

Product Datasheet - Technical Specifications



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Your contact

Technical and commercial sales, price information,
quotations, demo/test equipment, consulting:

Tel.: **+49 - 81 41 - 52 71-0**

FAX: **+49 - 81 41 - 52 71-129**

E-Mail: sales@meilhaus.com

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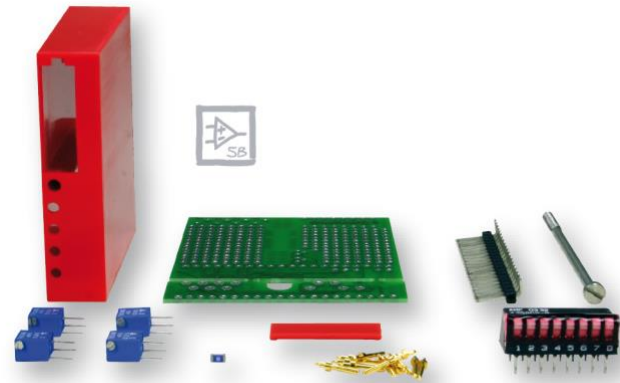
www.meilhaus.com/en/infos/download.htm

Meilhaus Electronic GmbH
Am Sonnenlicht 2
82239 Alling/Germany

Tel.	+49 - 81 41 - 52 71-0
Fax	+49 - 81 41 - 52 71-129
E-Mail	sales@meilhaus.com

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MA-KIT

Construction kit for 5B modules (5B)

Self-made. Individual.

The construction kit MA-KIT allows for the realization of special applications compatible to the 5B module series. It includes a stripboard with SMD pads which is assembled conventionally or with SMD components and integrated in a 5B module housing.

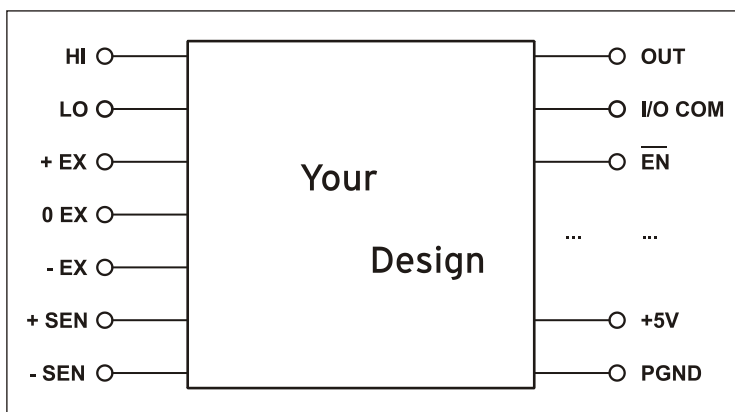
5B technology. Industrial standard.

The pin assignment of the 5B module corresponds to the 5B module standard of Analog Devices and Burr Brown. An additional 0EX pin has been introduced for sensors requiring unipolar supply to be suitable for connection.

It's the setting that matters.

Numerous functions can be implemented which are configurable via 8 DIP switches and soldering bridges. 4 potentiometers can be used for calibration.

Basic functionality.



Functional diagram

Basic functions are already provided on the board, which are selected by connecting solder bridges on the bottom side of the module.

Clearly safe.

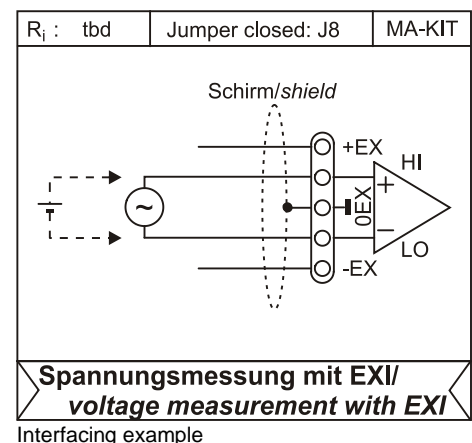
A Multifuse protects the module against overload. In this case, it is sufficient to interrupt the power supply. The Multifuse will be regenerated after one minute.

Compatibility.

The MA series provides a great variety of measuring amplifiers, measuring converters, or filter modules. They can be used in any combination allowing for the solution of the most individual measuring tasks.

Get connected.

