

Product Datasheet - Technical Specifications



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MAL-FU

Isolating Frequency/Voltage Converter

Transformed.

Frequency Becomes Voltage.

Ideal for rotation measurement: The frequency/ voltage converter measures frequencies and converts them into a proportional voltage signal, which is then adjusted to the input of a PC data acquisition system.

Minimum Size.

Great Performance. Small Price.

The miniature format of the MAL-FU is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

3 Frequency Ranges. 0..5V Out.

Frequency ranges of 100Hz, 1kHz, or 10kHz can be configured for the MAL-FU via solder bridges. A frequency signal applied to the input generates a proportional voltage in the range of 0..5V at the output.



Clearly Safe.

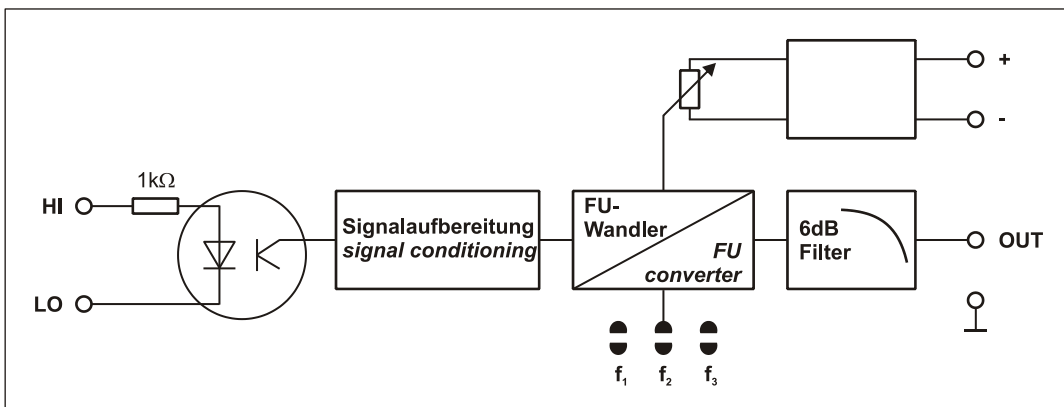
The galvanic isolation provided by a fast opto-coupler at the input guarantees interference-free operation and protects the DAQ system and the PC against high potentials.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data (typical at 20°C, after 5min., +7.5V supply)

• Input Range

Frequency ranges:

Range-to-range accuracy:

Input voltage // Input current:

Input suppressor circuit for 1sec:

0..100Hz (JL1 closed), 0..1kHz (JL2 closed, factory setting), 0..10kHz (JL3 closed)
±10%, max. ±20%
low <1.5V; high = 4..25V // 2mA at 5V, 20mA at 25V
max. 240V AC, 60V according to VDE

• Output Range

Output voltage // Output load:

Dependancy from the supply voltage:

Non-linearity // Temperature drift:

Output filter // Output ripple:

Max. bandwidth // Filter accuracy of f:

0..5V DC // >1k Ω ; recommended >10k Ω for higher accuracy
2.5%
±0.1% // ±500ppm/°C in the 100Hz measuring range, ±100ppm/°C in the other ranges
1-pole (6dB/oct.), 10Hz // max. 100mV
1Hz in all measuring ranges // ±15%

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

• General

Power supply // Current consumption:

CE standards:

ElektroG // ear registration:

Max. permissible potentials:

Dimensions // Protection type:

Temperature ranges // Relative humidity:

Delivery // Available accessories:

Warranty:

±7.5V DC .. ±15V DC // typ. 6mA (without connected sensor)
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C // 0-90% (not condensing)
product, description // module backplanes: BP16, BP2, BP2-BOX
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. 2.1 02/11/2020

MAL-I20mA

Miniature Amplifiers for Current

Perfectly Conditioned. For Current.

Current signals can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifier MAL-I20mA. It features a 5V sensor supply for connected sensors.

Minimum Size. Great Performance. Small Price.

The miniature format of the MAL-I20mA is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

$\pm 20V$ IN. $\pm 5V$ OUT.

The MAL-I20mA can be used for current measurement in the $\pm 20mA$ range. A $\pm 5V$ signal proportional to the input signal is provided at the output.

