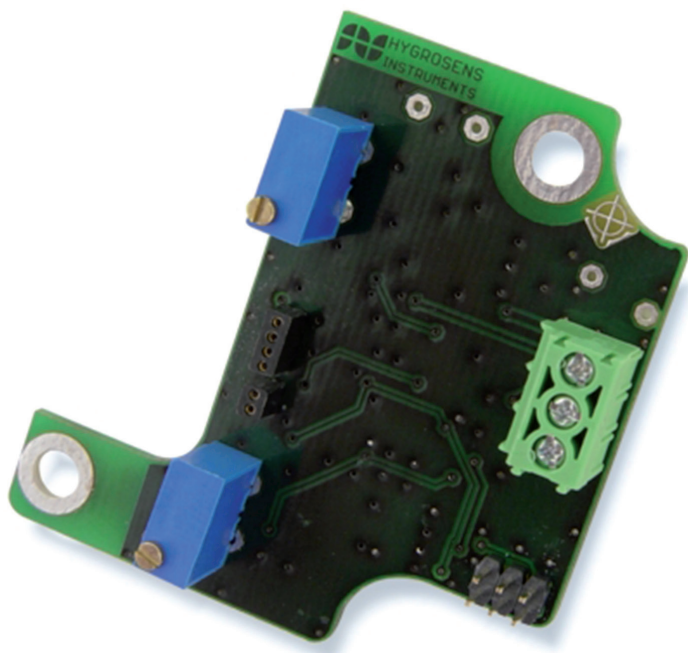


OPERATION MANUAL



Evaluation electronics for ceramic pressure sensors - DS-MOD-

Description



Characteristic features

- Transducer electronics with current output 4...20 mA or voltage output 0...10 V
- For ceramic pressure sensor series DS-KE or other bridge signals
- Adjustment over potentiometer or optional digital method via Software
- Digital I²C-interface

Areas of application

- Evaluation kit for pressure sensors
- Evaluation and reference design for ASIC-based instrument amplifier
- Signal evaluation of any measuring bridge

Technical Data

Evaluation electronics for pressure sensors	
Bridge operating voltage	5 V
Resistance measuring bridge	> 5 k Ω
Scaling	7 mV FS
Offset	0 mV
Application temperature range	-20...+80 °C
Dimensions	30 x 30 x 89 mm
Connection	Screw terminals
CE-conformance	2004/108/EG
EMV-Störaussendung	EN 61000-6-3:2011
EMV-Störfestigkeit	EN 61000-6-1:2007
Type 4...20 mA	
Output signal	4...20 mA, two wire
Power supply	12...30 V DC
Permissible load	$R_{a[\Omega]} = (U_v[V] - 12V) \cdot 0.02 A$
Type 0...10 V	
Output signal	0...10 V, three wire
Power supply	12...30 V DC / approx. 5 mA
Article	
DS-MOD 0...10 V	DS-MOD-10V
DS-MOD 4...20 mA	DS-MOD-20MA

Features

Piezoresistive pressure sensors deliver a differential bridge voltage with approx. 1 - 4 mV/V FS. To convert this relatively low sensor voltage into a standard-signal of 0...10 V or 4...20 mA, a high amplification stable electronics is required.

Our universal evaluation electronics is meant to relieve the user from the involvement of technology. A modern ASIC is used for the signal processing which is pre-calibrated ex factory for 7 mV FS and 0 mV Offset.

For a quick start, two potentiometers are provided on the circuit board with which the zero setting and amplification can be mechanically adjusted, without which one has to resort to digital ASIC technology.

In addition, experienced users can directly access the register of ASIC with the help of „ZMD Labkit“ (available as accessories) and carry out the digital adjustment. In addition to the offset and amplification setting, the digital adjustment method also enables linearisation and temperature compensation over a polynomial. Therefore, the evaluation electronics is also ideally suitable as an entry into the complex ASIC technology. The information and software necessary for it can be downloaded free of charge from the homepage of the chip manufacturer.

In principle, the electronics is also suitable for a variety of other applications in which bridge signals are to be processed.