With the backplanes (AP series) and amplifier systems (AMS series) for 5B modules varying in size and design, signal connection is easy



Interfacing example

Technical data

(typ. at 20°C, after 15min., +5V supply)

- General data

Voltage supply:

Current:

CE standards:

ElektroG // ear registration:

Temperature ranges // Relative humidity:

Max. permissible potentials // Protection type:

Dimensions:

Delivery:

Available accessories:

Warranty:

+5V DC ($\pm 5\%$), protected with Multifuse
to be defined by user, max. 250mA
to be defined by user
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
operating temp. to be defined by user, storage temp. $-25^{\circ}\text{C}..+70^{\circ}\text{C}$ // 0 - 90% (not condensing)
60V DC acc. to VDE , max. 1kV ESD on open lines // IP30
plastic housing 52 * 70 * 15mm
housing, screw, board, 10 pins, fuse, switch, 4 potentiometers, angled pin plug, description
backplanes: AP2a, AP8a, AAB-II; AMS amplifier measurement systems
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 1.1 02/10/2020



MA-P09/12/15

Power supply modules (5B)

Sensors well supplied.

The extremely low-priced power supply modules MA-P09, MA-P12, and MA-P15 can be used for the supply of active sensors.

5B technology.

Industrial standard.

The pin assignment of the 5B module corresponds to the 5B module standard of Analog Devices and Burr Brown. An additional 0EX pin has been introduced for sensors requiring unipolar supply to be suitable for connection.

Powered by voltage or current.

The modules are available in three versions providing an unregulated supply voltage of $\pm 9V$ (MA-P09), $\pm 12V$ (MA-P12), or $\pm 15V$ (MA-P15) as well as a regulated $+5V$ DC voltage or a $4mA$ current source for ICP sensors. The power supply modules are not electrically isolated and have no output switch.

Clearly safe.

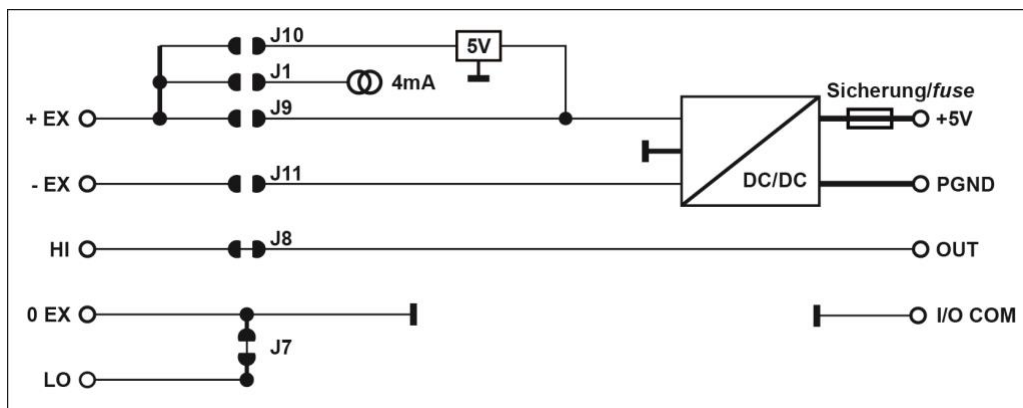
A Multifuse protects the module against overload. In this case, it is sufficient to interrupt the power supply. The Multifuse will be regenerated after one minute.

Compatibility.

The MA series provides a great variety of measuring amplifiers, measuring converters, or filter modules. They can be used in any combination allowing for the solution of the most individual measuring tasks.

Get connected.

With the backplanes (AP series) and amplifier systems (AMS series) for 5B modules varying in size and design, signal connection is easy.



Funktionsschaltbild

Technical data

(typ. at 20°C, after 15min., +5V supply)

- General data

Excitation generation:

Voltage supply (regulated):

CE standards:

ElektroG // ear registration:

Temperature ranges:

Relative humidity:

Max. permissible potentials:

Protection type:

Dimensions:

Delivery:

Available accessories:

Warranty:

±9V/±12V/±15V, 2W unregulated (no overload protection) or +5V regulated or 4mA
+5V DC (±5%), 50mA, max. 250mA, protected by Multifuse
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
operating temp. -25..50°C, storage temp. -25°C..+70°C
0 - 90% (not condensing)
60V DC acc. to VDE , max. 1kV ESD on open lines
IP30
plastic housing 52 * 70 * 15mm
product, description
backplanes: AP2a, AP8a, AAB-II; AMS amplifier measurement systems
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

MA-UI

Isolating multi-range amplifier (5B)

Voltage or current.

Precisely conditioned.

