A1429

64 Channel Charge Sensitive Preamplifier

Data Sheet

- **64-channel**
- **Max. output voltage: +/- 4,5V Diff on 100 Ω termination**
- **Sensitivities: 20, 45, 90, 200, 400mV / MeV**
- **Dimension (mm): 180 x 105 X 25 mm**
- **Input bias voltage (± 400 V Max) (2 LEMO 00 connector);**
- **ESD input protection**
- **TEST pulse input (1 LEMO 00)**
- **Low power consumption (< 50 mW for ch.)**
- **True Differential output (with 100 Ω Diff. back termination)**
- **Noise < 5 KeV on 0 pF input and < 35 eV/pF slope**
- **Rise Time < 20 ns @ 0 pF, < 60 ns @ 200 pF**

The **A1429** is a 64 ch. highly integrated charge preamplifier, suitable for single or double sided multi-strip silicon detectors as well as for multi-channel detectors with common Bias. Its compact size and low power consumption make it ideal for direct detector coupling in a high vacuum system. it is equipped with two LEMO Bias inputs, one input for channels from 0 to 31 and a second for channels from 32 to 63. Preamplifier output signals are in true differential supporting low-cost twisted flat cables for the output connection.

The A1429 is available in different sensitivities:

20, 45, 90, 200, 400 mV/MeV (Si)

Specification

Polarity

Positive or Negative Charge Input polarity
Output polarity: Differential

Energy Sensitivity

20, 45, 90, 200, 400 mV/MeV (Si)

Max Energy Ranges (Si)

- 225 MeV (Si) @ 20 mV/MeV
- 100 MeV (Si) @ 45 mV/MeV
- 50 MeV (Si) @ 90 mV/MeV
- 22 MeV (Si) @ 200 mV/MeV
- 11 MeV (Si) @ 400 mV/MeV

Output voltage

Differential ± 4.5 V_{Diff} max on 100 Ω Term.
Max Output offset: ± 100 mV
Common Offset adjust on Front Panel Trimmer

Noise

Model	Detector capacitance: 0 pF	
20 mV/MeV	< 5 KeV	slope < 28 eV/pF
45 mV/MeV	< 4 KeV	slope < 28 eV/pF
90 mV/MeV	< 4 keV	slope < 28 eV/pF
200 mV/MeV	< 4 keV	slope < 35 eV/pF
400 mV/MeV	< 4 keV	slope < 35 eV/pF

Rise Time

< 20 ns @ 0 pF detector capacitance
< 60 ns @ 200 pF detector capacitance

Decay time

20 mV/MeV	50 µs
45 mV/MeV	100 µs
90 mV/MeV	50 µs
200 mV/MeV	22 µs
400 mV/MeV	11 µs

Packaging

Shielded Box
Dimensions (WxHxD): 180 x 25 x 125 mm^3 (connectors included)
Weight: 900 g

Inputs

DETECTOR INPUT

Accepts positive and negative input charge pulses from semiconductor detectors and supplies the HV bias to the detector itself;
Detector input (AC coupled) - 22 MΩ to HV-IN
Samtec ERF8-040-01-L-D-RA-L-TR connector
ESD input protection
A3429: Adapter to Nr. 4 17x2, 2.54 mm male Header Connectors

Micro-coax cable ERCD series available from Samtec

HV-IN

Accepts detector bias from bias supply and applies it to detector through the DETECTOR INPUT connector
± 400 V Max
Nr.2 **LEMO-00** connector
- HV-IN[0:31] for ch. 0 to 31
- HV-IN[32:63] for ch. 32 to 63

TEST-IN

Positive or negative input for the energy calibration via Ctest

20 mV/MeV	2.2 pF
45/90 mV/MeV	1 pF
200/400 mV/MeV	0.5 pF

Nr.1 **LEMO-00** connector; 50 Ω on request

POWER IN

Power supply input connector
Power supply voltage:

pin 1	+6 V_{DC}
pin 2	GND
pin 3	-6 V_{DC}

DMini XRL 3 Pin Male connector

An adapter cable from **DMini XLR** to **D-Type 9-pin** connector is supplied in the kit.

length:	3 m
pin 1,2	GND
pin 3	+6 V_{DC}
pin 5	-6 V_{DC}

Outputs

DIFFERENTIAL OUTPUTS

Amplifier Out
Differential ± 4.5 V_{Diff} max
100 Ω Diff. back termination
Nr. 4 connectors: **Header with Latches** 17+17 pins (Male) pitch: 2.54 mm

