

Component Manual

ChargeAmplifier

In-Line Charge Amplifier



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Specific Safety Instructions



Before using this product, the user has to be familiar with the general safety instructions. Use the separate **Safety Information** manual for this purpose.

This chapter only describes specific safety instructions for this product.

Field of Application

The *IFTA ChargeAmplifier* (CA) has been designed to be mounted as described in the chapter *Installation*. Other uses are not permitted due to safety aspects.

Use in potentially explosive Atmospheres

The CA can be installed in potentially explosive atmospheres. The product can be ordered with or without an external industrial housing as described in the chapter *Ordering Information*.

Also mind the special ambient temperature range as shown in the chapter *Environmental* below.

In case the version without the industrial housing is used (models with suffix **B0** or **B2**), the equipment shall be installed in an enclosure that provides a degree of protection not less than IP 54 in accordance with EN 60079-15.

For models with industrial housing (suffix **B1**) only: Equipment for fixed installations where the installation is intended to minimize the risk of electrostatic discharge.

The CA was certified within a complete *IFTA* measurement setup as shown in the chapter *Measurement Chain Example*. In order to get the best experience and measurement results we highly recommend to use the CA with this setup.

The certification is only valid within the technical specifications as described in the chapter *Specifications*.

For further information regarding the certifications please see chapter *Declarations*.



Please always verify that the components are marked with the special symbol as it is described in the separate **Safety Information** manual.

Product Description

The product is a charge amplifier to convert dynamic charge signals into a voltage signal for further analysis. It is usable for a wide range of sensor types and an essential part of the *IfTA* measurement setup.

Specifications

Features

- Support of Piezo pressure and acceleration sensors
- Certified according to IEC/EN 60079-0 and IEC/EN 60079-7
- A wide range of different sensitivities are available as shown in the chapter *Ordering Information* (others on request)
- Available for wall mounting, with DIN rail or with Ex certified housing

Environmental

Operating temperature: -20 ... 75 °C

Storage temperature: -40 ... 85 °C

Humidity: 0 ... 95 % non-condensing

Altitude: Max. 2 000 m

Pollution degree: The device may only be used in areas with pollution degree 2 or better, as defined in IEC/EN 60991-1.

General

ChargeAmplifier

Case material: Sheet steel, galvanized

Weight: 175 g

Dimensions: See *Figure 1*

Protection class: For Ex environment the CA must be installed in an enclosure that provides a degree of protection not less than IP54 in accordance with IEC/EN 60079-0.

Calibration cycle: One year

Industrial Housing (with one mounted CA)

Material:	Fibreglass reinforced polyester
Seal:	Silicone sealing cord up to 130 °C
Weight:	690 g (including a mounted CA)
Dimensions:	See Figure 3
Protection class:	> IP 65 according to IEC/EN 60079-0

Technical Data

Frequency range:	3 Hz ... 20 000 Hz (-3 db) ¹
Linearity:	±1 % FSO
Thermal drift:	100 ppm/ °C typical

Signal Input

Valid input ranges:	±20 ... ±1000 pC ¹
Input coupling:	AC
Input protection:	100 Ω series resistor
Input termination:	1 MΩ

Due to its construction, the CA does not emit any current or voltage through its input terminals.

Signal Output and Power Supply

Output signal:	12 V operating point; ±5 V signal
IEPE current supply:	4 ... 12 mA ²
Supply voltage:	20 ... 28 VDC

¹ Option with enhanced input range and different frequency range available, see **Ordering Information**

² For the best performance the use of 12 mA is recommended.

Ordering Information

Product Key □□□□	Module □□	Sensor Type □	Amplification □□□□□	Environment □□	Housing / Installation □□□	Design □	Options □□
0330	CA	S	0005.0	St	B00	D	A
		D	0010.0	Ex	B01	C	B - ZZ
			0025.0		B02	P	Prototype
			0050.0				
			0100.0				
			0250.0				
			0000.5				
			0002.9				
			0052.6				
			0080.7				

Sensor Type

S Single ended
D Differential

Amplification

0005.0 5 mV/pC
0010.0 10 mV/pC
0025.0 25 mV/pC
0050.0 50 mV/pC
0100.0 100 mV/pC
0250.0 250 mV/pC
0000.5 0.5 mV/pC
0002.9 2.941 mV/pC
0052.6 52.63 mV/pC
0080.7 80.65 mV/pC

Environment

St Standard
Ex Explosive Ex ec

Housing / Installation

B00 Wall mounting
B01 With industrial Housing
B02 DIN rail (TS35)

Options

A High-pass filter and increased input range:
Frequency range: 100 Hz ... 20 000 Hz (-3 db)
Valid input ranges: ±200 ... ±10 000 pC
B - ZZ Spare

Default

Component Layout

As mentioned above the CA is available in different versions:

- For wall mounting
- With DIN rail (TS35)
- With Ex certified industrial housing

This chapter describes all three possibilities.