The measuring amplifier MA-UI adjusts voltage or current (DC) signals to the 5V input of a PC data acquisition system. With 10kHz bandwidth, it is ideal for dynamic signals. The great variety of adjustable measuring ranges allows the MA-UI to be used for signal conditioning tasks in an extremely flexible way.

5B technology. Industrial standard.

The pin assignment of the 5B module corresponds to the 5B module standard of Analog Devices and Burr Brown. An additional 0EX pin has been introduced for sensors requiring unipolar supply to be suitable for connection.

Measuring ranges.

Enough and to spare.

Nine input voltage ranges between $\pm 5\text{mV}$ and $\pm 50\text{V}$ and six current measuring ranges from ± 1 to $\pm 200\text{mA}$ in total are provided by the MA-UI to precisely adjust signals to the range of the DAQ system.

Sensors well supplied.

To operate sensors, either an unregulated $\pm 12\text{V}$ DC supply or a regulated $+5\text{V}$ DC

voltage or a 4mA current source for ICP sensors are provided.

Clearly safe.

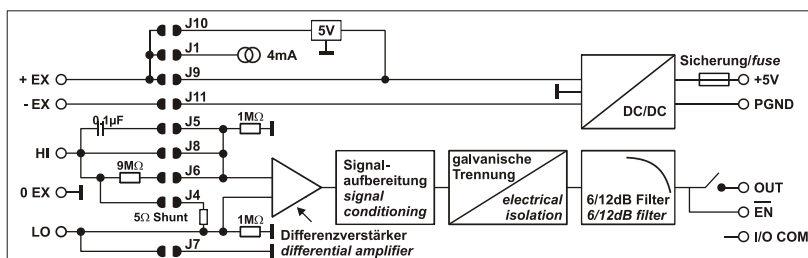
If using several modules, the channels are galvanically isolated to each other and to the DAQ system. This perfectly protects the whole system against high potentials and interferences.

Undisturbed.

Common-mode interferences often produced by machinery or other loads are effectively suppressed by the balanced input of the differential amplifier. If an output filter is set, disturbing frequencies can be eliminated.

It's the setting that matters.

The selection of the operation mode, ranges, and the three filter cut-off frequencies is done via DIP switches and soldering bridges. Offset and gain are adjustable with potentiometers.



Technical data

(typ. at 20°C, after 15min., +5V supply)

Measuring ranges

Gain:
max. Bandwidth at 6dB/oct. [kHz]:
Voltage DC [mV]:
Current DC [mA]:
U_i current range DC [mV]:

Measuring range 1	Measuring range 2	Measuring range 3	Measuring range 4
500	50	5	0.5
1	5	10	10
±10	±100	±1000	±10V
±2	±20	±200	-
±10	±100	±1000	-

At the output referring to: +5V .. -5V DC; Turning on DIP 1 reduces the respective measuring range to 50% (e.g. DIP 1 OFF: MR=±10V; DIP 1 ON: MR=±5V);
Opening solder bridge J8 and closing J6+J7 extends the ±10 measuring range → Max. range possible (DIP 1 to ON!): ±50V.

* The module is factory-balanced in the ±10V measuring range.

Accuracy (typical)

Calibration:
Filter accuracy of f // Relative range accuracy:
Amplifier accuracy // Non-linearity:
Current shunt accuracy:
Temperature drift offset // gain:

offset: ±10%; measuring range (gain): ±10%
±15% // 0.1%; if MR/2 typ. 1%; if MR=±50V typ. 2%
±0.1% // ±0.1%
±0.2%
typ. 100 ppm/°C, max 200ppm/°C // typ. 100 ppm/°C, max 200ppm/°C

The values for accuracy always relate to the respective measuring range. Errors might add at worst.

Input range

Input resistance (voltage // current):
Voltage drop // Input suppressor circuit:
Input AC decoupling (with J5):
Excitation generation (electr. isolated):

single-ended: 1MΩ, differential: 2MΩ, turned off: 100kΩ // 5Ω shunt
max. 1V // max. 240V AC for 1sec. (not in current measurement)
0.1μF and 1MΩ for f > 10Hz
±12V, ±30mA unregulated or +5V, 30mA regulated or 4mA, ±5% power source, max. amplitude app. 20V

Output range

Output voltage // Output load:
Output switch:
Output switching time // Switch resistance:
Output filter (switchable):
Supply sensitivity of the output:
Output hum/ripple:

±5V DC // >1kΩ, recommended >10kΩ for 0.1% accuracy
CMOS switch with TTL-level or open collector switchable (low active)
10μs at 200pF // typ. 50Ω; max. 100Ω (short-circuit proof)
2-pole (12dB/oct) for 10kHz; 1-pole (6dB/oct) for 10Hz, 100Hz
typ. ±5mV/V
typ. 10mV, max. 50mV

General data

Voltage supply (regulated):
CE standards:
ElektroG // ear registration:
Temperature ranges // Relative humidity:
Max. permissible potentials // Protection type:
Dimensions // Patent:
Delivery:
Available accessories:
Warranty:

+5V DC (±5%), 70mA, max. 250mA, protected by Multifuse
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
operating temp. -25..50°C, storage temp. -25°C..+70°C // 0 - 90% (not condensing)
60V DC acc. to VDE, max. 1kV ESD on open lines // IP30
plastic housing 52 * 70 * 15mm // German patent no.:196 52 293
product, description
backplanes: AP2a, AP8a, AAB-II; AMS amplifier measurement systems
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 8.1 02/11/2020

MA-U

Isolating voltage measuring amplifier (5B)

Conditioned to voltage.

The measuring amplifier MA-U adjusts voltage signals to the 5V input of a PC data acquisition system. To emphasize is the extremely large bandwidth of 50kHz so that even slightest peaks of high-frequent signals do not remain undetected.

5B technology. Industrial standard.

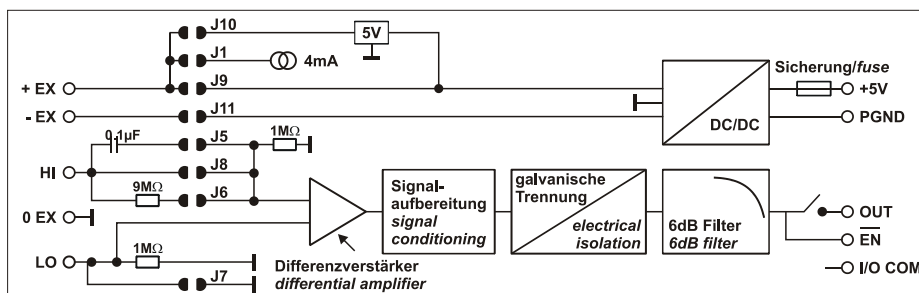
The pin assignment of the 5B module corresponds to the 5B module standard of Analog Devices and Burr Brown. An additional OEX pin has been introduced for sensors requiring unipolar supply to be suitable for connection.

You have the choice.

Four input voltage ranges from $\pm 0.5V$ to $\pm 10V$ are provided by the MA-U. DC voltage as well as AC voltage can be connected. Three filter cut-off frequencies for the output filter are provided.

Sensors well supplied.

To operate sensors, either an unregulated $\pm 12V$ DC supply or a regulated $+5V$ DC voltage or a 4mA current source for ICP sensors are provided.



Clearly safe.

If using several modules, the channels are galvanically isolated to each other and to the DAQ system. This perfectly protects the whole system against high potentials and interferences.

Undisturbed.

Common-mode interferences often produced by machinery or other loads are effectively suppressed by the balanced input of the differential amplifier. If an output filter is set, disturbing frequencies can be eliminated.

It's the setting that matters.

The selection of the measuring ranges, and the filter cut-off frequencies is done via DIP switches and soldering bridges. Offset and gain are adjustable with potentiometers.

Technical data

(typ. at 20°C, after 15min., +5V supply)

Measuring ranges

Gain:
Bandwidth at 6dB/oct. [kHz]:
Voltage DC [mV] // :
Current DC [mA]:
 U_{drop} current range DC [mV]:

Measuring range 1	Measuring range 2	Measuring range 3	Measuring range 4
500	50	5	0.5
1	5	10	10
±10	±100	±1000	±10V
±2	±20	±200	-
±10	±100	±1000	-

At the output referring to: +5V .. -5V DC; Turning on DIP 1 reduces the respective measuring range to 50% (e.g. DIP 1 OFF: MR=±10V; DIP 1 ON: MR=±5V); .

Opening solder bridge J8 and closing J6+J7 extends the ±10 measuring range → Max. range possible (DIP 1 to ON!): ±50V.

* The module is factory-balanced in the ±10V measuring range.

