

Strain gauge amplifier for strain and force sensors for applications with occasional zero point adjustments

Variants

X-201-KA07



DIN-rail mounting

X-201-IP07



Aluminum field housing

X-201-IN07



Inline housing

Amplifier with 4 ... 20 mA and 0 ... 10 V analogue output, zero point adjustment by onboard button or by external control signal, maximum 100,000 taring cycles

Features

- Universal connection of strain sensors, force sensors and load cell
- Large input range of 1.0 mV/V to 4.0 mV/V
- Teaching zero point with external input or via a button, zero correction is stored permanently (installation tare)
- With integrated amplifier with ± 10 V or 4-20 mA as robust output signal, can be operated simultaneously

Application

The amplifiers of X-Sensors are suitable for the universal signal conditioning of strain gauges sensors. They are therefore suitable for amplifying the mV-sensor signal of any force and strain sensors and load cells.

The zero point adjustment for these amplifiers is performed by a digital zero point-adjustment mechanism. The zero point setting is stored permanently, the zero point correction is also available after a power-off event. Thus, a constantly available installation tare is available. Therefore, these strain gauge amplifiers are suitable for all static applications. The number of taring operations is limited to 100,000.

Different types of housing allow a wide range of applications. In addition to the DIN rail version for mounting in control cabinets, there is also a robust field housing and inline housing available.

Ordering code

Description	Input sensitivity	Output-signal	Characteristic	Specifications
X-201-KA07	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V	0 ... 10 V 4 ... 20 mA	DIN-rail mounting	Page 3
X-201-IP07	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V	0 ... 10 V 4 ... 20 mA	Aluminum field housing	Page 4
X-201-IN07	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V	0 ... 10 V 4 ... 20 mA	Inline housing	Page 5

X-201-KA07 for DIN-rail mounting

Measuring amplifier with analogue signal path and control input for zero point adjustment 0.5...4 mV/V



Specifications

Performance

Sensitivity	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V
Linearity	< 0.5 % from full-scale
Zero point temperature coefficient	< 0.01 % / °C
Cut-off frequency	1.3kHz (-3dB)
Signal path	Analogue

Electrical data

Power supply	18 ... 28 VDC, <70mA
Output signal related to the final value	0 ... ± 10 V @ Rload > 2 kΩ
Voltage output	0/4 ... 20 mA @ Rload 0 ... 800Ω
Current output	
Output signal at overload	± 11.5 V / 1.5-23 mA
Noise	Max. 20 mVpp (0 ... 5kHz)
Resistance of strain gauge bridge	4.5 V (standard): 200 Ω ... 10 kΩ 10 V (range selection): 330 Ω ... 10 kΩ

External zero reset

Measurement mode	< 3 V or open
Zero reset / adjustment	> 10 V
Minimal pulse duration	1000 ms
Duration entire adjustment process	1010 ms
Adjustment of zero point	± 2.2 mV/V
Max numbers of tarings	100.000

«Onboard» Zero adjustment by pressing a button

Setting the output signal to 0, taugt-in zero offset is stored captive	«Zero» Button
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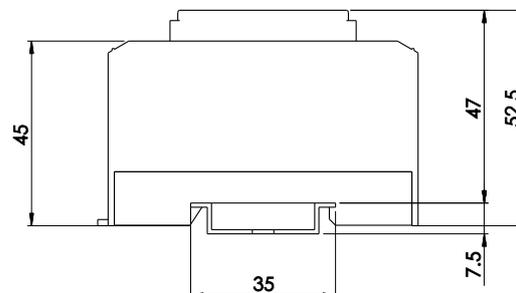
Mechanical data

Material	Polycarbonate fiber reinforced, UL 94 V0
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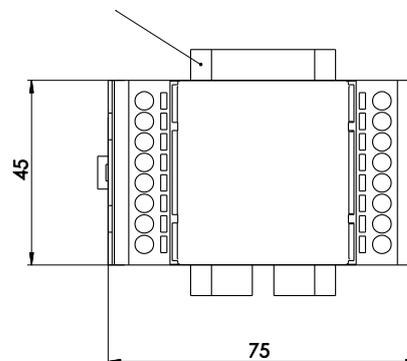
Environmental data

