

# METRAport 3A

## Folding Analog Multimeter

3-349-302-03  
3/7.11

- **9 voltage measuring ranges,  $V_{\sim}$ :**  
100 mV, 300 mV, 1 V, 3 V, 10 V, 30 V, 100 V, 300 V and 600 V
- **7 current measuring ranges,  $A_{\sim}$ :**  
10  $\mu$ A, 100  $\mu$ A, 1 mA, 10 mA, 100 mA, 1 A and 10 A
- **5 resistance measuring ranges:** 1  $\Omega$  ... 2 k $\Omega$ / 10  $\Omega$  ... 20 k $\Omega$ /  
100  $\Omega$  ... 200 k $\Omega$ / 1 k $\Omega$  ... 2 M $\Omega$ / 10 k $\Omega$  ... 20 M $\Omega$
- **9 level measuring ranges:** -40 dB ... +62 dB
- High input resistance of 10 M $\Omega$   
for no-load voltage measurement
- Reflective scale in folding lid which can be tilted for easy  
reading and provides transport protection as well,  
accuracy class 1.5 =
- Overload protection: 600 V $\approx$   
in all functions and range settings
- Automatic battery shutdown when instrument is folded closed



**300 V CAT III**  
**600 V CAT II**  
*IEC/EN 61010-1, second edition*



### Applications

The multimeter is equipped with an indicator display and an electronic amplifier. It can be used in a wide variety of practical electronics applications, for example in R&D, manufacturing, equipment operation, in the test lab and for service calls, as well as for training and vocational education.

### Description

The multimeter has 46 measuring ranges for direct and alternating voltages of up to 600 V, alternating voltage levels from -40 to +62 dB, direct and alternating current of up to 10 A and resistances of up to 20 M $\Omega$ . It has a constant input resistance of 10 M $\Omega$  in all voltage measuring ranges.

The multimeter is calibrated in RMS values for periodic sinusoidal quantities. It makes use of full-wave rectification for the evaluation of the arithmetic mean value.

All measuring ranges can be selected with the central measuring range selector switch. The ranges are laid out in a clear-cut fashion around the selector switch.

The measuring device and the display unit are enclosed in two separate housing components which are connected to each other by means of a hinge which can be snapped into various positions. In this way, the ideal angle for ease of reading can be selected with the instrument in any position.

Several well coordinated safety devices protect the instrument against damage caused by incorrect operation and overloading within the specified overload limit values:

- Oversized precision resistors
- Fuse link in combination with protective rectifier diodes
- Overvoltage arrester / positive temperature coefficient resistors (PTCs)

The instrument can be operated independent of mains current with a commercially available 9 V flat cell battery. Long battery service life is assured thanks to the minimal current consumption of the instrument's electronic components.

The multimeter's rugged design provides for outstanding protection where harsh mechanical stressing prevails. When folded together, the instrument is provided with extra mechanical protection for the measuring device, as well as for the display unit. The connector jacks are protected against accidental contact. Suitable measurement cables with 4 mm test probes are included as standard equipment.

### Applicable Regulations and Standards

|                                                  |                                                                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| IEC 61010-1<br>DIN EN 61010-1<br>VDE 0411 Part 1 | Safety requirements for electrical equipment for measurement, control and laboratory use<br>Part 1: General requirements |
| DIN EN 61326-1<br>VDE 0843-20-1                  | Electrical equipment for measurement, control and laboratory use – EMC requirements –<br>Part 1: General requirements    |
| EN 60529                                         | Test instruments and test procedures                                                                                     |

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### Characteristic Values

| Voltage <sup>1)</sup> | Level <sup>2)</sup> |                 | Input Resistance $R_i$  | Overload Protection to <sup>3)</sup> |
|-----------------------|---------------------|-----------------|-------------------------|--------------------------------------|
|                       | Constant            | Measuring Span  |                         |                                      |
| 100 mV $\approx$      | -20 dB              | -40 ... ÷ 18 dB | 10 M $\Omega$ / / 50 pF | 600 V $\approx$                      |
| 300 mV $\approx$      | -10 dB              | -30 ... ÷ 8 dB  |                         | 600 V $\approx$                      |
| 1 V $\approx$         | 0 dB                | -20 ... + 2 dB  |                         | 600 V $\approx$                      |
| 3 V $\approx$         | +10 dB              | -10 ... + 12 dB |                         | 600 V $\approx$                      |
| 10 V $\approx$        | +20 dB              | 0 ... + 22 dB   |                         | 600 V $\approx$                      |
| 30 V $\approx$        | +30 dB              | +10 ... + 32 dB |                         | 600 V $\approx$                      |
| 100 V $\approx$       | +40 dB              | +20 ... + 42 dB |                         | 600 V $\approx$                      |
| 300 V $\approx$       | +50 dB              | +30 ... + 52 dB |                         | 600 V $\approx$                      |
| 600 V $\approx$       | +60 dB              | +40 ... + 62 dB |                         | 600 V $\approx$                      |

