SI-xxx Sensors industry

bmcm
bmc messsysteme gmbh

Features

- high-quaility and precise
- force, distance, angle, inclination, temperature, pressure, acceleration, humidity, current, voltage

Applications

- supervision fo processes
- industrial measurement technology

The **SI-xxx** sensors have been assorted from the available sensor supply for the

... industrial environment ...

featuring great

... robustness and precision ... .

The **SI-xxx** sensors available at bmcm are only meant to be a

... representative selection ... .

The introduced sensor manufacturers, of course, provide a large variety as well as technical advice.

The selected sensors have been tested with bmcm products. The following connection examples demonstrate how to use them.

Besides that, simple operation, customer proximity and good service played an important role for the selection of suitable sensor manufacturers.

For further information about sensors and sensor manufacturers, please visit our website at

http://www.bmcm.de .

1 Available sensors

Order No.	Physical measuring quantity	Physical meas. unit	Elec. quantity (typ.)	Sensor supply	Size app. (without cable)
SI-AD10	acceleration (dyn.) (SEIKA-BDK10)	-10G .. 0 .. +10G	1.9 .. 2.5 .. 3.1V	5V	25 x 25 x 18mm
SI-AS10	acceleration (static) (SEIKA-B2)	-10G .. 0 .. +10G	2.2 .. 2.5 .. 2.8V	5V	24 x 24 x 19mm
SI-IN30	inclination (SEIKA-N3)	-30° .. 0 .. +30°	2.32 .. 2.5 .. 2.68V	5V	37 x 29 x 12.7mm
SI-F1	force (BCM-1660)	-1kg .. +1kg	-10mV .. +10mV	5V	70 x 22 x 17mm
SI-F10	force (BCM-1661)	-10kg .. +10kg	-10mV .. +10mV	5V	130 x 22 x 30mm
SI-F100	force (BCM-1664)	-100kg .. +100kg	-10mV .. +10mV	5V	150 x 40 x 35mm
SI-F500	force (BCM-1664-I)	-500kg .. +500kg	-10mV .. +10mV	5V	150 x 40 x 50mm
SI-TP300a	temperature (PT100) (electrotherm K1)	-30°C .. +300°C	86.25Ω .. 168.48Ω	1mA	100 x 6 x 6mm
SI-TP300b	temperature (PT100) (electrotherm K3)	-30°C .. +300°C	86.25Ω .. 168.48Ω	1mA	100 x 3 x 3mm
SI-TK1000a	temp. (thermocouple type K) (type 282)	0°C .. +1000°C	0mV .. 41.276mV	-	300 x 2 x 2mm
SI-TK1000b	temp. (thermocouple type K) (type 294)	0°C .. +1000°C	0mV .. 41.276mV	-	100 x 1 x 1mm
SI-HT	humidity / temperature (EFS10)	10-90% r.h./0-50°C	1 .. 9V / 0 .. 0.5V	12V	224 x 18 x 18mm
SI-DP10	distance (potentiometer) (RS 317-780)	0mm .. 10mm	0V .. 5V	5V	65 x 45 x 20mm
SI-DP11	distance (potentiometer) (MM1011R5K)	0mm .. 11mm	0V .. 5V	5V	64 x 8 x 7mm
SI-DP125	rotation angle (potentiometer) (PMR403)	0° .. 125°	0V .. 5V	5V	40 x 33 x 33mm
SI-DP360	rotation angle (poti) (MPA20-R1K)	0° .. 340°	0V .. 5V	5V	34 x 22 x 22mm
SI-DI2	distance (LVDT inductive) (WV2)	-1mm .. 0 .. +1mm	-60mV .. +60mV	$2V_{eff}$	80 x 14 x 14mm
SI-DI5	distance (LVDT inductive) (WV5)	-2.5mm..0..+2.5mm	-150mV .. +150mV	$2V_{eff}$	80 x 14 x 14mm
SI-P10	pressure (BCM-130C)	0..10bar	0V .. 5V	5V	99 x 47 x 33mm
SI-I200	current (current clamp) (AC-200)	0..200A AC	0 .. 200mV AC	-	111 x 50 x 33mm
SI-U230	voltage (transformer) (T-98)	0..230V AC	0 .. 8V AC	-	88 x 93 x 67mm

2 Acceleration, inclination SI-AD10 / SI-AS10 / SI-IN30

A static acceleration sensor regards the acceleration of gravity G=1 in the measurement. A dynamic acceleration sensor samples in the home position G=0 and records changes of acceleration. An inclination sensor measures the angle regardless of the gravity existing at the measurement site.