ChargeAmplifier for Wall Mounting (B0)

Dimensions

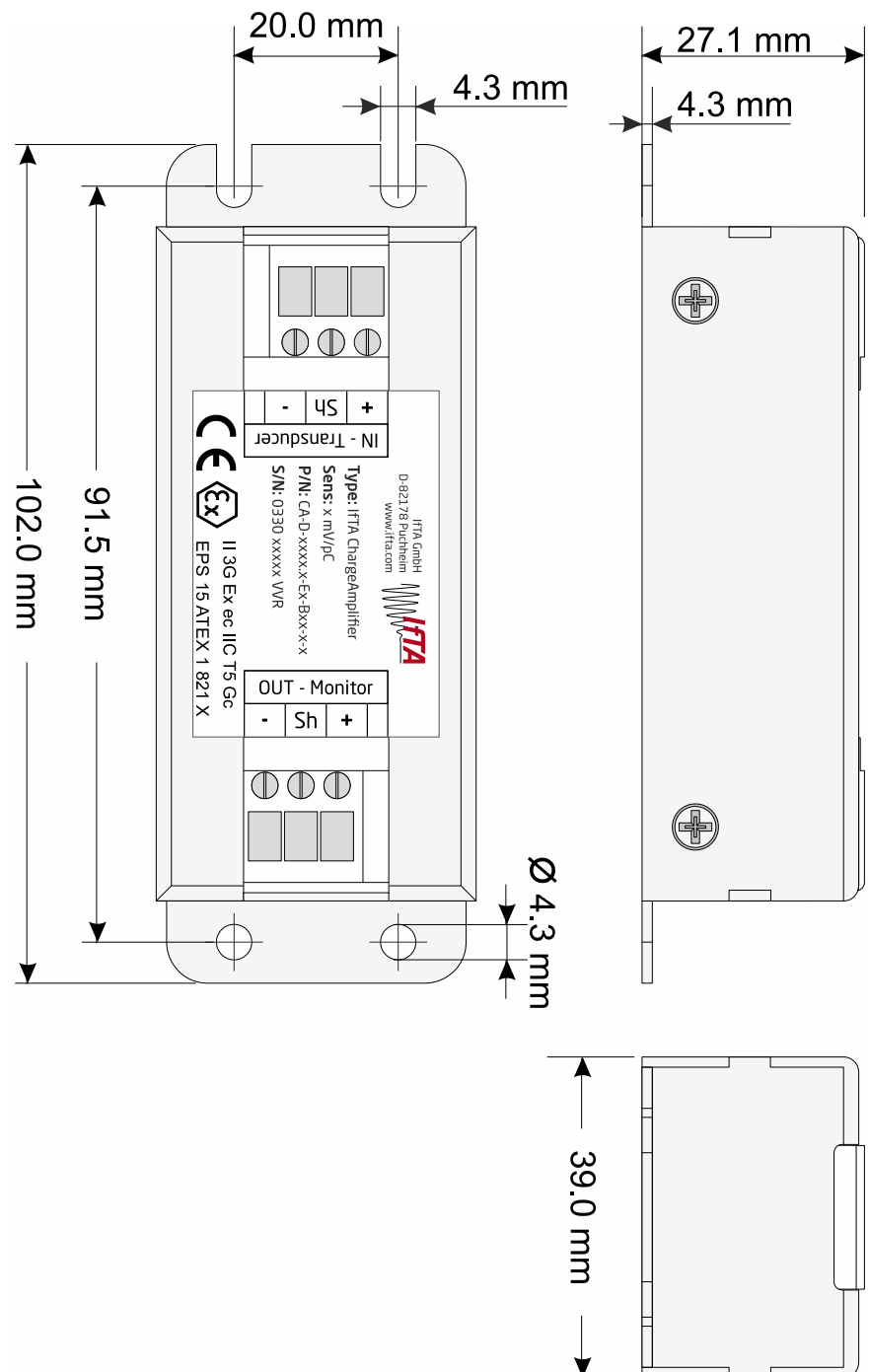


Figure 1: Dimensions of the CA for wall mounting (figure similar, subject to modification)

Layout



Figure 2: Layout of the CA for wall mounting (figure similar, subject to modification)

(1) **Case**

Housing of the CA

(2) **Transducer - Input**

3-pin screw terminal (the exact pin assignment is shown in *Figure 7* and *Figure 8*)

(3) **Monitor - Output**

3-pin screw terminal (the exact pin assignment is shown in *Figure 7* and *Figure 8*)

(4) **Fixing Points**

Four fixing points for the mounting of the CA (for details regarding the mounting see *Installing the*)

ChargeAmplifier with industrial Housing (B1)