Accuracy (typical)

Calibration:
Filter accuracy of f_0 // Relative range accuracy:
Amplifier accuracy // Non-linearity:
Current shunt accuracy:
Temperature drift offset // gain:

offset: ±10%; measuring range (gain): ±10%
±15% // 0.1%; if MR/2 typ. 1%; if MR=±50V typ. 2%
±0.1% // ±0.1%
±0.2%
typ. 100 ppm/°C, max 200ppm/°C // typ. 100 ppm/°C, max 200ppm/°C

The values for accuracy always relate to the respective measuring range. Errors might add at worst.

Input range

Input resistance (voltage // current):
Voltage drop // Input suppressor circuit:
Input AC decoupling (with J5):
Excitation generation (electr. isolated):

single-ended: 1M Ω , differential: 2M Ω , turned off: 100k Ω // 5 Ω shunt
max. 1V // max. 240V AC for 1sec. (not in current measurement)
0.1 μ F and 1M Ω for $f_0 > 10$ Hz
±12V, ±30mA unregulated or +5V, 30mA regulated or 4mA, ±5% power source, max. amplitude app. 20V

Output range

Output voltage // Output load:
Output switch:
Output switching time // Switch resistance:
Output filter (switchable):
Supply sensitivity of the output:
Output hum/ripple:

±5V DC // >1k Ω , recommended >10k Ω for 0.1% accuracy
CMOS switch with TTL-level or open collector switchable (low active)
10 μ s at 200pF // typ. 50 Ω ; max. 100 Ω (short-circuit proof)
2-pole (12dB/oct) for 10kHz; 1-pole (6dB/oct) for 10Hz, 100Hz
typ. ±5mV/V
typ. 10mV _{ss} , max. 50mV _{ss}

General data

Voltage supply (regulated):
CE standards:
ElektroG // ear registration:
Temperature ranges // Relative humidity:
Max. permissible potentials // Protection type:
Dimensions // Patent:
Delivery:
Available accessories:
Warranty:

+5V DC (±5%), 70mA, max. 250mA, protected by Multifuse
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
operating temp. -25..50°C, storage temp. -25°C..+70°C // 0 - 90% (not condensing)
60V DC acc. to VDE, max. 1kV ESD on open lines // IP30
plastic housing 52 * 70 * 15mm // German patent no.:196 52 293
product, description
backplanes: AP2a, AP8a, AAB-II; AMS amplifier measurement systems
2 years from date of purchase at bmc, claims for damages resulting from improper use excluded

MA-UNI

Isolating universal measuring amplifier (5B)

Perfectly conditioned. Universal.

The measuring amplifier MA-UNI adjusts signals of different type and size to the 5V input of a PC data acquisition system. With 10kHz bandwidth, it is ideal for dynamic signals. An all-rounder in signal conditioning optimizing performance and accuracy of your measuring system.

5B technology. Industrial standard.

The pin assignment of the 5B module corresponds to the 5B module standard of Analog Devices and Burr Brown. An additional 0EX pin has been introduced for sensors requiring unipolar supply to be suitable for connection.

Measure. Whatever you need.

You want to measure voltage, current, or resistance? Feasible, of course, with the MA-UNI: All common sensors as well as LVDTs (carrier frequency) and measuring bridges (strain gauge) can be connected directly. Numerous measuring ranges are provided for optimum signal conditioning.

Sensors well supplied.

The MA-UNI features a 100 μ A current source for resistance measurement in addition to the galvanically isolated ± 2.5 V sensor supply.

Clearly safe.

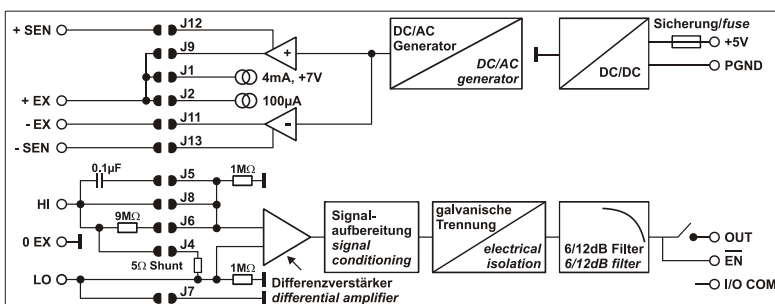
If using several modules, the channels are galvanically isolated to each other and to the DAQ system. This perfectly protects the whole system against high potentials and interferences.

Undisturbed.

Common-mode interferences often produced by machinery or other loads are effectively suppressed by the balanced input of the differential amplifier. If an output filter is set, disturbing frequencies can be eliminated.

It's the setting that matters.