SI-AD10: acceleration (dynamic)

- range: -10G = 1.9V
0G = 2.5V
+10G = 3.1V
- supply: 5V regulated
- accuracy: <1%
- installation: M4 thread
- connection: 3 wires (0.2m)
- manufacturer: SEIKA
- more info: www.seika.de

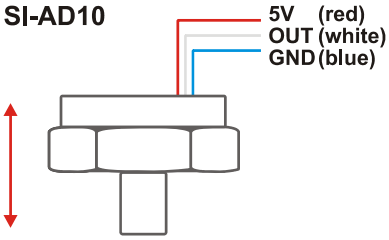
SI-AS10: acceleration (static)

- range: -10G = 2.2V
0G = 2.5V
+10G = 2.8V
- supply: 5V regulated
- accuracy: <1%
- installation: M4 thread
- connection: round cable (3m)
- manufacturer: SEIKA
- more info: www.seika.de

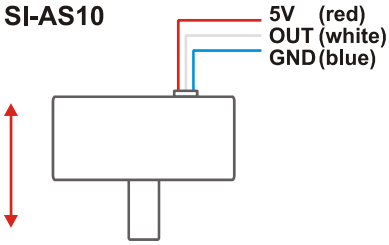
SI-IN30: inclination

- range: -30° = 2.32V
0° = 2.5V
+30° = 2.68V
- supply: 5V regulated
- accuracy: <1%
- installation: holes (3.2mm)
- connection: 3 wires (0.2m)
- manufacturer: SEIKA
- more info: www.seika.de

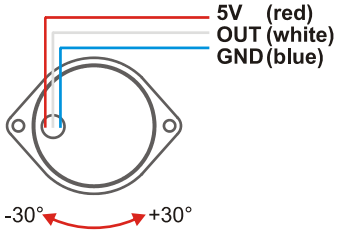
SI-AD10



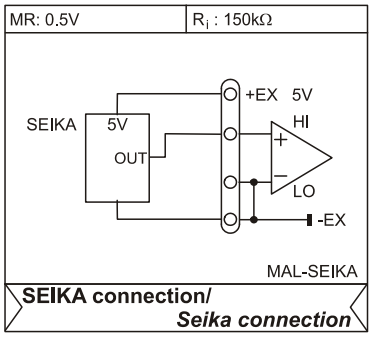
SI-AS10



SI-IN30



- **These sensors only represent a small selection, other types are available on demand.**
- **Wrong connection destroys the sensor!**
- **Connect 5V (regulated) as power supply. Any deviations will influence the measuring result.**
- **For more information about tolerances, please see the manufacturer's data sheet.**



Connection example for SEIKA sensors

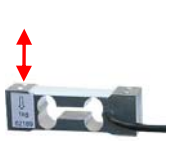
SEIKA sensors with 5V supply have their mid position at 2.5V. The *MAL-SEIKA* from bmcm shifts this mid position to zero. If the sensors are not precisely calibrated, the offset must be recalibrated via software where necessary.

Signals are amplified by a factor of 10.

+EX provides a 5V voltage (PL1 closed), which is used by carrier boards (e.g. *BP2*) for sensor supply.

3 Force SI-F1 / SI-F10 / SI-F100 / SI-F500

The force sensors are suitable for tractive and compressive force measurement or scales and are connected in combination with strain gauge amplifiers (e.g. *MA-UNI*, *MAL-SG2/5*). An arrow on the sensors shows the direction of the force effect the sensors have been calibrated for. However, with slight deviations regarding the specified accuracy, they can also be used in the opposite direction. The sensors are calibrated in kilogram but are suitable for force measurements in Newton (1N = 1kg * 9.81m/s^2), too.



SI-F1: force sensor

- range:
  -1kg = -10mV
  +1kg = +10mV
- supply:
  5V regulated
- accuracy: ±0.03%
- installation:
  with 4x M3 screws
- connection:
  round cable (3m)
- manufacturer:
  BCM Sensor
- more info:
  www.bcmsensor.com

SI-F10: force sensor

- range:
  -10kg = -10mV
  +10kg = +10mV
- supply:
  5V regulated
- accuracy: ±0.02%
- installation:
  with 4x M6 screws
- connection:
  round cable (3m)
- manufacturer:
  BCM Sensor
- more info:
  www.bcmsensor.com

