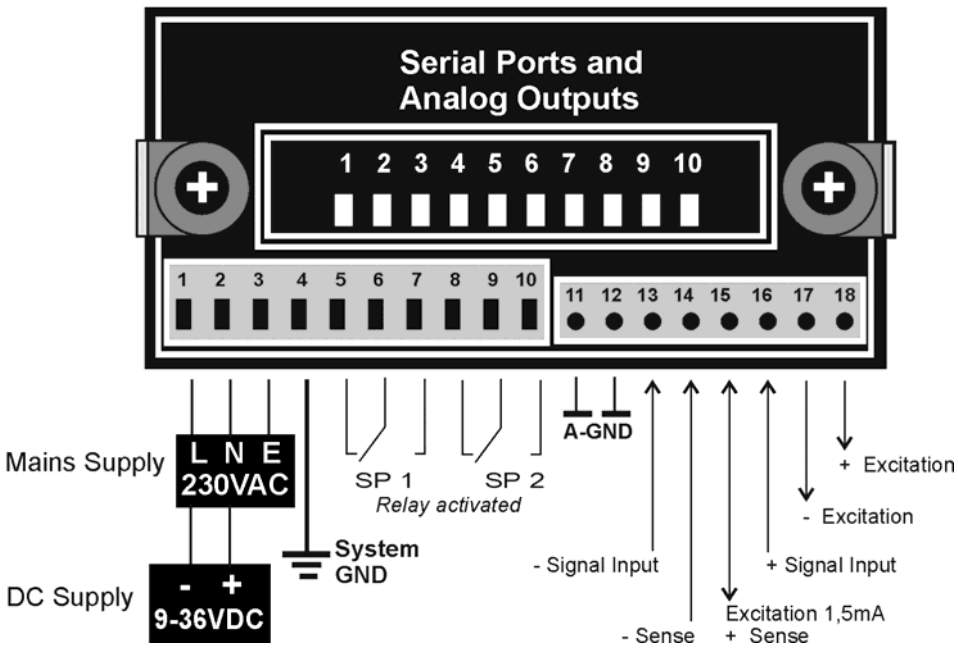
Thermocouples and Pt-100 sensors can be directly connected and linearized. The cold junction is compensated with a sensor at the input terminals. The menu supports also a compensation of external cold junction. The display resolution can be set for 1°C or 0.1°C.

Password is used to lock the keyboard against unauthorized entry into the menu and changing of parameters. Without the password, only the set points can be changed.

1 KEYBOARD

Key	Function
MENU	Entering the menu and scrolling the menu steps at the display
ACK	Confirmation of the selected menu step. Moving the flashing digit - Cursor.
UP	Increasing the selected digit value. Positioning the decimal point.
DOWN	Decreasing the selected digit value. Selecting the sign.
SET	Termination the programming mode and starting the measuring mode. Tara of the display in measuring mode.

2 REAR OF THE INSTRUMENT



3 SPECIFICATIONS

Input

Gauges: ± 20mV to ± 1V DC. Selectable gain with jumpers in 3 positions for 20mV, 150mV and 250mV, differential.
0/4-20mA: Available as option. Isolated excitation 5 ... 24V/50mA.
Pt-100: 2- or 4- terminal connection. Range -200 ... + 650 °C.
DIN-T/C: E, J, K, S, B, T and C according to DIN norms.
Junction: Internal compensation 0 to 60 ºC or external 0ºC Cold Junction.

Units

Memorized multiplicative constants: **bar, psi, MPa** and **mH2O**. The selection is with the key UP or DOWN. The selected unit is illuminated at the display.

Accuracy

DC: Gain Error: ± 10ppm/ ºK @ Gain = 50 (20mV range)
Offset Error: ± 10ppm/ ºK.
Pt-100: ± (1°C + 1 digit).
T/C: ± (1°C + 1 digit).

Tempco

±10 ppm/ °K temperature coefficient of the reference.

A-D-C

24 bit ADC. Sampling rate 66ms (FAST) or 132ms (SLOW) selectable.

Linearity

± (1 LSB + 1 digit).

Display

0 ... ± 9.9.9.9.9.9. red, 7 segments LED, 14,7 mm. The overrange is indicated with all six upper display segments ***oooooo***.

Analogue Outputs

Current: 0-20mA or 4-20mA direct proportional or inverted.
Load range 0 ... ≤ 300 Ohm. Resolution of 12bit.
Voltage: 0 ... + 10V or -10 ... +10V direct proportional or inverted.
Load >10 kOhm. Resolution of 12bit.

Tara

Three Tara functions are available:
OFF Tara is not activated
On Tara is activated. With the key *SET* the display shortly shows ***tara*** and switches to zero. The tara will be cancelled when *SET* is pressed for a second time. The display shortly shows ***untara*** and returns to follow the original no-tara signal.
OnLY Tara is activated. With the key SET the tara is always activated and sets the display to zero.

Filter

Programmable averaging filter with 1 to 99 samples.

Excitation

Constant current source 0,5 - 3.0 mA adjustable inside the instrument.
Constant voltage source 10V/60mA with 4 terminal compensating circuit.
Option: isolated 2V ... 24VDC/50mA adjustable inside the instrument.

Set Points

Two 6 digit Set Points with hystereze and delay adjustable from 100ms to 3600ms. Two NPN open collectors 60V-100mA or two relay 5A-230VAC.