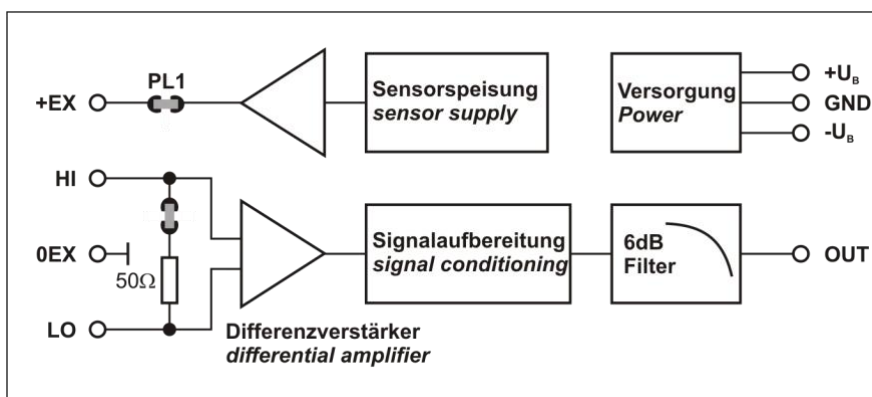


Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data

(typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range DC:
Input resistance diff.:
Input suppressor circuit for 1sec:

	20mA
	50Ω
	max. 200V (not in case of current measurement)

• Output Range

Output voltage:
Output load:
Amplifier accuracy // Temperature drift:
Current supply sensitivity:
Output filter // Filter cut-off frequency f_g :

	±5V DC
	>1kΩ; recommended for higher accuracy: >10kΩ
	typ. 0.2% // 50ppm/°C
	typ. ±10mV/V
	1-pole (6dB/oct.) // 2-100Hz (configurable with solder bridges PL8 + PL9)

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

• General

Power supply // Current consumption:
Sensor supply:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions // Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

	±7.5V DC .. ±15V DC // 1mA (without connected sensor)
	+5V DC supply voltage with ±5% accuracy (typ.)
	EN61000-6-1, EN61000-6-3, EN61010-1;
	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
	60V DC acc. to VDE , max. 1kV ESD on open lines
	plastic housing 33mm x 20mm x 15mm // IP30
	operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
	0-90% (not condensing)
	product, description
	module backplanes: BP16, BP2, BP2-BOX
	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

MAL-ISO

Isolation Amplifiers

Perfectly Conditioned. Isolated.

Voltage (MAL-ISO50/10/5/1) and current signals (MAL-ISO20mA) can optimally be adjusted to the input of a data acquisition system with the differential amplifiers MAL-ISO. The isolation of the analog inputs guarantees reliable measurement results.

Minimum Size.

Great Performance. Small Price.

The miniature format of the MAL-ISO is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

Clearly Safe.

The galvanic isolation provided by the isolation amplifiers guarantees interference-free operation and protects the DAQ system and the PC against high potentials.

Voltage or Current.

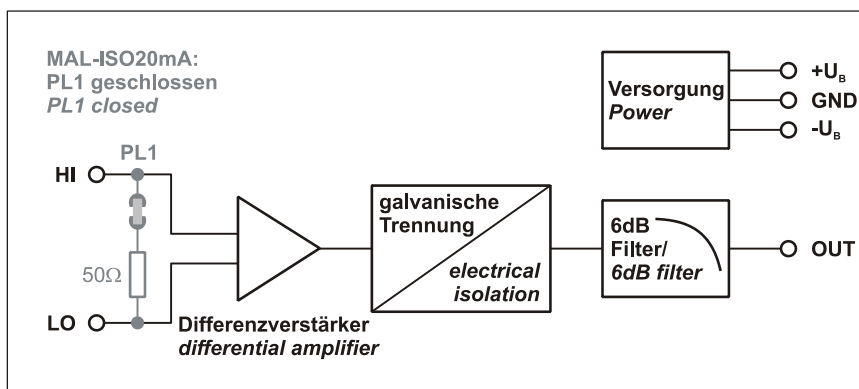
The amplifier types differ in their input voltage range of $\pm 1\text{V}$ up to $\pm 50\text{V}$ (MAL-ISO50/10/5/1) for voltage measurement and $\pm 20\text{mA}$ (MAL-ISO20m) for current measurement. A $\pm 5\text{V}$ signal proportional to the input signal is provided at the output.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data (typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range DC:
Input resistance:
Bandwidth:
Input suppressor circuit for 1 sec.:

MAL-ISO50	MAL-ISO10	MAL-ISO5	MAL-ISO1	MAL-ISO20mA
±50V	±10V	±5V	±1V	±20mA
1MΩ	220kΩ	120kΩ	20kΩ	50Ω
				50Hz
MAL-ISO50/10/5/1: max. 200V				

• Output Range

Output voltage:
Output load:
Amplifier accuracy // Temperature drift:
Output interference or output ripple :
Current supply sensitivity:
Output filter // Filter cut-off frequency f_c :

±5V
>1kΩ; recommended for higher accuracy: >10kΩ
typ. 0.1%; max: 0.2% // 50ppm/°C
typ. 5mV, at app. 100kHz (e.g. from DC/DC converter of the backplane)
typ. ±10mV/V
1-pole (6dB/oct.) // app. 160Hz

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

• General

Power supply // Current consumption:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions // Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

±7.5V DC .. ±15V DC // app. 6mA .. 10mA
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
0-90% (not condensing)
product, description
module backplanes: BP16, BP16-PC, BP2, BP2-BOX
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. 3.1 **02/11/2020**

MAL-PT100 / MAL-PT1000

Miniature Amplifiers for Temperature (PT100 / PT1000)

Perfectly Conditioned. Temperature.

Resistance signals of a PT100 sensor can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifier MAL-PT100 / MAL-PT1000. A perfect solution for temperature measurements in the range of $-60^{\circ} \dots 300^{\circ}\text{C}$. A 1mA sensor supply is provided for connected sensors.

Minimum Size.

Great Performance. Small Price.

The miniature format of the temperature measurement amplifier is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

Resistance Measurement. Linearization. Amplification.

The MAL-PT100 e.g. MAL-PT1000 measures the resistance of a PT100 or PT1000 sensor. As the signal values of the sensor are not linear,

the temperature measurement amplifiers takes care of linearization providing a proportional voltage in the range of $-1..5\text{V}$ at the output.

2-, 3-, or 4-Wire Technology.

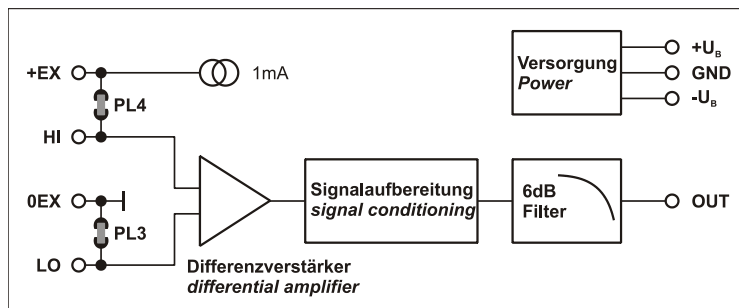
Depending on the demands concerning measuring accuracy, 2-, 3-, or 4-wire measurement is possible with the MAL-PT100 / MAL-PT1000. Very easy to configure with solder jumpers on the measuring amplifier.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data (typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range (incoming temperature):
Gain calibration at:
Supply current // Input resistance diff.:

-1..300°C (corresponds to: MAL-PT100 76Ω..212Ω, MAL-PT1000 763Ω..2120Ω)
300°C
1mA // 300kΩ

• Output Range

Output voltage:
Output load:
Amplifier accuracy:
Temperature drift:
Output interference or output ripple:
Current supply sensitivity:
Output filter // Filter cut-off frequency f_g :

-1..5V DC
>1kΩ; recommended for higher accuracy: >10kΩ
typ. 0.1%
300ppm/°C (gain and offset)
typ. 5mV at app. 66kHz (from DC/DC converter of the backplane)
typ. ±10mV/V
1-pole (6dB/oct.) // 80Hz (ex works: PL8 closed, PL9 open) or 8Hz (PL8 open, PL9 closed)

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

• General

Power supply // Current consumption:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions // Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

±7.5V DC .. ±15V DC // 2mA
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
0-90% (not condensing)
product, description
module backplanes: BP16, BP2, BP2-BOX
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. 6.1 **02/18/2020**

MAL-PT100 / MAL-PT1000 Miniature Amplifiers for Temperature (PT100 / PT1000)



Perfectly Conditioned. Temperature.