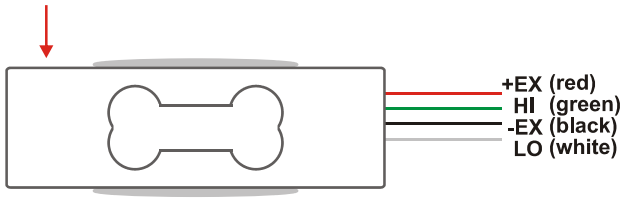
SI-F100: force sensor

- range:
  -100kg = -10mV
  +100kg = +10mV
- supply:
  5V regulated
- accuracy: ±0.02%
- installation: with
  8x M8 screws, 20mm
- connection:
  round cable (3m)
- manufacturer:
  BCM Sensor
- more info:
  www.bcmsensor.com

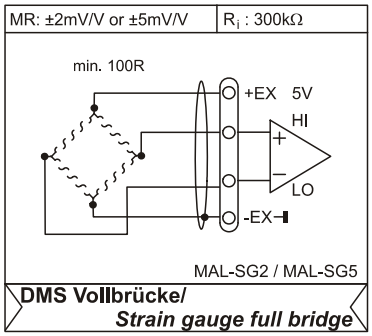
SI-F500: force sensor

- range:
  -500kg = -10mV
  +500kg = +10mV
- supply:
  5V regulated
- accuracy: ±0.02%
- installation: with
  8x M8 screws, 20mm
- connection:
  round cable (3m)
- manufacturer:
  BCM Sensor
- more info:
  www.bcmsensor.com

SI-F10 / SI-F10 / SI-F100 / SI-F500



- **These sensors only represent a small selection, other types are available on demand.**
- **Always connect sensor with shielded cables!**
- **In the strain area the sensor must be able to move freely. Maximum overload is ±120%.**
- **Connect 5V (regulated) as power supply. Any deviations will influence the measuring result.**



Connection example for force sensors

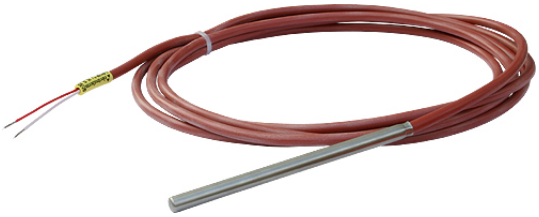
The force sensor features a strain gauge full-bridge and is supplied by +5V DC voltage. The input amplifier is operated differentially.

The measuring range is ±2mV/V if using the *MAL-SG2*, or ±5mV/V with the *MAL-SG5*. Offset and gain are hard-wired and must be recalibrated via software if necessary.

Alternatively the *MA-UNI* can be used. In this case offset and gain can be set with potentiometers at the amplifier.

4 Temperature sensors SI-TP300a / SI-TP300b

The available temperature sensors are based on resistance measurement. In PT100 sensors the resistance of platinum, changing under different temperature conditions, is measured. Since the output signals are extremely small and not linearized, these sensors need a measuring amplifier.



SI-TP300a: Resistance thermometer (PT100)

- range: -30°C .. +300°C
- electrically isolated, non-linear
- accuracy: < ±0.75% (class A, DIN60751)
- connection: 2-pole round cable (2.5m) for high temp.
- supply: 1mA constant current (*MAL-PT100*)
- manufacturer: electrotherm
- more info: www.electrotherm.de

SI-TP300b: Resistance thermometer (PT100)

- range: -30°C .. +300°C
- electrically isolated, non-linear, 4-Leiteranschluss
- accuracy: < ±0.75% (class A, DIN60751)
- connection: 4-pole round cable (2.5m) for high temp.
- supply: 1mA constant current (*MAL-PT100*)
- manufacturer: electrotherm
- more info: www.electrotherm.de

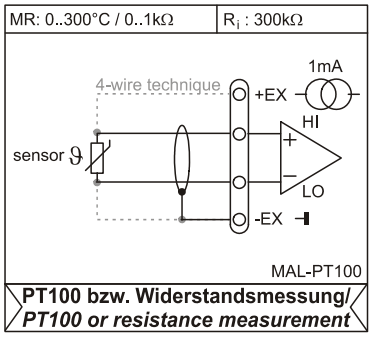
SI-TP1000a

SI-TP1000b

- reference values (PT100):

-30°C = 88,22Ω	90°C = 134,70Ω	210°C = 179,51Ω
0°C = 100,00Ω	120°C = 146,06Ω	240°C = 190,45Ω
30°C = 111,67Ω	150°C = 157,31Ω	270°C = 201,29Ω
60°C = 123,24Ω	180°C = 168,46Ω	300°C = 212,02Ω

- **These sensors only represent a small selection, other types are available on demand.**
- **Do not crack or squeeze the protective metal tube of the sensor!**
- **For more information about tolerances of PT100 sensors, please see DIN60751.**



PT100 bzw. Widerstandsmessung/
PT100 or resistance measurement

Connection example for PT100 in 2- or 4-wire technique

PT100 measuring resistors itself are not linear, but are linearized and offset adjusted by the *MAL-PT100* measuring amplifier.