Power Requirements

+6 V < 350 mA (no load)
-6 V < 195 mA (no load)

Environmental

Indoor use

WARNING During normal operation, a potentially hazardous high voltage bias is applied to a detector via the preamplifier. Only qualified personnel should carry out installation, operation and maintenance procedures of this unit. Furthermore, the preamplifier bias circuit has a very long time constant and therefore this circuitry can remain at high voltage for a very long time. If the user does not exercise adequate caution, this voltage can cause personal injury due to electrical shock. Pease observe the following precautions:

- Completely discharge the detector bias circuit by switching off the bias supply before connecting a cable, to the Input/Detector connector.
- If you are using a variable power supply, bring the voltage value to zero and wait for at least 30-60 seconds. The bias circuitry will discharge itself through the output of the bias supply.

WARNING Do not connect the **DETECTOR INPUT** to exposed circuitry. Connect the preamplifier to a Detector/Power Supply properly grounded to safety hearth.

Operation

Care must be taken in the use of A1429 with high voltage detectors.

Please remember to:

- Turn down gradually bias voltage prior to connect or disconnect preamp input
- Avoid fast changes in bias voltage
- Avoid Detector breakdown or discharge

Panel Layout

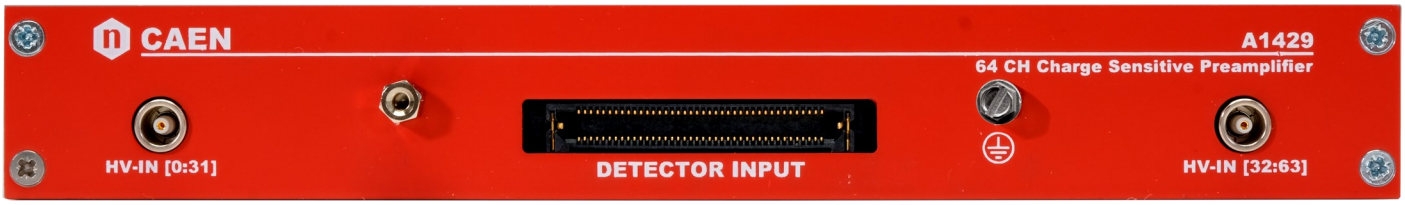


Fig. 1: A1429 Front Panel

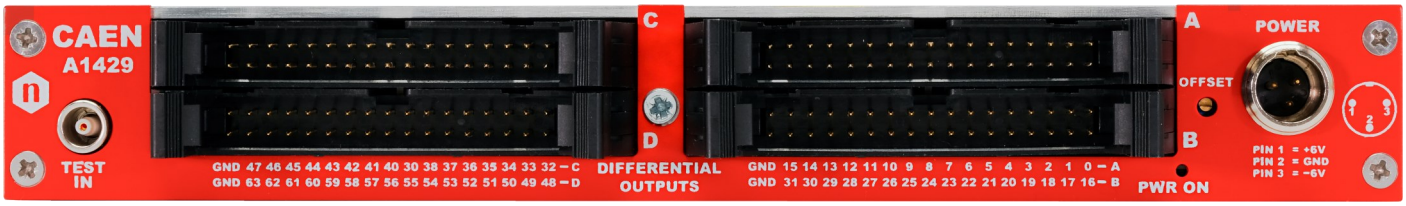


Fig. 2: A1429 Back Panel and Connectors pin numbering

I/O and Power Supply connectors pin-out

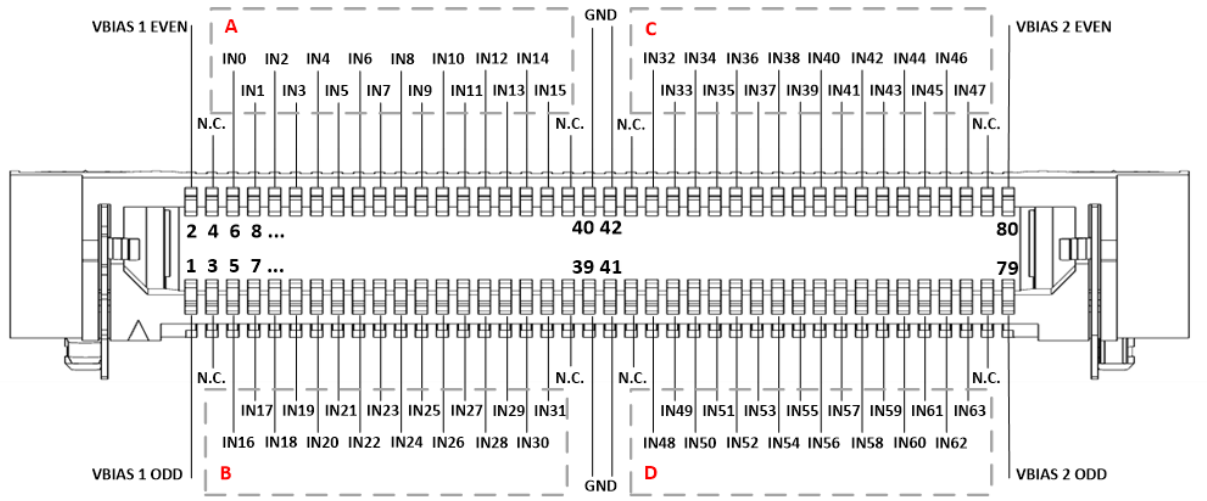


Fig. 3: DETECTOR INPUT pin-out

The connector used (Samtec ERF8-040-01-L-D-RA-L-TR) mates with Samtec **ERCD** Coax Cable Assemblies Family (for example the ERCD-040-01.72-TEU-TED-1-B part number).