Supply

115V/230V ± 15%, 48 - 60 Hz, 8VA. Option: 9-36VDC/5W.

Cabinet

DIN 48x96x150 mm (HxWxD), Panel cut-out 45 x 93 mm. Screw terminals.

4 MENU

With the key *MENU* the instrument's menu opens and scrolls at the display. The required parameter will be confirmed with *ACK*. The flashing digit is positioned with *ACK* and set with *UP* or *DOWN*. The sign and the decimal point can be selected when the flashing digit is moved out of the display range. The key *UP* sets the decimal points, the key *DOWN* the sign.

Key	**Display**	**Function**
MENU	SP 1	Set Point 1. Selection from -999999 to +999999
MENU	HSt 1	Hystereze 1. Selection from -999999 tis +999999
MENU	Fn SP1	Set Point 1 function in alarm conditions
MENU	ti SP1	Delay-reaction time of the Set Points 1: OFF, 100 - 3600 ms.
MENU	SP 2	Set Point 2. Selection from -999999 to +999999
MENU	HSt 2	Hystereze 2. Selection from -999999 to +999999
MENU	Fn SP2	Set Point 2 function in alarm conditions
MENU	ti SP2	Delay-reaction time of the Set Points 1: OFF, 100 - 3600 ms
MENU	PASS	Password.
MENU	SEt SEn	Selection of the input transfer characteristic:
	linEAr	Linear characteristic
	POLYn	Polynom 5th degree
	lintAb	Table linearizing
	tAbLin	Table linearizing
	tAbtAb	Linearizing by direct overwriting of the display
	Pt 100	RTD thermometer Pt-100
	tC E	Thermocouple E with external compensation
	tCC E	Thermocouple E with internal compensation
	tC J	Thermocouple J with external compensation
	tCC J	Thermocouple J with internal compensation
	tC L	Thermocouple K with external compensation
	tCC L	Thermocouple K with internal compensation
	tC S	Thermocouple S with external compensation
	tCC S	Thermocouple S with internal compensation
	tC b	Thermocouple B with external compensation
	tCC b	Thermocouple B with internal compensation
	tC t	Thermocouple T with external compensation
	tCC t	Thermocouple T with internal compensation
	tC C	Thermocouple C with external compensation
	tCC C	Thermocouple C with internal compensation
	Cold	Temperature of the cold junction
MENU	AnPF	Calibrating constants: 010,025,050,100. Used during the calibration as described at page 10, § 5.2.1.
MENU	Set in	0.0 1 select for bipolar signals without offset, e.g.0-20mA
		0.2 1 select for signals with offset, e.g. 4-20mA
		-1 1 select for bipolar signals e.g. –1 ... +1V
MENU	Set LO	Display value required for min. input signal, e.g. 0mV
MENU	Set HI	Display value required for max. input signal, e.g. +20mV
MENU	tArA	Activating the Tara-Function: **On** or **OFF**. When activated, the display in measuring mode will be set to zero with the key *SET*. When pressed for a second time, the display returns to follow the original non-tara input signal.

MENU	OrdEr	Display resolution: C.ddddd to CCCCCC.
MENU	Count	Count of the LSD (least significant digit) dsp 1 =1,2,3,4,5,6,7,8,9,0 dsp 2 = 2,4,6,8,0 dsp 5 = 5,0,5,0,... dsp 0 = dummy zero
MENU	dISPL	dSP 1 ... 16. Number of measurements for one display refresh. (dSP1= rate 66ms when SPEEd = FASt)
MENU	FILtEr	OFF, 1 ... 99 number of samples for the averaging filter.
MENU	SPEEd	SLO (120ms), FASt (66 ms).
MENU	Aout L	Display value required for analogue output 0/4mA and 0/-10V.
MENU	Aout H	Display value required for analogue output 20mA and +10V.
MENU	Fn Anl	OFF, 04-20 (direct output), 20-04 (inverted output).
MENU	bAUd	1200 - 19200 baud rate of the serial data port.
MENU	rS Adr	Address of the data port 00 ... 31. Selection 00 activates automatically RS232. One of addresses 01 to 31 activates RS485.
MENU	St PASS	Selection of memorized password combination.
MENU	StArt	Measuring mode.

4.1 SOFTWARE VERSIONS

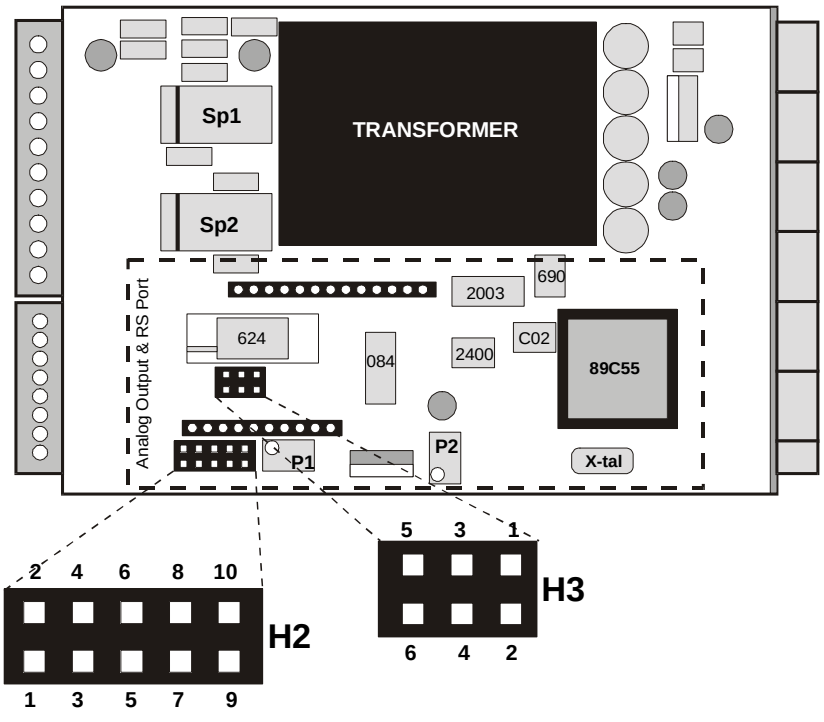
One of following soft ware versions can be ordered:

OC7015.hex Standard SW with BCD parallel data output (option). Display selectable units **bar**, **psi**, **MPa** and **mH_2O**. The display will be automatically multiplied with the corresponding constants.

OC7015M Automatic memory of the max. and the min. display readings. With the keys UP or DOWN the memorized values appear at the display as ***UPP*** (upper) and ***LOU*** (lower) or as ***dir*** (direct) momentary measurements.

5 MEASURING RANGES and EXCITATION

The ranges and the excitation are jumper selectable inside the instrument with H2 and H3.



5.1 EXCITATION - Jumpers H2

Jumper	Output	Terminals	Setting
1-3 and 2-4	1,5mA	Pin15 = +, Pin 12 = Analogue GND	Potentiometer **P1**
5-7 and 6-8	10V two wire type	Pin 18 = +10V, Pin 17 = 0V	Potentiometer **P2**
3-5 and 4-6	10V four wire type	Pin 18 = +10V, Pin 17 = 0V, Pin 15 = +Sense, Pin 14 = -Sense	Potentiometer **P2**
Option	5-24V two wire type	Pin 18 = +, Pin 17 = 0V	Potentiometer **P2**

5.2 GAIN - Jumpers H3

5.2.1 Standard Gains

Jumper	Gain	Input signal = Display	AnPF
2-4	50	20mV = 100 000	050
3-5	25	40mV = 100 000	025
4-6	10	100mV = 100 000	010

5.2.2. Customized Gains

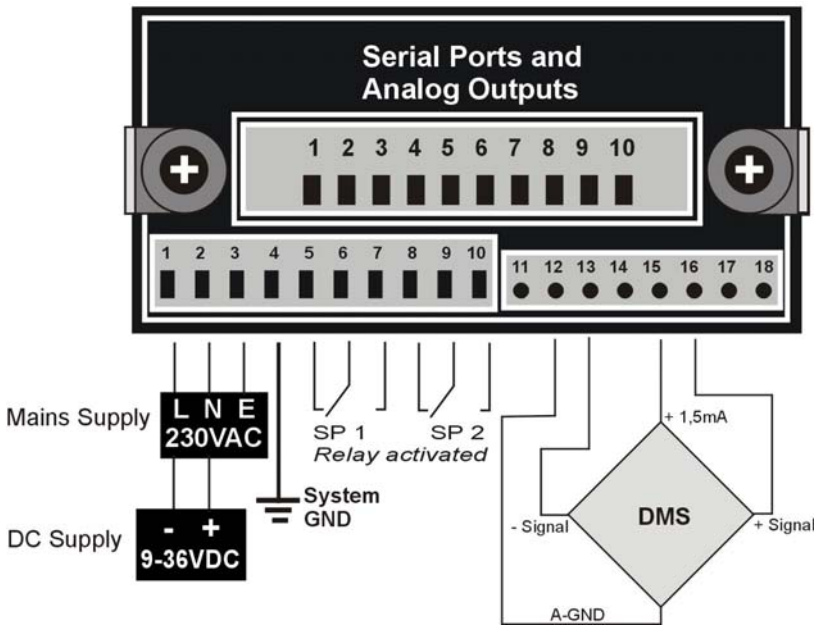
Jumper	Gain	Input signal = Display	AnPF
1-3	100	10mV = 100 000	100
2-4	50	20mV = 100 000	050
3-5	7	150mV = 100 000	025
4-6	4	250mV = 100 000	010

*After the gain has been set with the jumpers, the corresponding gain constant has to be selected in the menu step **AnPF** .*