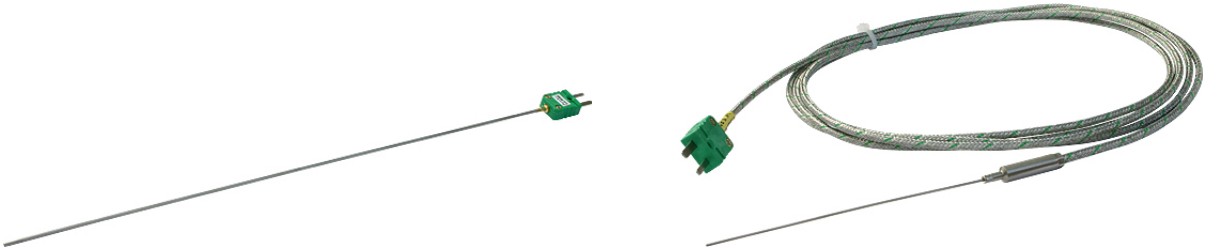
Ex works, the *MAL-PT100* is precalibrated for 2-wire measurement (PL3 + PL4 closed). For 4-wire measurement this has to be changed respectively.

At temperatures below 0°C, the *MAL-PT100* provides negative output voltages yet with small linearizing errors.

Alternatively the *MA-UNI* featuring several measuring ranges can be used.

5 Temperature sensors SI-TK1000a / SI-TK1000b

Thermocouple sensors consist of two different metals connected with each other. The electric voltage, emerging from the metals is temperature-dependant. A thermocouple sensor type K consists of a nickel-chrome/nickel metal pair. Since the output signals are extremely small and not linearized, these sensors need a measuring amplifier.



SI-TK1000a: Sheathed thermocouple (type K)

- range: 0°C .. 1000°C
- electrically isolated, non-linear
- accuracy: app. 0.4% (class 1, DIN60584)
- connection: thermocouple plug
- more info: www.electrotherm.de

SI-TK1000b: Sheathed thermocouple (type K)

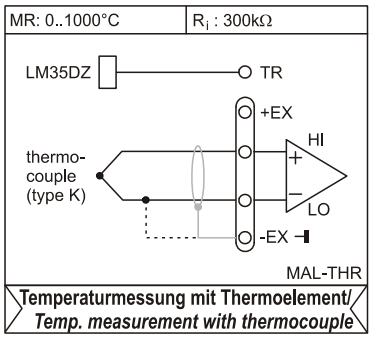
- range: 0°C .. 1000°C
- electrically isolated, non-linear
- accuracy: app. 0.4% (class 1, DIN60584)
- connection: thermocouple conn. at round cable (2.5m)
- more info: www.electrotherm.de

SI-TK1000a

SI-TK1000b

• reference values (thermo K):	0°C = 0V 100°C = 4.096mV 200°C = 8.138mV 300°C = 12.209mV	400°C = 16.397mV 500°C = 20.644mV 600°C = 24.905mV 700°C = 29.129mV	800°C = 33.275mV 900°C = 37.326mV 1000°C = 41.276mV
• voltage change:	up to 100°C: 42µV/°K	up to 500°C: 43µV/°K	up to 1000°C: 39µV/°K

- **These sensors only represent a small selection, other types are available on demand.**
- **Do not crack or squeeze the protective metal tube of the sensor!**
- **For precise measurements cold-junction compensation and linearization is required.**
- **For more information about tolerances of thermocouple sensors, please see DIN60584.**



Connection example with MAL-THR for thermocouple type K

Thermocouples are non-linear and usually need cold junction compensation.

The *MAL-THR* amplifier serves for the acquisition and amplification of thermocouple type K signals and is not linearized. The input amplifier is operated differentially! The amplifier is prepared and calibrated for cold junction compensation (see data sheet *MAL-xxx* or *BP2 / BP16*).

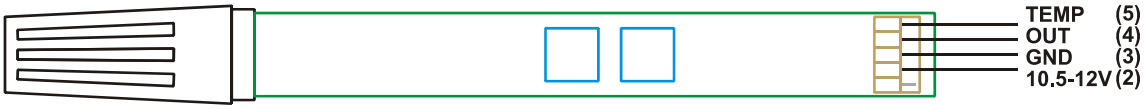
6 Humidity, temperature SI-HT

Humidity probes are used in very different areas, such as room climate measurements, humidity regulation, building automation, etc. The available humidity probe is an electrolytic, resistive polymer sensor measuring the relative humidity and sending linear values. It is additionally equipped with a temperature sensor (LM35DZ), to measure the temperature at the measurement site.

