9 Technical Specifications

All error limits and stability specifications are given according to a calibration standard traceable to the “Physikalisch Technische Bundesanstalt (PTB)” (German National Bureau of Standards). The ambient temperature at the time of calibration was 23°C ± 1°C .

Technical Specifications provided are valid when the Automatic Filter is active and when a proper offset correction has been done.

9.1 DC Voltage

RANGES ..... ± 300mV / ± 3V / ± 30V / ± 300V / ± 1000V 2)

RANGE SELECTION ..... manual, automatic

MEASUREMENT TIMES	**Full Scale**	**max. Resolution**
20ms / 40ms / 100ms	30 100	1µV
0.2s / 0.4s / 1s	3 010 000	100nV
2 / 4 / 10 / 20 / 40 / 100 s	30 100 000	10nV
1000V-Range max.	10 000 000	

STABILITY 24 Hours, 23°C ± 1°C 1),3),4)

	± (% of Reading + % of Full Scale)	
Range	**%Rdg.**	**% F.S.**
±300mV	0.0008	0.0002
±3V	0.0004	0.0002
±30V	0.0004	0.0002
±300V	0.0007	0.0005
±1000V 2)	0.0010	0.0009

ACCURACY (1 Year) 1),3),4)

± (% of Reading + % of Full Scale)
1 Year 23°C±5°C

Range	**%Rdg.**	**+**	**%F.S.**
±300mV	0.003	+	0.0002
±3V	0.002	+	0.0002
±30V	0.002	+	0.0002
±300V	0.003	+	0.0004
±1000V 2)	0.004	+	0.0010

The values specified above assume that the measuring time dependent readout span is set large enough to permit readout with the accuracy stated.
A rounding error of ± 1 digit must be added to the error specified as a percentage of the maximum reading.

TEMPERATURE COEFFICIENTS

Range	(10°C-18°C / 28°C-40°C) **±(%Rdg. + %F.S.)/°C**	(0°C-10°C / 40°C-50°C) **±(%Rdg. + %F.S.)/°C**
±300mV	0.0003 + 0.00015	0.0006 + 0.0003
±3V	0.0002 + 0.0001	0.0004 + 0.0002
±30V	0.0002 + 0.0001	0.0004 + 0.0002
±300V	0.0002 + 0.0001	0.0004 + 0.0002
±1000V 2)	0.0003 + 0.0001	0.0006 + 0.0002

ZERO POINT

Offset Voltage (1h warm-up time)

Temperature Coefficient	better than 0.3 µV/°C
Long-Term Stability	better than 5 µV in 90 Days

INPUT OFFSET CURRENT < ca. 20 pA at 23°C±1°C

INPUT RESISTANCE

±300mV, ±3V,	>10 GΩ 5)
±30V, ±300V, ±1000V 2)	10 MΩ

NOISE SUPPRESSION

(measured by increasing the interference peak value up to the error Reading of 1 digit, measurement time: 400ms)

Series Mode Rejection	50 / 60 Hz Mains ±5%	> 100 dB
	50 / 60 Hz Mains ±10%	> 50 dB

The peak value of the superimposed AC Voltage must be smaller than the DC Voltage Portion.

Common Mode Rejection	DC Voltage:	140 dB
	50Hz Mains	140 dB

(Low-Ohm connection from Shield to black “V, Ω–Lo" connector, with 1kΩ in the "Lo" Lead)

MEASUREMENT PAUSES after Range, Function, or Channel switch: 100ms

MEASURING METHOD fully integrating PREMA Multiple Ramp Method (DBP.Nr.2114141, (US-Pat. No. 3765012)

POLARITY CHANGE automatic, without measurement pause

OVERLOAD LIMITS

V/Ω-HI against Case (Ground)

± 1000 V Peak at 60 Hz max.
or ± 1000V DC

V/Ω-HI against V/Ω-LO Input

± 300mV, ± 3V	for 60 sec.	± 1000V	2)
	Continuous Load	± 700V	2)
±30V, ±300V, ±1000V	Continuous Load	± 1000V	2)

with built-in Scanner (Model 5017SC)