OPERATION MANUAL



Evaluation electronics for ceramic pressure sensors - DS-MOD-

Connection

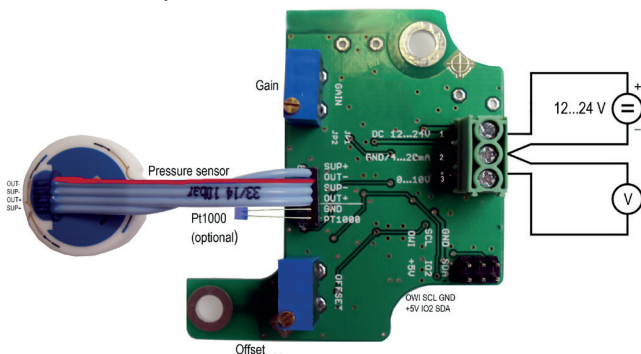
The pressure sensor is connected to the four pin socket strip as shown in the illustration. The connection cable can be directly inserted into the spring contacts of the socket strip.

The connection of a Pt1000 is optional and only required, if the digital setting with temperature compensation is being used.

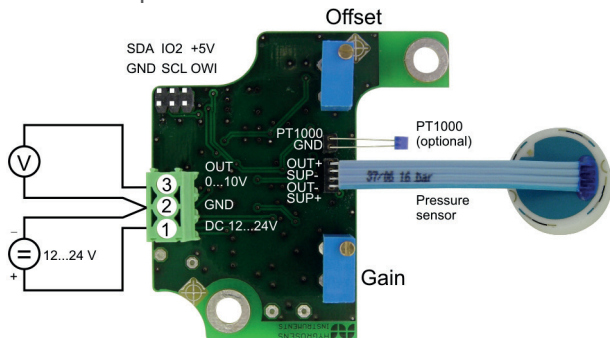
The connection of operating voltage and instrument is done as shown in the following diagrams:

Voltage connection diagram

with absolute pressure sensor

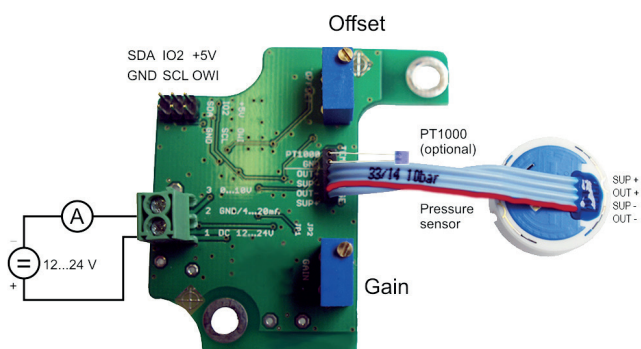


with relative pressure sensor

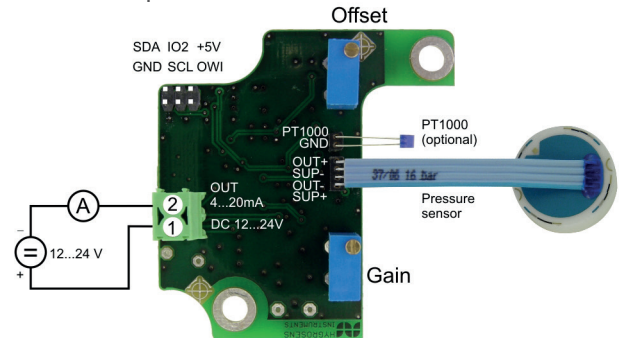


Current connection diagram

with absolute pressure sensor



with relative pressure sensor



Connection terminals

Pin	Voltage output	Current output
1	+DC 12 ... 24 V	+DC 12 ... 24 V
2	GND	OUT 4 ... 20 mA
3	OUT 0 ... 10V	---

Bridge input

Signal	Function
SUP+	Supply to measuring bridge +
OUT-	Output of measuring bridge -
SUP-	Supply to measuring bridge -
OUT+	Output of measuring bridge +

Pt1000

Signal	Function
Pt1000	Pt1000 ASIC input
GND	Ground

The Pt1000 is only to be fitted, if the electronics is be digitally calibrated with temperature compensation.