Dimensions

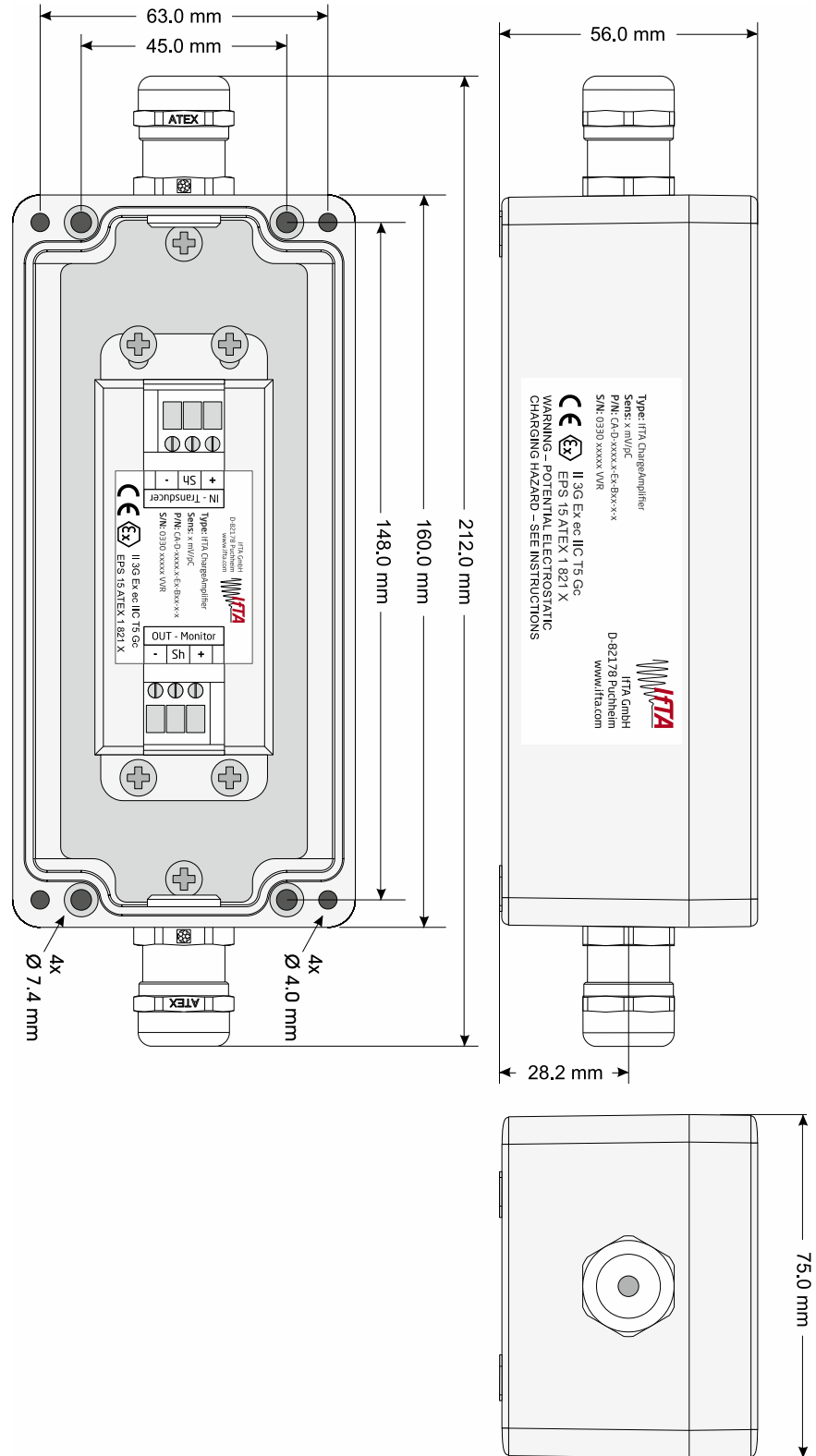


Figure 3: Dimensions of the industrial housing (figure similar, subject to modification)

Layout

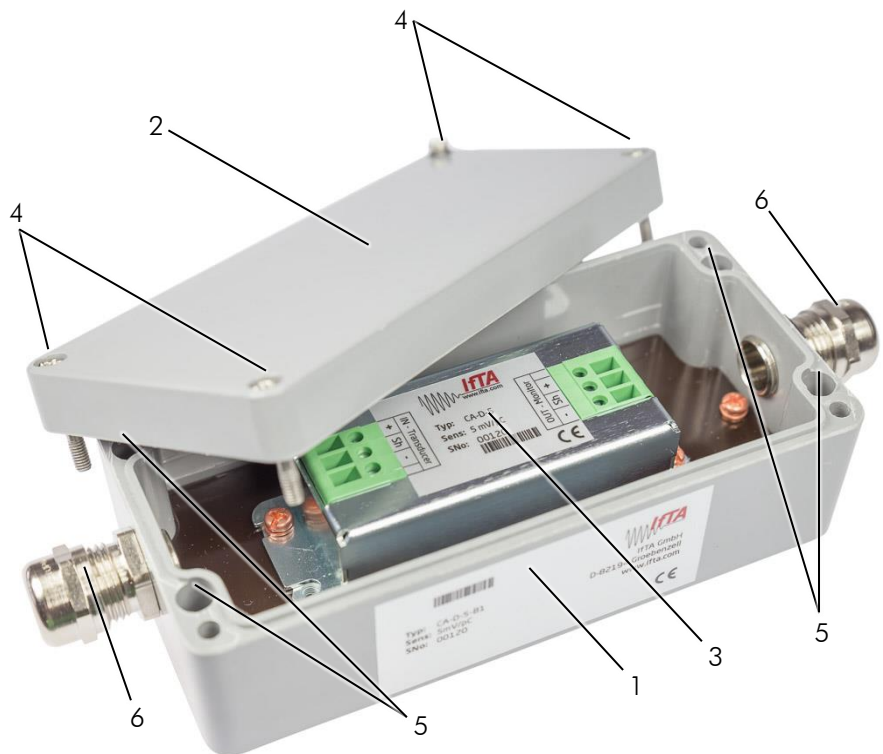


Figure 4: Layout of the industrial housing (figure similar, subject to modification)