Front Panel Connectors

± 300mV, ± 3V	for 60 sec.	± 1000V	2)
	Continuous Load	± 700V	2)
±30V, ±300V, ±1000V	Continuous Load	± 1000V	2)

Rear Panel Connectors

Continuous Load ± 125Vpk
with the limit $2*10^5*V*Hz$

V/Ω/LO against Ground 250 Vdc or 250 Vpk

1) All values ± 1 Digit and after Offset Correction
2) max. 125 Vpk on rear inputs for model 5017SC
3) Values are valid for constant input signal; ±0,0005 % F.S. is to be added within 100 ms of a signal change.
4) % F.S. is related to a Reading Span of 301 000 00
5) Valid for input Voltage up to Full Scale.

9.2 Resistance

MEASURING METHOD..... 2-, 4-pole with DC measuring current

RANGES ..... 300 Ω / 3 kΩ / 30 kΩ / 300 kΩ / 3 MΩ / 30 MΩ

RANGE SELECTION..... manual, automatic

MEASUREMENT TIMES	**Full Scale**	**max. Resolution**
20ms / 40ms / 100ms	301 000	1 mΩ
0.2s / 0.4s / 1s	3 010 000	100 µΩ
2 / 4 / 10 / 20 / 40 / 100 s	30 100 000	10 µΩ

STABILITY 24 Hours, 23°C ± 1°C 1), 2)

± (% of Reading + % of Full Scale)

Range	**% Rdg.**	**% F.S.**
300Ω	0.001	0.0003
3kΩ	0.0004	0.0002
30kΩ	0.0004	0.0002
300kΩ	0.0006	0.0002
3MΩ	0.004	0.0003
30MΩ	0.020	0.0010

ACCURACY (1 Year, 23°C±5°C) 1), 2)

± (% of Reading + % of Full Scale)

Range	**% Rdg.**	**% F.S.**
300Ω	0.003	0.0005
3kΩ	0.003	0.0004
30kΩ	0.003	0.0004
300kΩ	0.003	0.0004
3MΩ	0.007	0.0004
30MΩ	0.050	0.0010

TEMPERATURE COEFFICIENTS

Range	(10°C-18°C / 28°C-40°C) ±(%Rdg. + % F.S.)/°C	(0°C-10°C / 28°C-50°C) ±(%Rdg. + %F.S.)/°C
300Ω	0.0003 + 0.0003	0.0006 + 0.0006
3kΩ	0.0002 + 0.0002	0.0004 + 0.0004
30kΩ	0.0002 + 0.0002	0.0004 + 0.0004
300kΩ	0.0002 + 0.0002	0.0004 + 0.0004
3MΩ	0.0003 + 0.0003	0.0006 + 0.0006
30MΩ	0.0050 + 0.0005	0.0100 + 0.001

MEASURING CURRENT

Range	Measuring Current
300 Ω, 3 kΩ	1 mA
30 kΩ	100 µA
300 kΩ	10 µA
3 MΩ	1 µA
30MΩ	0.1 µA

OPEN CIRCUIT TERMINAL VOLTAGE ca. 5 V max.

MEASURING PAUSES after Range, Function, or Channel switches

300Ω to 3MΩ	100ms
30MΩ	400ms

OVERLOAD LIMIT ± 250 Vpk 3)

1) Values are ± 1 Digit and after Offset Correction
2) valid for constant input signal; ± 0,0005 % F.S. is to be added within 100 ms of a signal change.
3) Max. 125V Peak at rear panel connectors for model 5017SC

9.3 AC Voltage

CONVERSION METHOD True RMS value with DC Voltage coupling, or pure AC Voltage

RANGES 200mV/20/20V/200V/700V 3)

RANGE SELECTION..... manual, automatic

MEASURING TIMES	**Full Scale**	**max. Resolution**
100ms	199 999	1µV
0.2s - 100 s	1 999 999	100nV
Range 700V	700 000 0 3)	

ACCURACY 1 Year, 23°C ± 5°C 1), 2), 4)
± (% of Reading + % of Full Scale)

