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Charge Amplifier on Euro-Card

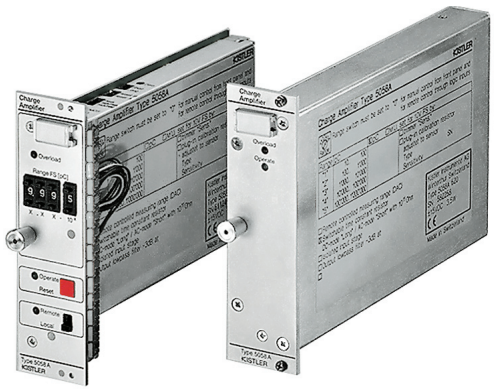
Type 5058A...

for Multi-Channel 19" Racks

The Charge Amplifier on Euro-Card Type 5058A... converts the charge yielded by piezoelectric sensors into a proportional voltage and can capture peak values.

Power supply is with ±15 VDC. Various accessories are available as options.

- Five measuring ranges
- Positive and negative peak memory
- Built-in low-pass filter (standard)
- Switchable "Track/Hold" and "Track/Peak" operating modes
- Conforming to CE



Description

The Charge Amplifier converts the electric charge yielded by the sensor (connection Q-IN) into a proportional voltage (see block diagram on page 3).
Prior to a measurement the range capacitors are discharged through a relay contact (Reset).

The following Programmable Amplifier adjusts the Type 5058A... to the desired measuring range [pC]. This is done by a potentiometer (standard), a DAC or a fixed sensor-specific resistor.

A Low-pass Filter is connected to the amplifier output; its standard cut-off frequency is 10 kHz (Low Pass 10 kHz).

The Zero Point Correction circuit reduces the zero point error during the reset phase to a negligible value.

The Input Logic converts TTL signals to the CMOS level and decodes the signals.

Both Analog Memories function either as peak value memories (Peak) or as Track/Hold memories or they first follow the signal (Track) and can subsequently be switched to peak value storing (Peak).

The memories are controlled by the Peak and Track/Hold Logic (Peak & Overload Detector & Track-Hold Control).

The summing amplifier ((PP)/2) adds the signals of both memories and divides the sum by 2.

The overload monitoring (Overload Detector) gives a logic signal if the output signal exceeds ±10,5 V.

Options:
The resistance in parallel to the charge amplifier (Time Constant R) and the range capacitor form together a high-pass filter with a defined lower cutoff frequency.

The Isolation Amplifier and the appertaining DC/DC converter electrically isolate the charge amplifier part from the output circuit.

Application

The Type 5058A... has been designed for applications in the industrial measuring technique and is especially destined for use in multi-channel systems and for mounting in 19" racks.

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Technical Data

Charge Amplifier		
No. of channels		1
Measuring range FS		
Range 1	pC	±10 ... 100
Range 2	pC	±100 ... 1 000
Range 3	pC	±1 000 ... 10 000
Range 4	pC	±10 000 ... 100 000
Range 5	pC	±100 000 ... 1 000 000
Drift (Operate)	pC/s	<±0,07
Reset/Operate transition	pC	≤0,2
(the larger value applies)	mV	≤±15
Zero point error (Reset)	mV	<±2
Input insulation resistance		
(Ranges ≤10 000 pC)	TΩ	≈100
Time constant R_{iso} x C_B		
Ranges >10 000 pC)	s	>100 000
Voltage at input	V	<±50

Analog Memory		
Operating mode		
Track/Hold, Track/Peak,		
+Peak, –Peak, PP/2		
Output voltage		
Peak mode	V	0 ... 10
Track/Hold mode	V	–10 ... 10
Output current	mA	<±5
Output resistance	Ω	10
Rise time 0 ... 99 %	ms	<0,5
Memory drift	mV/s	<0,5 (typ. 0,25)
Memory residual voltage	mV	<50 (typ. 30)

Signal Output Instant		
Output voltage	V	±10
Output current	mA	<±5
Output resistance	Ω	10
Output interference signal		
(0,1 Hz ... 10 MHz)		
10 ... 100 pC	mV_{pp}	<40
100 ... 1 000 000 pC	mV_{pp}	<25
Interference signal		
due to input capacitance	pC_{rms}/pF	$2 \cdot 10^{-5}$
Frequency range without internal LP filter (–3dB)		
Range <±100 000 pC	kHz	≈0 ... >80
All ranges	kHz	≈0 ... >15
Upper cutoff frequency		
–3 dB, with standard filter,		
40 dB/decade	kHz	10
Errors		
Range 10 ... 100 pC	%	<±3
Range >100 pC	%	<±1