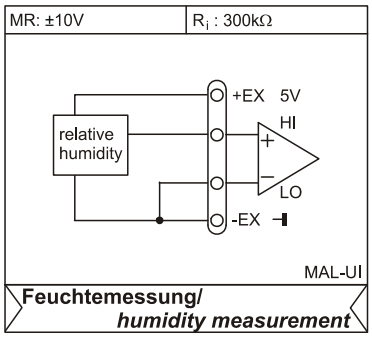
SI-HT: Humidity probe with temperature sensor (LM35DZ)

- range: 0% r.h. = 1V; 90% r.h. = 9V (humidity measurement); 0°C = 0V; 50°C = 0.5V (temperature measurement)
- supply: 12V regulated
- accuracy: ±3% (humidity measurement); ±1.5°C (temperature measurement)
- connection: 5-pole connector
- manufacturer: HYGROSENS INSTRUMENTS
- more info: www.hygrosens.com

SI-HT



- **Wrong connection destroys the sensor!**
- **Connect 12V (regulated) as power supply. Any deviations will influence the measuring result.**

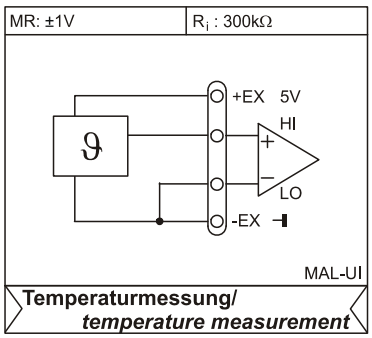


Connection example for the humidity sensor

The "OUT" line of the humidity probe **SI-HT** provides the proportional humidity signal.

The sensor can be connected directly to data acquisition systems featuring a 10V input range.

If using a high-speed data acquisition system, however, a measuring amplifier should be connected in-between, as otherwise the measuring input might falsify the signals. In this case, the *MAL-UI* miniature amplifier is suitable for perfect adjustment.



Connection example for The temperature sensor

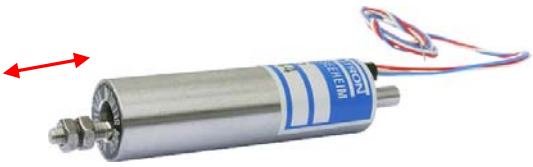
The "TEMP" line of the temperature probe **SI-HT** provides the proportional temperature signal.

The sensor can be connected directly to a data acquisition system (optimum input range: 1V).

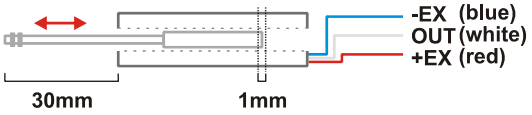
If using a high-speed data acquisition system, however, a measuring amplifier should be connected in-between, as otherwise the measuring input might falsify the signals. In this case, the *MAL-UI* miniature amplifier is suitable for perfect adjustment.

7 Distance (inductive) SI-DI2 / SI-DI5

The position and displacement sensors **SI-DI2** and **SI-D5** feature an LVDT allowing for precise distance measurements. Here a soft-iron core without direct connection to the sensor is moved from its zero position into both directions, so that an output voltage is induced. By means of a 5B amplifier *MA-UNI* from bmcm being operated in carrier frequency mode, it can be converted into a linear output voltage.



SI-DI2 / SI-DI5



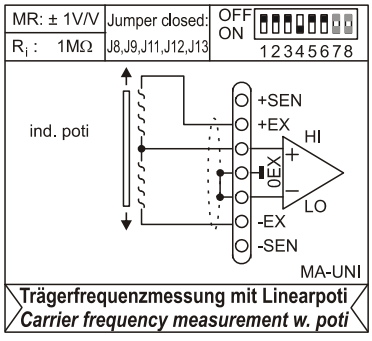
SI-DI2: Displacement sensor (inductive)

- range: -1mm = -60mV$_{eff}$; +1mm = +60mV$_{eff;}$
- supply: 2V$_{eff}$
- accuracy: 0.5%
- other: mounting of the iron core with M3 screw nuts
- connection: 3 wires (0.2m)
- manufacturer: MESSOTRON
- more info: www.messotron.de

SI-DI5: Displacement sensor (inductive)

- range: -2,5mm = -150mV$_{eff}$; +2,5mm = +150mV$_{eff;}$
- supply: 2V$_{eff}$
- accuracy: 0,5%
- other: mounting of the iron core with M3 screw nuts
- connection: 3 wires (0.2m)
- manufacturer: MESSOTRON
- more info: www.messotron.de