(1) Industrial Housing

Ex certified industrial enclosure for the CA

(2) Cover

Cover of the industrial housing

(3) ChargeAmplifier

Mounted CA

(4) Cover Screws

Four screws to attach the housing cover

(5) Fixing Points

Four holes for the mounting of the industrial housing (for details regarding the mounting see chapter *Installing the CA with industrial Housing*)

(6) Stuffing Gland

For the installation of the cables

ChargeAmplifier with DIN Rail (B2)

Dimensions

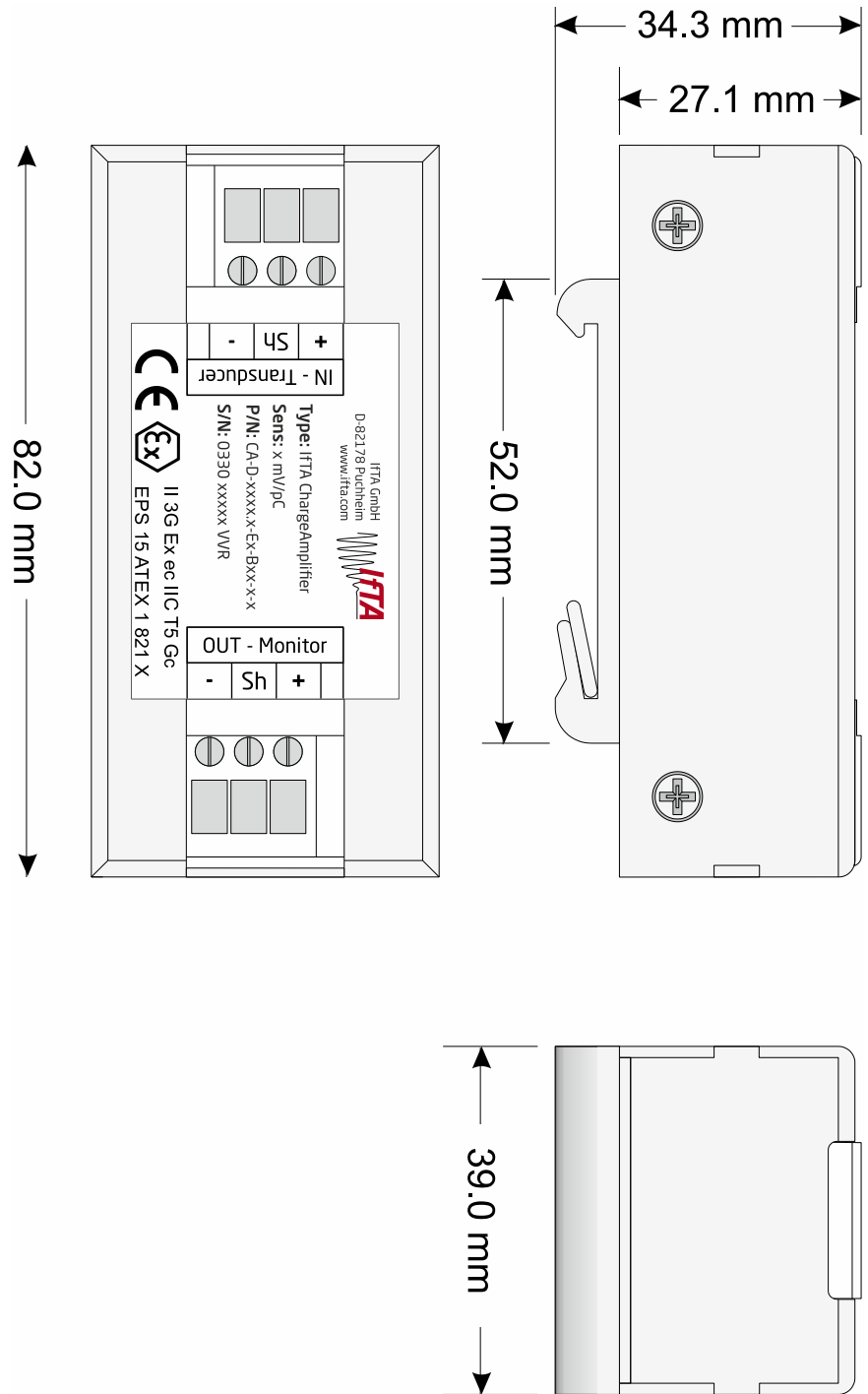


Figure 5: Dimensions of the CA with DIN rail (figure similar, subject to modification)

Layout

Beside the four fixing points, the layout is comparable to the version for wall mounting (see Figure 2).