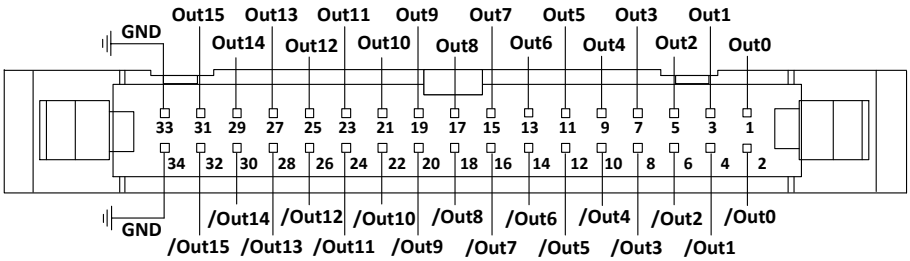


Fig. 4: Output Connector A: Out <0..15>

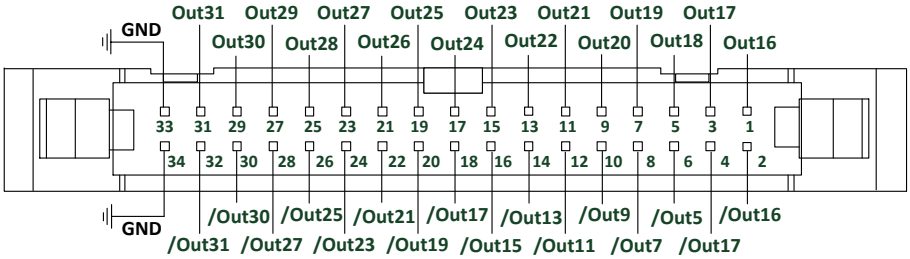


Fig. 5: Output Connector B: Out <16..31>

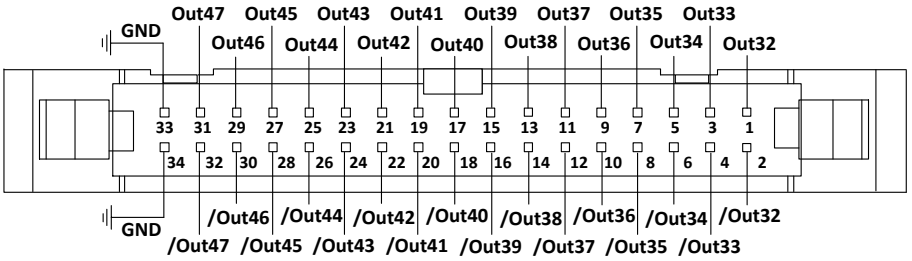


Fig. 6: Output Connector C: Out <32..47>

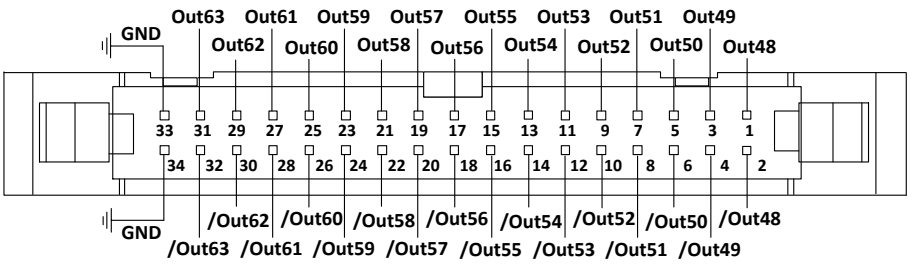


Fig. 7: Output Connector D: Out <48..63>

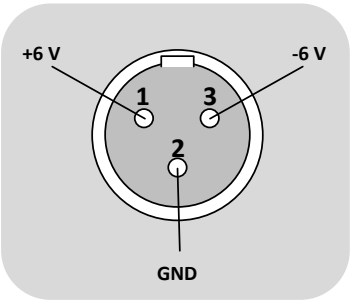


Fig. 8 back panel POWER Connector pin out.

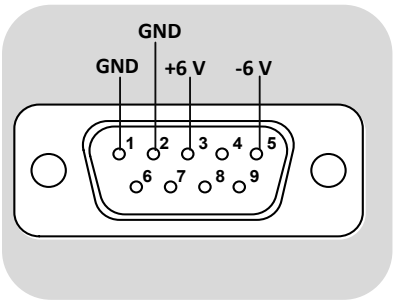
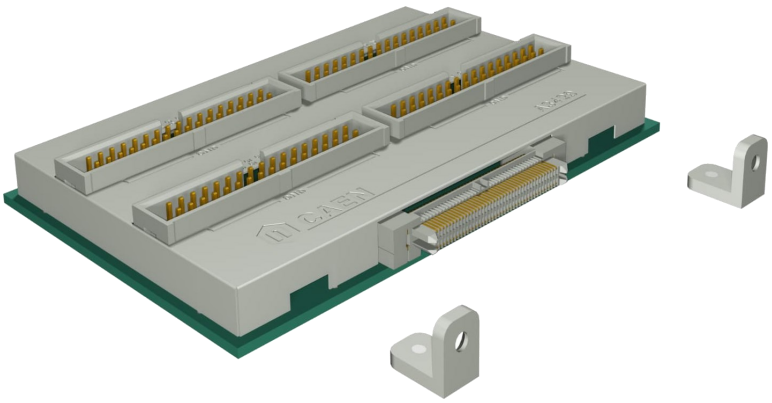


Fig. 9 Cable D-type Connector pin out.