Ambient temperature	- 20 ... +60 °C
EMV standards	EN 61000-4
Protection rate	IP 52

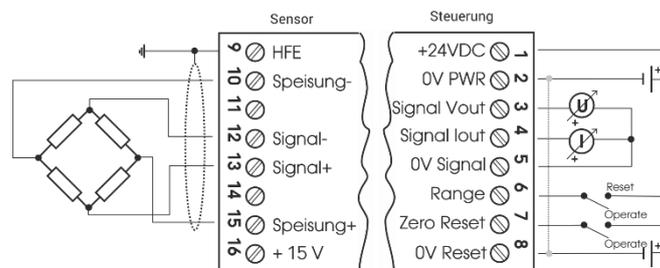
Mechanical dimensions



Tragschiene, DIN EN 60715



Pin assignment



Ordering code

See page 2 for detailed order information.

Options:

- Pre-configured setting (specific sensitivity)
- Calibrated measuring chain (amplifier and sensor)

X-201-IP07 in aluminum field housing

Measuring amplifier with analogue signal path and control input for zero point adjustment 0.5...4 mV/V



Specifications

Performance

Sensitivity	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V
Linearity	< 0.5 % from full-scale
Zero point temperature coefficient	< 0.01 % / °C
Cut-off frequency	1.3kHz (-3dB)
Signal path	Analogue

Electrical data

Power supply	18 ... 28 VDC, <70mA
Output signal related to the final value	
Voltage output	0 ... ± 10 V @ Rload > 2 kΩ
Current output	0/4 ... 20 mA @ Rload 0 ... 800Ω
Output signal at overload	± 11.5 V / 1.5-23 mA
Noise	Max. 20 mVpp (0 ... 5kHz)
Resistance of strain gauge bridge	4.5 V (standard): 200 Ω ... 10 kΩ 10 V (range selection): 330 Ω ... 10 kΩ

External zero reset

Measurement mode	< 3 V or open
Zero reset / adjustment	> 10 V
Minimal pulse duration	1000 ms
Duration entire adjustment process	1010 ms
Adjustment of zero point	± 2.2 mV/V
Max numbers of tarings	100.000

«Onboard» Zero adjustment by pressing a button

Setting the output signal to 0, taught-in zero offset is stored captive	«Zero» Button
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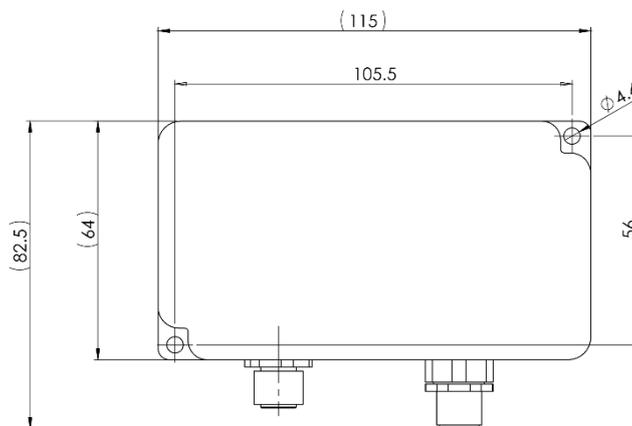
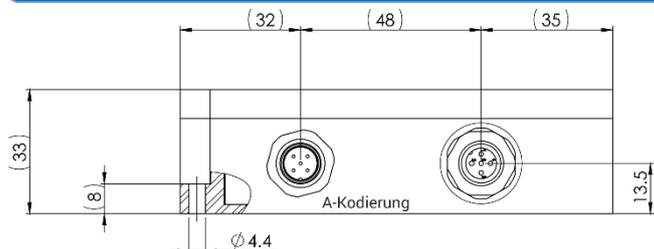
Mechanical data

Material	Aluminum
Electrical connection sensor	M12 socket (4 pin, a-coded, female)
Electrical connection control	M12 plug (8 pin, a-coded, male)

Environmental data

Ambient temperature	- 20 ... +60 °C
EMV standards	EN 61000-4
Protection rate	IP 65

Mechanical dimensions



Pin assignment field housing

M12 socket for sensor connection, 4 pin, female

Pin code	Function
1	Excitation +
2	Signal +
3	Signal -
4	Excitation -

M12 plug for PLC connection, 8-pole, male

Pin code	Function
1	Power +
2	n.c.
3	Reset-zero point 0V
4	Reset-zero point +
5	Signal output Vout+ (± 10 V)
6	Power 0V (GND)
7	Signal output 0V
8	Signal output Iout+ (4-20 mA)

Ordering code

See page 2 for detailed order information.