Technical Description

Schematics

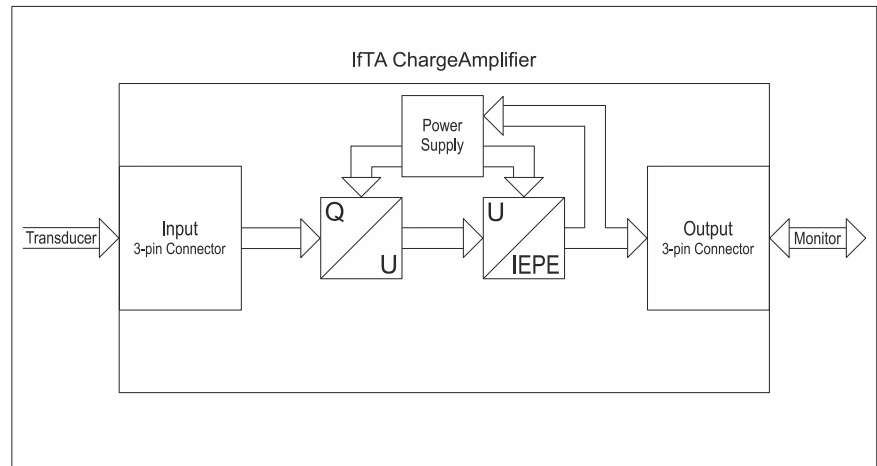


Figure 6: Schematics of the CA (figure similar, subject to modification)

Pin Assignment

For detailed information regarding the pin assignment see **Figure 7** and **Figure 8** below.

Measurement Chain Example

The CA is best used in a measurement setup with an *IFTA* system like the *ArgusOMDS*. This chapter includes two example configurations for both differential and single ended mode and the use with an *ArgusOMDS* system. The schematics are shown in the **Figure 7** and **Figure 8** below.