<sup>1)</sup> The 100 mV to 10 V measuring ranges can also be used for current measurement in accordance with the following table (e.g. reverse current or insulation current). These measuring ranges are rated at accuracy class 5. Frequency range at  $\sim$ : 15 ... 100 Hz.

Same overload protection as for voltage measuring ranges.

<sup>2)</sup> Measured value = displayed value + constant, 0 dB  $\triangleq$  0.775 V, i.e. 1 mW at 600  $\Omega$

<sup>3)</sup> Protected with PTC resistor

| Range            | Current at Upper Range Limit | $R_i$         |
|------------------|------------------------------|---------------|
| 100 mV $\approx$ | 10 nA                        | 10 M $\Omega$ |
| 300 mV $\approx$ | 30 nA $\approx$              |               |
| 1 V $\approx$    | 100 nA $\approx$             |               |
| 3 V $\approx$    | 300 nA $\approx$             |               |
| 10 V $\approx$   | 1 $\mu$ A $\approx$          |               |
| 30 V $\approx$   | 3 $\mu$ A $\approx$          |               |

| Current               | Input Resistance $R_i$ | Voltage Drop $\Delta U$ | Overload Protection to        |
|-----------------------|------------------------|-------------------------|-------------------------------|
| 10 $\mu$ A $\approx$  | 10.0 k $\Omega$        | 100 mV                  | 600 V $\approx$ <sup>3)</sup> |
| 100 $\mu$ A $\approx$ | 1.0 k $\Omega$         | 100 mV                  | 600 V $\approx$ <sup>3)</sup> |
| 1 mA $\approx$        | 100.0 $\Omega$         | 100 mV                  | 600 V $\approx$ <sup>3)</sup> |
| 10 mA $\approx$       | 10.0 $\Omega$          | 100 mV                  | 600 V $\approx$ <sup>3)</sup> |
| 100 mA $\approx$      | 1.4 $\Omega$           | 140 mV                  | 600 V $\approx$ <sup>3)</sup> |
| 1 A $\approx$         | 480 m $\Omega$         | 0.480 V                 | 600 V $\approx$ <sup>3)</sup> |
| 10 A $\approx$        | 26 m $\Omega$          | 260 mV                  | 600 V $\approx$ <sup>4)</sup> |

| Resistance Range     | Reading Range                   | Value at Scale Middle ( $R_i$ ) | Open-Circuit Voltage $U_0$ | Short-Circuit Current $I_k$ | Overload Protection to        |
|----------------------|---------------------------------|---------------------------------|----------------------------|-----------------------------|-------------------------------|
| $\Omega \times 1$    | 1 $\Omega$ ... 2 k $\Omega$     | 45.6 $\Omega$                   | 100 mV                     | 2.2 mA                      | 600 V $\approx$ <sup>3)</sup> |
| $\Omega \times 10$   | 10 $\Omega$ ... 20 k $\Omega$   | 456.0 $\Omega$                  | 100 mV                     | 0.22 mA                     | 600 V $\approx$ <sup>3)</sup> |
| $\Omega \times 100$  | 100 $\Omega$ ... 200 k $\Omega$ | 4.56 k $\Omega$                 | 100 mV                     | 22 $\mu$ A                  | 600 V $\approx$ <sup>3)</sup> |
| k $\Omega \times 1$  | 1 k $\Omega$ ... 2 M $\Omega$   | 45.6 k $\Omega$                 | 1 V                        | 22 $\mu$ A                  | 600 V $\approx$ <sup>3)</sup> |
| k $\Omega \times 10$ | 10 k $\Omega$ ... 20 M $\Omega$ | 456.0 k $\Omega$                | 1 V                        | 2.2 $\mu$ A                 | 600 V $\approx$ <sup>3)</sup> |

<sup>3)</sup> Protection by means of FF 16A/600V AC fuse link in combination with rectifier diodes.

