In-Line Charge Amplifier

Industrial Charge Amplifier for Installation in Machine Structures

Industrial one channel amplifier which converts the charge produced by quartz sensors into a proportional voltage.

- Extremely small dimensions
- Measuring range up to 450 000 pC
- Supplied calibrated or uncalibrated
- Handy accessories for on-site calibration
- Suitable for installation in machine structure
- Output ±5 V

Description
The In-Line Amp industrial, single-channel charge amplifier Type 5027A... contains a capacitive negative feedback amplifier at the signal input in hybrid construction with an extremely high isolation resistance. An unstabilized DC voltage of 10 ... 36 V is sufficient to supply the In-Line Amp.

The single-channel charge amplifier can be supplied either calibrated or uncalibrated in three measuring ranges.

Applications
The In-Line Amp charge amplifier is particularly suitable for signal conditioning of piezo sensors. Incorporation in their structures allows measuring of process parameters close to the sensor.

Examples of General Areas of Application
- Located in robotic systems of assembly plant
- Monitoring of forces or stresses in crossbeams
- Installation of electronic systems in force plates
- Installation in linearly moving machine parts, e.g. piston rods
- Measurement of forces, stresses and torques in rotating shafts

Technical Data

<table>
<thead>
<tr>
<th>Charge Amplifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of channels</td>
<td>1</td>
</tr>
<tr>
<td>Measuring ranges FS optional</td>
<td>pC</td>
</tr>
<tr>
<td></td>
<td>pC</td>
</tr>
<tr>
<td></td>
<td>pC</td>
</tr>
<tr>
<td>Frequency range (–3 dB) kHz</td>
<td>≥0 ... &gt;10</td>
</tr>
<tr>
<td>Setting tolerance %</td>
<td>&lt;±1</td>
</tr>
<tr>
<td>Drift (at 25 °C) pC/s</td>
<td>&lt;±0,05</td>
</tr>
<tr>
<td>Reset/Operate transition pC</td>
<td>&lt;±3</td>
</tr>
<tr>
<td>Output signal V</td>
<td>±5</td>
</tr>
<tr>
<td>Output current mA</td>
<td>±2</td>
</tr>
<tr>
<td>Output impedance Ω</td>
<td>100</td>
</tr>
<tr>
<td>Output noise signal mVpp</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Zero point error (Reset) mV</td>
<td>&lt;±10</td>
</tr>
<tr>
<td>Frequency range Hz</td>
<td>≈0 ... 10 000</td>
</tr>
<tr>
<td>Time constant s</td>
<td>&gt;50 000</td>
</tr>
</tbody>
</table>
In-Line Charge Amplifier – Industrial Charge Amplifier for Installation in Machine Structures, 
Type 5027A...

Control Inputs for Reset/Operate

<table>
<thead>
<tr>
<th>Control connection for (PIN 6)</th>
<th>Connection to GND or &lt;0.8 V/0.1 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate</td>
<td></td>
</tr>
<tr>
<td>Reset</td>
<td>Input open or &gt;2 V</td>
</tr>
</tbody>
</table>

Input impedance (pull-up) on +7.5 V  kΩ  100

Operate-Reset time
Residual charge <0.5 % FS (depends on quantity of charge) ms <10 ... 500

Power Supply
Supply voltage VDC 10 ... 36
Current consumption without load mA ≈10

General Data
Operating temperature range °C 0 ... 60
Temperature min/max °C −10/70
Case material stainless steel
Degree of protection (EN 60529) IP65
Vibration resistance g 10
Shock resistance, over 1 ms g 200
Connections
Charge input Type KIAG 10-32 neg.
Charge output, supply Type 8-pol DIN 45326
Weight gramm ≈45

The device is CE-conform to the CE Directives 89/3336/EEC and complies with the EMC standards for industrial and laboratory equipment.

Mounting Examples
The single-channel charge amplifier can be installed in the structure in the immediate vicinity of a sensor. The entire measuring chain is then largely protected against environmental influences.

Fig. 1: Block diagram In-Line Charge Amplifier Type 5027A...

Fig. 2: Whole pattern of Fig. 3: Mounting bore for installation

In-Line Charge Amplifier Type 5027A...

Sensor e.g. Charge Amplifier Round connector
Type 913x82x Type 5027A... Type 1500A57

Fig. 4: Example of an industrial measuring chain
Optional Accessories for Calibrating the In-Line Charge Amplifier

Calibration Cable Type Z16401
A screwdriver device is fitted in the connecting plug of calibration cable Type Z16401 in the In-Line Charge Amplifier, allowing mechanical adjustment of a potentiometer in the 8-pole connector of the charge amplifier.

Remote Control Monitor Type 5825A1
Portable service unit for on-site adjustment.

The battery-operated unit supplies a constant 18 V current. It can also be used for operating the Reset/Operate mode and output signal indication.

Optional Accessories for Installing the In-Line Charge Amplifier
Mounting of the charge amplifier on the surface of a structure with the mounting bracket Type 1413.

Optional Accessories for Cable Connection of the In-Line Charge Amplifier
Round connector, 8-pole, per DIN 45326.

Aluminium cap for 8-pole plug connection DIN 45326, degree of protection IP67.

1. **Calibration Cable Type Z16401**
2. **Remote Control Monitor Type 5825A1**
3. **Mounting bracket, Type 1413**
4. **Round connector, Type 1500A57**
5. **Aluminum cap, Type 1433**
In-Line Charge Amplifier – Industrial Charge Amplifier for Installation in Machine Structures,
Type 5027A...

Included Accessories
- None

Optional Accessories
- Calibration cable: Z16401
- Remote Control Monitor: 5825A1
- Mounting bracket: 1413
- Round connector: 1500A57
- Aluminium cap: 1433

(For further details, please consult page 3)

Ordering Key

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Type 5027A</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... ±150 pC up to 0 ... ±4 800 pC</td>
<td>1</td>
</tr>
<tr>
<td>±145 000 pC</td>
<td>2</td>
</tr>
<tr>
<td>0 ... ±4 800 pC up to 0 ... ±145 00 pC</td>
<td>3</td>
</tr>
<tr>
<td>±450 000 pC</td>
<td></td>
</tr>
<tr>
<td>0 ... ±145 000 pC up to 0 ... ±450 000 pC</td>
<td></td>
</tr>
</tbody>
</table>

Nonadjusted, to be adjusted in situ,
max. measuring range ≈±5 V
Calibrated as specified in the order

Ordering Example
Type 5027A22, adjusted to ±50 000 pC = ±5 V