	True RMS Value					
Range	**20Hz - 40Hz**	**- 10kHz**	**- 50kHz**	**- 100kHz**	**- 400kHz**	**- 1MHz**
200mV	0.2+0.01 /	0.05+0.05 /	1.0+0.05 /	5.0+0.2 /		
2V	0.2+0.01 /	0.05+0.01 /	0.1+0.02 /	0.5+0.1 /	4.5+0.4	
20V	0.2+0.01 /	0.05+0.01 /	0.1+0.02 /	0.5+0.1 /	1.5+0.4 /	2.0+2.0
200V	0.2+0.01 /	0.05+0.01 /	0.1+0.02 /	0.5+0.1		
700V 3)	0.2+0.01 /	0.05+0.01 /	0.1+0.02 /	0.5+0.1		

DC Voltage..... ± (0.15%Rdg. + 0.2% F.S.)

TEMPERATURE COEFFICIENT

(10°C-18°C and 28°C - 40°C)
0 to 20 kHz ±(0.01% Rdg. + 0.004% F.S.)/°C
20 to 1000 kHz ±(0.04% Rdg. + 0.02% F.S.)/°C

(0°C-10°C and 40°C - 50°C)
0 to 20 kHz ±(0.02% Rdg. + 0.008% F.S.)/°C
20 to 1000 kHz ±(0.08% Rdg. + 0.04% F.S.)/°C

OVERLOAD LIMITS

V/Ω-HI against Case	± 1000 V Peak at 60 Hz max. or ± 1000V DC Voltage	
V/Ω-HI against V/Ω-LO		
200mV-, 2V-Range	for 60 sec.	± 1000V Peak with the limit of $1*10^7*V*Hz$
	Continuous Load	± 700V Peak with the limit of $5*10^6*V*Hz$
20V-, 200V-, 700V-Range 3)	Continuous Load	± 1000V Peak with the limit of $1*10^7*V*Hz$
with built-in Scanner (Model 5017SC)		
	Continuous Load on rear panel connectors	± 125V Peak with the limit of $2*10^5*V*Hz$
V/Ω/LO against Ground	250 Vdc or 250 Vpk	

MEASUREMENT PAUSES after Range, Function, or Channel Switching:

200mV	300ms
2V, 20V	200ms
200V, 700V	250ms

CREST FACTOR max. 7:1

INPUT RESISTANCE 1 MΩ in parallel >60pF

SETTLING TIME 100ms at 0.1%

1) V/Ω/LO connected to Ground, Sine Signal larger than 5% of Full Scale
2) % F.S. is always related to a Readout Span of 20 100 000

3) max. 100Vrms on rear panel connectors for Model 5017SC
4) the mode Vac+dc must be activated for AC voltages with a frequency lower than 50Hz

9.4 DC Current

RANGES ..... ±200µA, ±2mA, ±20mA, ±200mA, 2A

MEASUREMENT TIMES	**Full Scale**	**max. Resolution**
20ms / 40ms / 0.1s	201 000	1 nA
0.2s - 100s	2 010 000	100 pA

STABILITY 24 Hours, 23°C ± 1°C 1, 2)

	± (% of Reading + % of Full Scale)	
Range	**% Rdg.**	**% F.S.**
±200µA	0.010	0.002
±2mA	0.008	0.002
±20mA	0.008	0.002
±200mA	0.008	0.002
±2A 2)	0.015	0.003

ACCURACY (1 Year, 23°C ± 5°C) 1, 2)

	± (% of Reading + % of Full Scale)	
Range	**%Rdg.**	**%F.S.**
±200µA	0.03	0.002
±2mA	0.03	0.002
±20mA	0.03	0.002
±200mA	0.03	0.004
±2A 2)	0.03	0.004

The values specified above assume that the measuring time dependent readout span is set large enough to permit readout with the accuracy stated.
A rounding error of ± 1 digit must be added to the error specified as a percentage of the maximum reading.

The temperature coefficient of the offset current equals 0.5ppm of the Full Scale.