6 EXAMPLES of CONNECTIONS

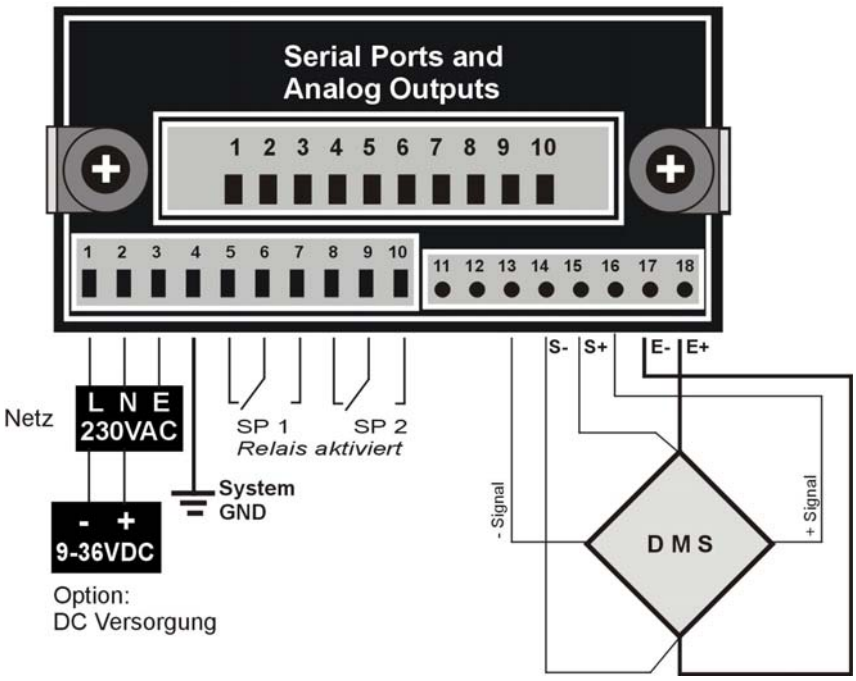
6.1 Strain gauge with constant current source

H2 jumpers: 1-3 and 2-4



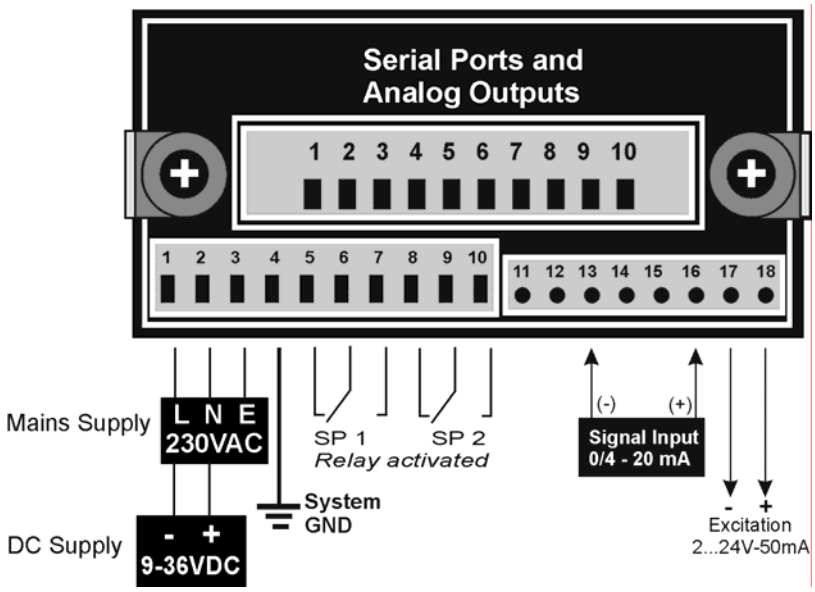
6.2 Strain gauge with constant voltage, 6 terminal connection

H2 jumpers: 5-7 and 6-8 (2 wire supply) or 3-5 and 4-6 (4 wire supply)

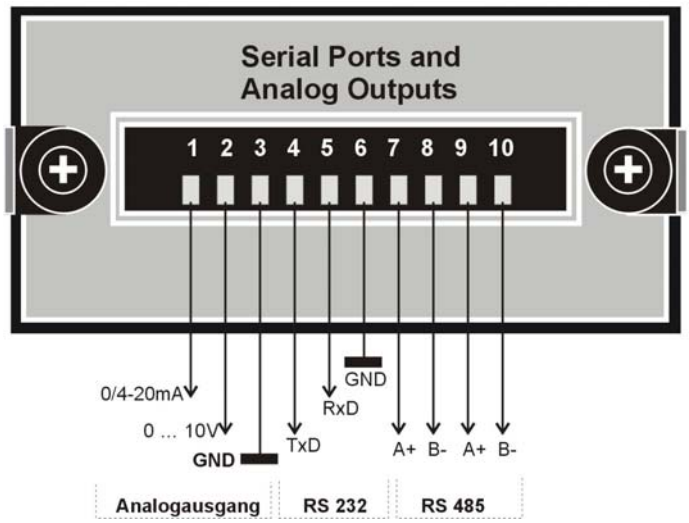


6.3 *Option:* Input 0/4 - 20 mA Current Loop

with adjustable excitation 2 ... 24VDC-50mA



7 ANALOGUE OUTPUTS and SERIAL DATA PORTS



7.1 Analogue Outputs

Two analogue outputs are generated at the same time: 0/4 - 20 mA and 0 ... 10V.

The outputs can be selected for direct acting (04 - 20) or inverted (20 - 04). The voltage output can be programmed for 0 ... 10V or -10 ... +10V. The assignment of the analogue output LOW and the analogue output HIGH to the required display values LOW and HIGH is selected in the menu steps *Aout L* and *Aout H*.

Example: Aout L = 000000
Aout H = 001500

At the display 000000 is the current output 0 (or 4mA - selection with keyboard) and the voltage output 0V. At the display 1500 or larger is the current output 20mA and the voltage output 10V.

The outputs can be modified in accordance with following table - see fig. at page 13.