Calibration plug connector

Signal	Function
+5V	ASIC Operating voltage
OWI	One Wire Interface and analog output
IO2	Digital switch output or PWM-Signal
SCL	I2C Clock
SDA	I2C Data
GND	Ground

Caution! The ASIC can be damaged by wrong connection at the calibration plug connector. Please only use our "ZMD Labkit" on the module for calibration!

OPERATION MANUAL



Evaluation electronics for ceramic pressure sensors - DS-MOD-

Calibration arrangement

For the described calibration, the sensor can be subjected to pressure.

Some device, for example a pneumatic hand pump, is required for creating the pressure. Our model KAL-KHP30 is suitable for creating reference pressure of vacuum (approx.900 mbar) as well as high pressure of up to 30 bar. The pressure can be accurately adjusted to the desired value by the volume adjustment integrated in the pump.



Parallel to the test piece, the pressure must be also determined with a suitable accurate pressure reference instrument, in addition to the output voltage / output current of the electronics.

Ideal for this is the pressure calibrator KAL-MC2G. The device contains a pressure reference instrument, a highly accurate voltage and current instrument as well as 24 V voltage source for feeding the electronics.



Manual adjustment

The sensor electronics is pre-calibrated at offset 0 mV and full scale 7 mV. For adaptation of a specific sensor, the two potentiometers „Offset“ and „Gain“ have been provided.

First, the zero point is positioned, then the output voltage without pressure is adjusted to 0 V with the potentiometer „Offset“. Afterwards the sensor is subjected to approx. 80 % of maximum pressure and the voltage is adjusted to desired value corresponding to the scale with the „Gain“ potentiometer.

The adjustment is to be mutually repeated several times, because the two potentiometers slightly affect each other.

Assembly in a housing

The outer profile of the circuit board fits into a housing type PK101, which we offer as accessories.

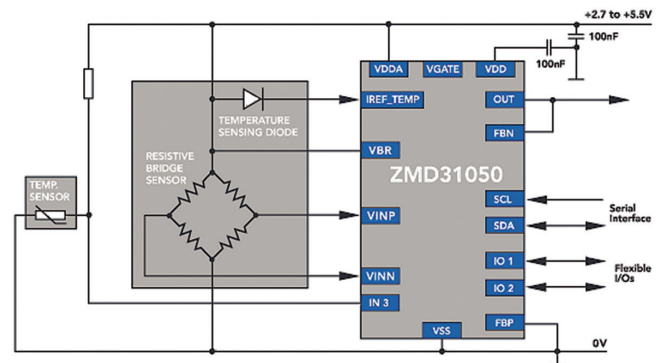
Digital adjustment

Much more accurate results (up to 0.1 % FS) and a compensation of linearity error as well as temperature drift is possible with digital adjustment. The two soldered joints JP1 and JP2 on the lower surface of the circuit board must be opened, in order to separate the potentiometer network.

The applied ASIC ZMD 31050 enables correction of up to eight pressure reference points and three different temperatures. The correction is done in the chip with arithmetical methods by means of polynomial of second or third order.

For digital adjustment, a set of corresponding equipment (calibrator and temperature panel) is required. Moreover, the user should have required technical knowledge.

Please note that we cannot provide any telephone support services for digital adjustment.