TEMPERATURE COEFFICIENT

(10°C-18°C and 28°C - 40°C)	±(0.001%Rdg. + 0.0002% F.S.)/°C
(0°C-10°C and 40°C - 50°C)	±(0.002%Rdg. + 0.0004% F.S.)/°C

BURDEN VOLTAGE AND INSTRUMENT SHUNT

Range	**Burden Voltage**	**Instrument Shunt**
200µA	350mV	1000 Ω
2mA	350mV	100 Ω
20 mA	350mV	10 Ω
200mA	350mV	1 Ω
2A	600mV	0.1 Ω

MEASUREMENT PAUSES after Range, Function, or Channel switching, 100ms

OVERLOAD LIMITS input protection
3A fast blow fuse

Personal Safety :

A-Hi against Ground	max. 60 Vpk
A-Lo against Ground	max. 60 Vpk

1) Values are ± 1 Digit and after Offset Correction, valid for constant input signal; ±0,0005% is to be added to F.S. within 100 ms after a signal change.
2) the specs are to be multiplied with factor 3 for currents > 1A

9.5 AC Current

CONVERSION METHOD.... True RMS value with DC Current coupling or pure AC Current

RANGES ..... 200µA / 2mA / 20mA / 200mA / 2A

RANGE SELECTION..... manual, automatic

MEASUREMENT TIMES	**Full Scale**	**max. Resolution**
100ms	201 000	1nA
0.2s - 100 s	2 010 000	100pA
Range 2A	2 010 000	1µA

ACCURACY (1 Year, 23°C ± 5°C) 1)

± (% of Reading + % of Full Scale)

Range	**20Hz to 40Hz**	**to 1kHz**	**to 5kHz**
200µA	0.2 + 0.01 /	0.08 + 0.05 /	0.2 + 0.05
2mA	0.2 + 0.01 /	0.08 + 0.05 /	0.1 + 0.05
20mA	0.2 + 0.01 /	0.08 + 0.05 /	0.1 + 0.05
200mA	0.2 + 0.01 /	0.08 + 0.05 /	0.1 + 0.05
2A 2)	0.2 + 0.01 /	0.08 + 0.05 /	0.4 + 0.05

DC Current ± (0.15% Rdg. + 0.2% F.S.)

TEMPERATURE COEFFICIENT

(10°C-18°C and 28°C - 40°C)	±(0.005%Rdg. + 0.001% F.S.)/°C
(0°C-10°C and 40°C - 50°C)	±(0.010%Rdg. + 0.002% F.S.)/°C

BURDEN VOLTAGE

Range	
200µA	250mV
2mA, 20mA	250mV
200mA	250mV
2A	600mV

SETTLING TIME.....	100ms at 0.1%
MEASUREMENT PAUSES...	after Range, Function, or Channel switching, 300ms
OVERLOAD LIMITS	input protection (3A fast blow out fuse)
Personal Safety:	
A-Hi to Ground	max. 60Vpk
A-Lo to Ground	max. 60Vpk

1) Sine Signal larger than 5% of the Full Scale; V/Ω/LO connected to Ground.
2) the specs are to be multiplied with factor 3 for currents > 1A

9.6 Temperature

MEASUREMENT METHOD.....	4-pole Resistance Measurement with Linearization as per EN 60751 for Pt10, Pt25, Pt100, Pt500, Pt1000	
TEMPERATURE SENSORS.....	Pt10 , Pt25, Pt100, Pt500, Pt1000 Platinum Resistance Sensors	
DISPLAY RANGE	**Full Scale**	**Resolution from 1s**
Celsius	- 200°C to +850°C	0.001°C
Fahrenheit	- 328°F to +1562°F	0.001°F
Kelvin	+73 K to +1123 K	0.001 K
MEASUREMENT CURRENT	Pt10/Pt25/Pt100/Pt500	1 mA
	Pt1000	100 µA

VOLTAGE ON OPEN CLAMPS ca. 5V

MEASUREMENT TIMES..... 100ms to 100s

MEASUREMENT PAUSES..... after Range, Function, or Channel switches: 100ms

ACCURACY 1)