- **These sensors only represent a small selection, other types are available on demand.**
- **To minimize the wear, the sensor as well as the core should be mounted in such a way so that the core does not touch the inside of the sensor inside.**



Connection example for inductive distance sensors with MA-UNI

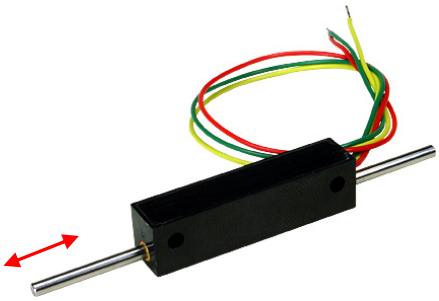
The measurement of carrier frequency with the *MA-UNI* is used for differential inductors and LVDTs (Linear Variable Differential Transformers).

A 5kHz sine voltage with 2V$_{eff}$ is provided at the EX pins of the module.

If the *MA-UNI* is operated in the carrier frequency mode, f_g is 200Hz at the maximum.

8 Distance (potentiometric) SI-DP10 / SI-DP11

Potentiometer are continuously adjustable voltage dividers consisting of a base carrying a resistance material and a slider (sliding contact) splitting the total resistance into two partial resistances. The following distance sensors are slide potentiometer changing their resistance value by a sliding movement along an axis.



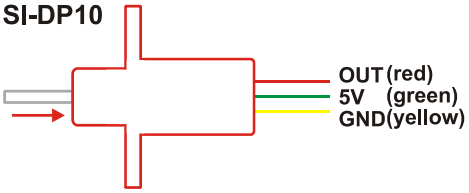
SI-DP10: Distance sensor (potentiometer)

- range: 0mm = 0V; 10mm = 5V
- supply: 5V regulated, 1mA
- accuracy: ±2%
- other: mounting holes (5.5mm)
- connection: 3 wires (0.2m)
- manufacturer: RS Components
- more info: www.rs-components.de

SI-DP11: Distance sensor (potentiometer)

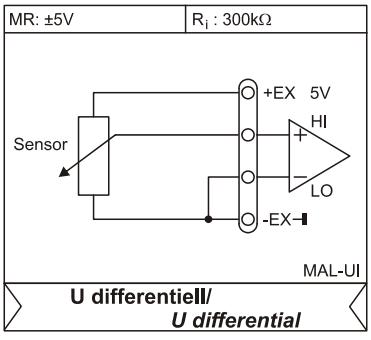
- range: 0mm = 0V; 11mm = 5V
- supply: 5V regulated, 1mA
- accuracy: ±0,5%
- other: mounting holes (3mm)
- connection: 3 wires (0.15m)
- manufacturer: MEGATRON
- more info: www.megatron.de

SI-DP10



SI-DP11

- **These sensors only represent a small selection, other types are available on demand.**
- **Wrong connection destroys the sensor!**
- **Connect 5V (regulated) as power supply. Any deviations will influence the measuring result.**



Connection example for potentiometers with 5V supply

The **SI-DP10** and **SI-DP11** must be supplied with 5V. The supply voltage is provided by the bmcm amplifiers and data acquisition systems.

These sensors can also be connected directly to data acquisition systems.

If using a high-speed data acquisition system, however, a measuring amplifier should be connected in-between, as otherwise the measuring input might falsify the signals. In this case, the *MAL-UI* miniature amplifier is suitable for perfect adjustment.

9 Rotation angle SI-DP125 / SI-DP360

The resistance change of the following potentiometers is caused by rotation. A slider (sliding contact) is fixed to the rotary axis recording the current flow at a particular point of the resistor. Rotation changes the position.

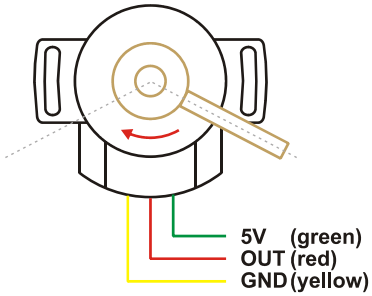
SI-DP125: Rotation angle sensor (potentiometer)

- range: 0° = 0V; 125° = 5V
  (electrically usable: 95°, ±3%)
- supply: 5V, 1mA
- accuracy: 1.5%
- connection: 3 wires 0.2m
- manufacturer: TWK Elektronik GmbH
- more info: www.twk.de

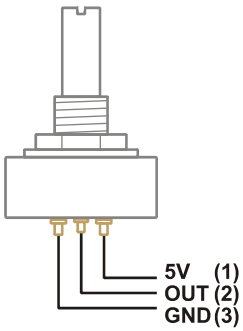
SI-DP360: Rotation angle sensor (potentiometer)