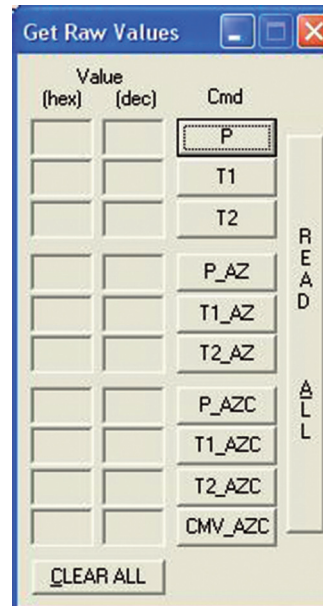
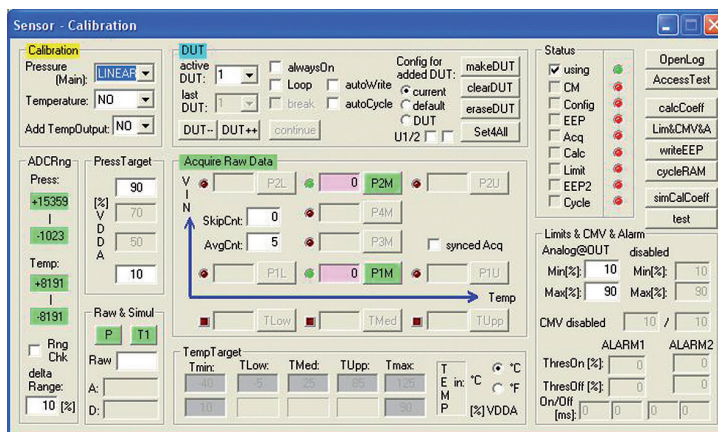
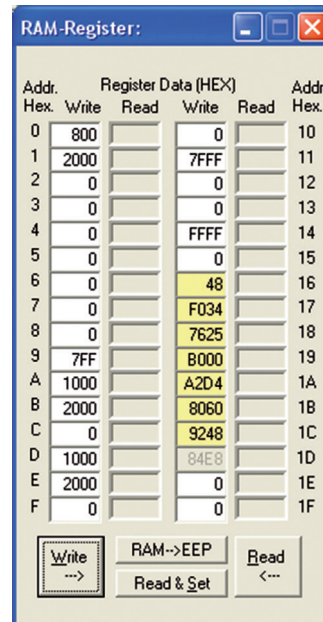
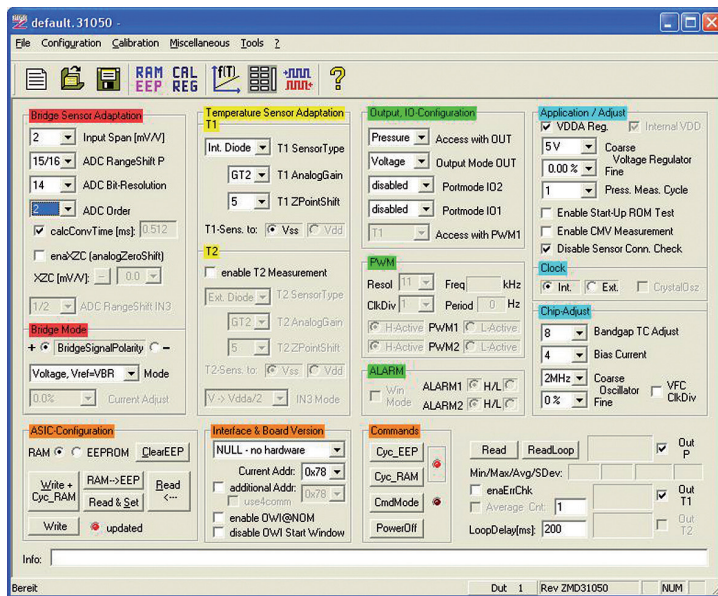


OPERATION MANUAL



Evaluation electronics for ceramic pressure sensors - DS-MOD-

View of calibration software



Attention

Please avoid extreme mechanical and inappropriate exposure.

The device/product is not suitable for potential explosive areas and medical-technical applications.