Differential Mode

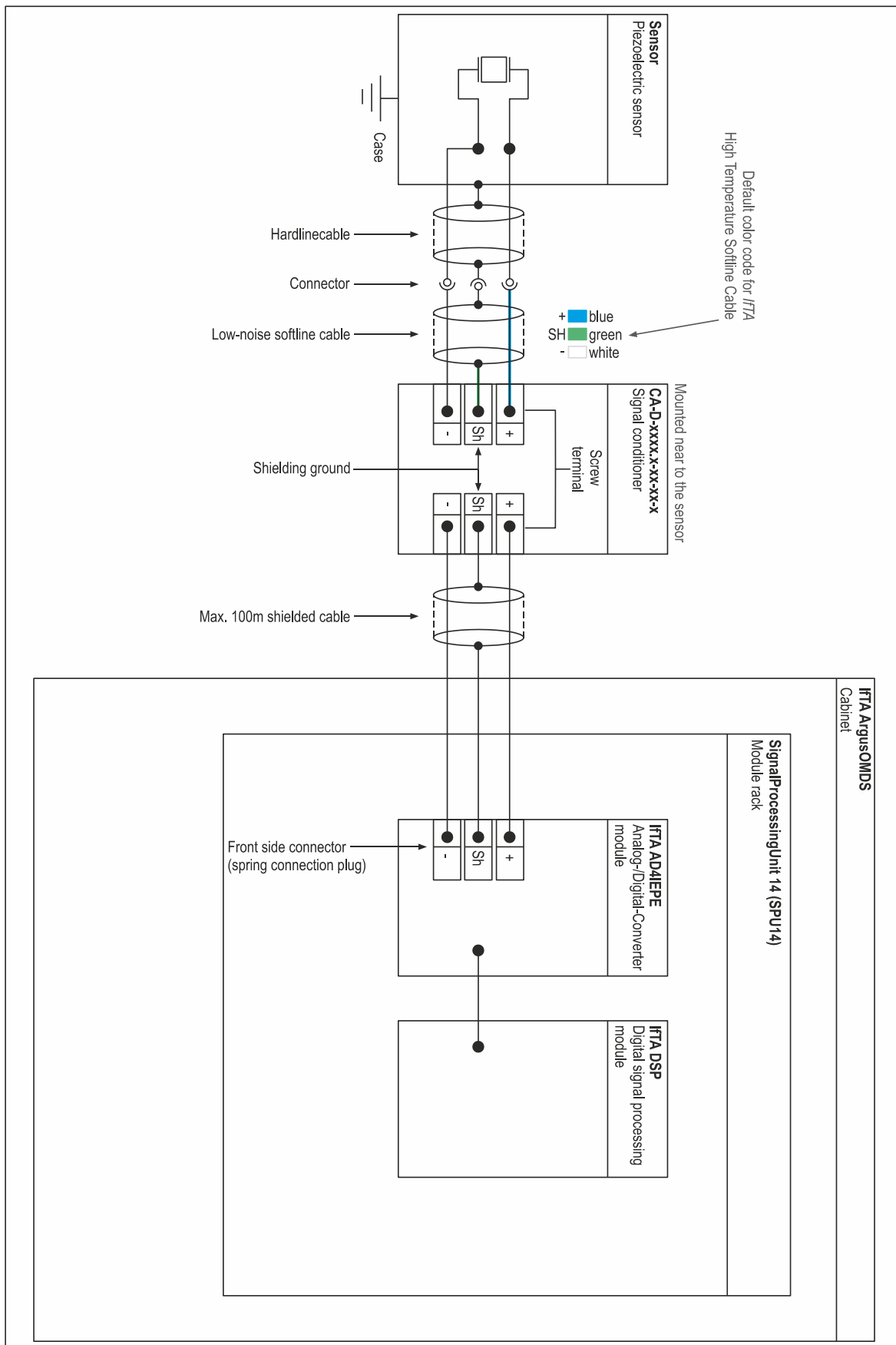


Figure 7: Schematics of the differential mode measurement chain (figure similar, subject to modification)

Single ended Mode

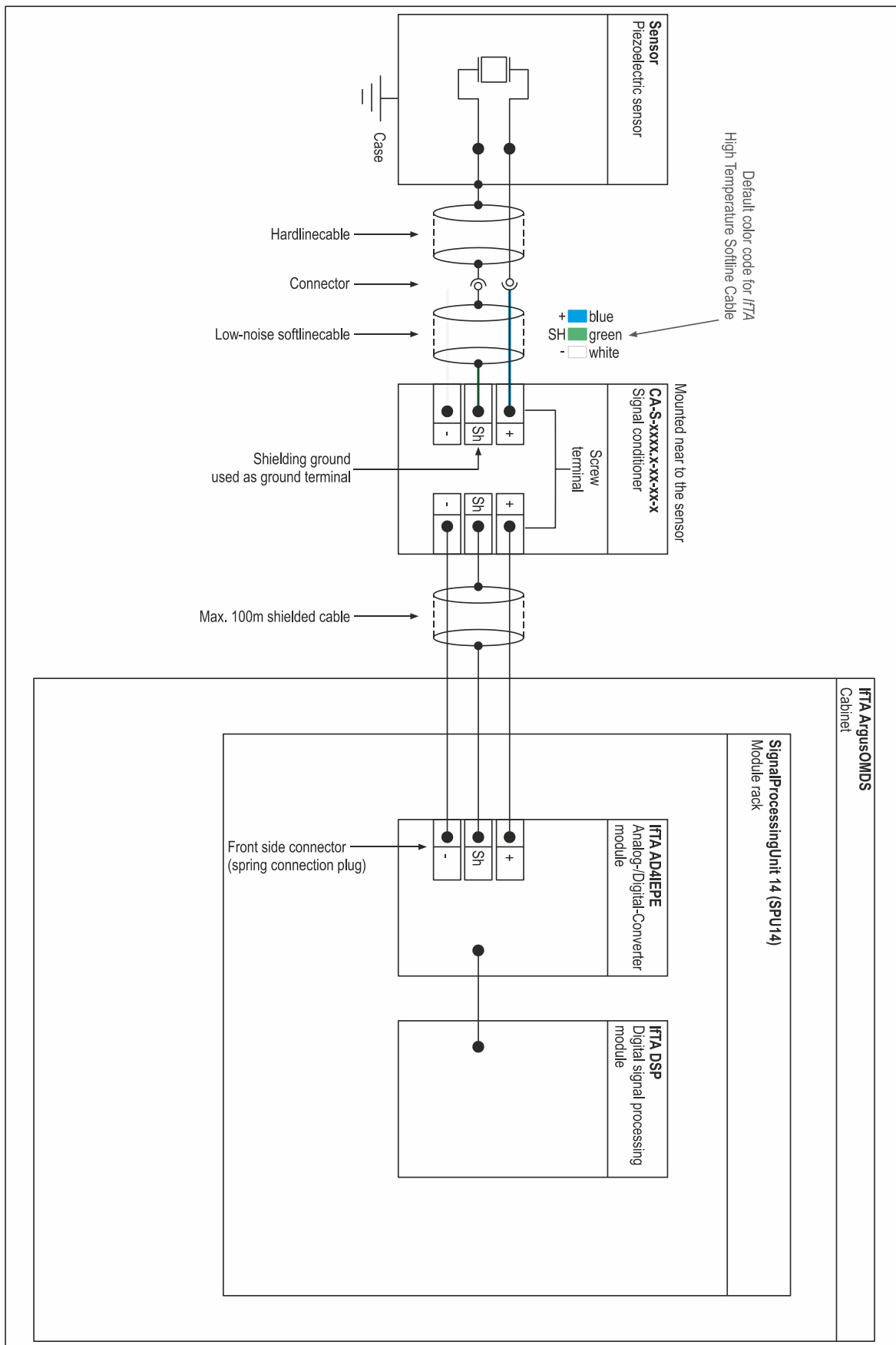


Figure 8: Schematics of the single ended mode measurement chain (figure similar, subject to modification)

Installation and Maintenance

Installing the CA with industrial Housing

Mounting of the industrial Housing

- (1) Choose a vibration-free place for the mounting.
- (2) Remove the cover of the industrial housing by unscrewing the four cover screws (see *Figure 4*).
- (3) Use the four fixing points (see *Figure 4*) to mount the housing on a suitable surface.
- (4) Continue with the steps described in the chapter below.