Logic		
Logic inputs		
switchable level with input current		TTL/CMOS
"L" level <0,4 mA/<1,4 mA	V	<0,8/<6
"P" level <0,3 mA/<0,6 mA	V	>2/>8
Logic output for		
"Overload"/triggering threshold	V	≈±10,5

General Data		
Power supply voltage		
Supply voltage	VDC	±15
Current consumption +15 V	mA	<90
Current consumption –15 V	mA	<80
Ambient temperature		
Operation	°C	0 ... 50
Storage	°C	–10 ... 60
Connections		
Input signal		piezoelectric/mini-coax neg.
Multipole connector, 52 + 2 pol.		DIN 41 612
Dimensions, structural shapes M		
withour partial front panel	mm	100x160x20,3 (4 TE)
Weight	g	≈190
Degree of protection EN 60529		IP40

Other Features

- Programmable measuring range
- Manual operation
- Peak memory
- Low-pass filter
- Galvanic isolation

Variants (see also page 4)

Sensitivity adjustment with DAC		
Resolution	Bit	12
Non-linearity	LSB	±0,5
Setting time	µs	2
Logic inputs "L" level		
Input current <400 µA	V	<0,8
Logic inputs"H" level		
Input current <1 µA	V	>3
Additional current consumption +150	mA	15
–150	mA	6

Electric Isolation		
Isolation voltage	V_{rms}	50
Frequency range	kHz	0 ... 20
Non-linearity	% FS	≤±0,05
Gain error	%	≤0,5 (typ. 0,05)
Additional current consumption +150	mA	60
–150	mA	40

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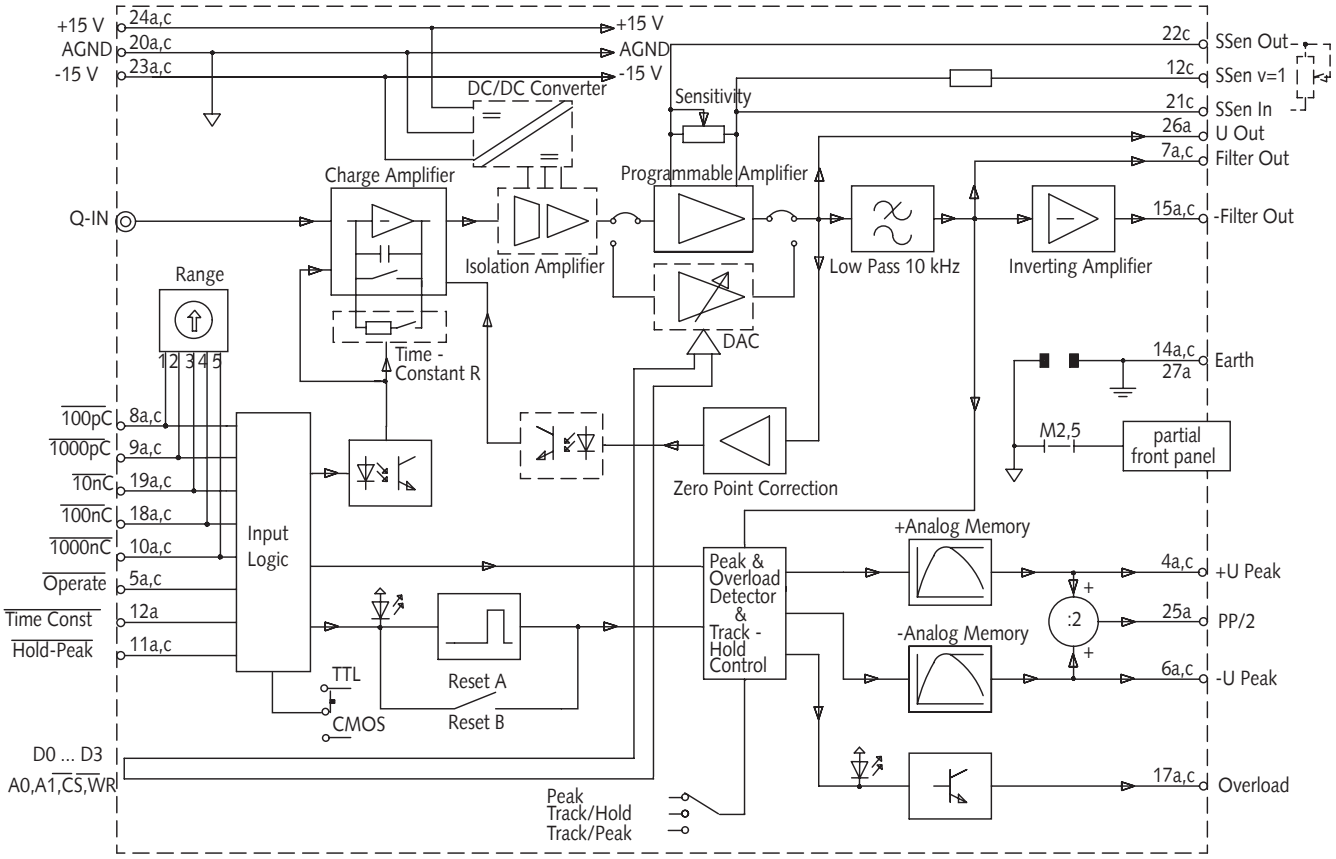