Analogue Outputs	Components	Solder Blobs
-10V ... +10V and 0-20mA	R16,R18, R19 = in circuit	A=open, B=closed
-10V ... +10V and 4-20mA	R16=R19= open	A=closed, B=open
0V ... +10V and 0-20mA	R16=open	A=open, B=closed
0V ... +10V and 4-20mA	R16=R18= R19=open	A=closed, B=open

7.2 Serial Data Ports RS232 and RS485

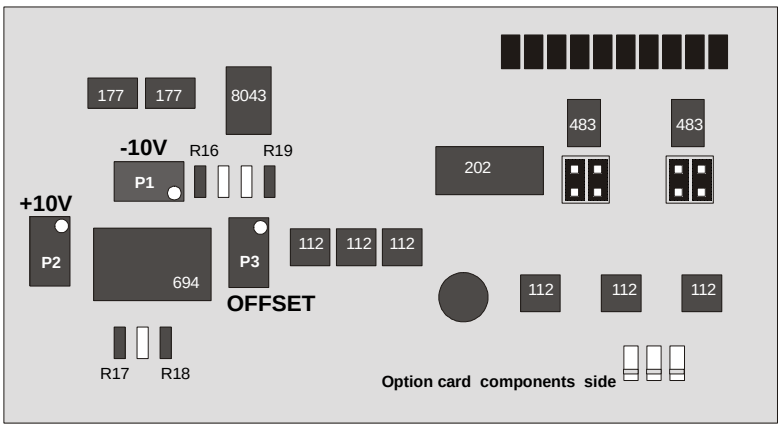
The Baud Rate is selectable in the menu step ***bAUd*** with keys UP or DOWN. In the step ***rS Adr*** is the address programmable. Address 00 selects automatically RS232. One of addresses 01 ... 31 activates RS485.

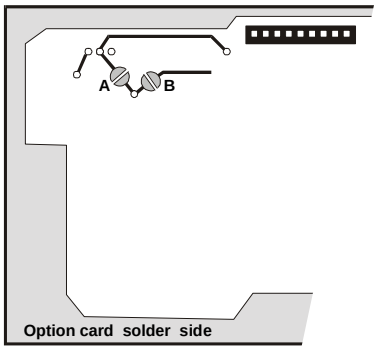
Data Format: 8 bit, without Parity, 1 Start and 1 Stop, Baud Rate 1200 to 19200.

RS 232
Transmission: Continuous transmission of the displayed data.

RS 485
Transmission: Request transmission of the displayed data. Two bytes has to be send from the PC to the instrument. The first byte is the ***Address***, the second byte is ***D***. The instrument answers with one telegram, terminated by <*CR*> <*LF*>. The address contains a number 128 + the selected address of the instrument (1 ... 31). For an instrument with e.g. address 1 is the first byte 129 (1 + 128). The second byte is D, which is 44H = 68D.

7.3 Option Card: Analogue Outputs and Serial Data Ports

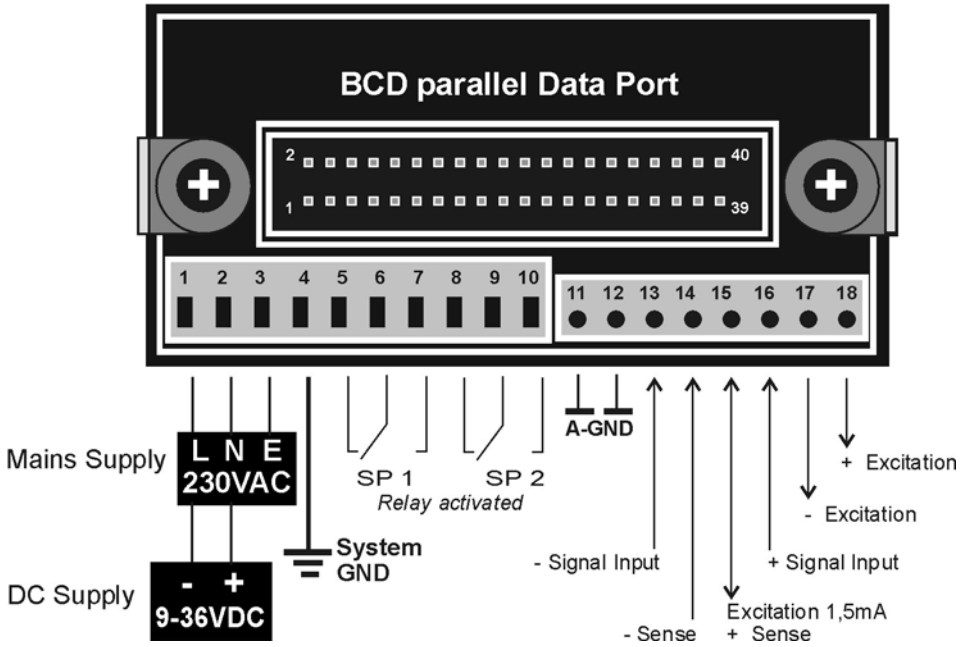




7.4 BCD parallel

BCD parallel data port from all 6 digits is available as an option. The logic output is selectable for open collector (option card OC4000C) or emitter follower (option card OC4000E). The output stage requires external voltage 5-28VDC and delivers the signal level of the same magnitude as the supply voltage. The logic is keyboard programmable for true or inverted. The outputs can be ordered as isolated or non-isolated.