Connecting Cables



Risk of electrostatic discharge. Equipment for fixed installation where the installation is intended to minimize the risk from electrostatic discharge. Clean with damp cloth only. Not suitable for application with strong electrostatic charging processes.

Industrial Housing

- (1) Loosen the stuffing glands (see *Figure 4*).
- (2) Pass the cables through the stuffing glands into the designated position.
- (3) Tighten the stuffing glands and verify that the cables are securely fastened by the stuffing glands to ensure a proper sealing.
- (4) Continue with the next chapter to connect cables to the charge amplifier.

Mind that there are two different types of stuffing glands used as described below. The specification of them is as follows:

Type A – Sensor Side

Clamping range: 3 ... 6 mm

Tightening torque: 2 Nm

For the softline cables coming from the sensor side

Type B – Monitor Side

Clamping range: 5 ... 10 mm

Tightening torque: 3 Nm

For the outgoing cables to the monitor side

ChargeAmplifier



Before connecting anything to the charge amplifier, ensure to be familiar with the requirements as shown in the chapter **Specifications** and the terminal specifications as shown below.

The charge amplifier has two 3-pin screw terminals for the signal in- and output as shown in **Figure 2**. The terminal specification is as follows:

Valid cable types: 0.2 ... 2.5 mm² solid wire
 0.2 ... 2.5 mm² flexible
 0.25 1.5 mm² flexible with end sleeve
 AWG24 ... AWG14

Stripping length: 9.0 mm

Tightening torque: 0.4 ... 0.5 Nm

- (1) Ensure that the cable type is fitting the described specification above.
- (2) Connect the cable to the corresponding pin of the two screw terminals (the exact pin assignment is shown in **Figure 7** and **Figure 8**).
- (3) Install the cover of the industrial housing again.

Installing the CA without Housing

Installation



The user has to ensure that the CA will be installed into a certified housing for the mounting in potentially explosive atmospheres.



It is very important to ensure that the housings of the amplifiers do not touch each other and that there is no contact between them.

For this purpose, always install the wall mounting variant on a surface which is electrically non-conducting.

When using the DIN rail variant, it is recommended to install spacer between the amplifiers as shown in the *Figure 9* below.

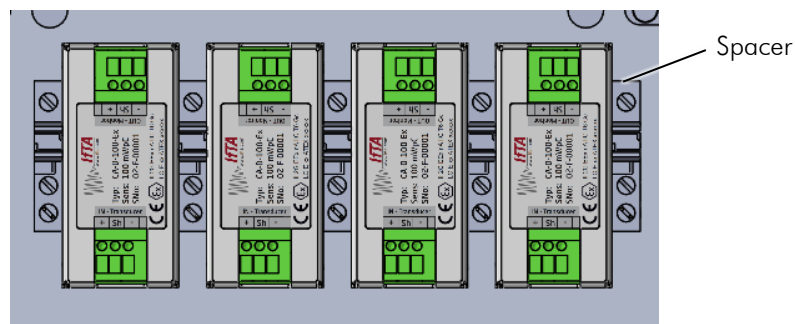


Figure 9: Recommended installation of the DIN rail ChargeAmplifier (figure similar, subject to modification)

ChargeAmplifier for Wall Mounting

Use the four fixing points (see *Figure 2*) to mount the CA into a suitable housing and mind the information in the chapter *Installation* above.

ChargeAmplifier with DIN Rail

Use the DIN rail at the rear side to mount the CA into a suitable housing and mind the information in the chapter *Installation* above.

Connecting Cables

Please use the chapter *Connecting Cables - ChargeAmplifier*.

Maintenance and Cleaning

The *ChargeAmplifier* has no actively turning parts nor other components which would require maintenance.

However, it is necessary to keep the device clean and free from dust using a soft cloth. Especially the connectors need to be clean to avoid any signal distortions.

It is also highly recommended to follow the calibration cycle mentioned in the chapter *Product Description - General*. Recalibration at the *IFTA* laboratory can be offered - contact us for details.

Declarations and Certificates



EU Declaration of Conformity

Product: ChargeAmplifier
Model: 0330-CA-D-xxxx.x-Ex-Bxx-x-x

Manufacturer: IfTA Ingenieurbuero fuer Thermoakustik GmbH
Address: Junkersstrasse 8, D-82178 Puchheim, Germany

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

2014/30/EU Electromagnetic Compatibility (EMC)
2011/65/EU Restriction of Hazardous Substances (RoHS)
2014/34/EU Equipment and protective systems intended for use potentially explosive atmospheres

Compliance was proved by the application of the following standards:

EMC EN 61326-1:2013
EN 55011:2009+A1:2010

RoHS EN 50581:2012

ATEX EN 60079-0:2012+A11:2013
DIN EN IEC 60079-7/A1:2018
NB: Bureau Veritas Consumer Service Germany GmbH
NB Nr.: 2004
COC: ESP 15 ATEX 1 821 X