Resistance signals of a PT100 sensor can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifier MAL-PT100 / MAL-PT1000. A perfect solution for temperature measurements in the range of $-60^{\circ} \dots 300^{\circ}\text{C}$. A 1mA sensor supply is provided for connected sensors.

Minimum Size. Great Performance. Small Price.

The miniature format of the temperature measurement amplifier is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

Resistance Measurement. Linearization. Amplification.

The MAL-PT100 e.g. MAL-PT1000 measures the resistance of a PT100 or PT1000 sensor. As the signal values of the sensor are not linear, the temperature measurement amplifiers takes care of linearization providing a proportional voltage in the range of $-1..5\text{V}$ at the output.

2-, 3-, or 4-Wire Technology.

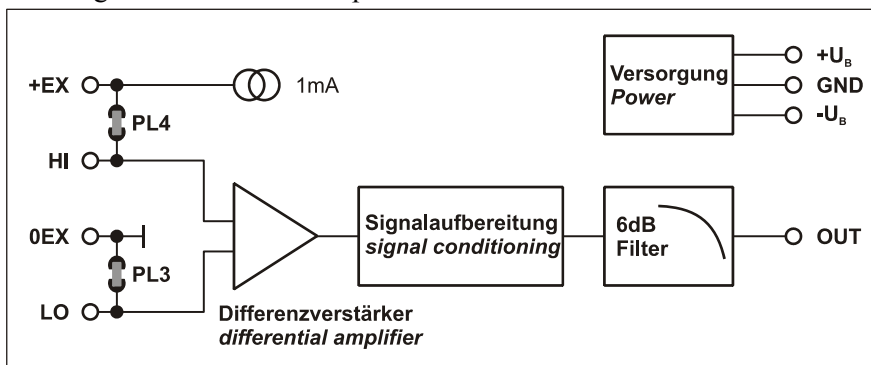
Depending on the demands concerning measuring accuracy, 2-, 3-, or 4-wire measurement is possible with the MAL-PT100 / MAL-PT1000. Very easy to configure with solder jumpers on the measuring amplifier.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data

(typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range (incoming temperature):

Gain calibration at:

Supply current // Input resistance diff.:

-1...300°C (corresponds to: MAL-PT100 76Ω..212Ω, MAL-PT1000 763Ω..2120Ω))
300°C
1mA // 300kΩ

• Output Range

Output voltage:

Output load:

Amplifier accuracy:

Temperature drift:

Output interference or output ripple:

Current supply sensitivity:

Output filter // Filter cut-off frequency f_g :

-1...5V DC
>1kΩ; recommended for higher accuracy: >10kΩ
typ. 0.1%
300ppm/°C (gain and offset)
typ. 5mV _{ss} at app. 66kHz (from DC/DC converter of the backplane)
typ. ±10mV/V
1-pole (6dB/oct.) // 80Hz (ex works: PL8 closed, PL9 open) or 8Hz (PL8 open, PL9 closed)

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

• General

Power supply // Current consumption:

CE standards:

ElektroG // ear registration:

Max. permissible potentials:

Dimensions // Protection type:

Temperature ranges:

Relative humidity:

Delivery:

Available accessories:

Warranty:

±7.5V DC .. ±15V DC // 2mA
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
0-90% (not condensing)
product, description
module backplanes: BP16, BP2, BP2-BOX
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. 6.0 03/02/2016

MAL-R1K

Miniature Amplifiers for Resistance

Perfectly Conditioned. Resistance.

Resistance signals can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifier MAL-R1K. A 1mA sensor supply is provided for connected sensors.

Minimum Size.

Great Performance. Small Price.

The miniature format of the MAL-R1K is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

0..1k Ω In. 0..5V Out.

The MAL-R1K measures resistances in the 0..1k Ω range. A 0..5V signal proportional to the input signal is provided at the output.



2-, 3-, or 4-Wire Technology.