7.5 BCD Terminals



Terminal	Value	Description	Terminal	Value	Description
1	+Vcc	ISO + Supply	**21**	+Vcc	ISO + Supply
2	GND	ISO GND	**22**	GND	ISO GND
3	STROBE	Strobe	**23**	2 000	4 Digit B
4	OVER	Overrange	**24**	1 000	4 Digit A
5	SIGN	Sign neg.	**25**	800	3 Digit D
6	DP 3	Decimal point Bit C	**26**	400	3 Digit C
7	DP 2	Decimal Point Bit B	**27**	200	3 Digit B
8	DP 1	Decimal Point Bit A	**28**	100	3 Digit A
9	800 000	6 Digit D	**29**	80	2 Digit D
10	400 000	6 Digit C	**30**	40	2 Digit C
11	+Vcc	ISO + Supply	**31**	+Vcc	ISO + Supply
12	GND	ISO GND	**32**	GND	ISO GND
13	200 000	6 Digit B	**33**	20	2 Digit B
14	100 000	6 Digit A	**34**	10	2 Digit A
15	80 000	5 Digit D	**35**	8	1 Digit D
16	40 000	5 Digit C	**36**	4	1 Digit C
17	20 000	5 Digit B	**37**	2	1 Digit B
18	10 000	5 Digit A	**38**	1	1 Digit A
19	8 000	4 Digit D	**39**	OVER +	Overrange +
20	4 000	4 Digit C	**40**	OVER -	Overrange -

8 CALIBRATION

When a new measuring range is selected with H3-jumpers, the instrument has to be recalibrated. A software calibration is available via the keyboard:

1. Set the H3 jumpers for the required gain.
2. Set the required values in the menu steps *Set LO* and *Set HI*.
3. Select the gain constant *AnPF* in Menu (100, 050, 025, 010) in accordance with the gain set.
4. Switch-off the instrument and switch-on again with SET pressed. Keep the SET pressed as long as the display shows *CALSEt*. Release the key. The display returns into the measuring mode. Let the instrument warm-up for 30 minutes.
5. Apply the low signal e.g. 0mV from the calibrator. Wait for some seconds until the display is steady. Press DOWN. The display changes between ***A 010*** (value of *AnPF* step selected) and ***CAL LO***. Release the key DOWN.
6. Apply the high signal from the calibrator, e.g. 150mV. Wait for some seconds until the display is steady. Press UP. The display changes between ***A010*** and ***CAL HI***. Release the key UP.
7. Switch-off the instrument from the supply. Switch-on again after 3 sec.
   The instrument is calibrated.

8.1 Calibration of 0/4 - 20 mA input signal

Set the required values for 0/4mA and 20mA in the menu steps *SEt LO* and *SEt HI*, e.g. *SEt LO = 000000* and *Set HI = 10000.*

Switch-off the instrument and switch-on again with key *SET* pressed. Keep the key *SET* pressed until the display shows *CALSEt*. Then release the key.

Apply 4mA from the calibrator and press the key *DOWN*. The display changes between *CAL LO* and *A010*.

Apply 20 mA from the calibrator and press the key *UP*. The display changes between *CAL HI* and *A010*.

The instrument is calibrated. Switch-off the power and switch-on again. The display returns into the measuring mode.

The key *SET* activates tara to set the display to zero at 4mA, when necessary. The Tara function has to be enabled - ***On*** - in the menu step *tArA*.

9 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 by a Polynom can be linearized with a fifth degree polynom method. The coefficients are 6 digits with decimal point and sign, the exponents can be selected from 0 to ± 5.

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

DISPLAY = ± Coef 0x10$^{\pm 0}$ ± Coef 1x10$^{\pm 1}$ ± Coef 2x10$^{\pm 2}$ ± Coef 3x10$^{\pm 3}$ ± Coef 4x10$^{\pm 4}$ ± Coef 5x10$^{\pm 5}$

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

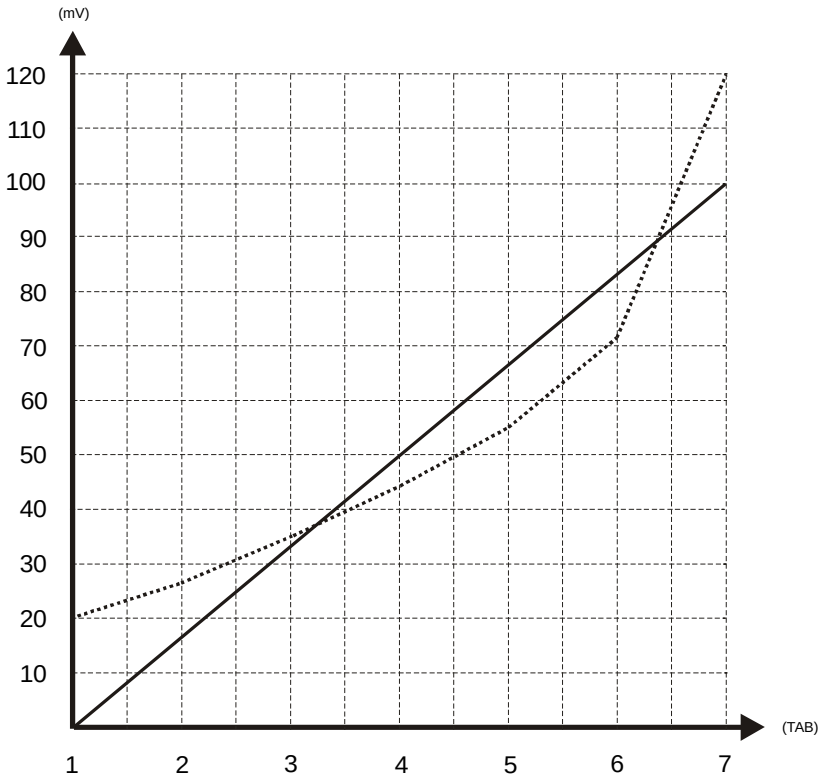
This linearizing method can be used when a non-linear input signal has to be transformed into a linear display. Up to 38 points are available for the linearizing.