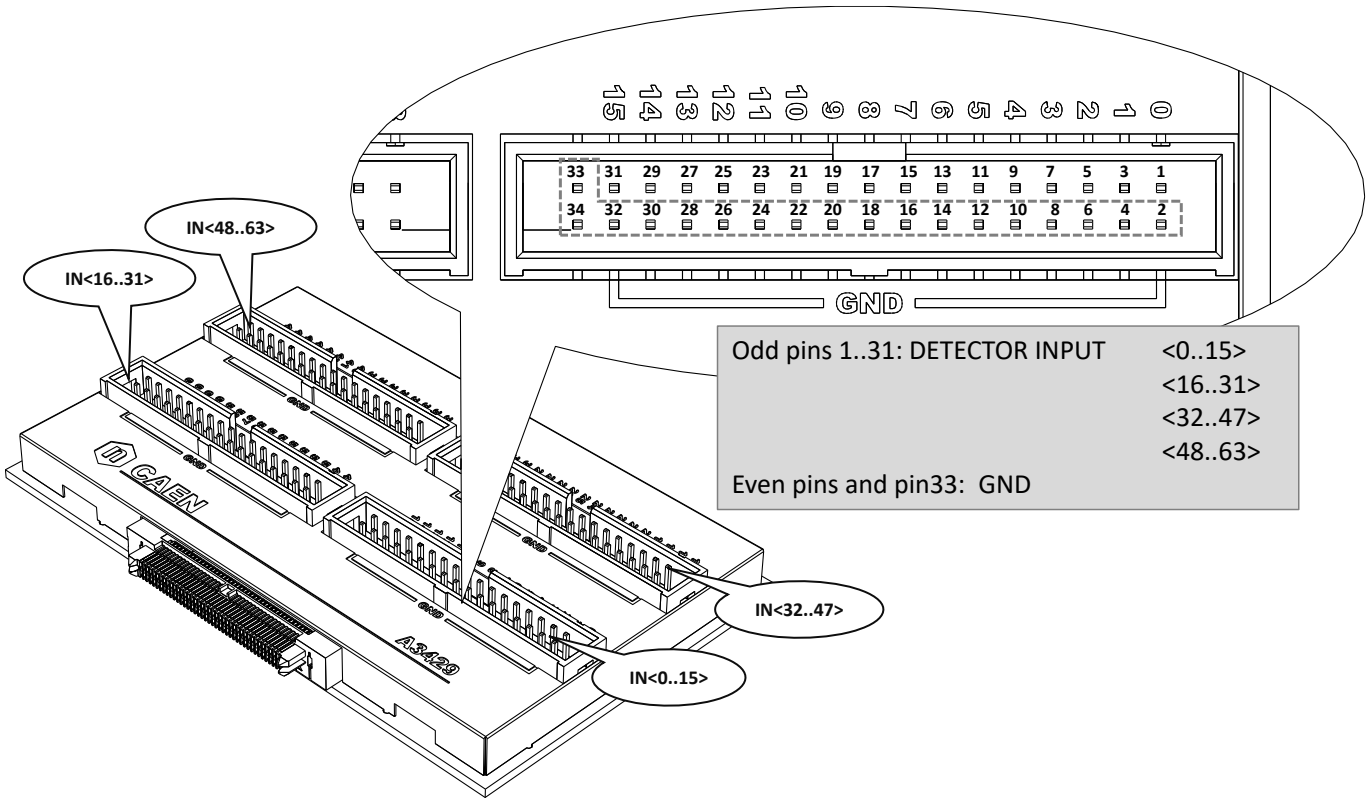
Fig. 10 Adapter cable from DMini XLR to D-Type connector (length: 3 m)

Accessories



A3429
64 channel Adapter to 2.54mm Male Header Connector

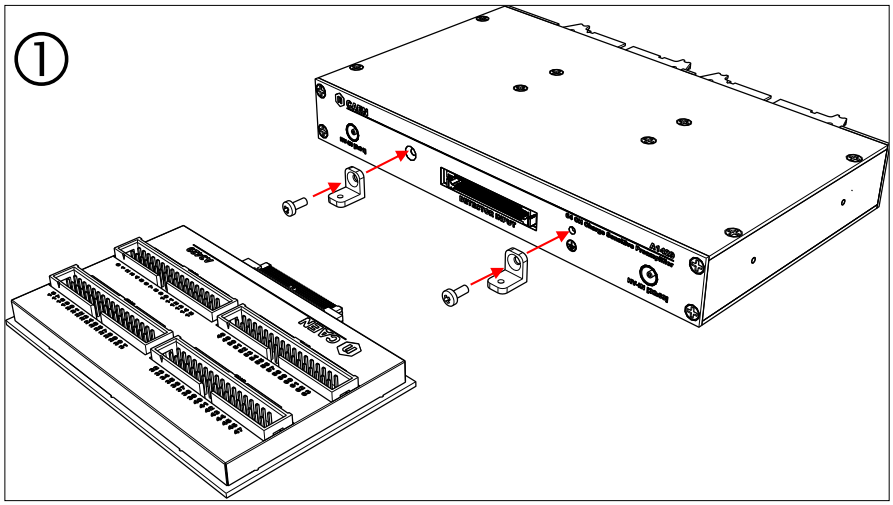
- 64-channel
- Input connectors: 34-pin 2.54mm Male Header
- Output connectors: Samtec ERM8-040-01-L-D-RA-TR