Sensors	**Stability 24h, 23±1°C** ± (%Rdg. + °C)	**Accuracy 1 Year, 23±5°C** ± (%Rdg. + °C)
Pt10	0.002% + 0.03°C	0.007% + 0.04°C
Pt25	0.002% + 0.03°C	0.007% + 0.03°C
Pt100	0.002% + 0.03°C	0.004% + 0.02°C
Pt500	0.002% + 0.03°C	0.004% + 0.02°C
Pt1000	0.002% + 0.03°C	0.004% + 0.02°C

each case without sensor tolerance

TEMPERATURE COEFFICIENT

(10°C-18°C, 28°C-40°C)	0.009°C/°C
(0°C-10°C, 40°C-50°C)	0.018°C/°C

CALIBRATION ..... with Resistance Standard in Ω/4 for

Pt10, Pt25	300Ω Range
Pt100, Pt500	3kΩ Range
Pt1000	30kΩ Range

1) for Measurement Times < 1s, ±0.03°C are to be added, Values are valid after offset correction.

9.7 Frequency and Period

MEASUREMENT METHOD.....	Reciprocal Enumeration Method
FREQUENCY RANGE.....	Vac: 0.2 Hz to 1 MHz Iac: 0.2 Hz to 10 kHz
PERIOD RANGE.....	Vac: 40 µs to 5 s Iac: 100 µs to 5 s
INPUT SIGNAL.....	Vac: 10mV rms to 700V rms Iac: 50µA rms to 2A rms
INPUT IMPEDANCE.....	Vac: 1 MΩ with in parallel < 60pF Iac: 0.1Ω to 1000 Ω
RESOLUTION.....	7 Digits
ACCURACY.....	0.01% ± 3 Digit
TIME BASE.....	5 MHz ± 0.01%
GATE TIME.....	10ms, 100ms, 1s, 10s

9.8 Special Functions

- **Continuity Check** with acoustic signal with threshold of 50 Ω.

- **Math Programs**
  Offset
  ax + b
  Ratio
  %Deviation

- **Filter Functions**
  Moving Average with 10 readings
  Automatic Filter with window

- **Storage of Instrument Settings**
  Store power-on settings
  Load factory settings

- **Trigger Functions**

Trigger with:	Key Stroke
	Trigger Line

9.9 Scanner with Model 5017SC

CHANNELS ..... 80 Channels 1-pole, 40 Ch 2-pole, 20 Ch 4-pole

SWITCHING METHOD ..... bi-stable mechanical relays

MEAS. FUNCTIONS ..... Voltage, Resistance, Temp., Hz

THERMO VOLTAGE ..... typ. ± 1µV, max. 2µV after 1.5h warm-up time

MAX. VOLTAGE BETWEEN 2 CONTACTS ..... 125 Vpk with the limitation of 100 000 * V * Hz.

MAX. MEAS. VOLTAGE ..... 125Vpk (also over the V/Ω-Connector) with the limitation of 100 000 * V * Hz.

MAX. CONTINUITY RESISTANCE (PER LEAD) ..... approx. 1 Ω

LIFETIME ..... 2 * 100 000 000 Alternations (0.1 A, 10 Vdc)

ISOLATION RESISTANCE BETWEEN 2 CONTACTS ..... 3 GΩ at relative ambient humidity under 60%

ISOLATION RESISTANCE AGAINST CASE ..... 3 GΩ at relative ambient humidity under 60%

CAPACITANCE ..... smaller than 100 pF between the contacts

TIME BETWEEN TWO SWITCHING ACTIONS 20ms

DELAY BEFORE MEASUREMENT START AFTER CHANNEL SWITCH.... depends on Function and Range between 100ms and 500ms

ACTIVATE SCANNER with internal socket (see Ch. „Getting Started“)