Options:

- Pre-configured setting (specific sensitivity)
- Calibrated measuring chain (amplifier and sensor)

X-201-IN07 in Inline-housing

Measuring amplifier with analogue signal path and control input for zero point adjustment 0.5...4 mV/V



Specifications

Performance

Sensitivity	0 ... 1.0 mV/V 0 ... 1.25 mV/V 0 ... 1.5 mV/V 0 ... 2.0 mV/V 0 ... 3.0 mV/V 0 ... 4.0 mV/V
Linearity	< 0.1 % from full-scale
Zero point temperature coefficient	< 0.5 % / °C
Cut-off frequency	700 Hz (-3dB)
Signal path	Analogue

Electrical data

Power supply	18 ... 30 VDC, <80mA
Output signal at full scale	± 10 V / 4-20 mA
Output signal at overload	± 11.5 V / 1.5-23 mA
Resistance of strain gauge bridge	9 V: 700 Ω ... 2 kΩ

External zero reset

Measurement mode	< 3 V or open
Zero reset / adjustment	> 10 V
Minimal pulse duration	1000 ms
Duration entire adjustment process	1010 ms
Adjustable sensitivity	± 2.2 mV/V
Maximum number of zero point adjustment cycles	100.000

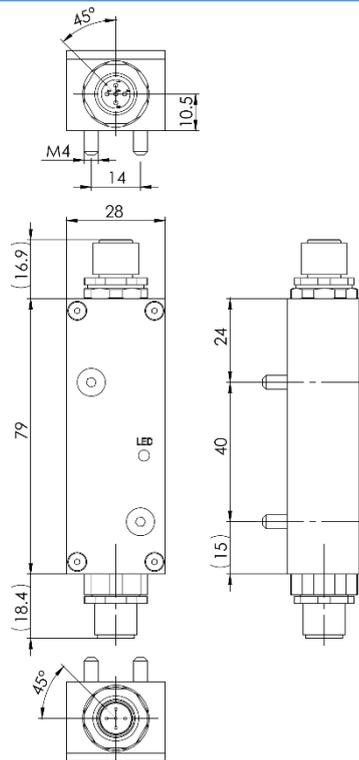
Mechanical data

Material	Aluminum
Electrical connection sensor	M12 socket (4 pin, a-coded, female)
Electrical connection control	M12 plug (8 pin, a-coded, male)
Assembly	2x M4-countersunk screws

Environmental data

Ambient temperature	0 ... +70 °C
Storage temperature	-40 ... +85 °C
EMV standards	EN 61000-4
Protection rate	IP 65

Mechanical dimensions



Pin assignment field housing

M12 socket for sensor connection, 4 pin, female

Pin code	Function
1	Excitation +
2	Signal +
3	Signal -
4	Excitation -

M12 plug for PLC connection, 8-pole, male

Pin code	Function
1	Power +
2	n.c.
3	Reset-zero point 0V
4	Reset-zero point +
5	Signal output Vout+ (± 10 V)
6	Power 0V (GND)
7	Signal output 0V -
8	Signal output Iout+ (4-20 mA)

Ordering code

See page 2 for detailed order information.