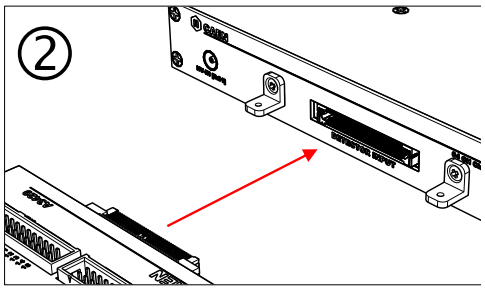


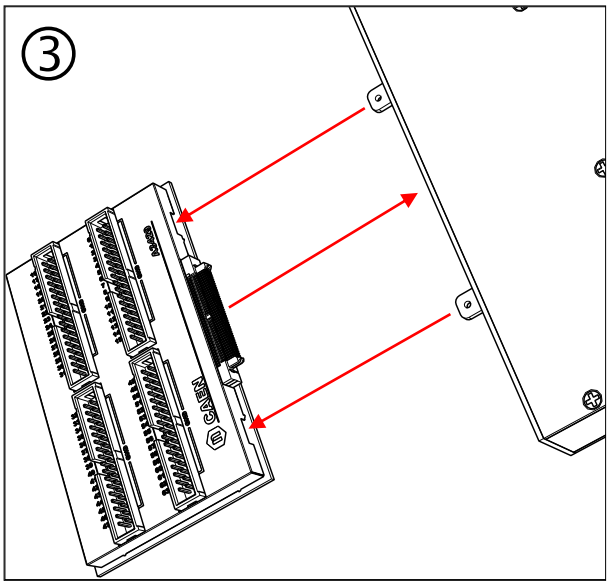
Odd pins 1..31: DETECTOR INPUT <0..15>
<16..31>
<32..47>
<48..63>

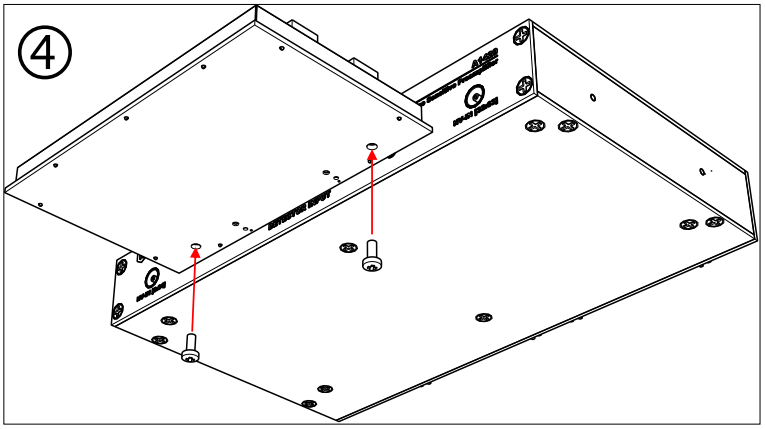
Even pins and pin33: GND

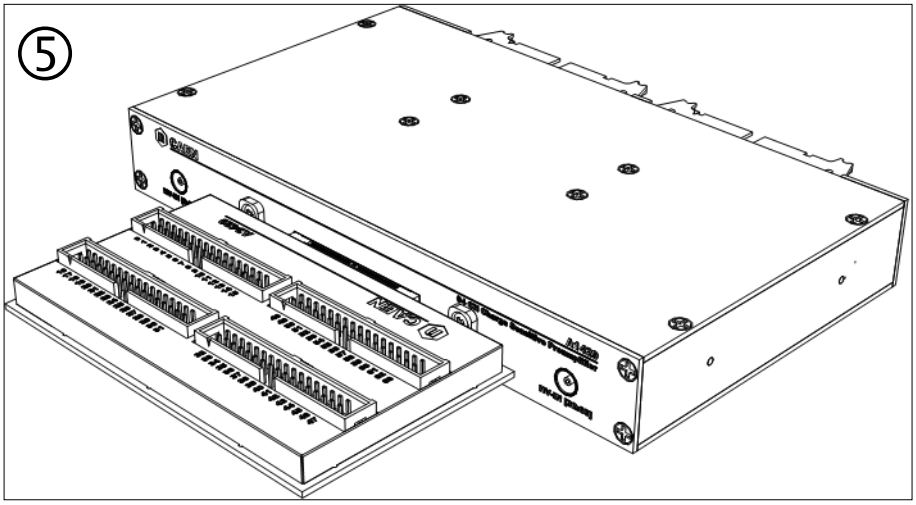
Adapter mounting procedure











Ordering Option

Ordering code	Description
WA1429X020AA	A1429x020 - 64 Ch. Charge Sensitive Preamplifier 20 mV/MeV
WA1429X045AA	A1429x045- 64 Ch. Charge Sensitive Preamplifier 45 mV/MeV
WA1429X090AA	A1429x090- 64 Ch. Charge Sensitive Preamplifier 90 mV/MeV
WA1429X200AA	A1429x200- 64 Ch. Charge Sensitive Preamplifier 200 mV/MeV
WA1429X400AA	A1429x400- 64 Ch. Charge Sensitive Preamplifier 400 mV/MeV