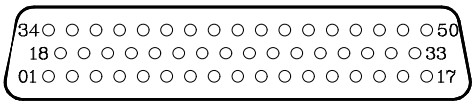
Pin Assignment of the Scanner

Scanner Input 1

Channel 4-pole	Channel 2-pole	Channel 1-pole	PIN No.	Channel 4-pole	Channel 2-pole	Channel 1-pole	PIN No.
01 SHi	01 Hi	01 Hi	19	06 SHi	11 Hi	21 Hi	25
01 SLo	01 Lo	02 Hi	18	06 SLo	11 Lo	22 Hi	24
01 Hi	02 Hi	03 Hi	35	06 Hi	12 Hi	23 Hi	9
01 Lo	02 Lo	04 Hi	34	06 Lo	12 Lo	24 Hi	8
02 SHi	03 Hi	05 Hi	4	07 SHi	13 Hi	25 Hi	27
02 SLo	03 Lo	06 Hi	3	07 SLo	13 Lo	26 Hi	26
02 Hi	04 Hi	07 Hi	2	07 Hi	14 Hi	27 Hi	11
02 Lo	04 Lo	08 Hi	1	07 Lo	14 Lo	28 Hi	10
03 SHi	05 Hi	09 Hi	21	08 SHi	15 Hi	29 Hi	29
03 SLo	05 Lo	10 Hi	20	08 SLo	15 Lo	30 Hi	28
03 Hi	06 Hi	11 Hi	37	08 Hi	16 Hi	31 Hi	13
03 Lo	06 Lo	12 Hi	36	08 Lo	16 Lo	32 Hi	12
04 SHi	07 Hi	13 Hi	5	09 SHi	17 Hi	33 Hi	31
04 SLo	07 Lo	14 Hi	22	09 SLo	17 Lo	34 Hi	30
04 Hi	08 Hi	15 Hi	39	09 Hi	18 Hi	35 Hi	15
04 Lo	08 Lo	16 Hi	38	09 Lo	18 Lo	36 Hi	14
05 SHi	09 Hi	17 Hi	7	10 SHi	19 Hi	37 Hi	33
05 SLo	09 Lo	18 Hi	6	10 SLo	19 Lo	38 Hi	32
05 Hi	10 Hi	19 Hi	40	10 Hi	20 Hi	39 Hi	17
05 Lo	10 Lo	20 Hi	23	10 Lo	20 Lo	40 Hi	16

Ground = 41, 42, 43, 44, 45 (only in 1-pole configuration)
Not Connected = 50
Output Channel = 46 (Hi), 47 (Lo), 48 (SHi), 49 (SLo) *)

SHi = Sense Hi
SLo = Sense Lo



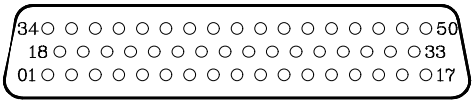
*) all lines remain connected in 1-pole or 2-pole arrangement

Scanner Input 2

Channel 4-pole	Channel 2-pole	Channel 1-pole	PIN No.	Channel 4-pole	Channel 2-pole	Channel 1-pole	PIN No.
11 SHi	21 Hi	41 Hi	19	16 SHi	31 Hi	61 Hi	25
11 SLo	21 Lo	42 Hi	18	16 SLo	31 Lo	62 Hi	24
11 Hi	22 Hi	43 Hi	35	16 Hi	32 Hi	63 Hi	9
11 Lo	22 Lo	44 Hi	34	16 Lo	32 Lo	64 Hi	8
12 SHi	23 Hi	45 Hi	4	17 SHi	33 Hi	65 Hi	27
12 SLo	23 Lo	46 Hi	3	17 SLo	33 Lo	66 Hi	26
12 Hi	24 Hi	47 Hi	2	17 Hi	34 Hi	67 Hi	11
12 Lo	24 Lo	48 Hi	1	17 Lo	34 Lo	68 Hi	10
13 SHi	25 Hi	49 Hi	21	18 SHi	35 Hi	69 Hi	29
13 SLo	25 Lo	50 Hi	20	18 SLo	35 Lo	70 Hi	28
13 Hi	26 Hi	51 Hi	37	18 Hi	36 Hi	71 Hi	13
13 Lo	26 Lo	52 Hi	36	18 Lo	36 Lo	72 Hi	12
14 SHi	27 Hi	53 Hi	5	19 SHi	37 Hi	73 Hi	31
14 SLo	27 Lo	54 Hi	22	19 SLo	37 Lo	74 Hi	30
14 Hi	28 Hi	55 Hi	39	19 Hi	38 Hi	75 Hi	15
14 Lo	28 Lo	56 Hi	38	19 Lo	38 Lo	76 Hi	14
15 SHi	29 Hi	57 Hi	7	20 SHi	39 Hi	77 Hi	33
15 SLo	29 Lo	58 Hi	6	20 SLo	39 Lo	78 Hi	32
15 Hi	30 Hi	59 Hi	40	20 Hi	40 Hi	79 Hi	17
15 Lo	30 Lo	60 Hi	23	20 Lo	40 Lo	80 Hi	16