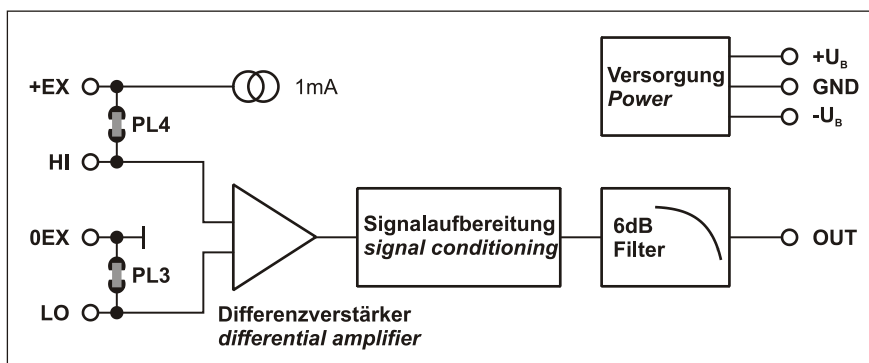
Depending on the demands concerning measuring accuracy, 2-, 3-, or 4-wire measurement is possible with the MAL-R1K. Very easy to configure with solder jumpers on the measuring amplifier.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data (typical at 20°C, after 5min., +7.5V supply)

• Input Range

Meas. range (resistance) // Gain calibration:
Supply current // Input resistance diff.:

0..1k Ω // calibrated at: 1k Ω
1mA // 300k Ω

• Output Range

Output voltage:
Output load:
Amplifier accuracy:
Temperature drift:
Output interference or output ripple:
Current supply sensitivity:
Output filter // Filter cut-off frequency f_g :

0..5V DC
>1k Ω ; recommended for higher accuracy: >10k Ω
typ. 0.1%
100ppm/°C (gain and offset)
typ. 5mV _{ss} at app. 100kHz (from DC/DC converter of the backplane)
typ. ± 10 mV/V
1-pole (6dB/oct.) // app. 15Hz

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

• General

Power supply // Current consumption:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions // Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

± 7.5 V DC .. ± 15 V DC // typ. 3mA
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
0-90% (not condensing)
product, description
module backplanes: BP16, BP2, BP2-BOX
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

MAL-SG2/SG-5 Miniature Amplifiers for Strain Gauge



Perfectly Conditioned. For Strain Gauge.

Load and pressure signals of strain gauges and sensors based on strain gauge technology can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifiers MAL-SG2 and MAL-SG5. The measuring amplifiers feature 5V sensor supply for connected sensors.

Minimum Size.

Great Performance. Small Price.

The miniature format of the MAL-SG2 / MAL-SG5 is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

Connect Strain Gauge ($\pm 2\text{mV/V}$ or $\pm 5\text{mV/V}$). Get $\pm 5\text{V}$.

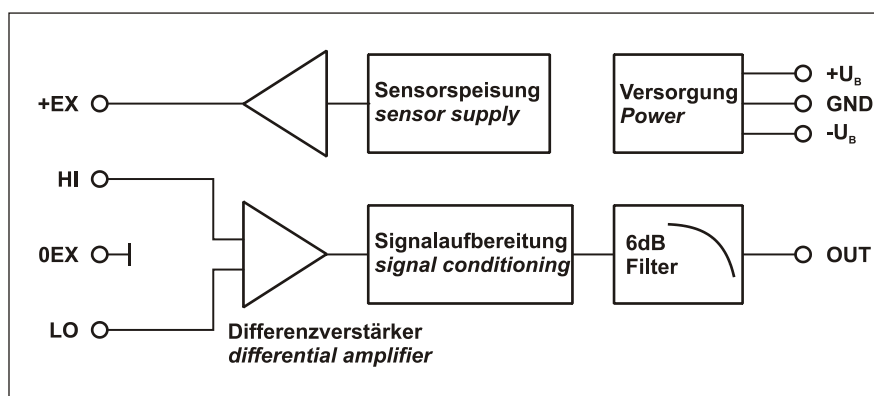
The two measuring amplifier types differ in sensitivity of $\pm 2\text{mV/V}$ (MAL-SG2) or $\pm 5\text{mV/V}$ (MAL-SG5). A $\pm 5\text{V}$ signal proportional to the input signal is provided at the output. The MAL-SG5 with less sensitivity is recommended for external supply more than $+5\text{V}$ or high offset errors.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data