Accessories

Ordering code	Description
WA3429XAAAAA	A3429 - 64 channel Adapter to 2.54mm Male Header Connector for A1429 Preamplifier
WA952XAAAAAA	A952 - Cable assembly 2.54mm 34 pin female to 2.54mm 34 pin female - 50 cm

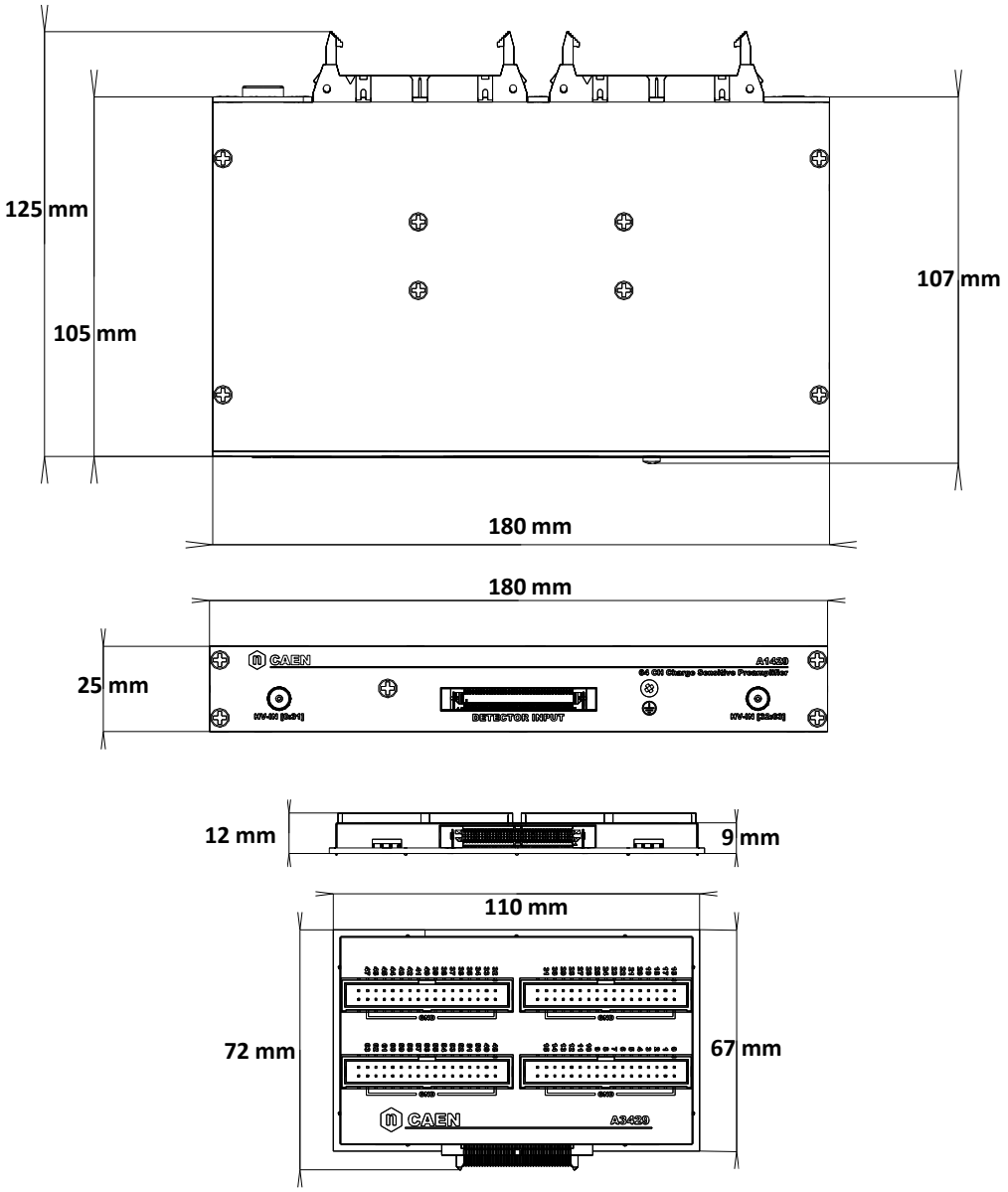


Fig. 11 A1429 and A3429 dimension