Ground = 41, 42, 43, 44, 45 (only in 1-pole configuration)
Not connected = 46, 47, 48, 49, 50

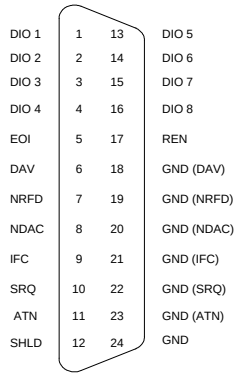
SHi= Sense Hi
SLo = Sense Lo



9.10 IEEE-488 Interface

OUTPUT INFORMATION	measurement result, function, range, measurement time, calculation result and other device settings.
INPUT INFORMATION	function, range, measurement time, start command, calibration set-point, math program and constants, display text and other device settings.
ADDRESS	selectable from 0 to 30, in the menu "Device, Interface, IEEE488".
SERVICE REQUEST.....	SRQ after each measurement value.
TERMINATOR	EOI Line and Line Feed
KEYBOARD	can be de-activated over REN, can be activated over GTL and over ESC/LOCAL key (lockable over LLO)
COMPATIBILITY	IEEE-488.1 and IEEE-488.2
BUS CONNECTOR.....	24-pin as per IEEE-488

PIN ASSIGNMENTS IEEE-488 INTERFACE



GND = Signal Ground (µP Ground)
SHLD = Shielding

Data Bus: DIO 1-DIO 8	Data Bits 1-8	I/O
Data Transfer Control Bus DAV	Data Valid	I/O
NRFD	Not ready for Data	I/O
NDAC	No Data Accepted	I/O
Interface Control Bus: IFC	Interface Clear	I
ATN	Attention	I
SRQ	Service Request	O
REN	Remote Enable	I
EOI	End or Identify	I/O

Attention! Avoid any discharge of electrostatic voltages over the IEEE-488 connector, since it can lead to damage or destruction of the unit.

9.11 RS232 Serial Interface

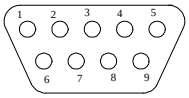
DATA FORMAT 8N1 (8 data bits, no parity, 1 stop bit)

BAUD RATE 9600 Bd

CONNECTOR TYPE 9-pin Sub-D connector

HANDSHAKE selectable:
- Xon/Xoff
- RTS/CTS
- no handshake

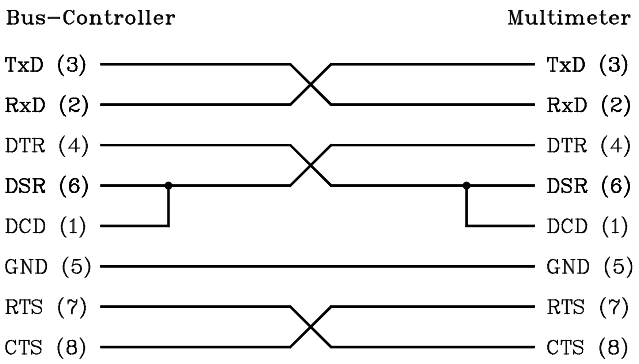
PIN ASSIGNMENTS:



PIN-No.	Orientation	Signal	Description
1	Input	DCD (Data Carrier Detect)	
2	Input	RD (Receive Data)	Received Data
3	Output	TD (Transmit Data)	Sent Data
4	Output	DTR (Data Terminal Ready)	
5		GND	Signal Ground
6	Input	DSR (Data Set Ready)	
7	Output	RTS (Request to Send)	
8	Input	CTS (Clear to Send)	
9	Input	RI (Ring Indicator)	