The selection of the measuring quantities, ranges, and the three filter cut-off frequencies is done via DIP switches and soldering bridges. Offset and gain are adjustable with potentiometers.



Functional diagram

Technical data (typ. at 20°C, after 15min., +5V supply)

• Measuring ranges

Gain:
 max. Bandwidth at 6dB/oct. [kHz]:
 Voltage DC [mV] // Current DC [mA]:
 Voltage AC [mV] // Current AC [mA]:
 U₋ current range DC [mV] // AC [mV]:
 Resistance [Ω]:
 Sensitivity (strain gauge) at 2.5V DC [mV/V]:
 Sensitivity (carrier frequ.) at 2V₋ AC [mV/V]:

Measuring range 1	Measuring range 2	Measuring range 3	Measuring range 4
5000	500	50	5
1	5	10	10
±1 // ±0.2	±10 // ±2	±100 // ±20	±1000 // ±200
±1 // ±0.2	±10 // ±2	±100 // ±20	±1000 // ±200
±1 // 1	±10 // 10	±100 // 100	±1000 // 1000
10	100	1k	10k
0.2	2	20	200
--	--	100	1000

At the output referring to: +5V .. -5V DC (i.e. 0 .. +5V DC to resistance test and rectifying); Turning on DIP 1 reduces the respective measuring range to 50%.

* The module is factory-balanced in the ±1V measuring range. Opening solder bridge J8 and closing J6+J7 extends the ±1V measuring range to ±10V.

• Generator

Generator voltage (DMS // LVDT):
 Generator current // Internal resistance:
 Connectable pickups:

±2.5V DC // 2V ₋ at 5kHz AC
100μA or 4mA, max. swing 5V // max. 50Ω
strain gauge 100Ω-1000Ω; ind. 8mH-20mH

• Accuracy (typical)

Range calibration (gain) // Filter accuracy of f:
 Zero balance (offset) fine // coarse:
 Generator current // Generator voltage:
 Relative range accuracy // Residual ripple CF:
 Measuring accuracy current DC // resistance:
 Measuring accuracy current AC // voltage AC:
 Amplifier accuracy // Non-linearity:
 Temperature drift offset // gain:

app. ±10% // max. ±15%
±10% // ±100% (temperature drift approximately 200ppm)
±0.25% max. 1%; temp. coefficient=25ppm/°C, for 4mA ±5% // ±0.25% DC, max. 1%; ±2% AC
0.1%; if MR/2 typ. 1%; if MR=±10V typ. ±2% // max. 0.2%
typ. ±0.2% // typ. 0.1%; max. 1%
±5% // ±5%
typ. 0.01%; max. 0.1% // typ. 0.01%; max. 0.1%
typ. 100 ppm/°C, max 200ppm/°C // typ. 100 ppm/°C, max 200ppm/°C

The values for accuracy always relate to the respective measuring range. Errors might add at worst.

• Input range / Output range

Input resistance (voltage // current):
 Input suppressor circuit:
 Input AC decoupling (with J5):
 Output switch // Output switching time:
 Switch resistance // Output load:
 Output voltage // Output hum/ripple:
 Output filter // Demodulator filter CF range:
 Supply sensitivity of the output:

single-ended: 1MΩ, differential: 2MΩ, turned off: 100kΩ // 5Ω shunt (voltage drop max. 1V)
max. 240V AC for 1sec. (not in current measurement and resistance test)
0.1μF and 1MΩ for f > 10Hz
CMOS switch with TTL-level or open collector switchable (low active) // 10μs at 200pF
typ. 50Ω; max. 100Ω (short-circuit proof) // >1kΩ, recommended >10kΩ for 0.1% accuracy
±5V DC // typ. 10mV ₋ , max. 80mV ₋ in the ±1mV measuring range and f=10kHz
2-pole (12dB/oct) for 10kHz; 1-pole (6dB/oct) for 10Hz, 100Hz // 3-pole (18dB/Okt.) at 200Hz
typ. ±5mV/V

• General data

Voltage supply (regulated):
 CE standards:
 ElektroG // ear registration:
 Temperature ranges // Relative humidity:
 Max. permissible potentials // Protection type:
 Dimensions // Patent:
 Delivery:
 Warranty:

+5V DC (±5%), 70mA, max. 250mA, protected by a Multifuse
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
operating temp. -25...50°C, storage temp. -25°C...+70°C // 0 - 90% (not condensing)
60V DC acc. to VDE, max. 1kV ESD on open lines // IP30
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