(typical at 20°C, after 5min., +7.5V supply)

• Input Range

Input voltage DC:
Sensitivity:
Gain calibration at:
Input resistance differential:
Input suppressor circuit for 1sec.:

MAL-SG2	MAL-SG5
±10mV	±25mV
±2mV/V	±5mV/V
+10mV	+25mV
300kΩ	300kΩ
max. 200V	max. 200V

• Output Range

Output voltage:
Output load:
Amplifier accuracy:
Temperature drift:
Output interference or output ripple:
Current supply sensitivity:
Output filter:
Filter cut-off frequency f_g :

±5V DC
>1kΩ; recommended for higher accuracy: >10kΩ
typ. 0.2%
100ppm/°C (gain and offset)
typ. 5mV _{ss} at app. 100kHz (from DC/DC converter of the backplane)
typ. ±10mV/V
1-pole (6dB/oct.)
app. 40Hz
app. 100Hz

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

• Generator

Generator voltage:
Accuracy:
Connectable sensors:

+5V DC
±0.5%
100Ω..1000Ω

• General

Power supply:
Current consumption:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions:
Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

±7.5V DC .. ±15V DC
1mA (without sensor) and 51mA..6mA (with sensor 100Ω..1000Ω in full-bridge circuit)
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm
IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
0-90% (not condensing)
product, description
module backplanes: BP16, BP2, BP2-BOX (2x MAL-SG2/5 not with BP2/BP2-BOX!)
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

MAL-THR

Miniature Amplifiers for Thermocouple (type K)

Perfectly Conditioned. Temperature.

Temperature signals of a thermocouple sensor, type K can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifier MAL-THR.

Minimum Size.

Great Performance. Small Price.

The miniature format of the MAL-THR is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

0..1250°C In. 0..5V Out.

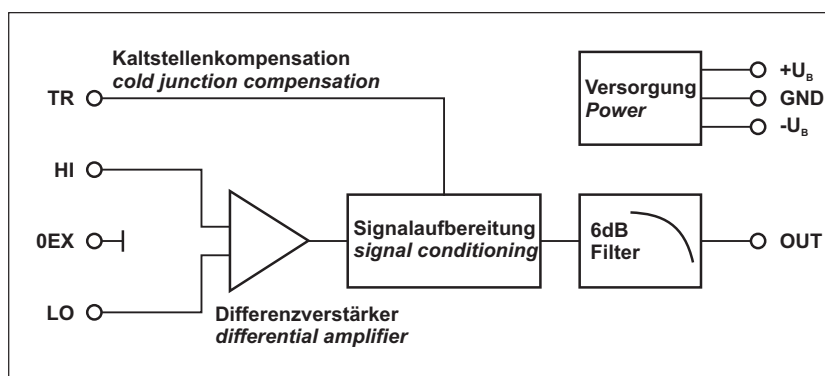
The MAL-THR measures the voltage difference between the two conductors (NiCr-NiAl) of a thermocouple sensor resulting from input temperatures in the range of 0..1250°C. A 0.5V signal proportional to the input signal is provided at the output.

Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.



Functional diagram

Technical Data (typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range (incoming temperature):
Gain calibration at // Input resistance:
Input suppressor circuit for 1 sec:

	0..1250°C
	1000°C=4V // 300kΩ
	max. 200V

• Output Range

Output voltage:
Output load:
Amplifier accuracy // Temperature drift:
Output interference or output ripple:
Current supply sensitivity:
Output filter // Filter cut-off frequency f_g :

	0..5V DC
	>1kΩ; recommended for higher accuracy: >10kΩ
	typ. 0.1% // 300ppm/°C
	typ. 5mV at app. 100kHz (from DC/DC converter of the backplane)
	typ. ±10mV/V
	1-pole (6dB/oct.) // 25Hz (ex works: PL8 closed, PL9 open) or 3Hz (PL8 open, PL9 closed)

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

• General

Power supply // Current consumption:
CE standards:
ElektroG // ear registration:
Max. permissible potentials:
Dimensions // Protection type:
Temperature ranges:
Relative humidity:
Delivery:
Available accessories:
Warranty:

	±7.5V DC .. ±15V DC // 1mA
	EN61000-6-1, EN61000-6-3, EN61010-1
	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
	60V DC acc. to VDE , max. 1kV ESD on open lines
	plastic housing 33mm x 20mm x 15mm // IP30
	operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
	0-90% (not condensing)
	product, description
	module backplanes: BP16, BP2, BP2-BOX; temperature reference sensor ZU-TR (LM35CAZ)
	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. 6.1 02/11/2020

MAL-U10/5/1 **Miniature Amplifiers for Voltage**

Perfectly Conditioned. For Voltage.