<sup>4)</sup> FF 16A/600V fuse link, 10 A: max. 10 minutes

### Accuracy under Reference Conditions per IEC 60051/EN 60051

Class 1.5 for zero-frequency quantities, class 2.5 for periodic sinusoidal quantities and class 1.5 for resistance (intrinsic error relative to 69 mm scale length) corresponding to max. 10% intrinsic error of the measured value within the range of the exaggerated scale arc.

### Reference Conditions

|                              |                                          |
|------------------------------|------------------------------------------|
| Ambient temperature          | +23° C $\pm$ 2 K                         |
| Relative humidity            | 40 ... 60 %                              |
| Normal position of use       | Instrument and scale horizontal $\pm$ 1° |
| Measured quantity frequency  | 45 ... 65 Hz                             |
| Measured quantity waveshape  | Sine                                     |
| Battery voltage              | 7.5 V $\pm$ 0.1 V                        |
| Other influencing quantities | per IEC 60051/EN 60051                   |

### Influencing Quantities and Nominal Ranges of Use

|                                          |                                                                                                                                                                                                             |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature                              | +5 ... +23 ... +35° C                                                                                                                                                                                       |
| Limiting temperatures                    | For accuracy +5 ... +35° C<br>For operation 0 ... +40° C<br>For storage -25 ... +65° C (without batteries)                                                                                                  |
| Position                                 | Additional influence error of max. $\pm$ 1% of the scale length if the scale is tilted between 0 and $\pm$ 120° relative to horizontal                                                                      |
| Frequency                                | Additional influence error of max. $\pm$ 5% of full scale value in the following ranges:<br>100 mV, 3 V ... 600 V: 15 Hz ... 1 kHz<br>10 $\mu$ A ... 10 A: 15 Hz ... 1 kHz<br>300 mV, 1 V: 15 Hz ... 200 Hz |
| Auxiliary voltage                        | No additional influence error. The upper limit must be set with the potentiometer for all measuring ranges in the case of resistance measurement.                                                           |
| Series-mode interference voltage damping | For $V_{\approx}$ : > 60 dB, AC 50 Hz<br>For $V_{\sim}$ : > 120 dB, DC                                                                                                                                      |
| Common-mode interference voltage damping | > 120 dB, DC and 50 Hz AC                                                                                                                                                                                   |
| Other influencing quantities             | per IEC 60051/EN 60051                                                                                                                                                                                      |

### Power Supply

|                      |                                                                                                                                          |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Battery operation    | Nominal voltage: 9 V $\approx$ ,<br>9 V flat cell battery per IEC 6LR61 (6F22), alkaline manganese or NiMH rechargeable battery.         |
| Battery service life | With alkaline manganese: approx. 1000 hours, with NiCd: approx. 200 hours, in the $\Omega \times 1$ range: 1/4 of specified service life |
| Battery test         | Pointer must be within the battery test field.                                                                                           |

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### Fuses

|                            |                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ranges to 1 A and $\Omega$ | FF 1.6A/600V, 6 mm x 32 mm in combination with rectifier diodes for the 10 $\mu$ A ... 1 A and $\Omega$ x1 ... k $\Omega$ x10 ranges, switching capacity: 50 kA at 600 V~ |
| 10 A range                 | FF 16A/600V AC, 6 mm x 32 mm, switching capacity: 50 kA at 600 V~                                                                                                         |

### Electrical Safety

|                    |                                                 |
|--------------------|-------------------------------------------------|
| Safety class       | II per IEC/EN 61010-1:2001/VDE 0411-1:2002      |
| Measuring category | II III                                          |
| Operating voltage  | 600 V 300 V                                     |
| Fouling factor     | 2                                               |
| Test voltage       | 3.5 kV~ per IEC/EN 61010-1:2001/VDE 0411-1:2002 |

### Electromagnetic Compatibility (EMC)

|                       |                                        |
|-----------------------|----------------------------------------|
| Interference emission | EN 61326:2006 class B                  |
| Interference immunity | EN 61326-1: 2006<br>EN 61326-2-1: 2006 |

### Mechanical Design

|            |                                        |
|------------|----------------------------------------|
| Protection | Housing: IP 40, connector jacks: IP 20 |
| Dimensions | 146 x 118 x 44 mm (folded closed)      |
| Weight     | approx. 0.45 kg without battery        |



### Standard Equipment

- 1 multimeter
- 1 9 V battery
- 1 KS17 measurement cable
- 1 set operating instructions