- range: 0° = 0V; 360° = 5V
  (electrically usable: 340°, ±4%)
- supply: 5V, 1mA
- accuracy: ±1%
- connection: 3 solder pins
- manufacturer: MEGATRON
- more info: www.megatron.de

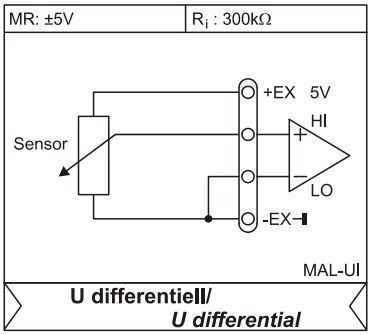
SI-AD10



SI-DP360



- **Wrong connection destroys the sensor!**
- **Connect 5V (regulated) as power supply. Any deviations will influence the measuring result.**



Connection example for potentiometers with 5V supply

The **SI-DP125** and **SI-DP360** must be supplied with 5V. The supply voltage is provided by the bmcm amplifiers and data acquisition systems.

These sensors can also be connected directly to data acquisition systems.

If using a high-speed data acquisition system, however, a measuring amplifier should be connected in-between, as otherwise the measuring input might falsify the signals. In this case, the *MAL-UI* miniature amplifier is suitable for perfect adjustment.

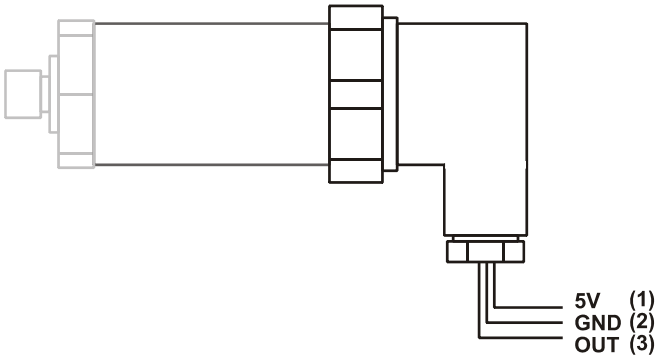
10 Pressure SI-P10

By means of a strain gauge bridge on a ceramics base the pressure sensor measures the relative high pressure. Provided with screw connectors in IP65 type the pressure of gases and dilute liquids can be determined.

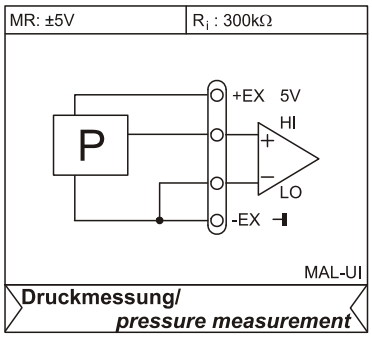
SI-P10: Pressure sensor

- range: 0bar = 0V, 10bar = 5V
- linear
- supply: 5V regulated
- accuracy: 0.5%
- connection: screw connection + PG screw joint
- manufacturer: BCM Sensor
- more info: www.bcmsensor.com

SI-P10



- **These sensors only represent a small selection, other types are available on demand.**
- **The output does not exactly reach the both ends of the measuring range.**
- **The sensor can be overloaded shortly with up to 200%.**
- **Connect 5V (regulated) as power supply. Any deviations will influence the measuring result.**



Connection example for pressure sensors

The **SI-P10** must be supplied with 5V. The supply voltage is provided by the bmcm amplifiers and data acquisition systems.

These sensors can also be connected directly to data acquisition systems.

If using a high-speed data acquisition system, however, a measuring amplifier should be connected in-between, as otherwise the measuring input might falsify the signals. In this case, the *MAL-UI* miniature amplifier is suitable for perfect adjustment.

11 AC current, AC voltage SI-I200 / SI-U230

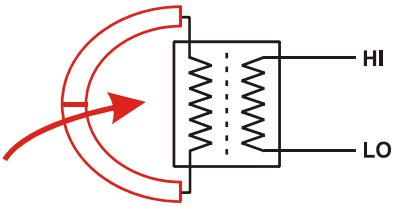
SI-I200: Current clamp (AC)

- range: 0A = 0; 200A AC = 200mV AC
- accuracy: ±2%
- connection: 2 cables with 4mm plug
- other: electrical isolation
- manufacturer: Voltcraft