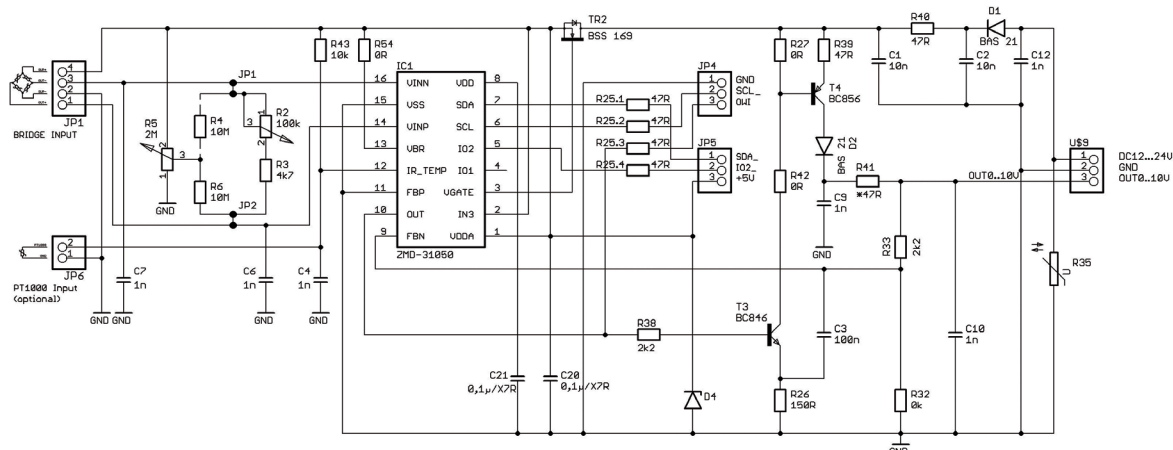


OPERATION MANUAL

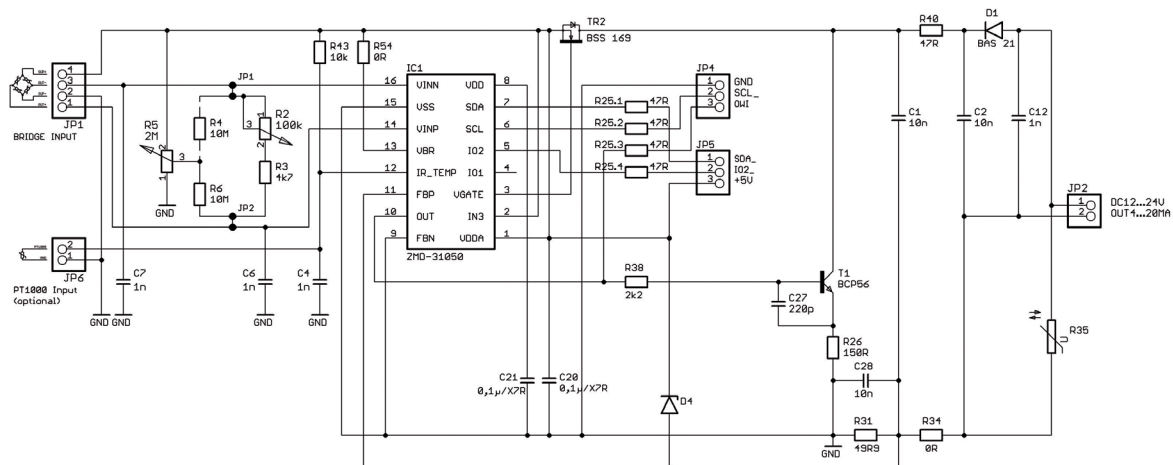


Evaluation electronics for ceramic pressure sensors - DS-MOD-

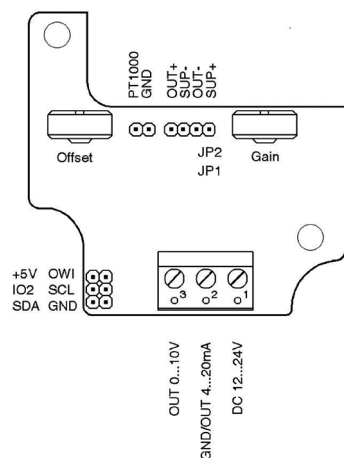
Circuit diagram of model with voltage output



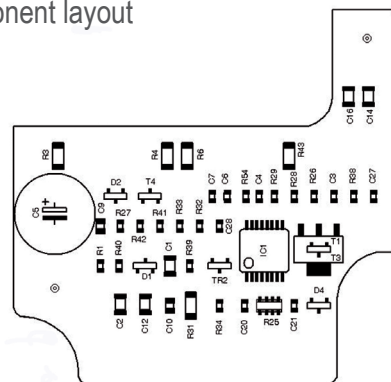
Circuit diagram of model with current output



Connection



Component layout



Attention

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