### Order Information

| Description                                                                                                                         | Type               | Article Number  |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| Folding analog multimeter for demanding requirements                                                                                | METRAport 3A       | M113A           |
| <b>Consumable Materials</b>                                                                                                         |                    |                 |
| Fuse link (shipped in package of 10)                                                                                                | FF(UR)1.6A/700V AC | Z109E           |
| Fuse link (shipped in package of 10)                                                                                                | FF(UR)16A/600V AC  | Z109A           |
| <b>Accessories</b>                                                                                                                  |                    |                 |
| Carrying pouch                                                                                                                      | F822               | GTY3172095P01   |
| Current measuring adapter for safe, trouble-free measurement of current consumption via the mains plug of connected power consumers | SM16               | GTM9070190E0002 |
| Temperature probes with integrated or plug-on sensors (see Measuring Instruments and Testers catalog)                               | Z3431...           | GTZ3431...      |

### Accessories

#### SM16 Current Measuring Adapter



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| Current Measuring Accessories                                                                                              |                                                                                    |                                                 |                                |                               |                                     |                                   |                                       |                     | Suitable for METRAport |  |  |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------|-------------------------------|-------------------------------------|-----------------------------------|---------------------------------------|---------------------|------------------------|--|--|
| All current sensors and transformers are equipped with a connector cable (1.2 to 1.5 m long) with 4 mm safety banana plugs |                                                                                    |                                                 |                                |                               |                                     |                                   |                                       |                     | 3A                     |  |  |
| Type                                                                                                                       | Designation                                                                        | Measuring Range                                 | Meas. Category                 | Max. Wire Dia.                | Transformation Factor               | Frequency Range                   | Intrinsic Uncertainty ±(% rdg. + ...) | Article Number      |                        |  |  |
| <b>DC/AC Current Sensors with Voltage Output</b>                                                                           |                                                                                    |                                                 |                                |                               |                                     |                                   |                                       |                     |                        |  |  |
| CP30                                                                                                                       | DC/AC clip-on current sensor, with battery mode (30 h)                             | 5 mA ... 30 A                                   | 300 V / CAT III                | 25 mm                         | 100 mV/A                            | DC...20 kHz (-1dB)                | 1 % + 2 mA                            | Z201B               | ▼                      |  |  |
| CP330                                                                                                                      | DC/AC clip-on current sensor, with 2 measuring ranges, battery mode (30 h)         | 0,5 ... 30 A<br>5 ... 300 A                     | 300 V / CAT III                | 25 mm                         | 10 mV/A;<br>1 mV/A                  | DC...20 kHz (-3 dB)               | 1 % + 50 mA<br>1 % + 100 mA           | Z202B               | ▲                      |  |  |
| CP1100                                                                                                                     | DC/AC clip-on current sensor, with 2 measuring ranges, battery mode (30 h)         | 0,5 ... 100 A<br>5 ... 1000 A                   | 300 V / CAT III                | 32 mm                         | 10 mV/A;<br>1 mV/A                  | DC...20 kHz (-1dB)                | 1 % + 100 mA<br>1 % + 500 mA          | Z203B               | ▲                      |  |  |
| Z13B                                                                                                                       | DC/AC clip-on current sensor, with 2 measuring ranges, battery mode (50 h)         | 0.2 ... 40 A~/60 A~;<br>0.5 ... 400 A~/600A~    | 300 V / CAT IV                 | 50 mm                         | 10 mV/A,<br>1 mV/A                  | <u>DC...65 Hz</u><br>... 10 kHz   | 1,5 %<br>2,0 %                        | Z213B               | ▲                      |  |  |
| <b>AC Current Sensors with Voltage Output</b>                                                                              |                                                                                    |                                                 |                                |                               |                                     |                                   |                                       |                     |                        |  |  |