Voltage signals can optimally be adjusted to the input of a PC data acquisition system with the miniature measuring amplifiers MAL-U10, MAL-U5, and MAL-U1. They feature a 5V sensor supply for connected sensors.

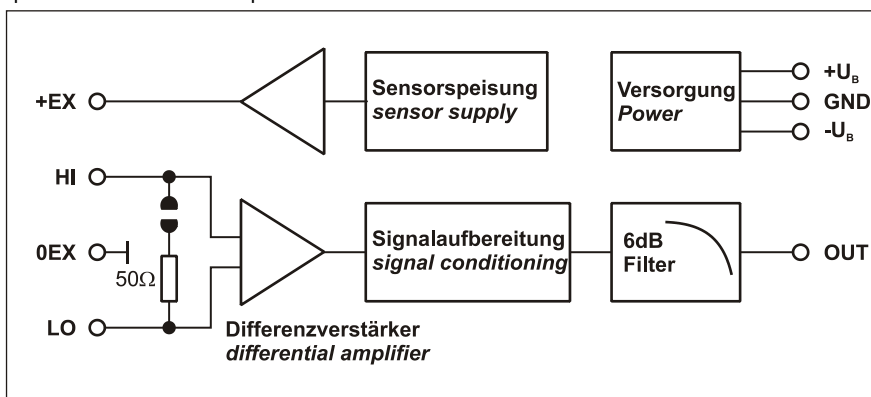
Minimum Size. Great Performance. Small Price.

The miniature format of the MAL-U10/5/1 is ideal to realize measurement applications even if the installation is in problematic locations. Despite the small size, the measuring amplifier features great functionality. All this at a reasonable price.

$\pm 10V$, $\pm 5V$, $\pm 1V$ IN. $\pm 5V$ OUT.

The amplifier types differ in their input voltage range of $\pm 10V$ (MAL-U10), $\pm 5V$ (MAL-U5), and $\pm 1V$ (MAL-U1).

A $\pm 5V$ signal proportional to the input signal is provided at the output.



Functional diagram



Compatibility.

The MAL 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 of the BP series varying in size and design, signal connection is easy. The modules just have to be plugged on the relevant slot of the backplane.

Technical Data

(typical at 20°C, after 5min., +7.5V supply)

• Input Range

Measuring range DC:

Input resistance diff.:

Input suppressor circuit for 1sec:

±10V (MAL-U10), ±5V (MAL-U5), ±1V (MAL-U1)
300k Ω (for U) or 50 Ω (for I)
max. 200V (not in case of current measurement)

• Output Range

Output voltage:

Output load:

Amplifier accuracy // Temperature drift:

Output interference or output ripple:

Current supply sensitivity:

Output filter // Filter cut-off frequency f_g :

±5V DC
>1k Ω ; recommended for higher accuracy: >10k Ω
typ. 0.2% // 50ppm/°C
typ. 5mV _{ss} at app. 100kHz (from DC/DC converter of the backplane)
typ. ±10mV/V
1-pole (6dB/oct.) // 2-340Hz (configurable with solder bridges PL8 + PL9)

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

• General

Power supply // Current consumption:

Sensor supply:

CE standards:

ElektroG // ear registration:

Max. permissible potentials:

Dimensions // Protection type:

Temperature ranges:

Relative humidity:

Delivery:

Available accessories:

Warranty:

±7.5V DC .. ±15V DC // 1mA (without connected sensor)
+5V DC supply voltage 8pI! CLOSED9 with ±5% accuracy (typ.)
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
plastic housing 33mm x 20mm x 15mm // IP30
operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
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