Options:

- Pre-configured setting (specific sensitivity)
- Calibrated measuring chain (amplifier and sensor)

External zero point adjustment

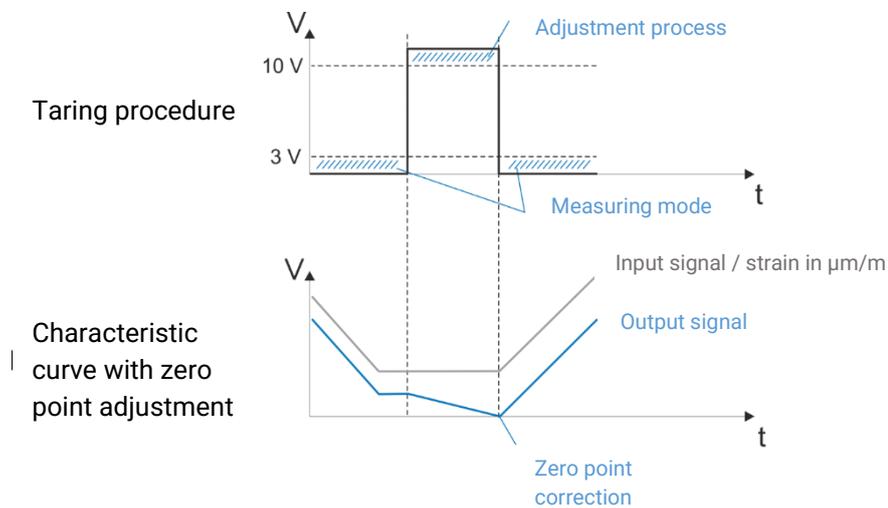
The zero point adjustment for these amplifiers is performed by a digital zero point-adjustment mechanism. The zero point setting is stored permanently, the zero point correction is also available after a power-off event. Thus, a constantly available installation tare is available. Therefore, these amplifiers are suitable for all static applications. The number of taring operations is limited to 100,000.

The zero point adjustment is triggered by an external control input (reset input). It is available with Active Low and Active High logic.

The following characteristic values are to be considered for the external zero point adjustment.

External zero point adjustment	Active low	Active High
Measurement mode	> 10 V or open	< 3 V or open
Zero reset / adjustment	< 3 V	> 10 V
Minimal pulse duration	1000 ms	1000 ms

The following diagram describes the behavior of the amplifier in reference to the zero adjustment control input:

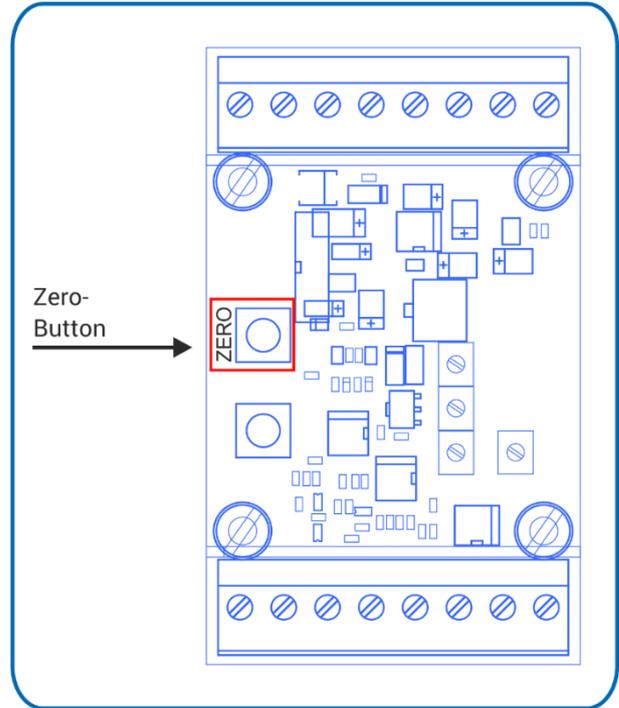


Zero point adjustment "Onboard"

With the DIN-Rail version (X-201-KA07) and aluminum field housing version (X-201-IP07), the zero point can be teached-in by pressing a button.

The zero point correction taught with the "Zero" button is always saved as an installation tare. This means that the zero point correction is still present even after a power-off.

Zero adjustment is performed as long as the zero-button is pressed. The output signal is set to zero at this moment.



Output

The X-201 offers two calibrated outputs at once, a voltage output and a current output. The relation between these two outputs is strictly proportional, in other words, if the voltage output is forced to 100%, the current output will also go to 100%.

$$U_{out} 0 \dots 10 \text{ V} = I_{out} 0 \dots 20 \text{ mA (or } 4 \dots 20 \text{ mA)}$$