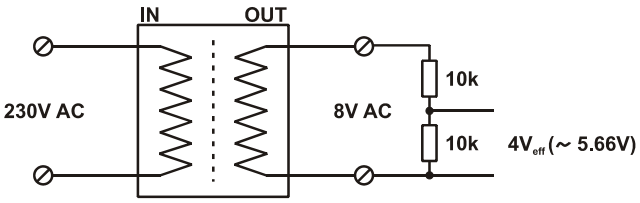
SI-U230: Transformer

- range: 0V = 0V; 230V AC = ca. 8V AC
- accuracy: app. 20%
- connection: screw terminals
- other: suitable for DIN rail mounting, electrical isolation, incl. 2x 10kΩ for voltage division

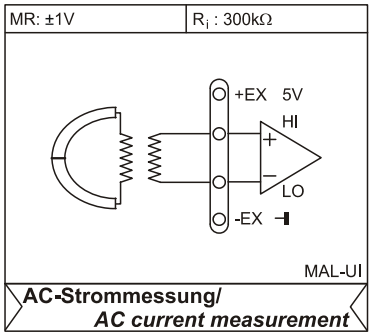
SI-I200

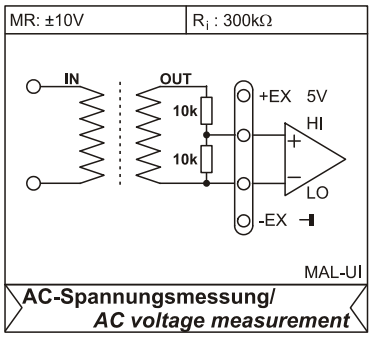


SI-U230



- **Mains voltage installations must only be done by electrical experts!**
- **The accuracy of these transformers is not very high. Recalibrate if necessary.**





Connection example for SI-I200 current clamp adapters

The **SI-I200** is a transformer converting a high input current into a proportional output voltage. As the output voltage is very small, signal conditioning with an amplifier (e.g. MAL-UI) is necessary.

Calibration can be done with a DVM in a comparative measurement. Usually the DVM shows the effective value, the data acquisition system, however, the peak-to-peak value.

Use the following conversion formula: $I_{pp} = 2 * 1.41 * I_{eff}$

Connection example for SI-U230 transformers

The transformer **SI-U230** converts a high input voltage into a proportional low voltage. To be able to use a data acquisition system with 10V input range directly, the downstream voltage divider splits the voltage in half again. For fast sampling a measuring amplifier is recommended.

Calibration can be done with a DVM in a comparative measurement. Usually the DVM shows the effective value, the data acquisition system, however, the peak-to-peak value.

Use the following conversion formula: $U_{pp} = 2 * 1.41 * U_{eff}$

12 Important notes for using the SI-xxx sensors

- All examples are meant as help only, you cannot assert claims to applicability in a specific individual case. The available industrial sensors are only a representative example to measure the mentioned physical quantities. **Other sensor types are offered by the manufacturers which can be purchased at bmcm.**
- As the sensors in some extend provide slight errors caused by inaccuracy or operate non-linearly, a calibration directly at the object is always advisable. Therefore, first adjust the offset, then apply a known value to the object to determine the gain. Usually a software calibration of these two points should be sufficient and easy to realize with measuring systems and software (**NextView®**) by bmcm.
- Depending on the application, sensors with single wires should be extended with round cables, all junctions be sealed with heat shrinkable tubing and the cables at the object appropriately be fixed to the object.
- The **SI-xxx** sensors are only suitable for extra-low voltages - please observe the relevant regulations! For power supply an electrically isolated power unit (with CE) must be used. During installation turn off the power!
- For 5V sensors the values for accuracy always relate to exactly 5V (<±1%). Errors might add at worst.
- In case of doubt the data of the manufacturers apply. The relevant documentation (if existing) can be downloaded as PDF file at www.bmcm.de .
- The sensor lines should be shielded, connect shield to the measuring system at on end only.
- For cleaning use water and mild detergent only. The sensors are maintenance-free.
- The product must not be used for any safety-relevant tasks. By using or processing this product the customer becomes manufacturer by law and therefore is responsible for the proper installation, use and handling of the product. In the case of improper use or unauthorized interference our warranty ceases and any warranty claims are excluded.

Do not dispose of the product in the domestic waste or at any waste collection places. It has to be either duly disposed according to the WEEE Directive or can be returned to bmcm at your own expense.

13 Technical data SI-xxx (typ. at 20°C and 5V supply)

- **General**

CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. potentials:	**max. 60V DC (acc. to VDE)**, max. 1kV ESD on open lines
Relative humidity:	0..90% not condensing
Temperature range:	-25°C..+70°C
Delivery:	product, description
Available accessories:	on demand: customized cable assembling, sensor connectors
Guarantee:	2 years with effect from sales date, damages resulting from improper use excluded

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. 12/15/2008