| WZ12B                                                                                                                      | AC clip-on current sensor                                                          | 10 mA~ ... 100 A~                               | 300 V / CAT III                | 15 mm                         | 100 mV/A                            | <u>45 ... 65</u><br>... 500 Hz    | 1.5% + 0.1 mA                         | Z219B               | ●                      |  |  |
| WZ12C                                                                                                                      | AC clip-on current sensor, with 2 measuring ranges                                 | 1 mA~ ... 15 A~,<br>1 ... 150 A~                | 300 V / CAT III                | 15 mm                         | 1 mV/mA,<br>1 mV/A                  | <u>45 ... 65</u><br>... 400 Hz    | 3% + 0.15 mA,<br>2% + 0.1 A           | Z219C               | ●                      |  |  |
| WZ11B                                                                                                                      | AC clip-on current sensor, with 2 measuring ranges                                 | 0.5 ... 20 A~,<br>5 ... 200 A~                  | 600 V / CAT III                | 20 mm                         | 100 mV/A,<br>10 mV/A                | <u>30...48...65</u><br>... 500 Hz | 1 ... 3%                              | Z208B               | ●                      |  |  |
| Z3512A                                                                                                                     | AC clip-on current sensor, with 4 measuring ranges                                 | 1 mA ... 1/10/100/<br>1000 A~                   | 600 V / CAT III                | 52 mm                         | 1 V/A, 100 mV/A,<br>10 mV/A, 1 mV/A | <u>10...48...65</u><br>... 3 kHz  | 0.5 ... 3%,<br>0.2 ... 1%             | Z225A               | ●                      |  |  |
| METRAFLEX 3000                                                                                                             | Flexible AC current sensor with 3 measuring ranges, battery mode (2000 h)          | 0,5 ... 30 A,<br>0,5 ... 300 A,<br>5 ... 3000 A | 1000 V CAT III<br>600 V CAT IV | Circum-<br>ference:<br>610 mm | 100 mV/A,<br>10 mV/A,<br>1 mV/A     | 10 Hz ... 20 kHz                  | 1% + 0.1 A<br>1% + 0.1 A<br>1% + 1 A  | Z207E               | ●                      |  |  |
| METRAFLEX 3000M                                                                                                            | Flexible AC miniature current sensor with 3 measuring ranges, battery mode (150 h) | 0,5 ... 30 A,<br>0,5 ... 300 A,<br>5 ... 3000 A | 1000 V CAT III<br>600 V CAT IV | Circum-<br>ference:<br>160 mm | 100 mV/A,<br>10 mV/A,<br>1 mV/A     | 10 Hz ... 100 kHz                 | 1% + 0.2 A<br>1% + 0.2 A<br>1% + 1 A  | Z207J               | ●                      |  |  |
| <b>AC Current Transformer with Current Output</b>                                                                          |                                                                                    |                                                 |                                |                               |                                     |                                   |                                       |                     |                        |  |  |
| WZ12A                                                                                                                      | AC clip-on current transformer                                                     | 15 ... 180 A~                                   | 300 V / CAT III                | 15 mm                         | 1 mA/A                              | <u>45 ... 65</u><br>... 400 Hz    | 3%                                    | Z219A               | ●                      |  |  |
| WZ12D                                                                                                                      | AC clip-on current transformer                                                     | 30 mA ... 150 A~                                | 300 V / CAT III                | 15 mm                         | 1 mA/A                              | <u>45 ... 65</u><br>... 500 Hz    | 2.5% + 0.1 mA                         | Z219D               | ▲                      |  |  |
| WZ11A                                                                                                                      | AC clip-on current transformer                                                     | 1 ... 200 A~                                    | 600 V / CAT III                | 20 mm                         | 1 mA/A                              | <u>48 ... 65</u><br>... 400 Hz    | 1 ... 3%                              | Z208A               | ●                      |  |  |
| Z3511                                                                                                                      | AC clip-on current transformer                                                     | 4 ... 500 A~                                    | 600 V / CAT III                | 30 x 63 mm                    | 1 mA/A                              | <u>48 ... 65</u><br>... 1 kHz     | 3% + 0.4 A                            | GTZ3511<br>000R0001 | ◆                      |  |  |
| Z3512                                                                                                                      | AC clip-on current transformer                                                     | 0.5 ... 1000 A~                                 | 600 V / CAT III                | 52 mm                         | 1 mA/A                              | <u>30...48...65</u><br>... 5 kHz  | 0.5% ... 0.7%                         | GTZ3512<br>000R0001 | ◆                      |  |  |
| Z3514                                                                                                                      | AC clip-on current transformer                                                     | 1 ... 2000 A ~                                  | 600 V / CAT III                | 64 x 150 mm                   | 1 mA/A                              | <u>30...48...65</u><br>... 5 kHz  | 0.5% + 0.1 A                          | GTZ3514<br>000R0001 | ■                      |  |  |

● Without restriction ▼ As of 0,1 A ▲ As of 1 A ◆ As of 10 A ■ As of 100 A



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