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 174, 1.7.2011, p. 88):

04.03.2021 / Puchheim
Date / Place


Dr. Jakob Hermann, General Manager



- (1) **Certificate of Conformity**
- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – Directive 2014/34/EU
- (3) Certificate Number: **EPS 15 ATEX 1 821 X** **Revision 1**
- (4) Equipment: Charge Amplifier: 0330-CA-D-xxxx.x-Ex-Bxx-x-x
(see following page for nomenclature)
- (5) Manufacturer: IFTA Ingenieurbüro für Thermoakustik GmbH
- (6) Address: Junkersstrasse 8
D-82178 Puchheim
Germany
- (7) This equipment and any acceptable variation thereto are specified in the schedule to this Certificate of Conformity and the documents therein referred to.
- (8) Bureau Veritas Consumer Products Services Germany GmbH certifies based on a voluntary assessment that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II of the Directive 2014/34/EU. The examination and test results are recorded in the confidential documentation under the reference number 13TH0249.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN 60079-0:2012+A11:2013 DIN EN IEC 60079-7/A1:2018**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subjected to special conditions for safe use specified in the annex to this certificate.
- (11) The marking of the equipment shall include the following:

 II 3G Ex ec IIC T5 Gc



Certification department of explosion protection

Hamburg, 2020-03-19



H. Schaffer

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(12)

Annexe

(13) **Certificate of Conformity EPS 15 ATEX 1 821 X**

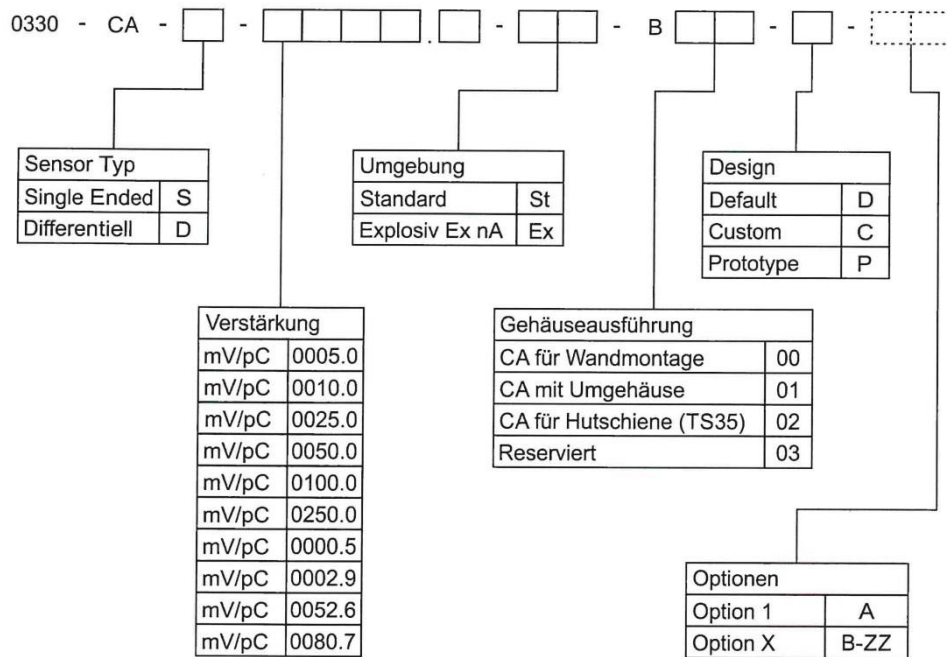
Revision 1

(14) Description of Equipment:

The product is a charge amplifier to convert dynamic charge signals into a voltage signal for further analysis. It is usable for a wide range of sensor types and an essential part of the IFTA measurement setup. The Charge Amplifier is available in two versions:

a) Model 0330-CA-D-xxx.x-Ex, 0330-CA-D-xxx.x-Ex-B00-x-x and 0330-CA-D-xxx.x-Ex-B02-x-x are provided with functional enclosure only and are intended for built-in use, enclosure must be provided by the installation

b) Model 0330-CA-D-xxx.x-Ex-B01-x-x is provided with enclosure Sensor type and amplification do not affect safety.



Electrical data:

Power supply: 20 – 28 Vdc; 8 – 12 mA

(15) Reference number: 13TH0249



(16) Special conditions for safe use:

- Special ambient temperature range: T5: $-20^{\circ}\text{C} \leq T_{\text{amb}} \leq +75^{\circ}\text{C}$
- For models with suffix "B00" or "B02" or without suffix (without enclosure) only: The equipment shall be installed in an enclosure that provides a degree of protection not less than IP 54 in accordance with EN 60079-15.
- For models with suffix "B01" (with enclosure) only: Equipment for fixed installations where the installation is intended to minimize the risk from electrostatic discharge (refer to instructions).

(17) Essential health and safety requirements:

Met by compliance with standards.



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Technical Support

If you have any questions about the use of this product, please contact:

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