Fig 1: Block diagram of Type 5058A...

Variants

Fig 2a: Type 5058A1xx/5058A2xx
without front panel

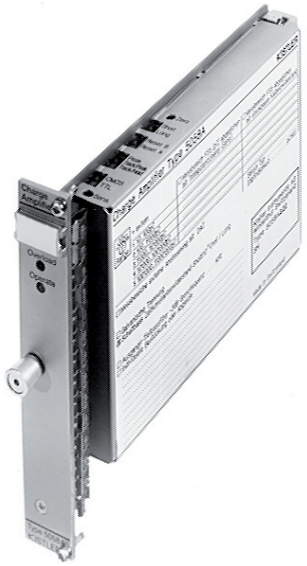

Fig 2b: Type 5058A3xx/5058A4xx
with partial front panel 4TE/3H

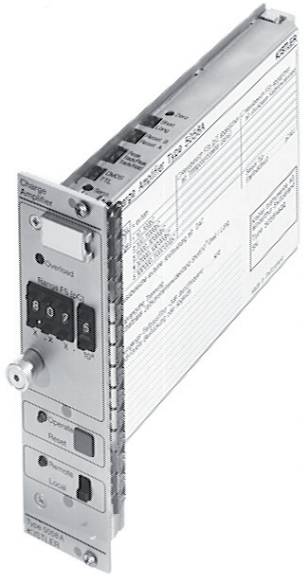

Fig 2c: Type 5058A5xx
with partial front panel 7TE/3HE

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Accessories Included	Type/Art. No.
• The input cable with mini-coax pos. and chassis jack BNC neg., 300 mm long	7.620.156
• Female connector Type M-Series 105, contact arrangement: row a + c Termination methods: solder pins 4,5 mm	5.512.066

Optional Accessories	Type/Art. No.
• Female connector Type M-Series 105, contact arrangement: row a + c Termination methods: Wire Wrap 13 mm	5.512.123

Ordering Key

Type 5058A □ □ □

Without front panel, internal* range adjustment	**1**
Without front panel, external** range adjustment	**2**
With partial front panel 4 TE/3 HE, without manual operation, internal* range adjustment	**3**
With partial front panel 4 TE/3 HE, without manual operation, external* range adjustment	**4**
With partial front pane 7 TE/3 HE, with manual operation	**5**

Without electrical isolation, without switchable time constant resistor	**0**
With electrical isolation, without switchable time constant resistor	**1**
Without electrical isolation, but with switchable time constant resistor of 10^{11} Ω	**2**
With electrical isolation and with switchable time constant resistor of 10^{11} Ω	**3**

Without individual assembly and adjustment	**0**
With individual assembly and adjustment according to order**	**9**

* **Range Adjustments**

- **Internal**
  Measuring range adjustable with trimmer potentiometer
- **External**
  Measuring range digitally adjustable through built-in DAC from outside, e.g. via bus system

****Individual Assembly and Adjustment**
including
- Modified output low-pass filter with cut-off frequency <10 kHz (specify cut-off frequency)
- Range is set by a plug-in calibration resistor (per order). Applies only to Type 5058A1xx and 5058A3xx

EMC requirements
The variants 3xx to 5xx are designed for the electromagnetically shielded subrack "europac lab HF" and the housing "cardpac" from Schroff.

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