Table: PIN assignment RS232

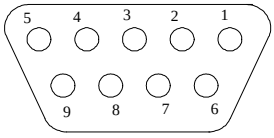
PIN Assignment RS232 Cable



9.12 Trigger Interface

CONNECTOR TYPE	9-pin SUB-D Connector
NUMBER OF LEADS	8 lines (4 used)
INPUT VOLTAGE	Active Low VIH Min. -0.5V Max. 0.8V VIL Min. 2.0V Max. 5.5V

PIN ASSIGNMENTS OF TRIGGER INTERFACE



PIN	9	8	7	6	5	4	3	2
Signal	In	In	In	In	-	-	-	-
	Trigger Reading							

PIN 1 = Ground

9.13 EU Conformity

The EU Declaration of Conformity for the 5017 certifies that this multimeter conforms to the pertinent requirements of the relevant EU directives and standards.

EMC Compliance Tests

The following EMC (EMC = Electromagnetic Compatibility) compliance tests have been carried out conforming to the EMC directive 89/336/EWG. The compliance has been documented.

Measurement of the EMI Emissions

EN 50081-1
Electromagnetic Compatibility
Generic Standard Class: Residential, Commercial and Light Industry

EN 55022
Class B, Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment (CISPR 22, modified), European Standard
Emission radiated, Frequency Range 30 MHz to 1 GHz.

EN 55022
Class B, Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment (CISPR 22, modified), European Standard
Emission conducted, Frequency Range 150 kHz to 30 MHz.

Measurement of EMI Immunity

Conforming EN 50082-1, **European Standard**,
Electromagnetic Compatibility - Generic Immunity Standard
Generic Standard Class: Residential, Commercial, or Light Industry.
Additional 5017 specifications under EMC test conditions

ENV 50140
EMC Immunity against radiated EMI (Electromagnetic Interference).
EMC Basic Directive, 30-1000MHz. Residential environment
EMI Radiation: 3V/m, 80%AM - f.e. Handy in a distance of 3-5m
5017 Specifications min. +/- 0.1 % F. S. (Full Scale)

ENV 50141
EMC Immunity against conducted EMI
EMC Basic Directive, 150 kHz - 80 MHz
EMI Source: $3V_{RMS}$ on open wires.
5017 Specifications min. +/- 0.1% F.S.

EN 61000-4-2
ESD Immunity Part 4-2
ESD: Air or Contact Discharge +/-8kV / 4 kV - Protection Class 2.
5017 Specifications min. +/- 0.1% F.S.

EN 61000-4-4
Burst and electrical fast transient immunity Part 4-4
Environment: Industrial Area 2kVpk - Protection Class 3.
5017 Specifications min. +/- 0.1% F.S.

EN 61000-4-5
Surge Immunity Test, Part 4-5
Environment: Industrial Area 2kV non symm. - Protection Class 3.
5017 Specifications min. +/- 0.1% F.S.

9.14 General

SECURITY complies with EN 61010,
Ground is connected to the case.

WARM-UP TIME ..... 20 min. to reach 1-Year Accuracy,
1h to reach 24h Stability.

ENVIRONMENT TEMPERATURE

Operation.....	10°C to 45°C
Storage.....	-25°C to 60°C

RELATIVE HUMIDITY

Operation.....	20% to 75% (at 0°C to 25°C)
	20% to 65% (at 25°C to 45°C)
Storage	10% to 90% (40°C)
Transportation.....	5% to 95% (40°C)
	in each case excluding condensation

POWER SUPPLY

Voltage ..... 230V (switchable to 115V)

115V +15%, -22%
Mains Fuse with 0.4A

230V +15%, -22%
Mains Fuse with 0.2A

Power ..... typ. 20 VA /max. 50 VA
Frequency ..... 47 to 63 Hz

WEIGHT ..... about 3.4 kg, 7.5 lbs

CASE ..... ½-19” Case 2 HU
Cast Aluminum Case

DIMENSIONS

Height	about 96 mm / 3.8 inch with feet
	about 89 mm / 3.5 inch without feet
Width	about 225 mm / 8.86 inch
Depth	about 375 mm / 14.7 inch

DIMENSIONS OF DELIVERED PACKAGE (CARTON)

Height	about 270 mm / 10.6 inch
Width	about 320 mm / 12.6 inch
Depth	about 460 mm / 18.1 inch