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.

9.1 LINTAB

The input signal is linear, the display is non-linear.
Example: Linearizing in 7 points.



Parameter	
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**:

$$\frac{100\ \text{mV}}{7\ \text{points} - 1} = 16{,}6667$$

To each point a display value is assigned.

Tb1	for	0mV	➔	20
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

9.2 TABLIN

The input signal is non-linear, the display is linear.
Example: Linearizing in 7 points.

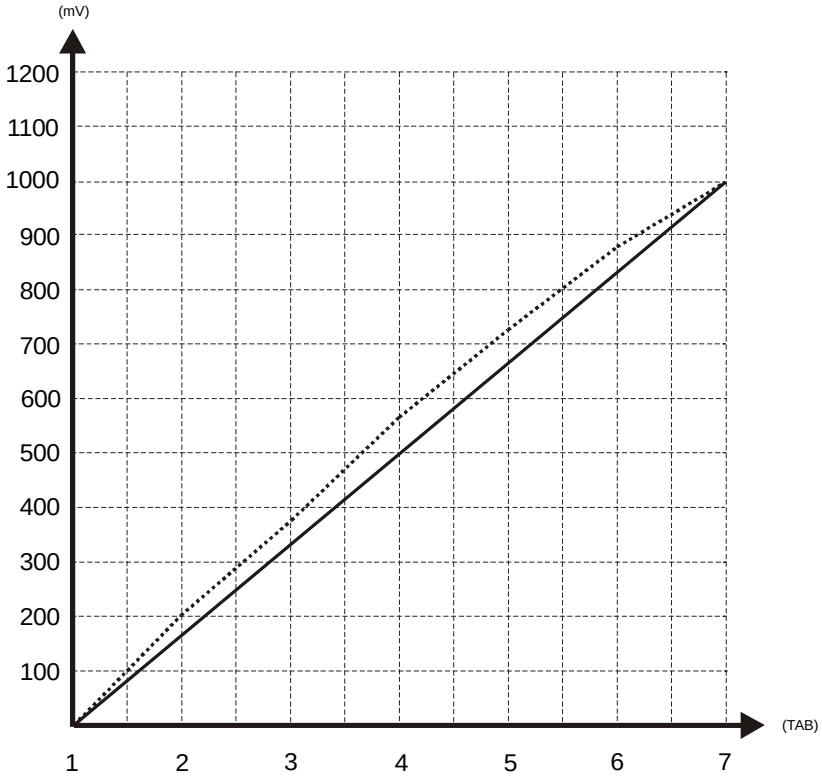


Fig. 2

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

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

$$\frac{1000\ mV}{7\ points\ -\ 1} = 166{,}667$$

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

9.3 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).

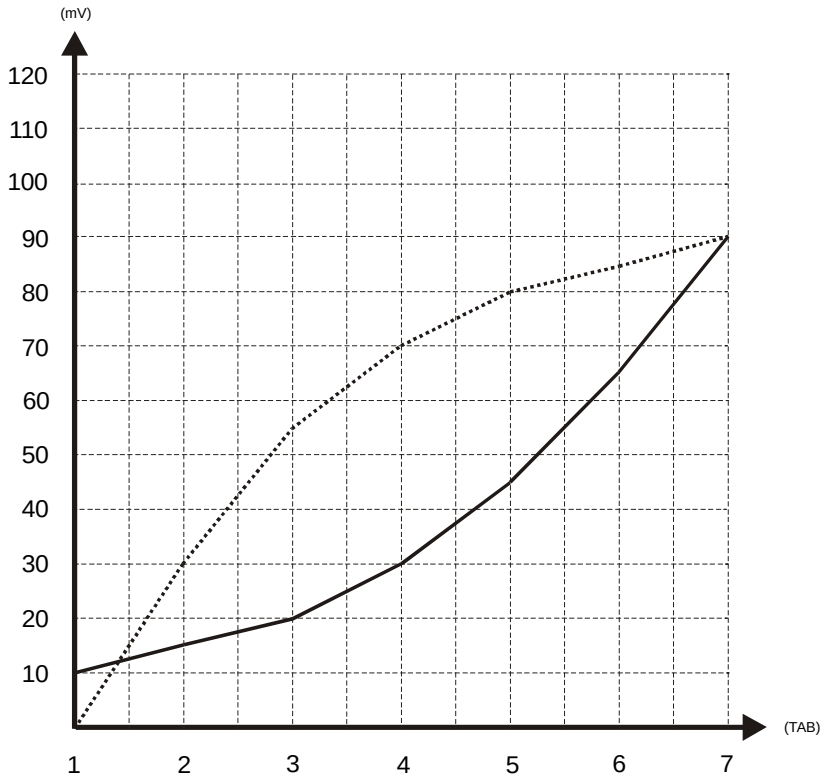


Bild 3

Parameters	
Set Lo	= 0
Set Hi	= 100
tabSet	= tabtab
CoEf	= 14
tb st	= 0
tb ln	= 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

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

The parameters **tb st** and **tb ln** are not relevant and 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	
ACK	14 COE	Select with UP or DOWN
MENU	td St , tb ln	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 applied from the calibrator
SET	StorE	The actual signal value is memorized and stored
MENU	tbd 01	Recall 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.

9.4 POLYNOM

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:

$$DISPLAY = \pm coef\ 0x10^{\pm 0} \pm coef\ 1x10^{\pm 1} \pm coef\ 2x10^{\pm 2} \pm coef\ 3x10^{\pm 3} \pm coef\ 4x10^{\pm 4} \pm coef\ 5x10^{\pm 5}$$

10 H - TEST

The instrument's function can be checked when the key MENU is pressed during the instrument is switched-on. Keep the key MENU pressed until the display shows HtESt. The key MENU advances the control steps. The key SET permits to return to the previous step. First the display segments and the decimal points are checked. After the Set Points and the corresponding relay or transistors and the LEDs SP1 and SP2 at the display are activated. In the next step the analogue outputs are activated. They are available at the output terminals. At the end the ADC function is checked.

SP1Ld1	Set Point 1 is activated. The SP1 - LED is illuminated.
SP2Ld2	Set Points 2 is activated. The SP2 - LED is illuminated.
Ld3	LED 3 is illuminated.
Ld4	LED 4 is illuminated.
Ld5	LED 5 is illuminated.
Ld6	LED 6 is illuminated.
I = 0	Analogue Outputs 0mA and 0V are generated.
I = 4	Analogue Outputs 4mA and 2V are generated.
I = 5	Analogue Outputs 5mA and 2,5V are generated.
I = 10	Analogue Output 10mA and 5V are generated.
I = 15	Ana log Outputs 15mA and 7,5V are generated.
I = 16	Ana log Outputs 16mA and 8V are generated.
I = 20	Analogue Outputs 20mA and 10V are generated.
InPut	Internal ADC- Function is displayed.
Start	The Display switches into the measuring mode.

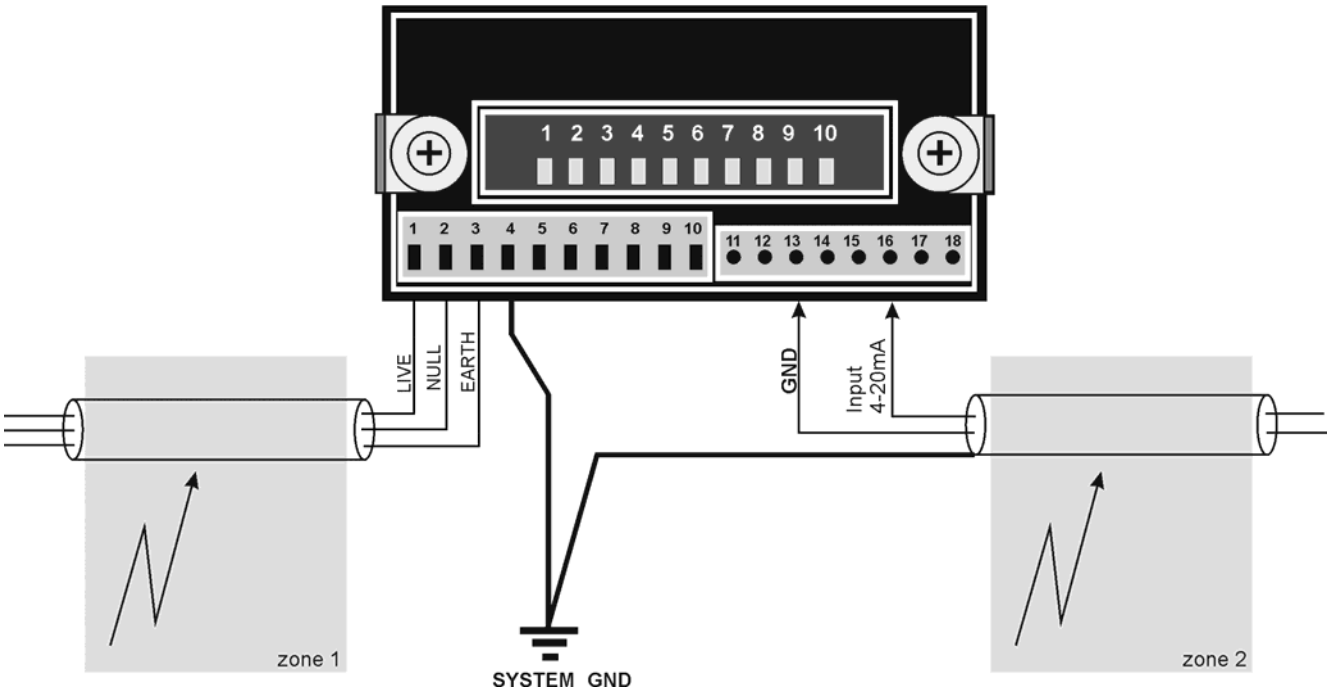
11 BURST TEST and recommended CONNECTIONS

Tester: Burst-Surge Generator HILO, Model CE-Tester
Date: 28. August 2000
E.U.T.: OC7015, SN: 200828, Supply 230VA
Mode: Linear, Set Lo = 000000, Set Hi = 010000
Input: 4-20mA
Display: 10 000

11.1 Test Conditions

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

11.2 Test Set - Up



11.3 Test Results

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

Technician: Oliver Matthews 28. August 2000