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Multi-Cavity Monitoring System

Type 6829A...

for Mold Cavity Pressure Measurement with Unisens®-Technique

Complete modular monitoring system for multi-cavity injection molds consisting of cavity pressure sensors and charge amplifier.

- Made for use in industrial environment
- Sensor connection with cut and grip technique
- Cable length individually adjustable

Description

The sensors available in single-wire technology for this system are the Types 6152A..., 6157B..., 6159A..., 6167A..., 6169A..., 6182A... and 6183A... .

The pressure is applied directly to the entire front of the sensor and is transfered to the quartz measuring element, which produces a charge proportional to the pressure. All parts of the sensor are corrosion resistant. The sensitivity (charge per pressure or pC/bar) is the same for all sensors (Unisens technique) and needs to be entered jointly in the process monitoring system only once (e.g. Kistler DataFlow).

The single-wire cable of the sensors with its very small cross-sectional area offers flexibility for installation purposes. The electrical shielding in the single-wire technology is provided by the mold. The open cable end is connected using cut and grip technique to the multi-channel charge amplifier mounted on the mold. This renders a plug connection completely unnecessary and the length of the single-wire cable can be selected on site. The number of measuring channels is selected according to the number of cavities (8, 16, 24 or 32 channels).

In the case of molds with a large number of cavities, it is also possible to combine various charge amplifiers. For a 48-cavity mold, for example, two 24-channel charge amplifiers can be installed.

Application

The sensors measure mold cavity pressures and is particularly suitable for industrial applications for monitoring, open and closed loop control in the injection molding process. The measuring range of the injection molding process and the operating temperature range is dependent on the type of sensor and must be taken from the technical data.

Type 6152A...

Type 6157B...

Type 6159A...

Type 6167A...

Type 6169A...

Type 6182A...

Type 6183A...

Sensor basic Types 6152A..., 6157B..., 6159A..., 6167A..., 6169A..., 6182A... and 6183A... with single-wire cable

Multi-channel charge amplifiers Type 5048A…
for mounting on the mold

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Technical Data

Type 5048A...

Measuring range of the channels (Basic type)	pC	–2 500 ... +2 500
Error	%	<1
Output voltage of the channels and sum signal	V	–5 ... +5
Output voltage limitation under no-load conditions	V	>± 7
Output current per channel	mA	<±2
Output resistance	Ω	100
Output offset	mV	<±8
Frequency range (-3 dB)	kHz	≈0 ... >10
Drift	pC/s	<0,1
	mV/s	<0,2
Reset/Operate transient	pC	<2
Input insulation	Ω	$>10^{11}$
Operate input (Electrically isolated from supply and charge amplifier)		
Reset: Input open or	V	<0,5
Operate:	V / mA	3 ... 30 / 0,3 ... 3
Operate output output voltage		
for Operate	V	≈4,7
for Reset	V	≈0
output current	mA	0,7 ... 1
Output resistance	Ω	4
Supply (Electrically isolated from Reset/Operate and charge amplifier)		
Supply voltage	V DC	18 ... 30
Power consumption	W	≈4
Connections		
Supply and control inputs		Type MIL KPT02E8-4P
Output signal		Type MIL KPT02E20-41S
Charge inputs		P.c.b. pieced insulation terminal, Phoenix contact IDC-0,5-DL
Repeat connections p.c.b. pierced insulation terminals for the same conductor type (a new conductor point must be used)	max.	50

General Data		
Operating temperature range	°C	0 ... 60
min. / max. temperature	°C	–10 / 70
Dimensions LxWxH		
Type 5048A08... (8-channel)	mm	137x122x81
Type 5048A16... (16-channel)	mm	249x202x111
Type 5048A24... (24-channel)	mm	249x202x111
Type 5048A32... (32-channel)	mm	249x202x111
Weight		
Type 5048A08... (8-channel)	kg	≈1,5
Type 5048A16... (16-channel)	kg	≈2,8
Type 5048A24... (24-channel)	kg	≈2,8
Type 5048A32... (32-channel)	kg	≈2,8

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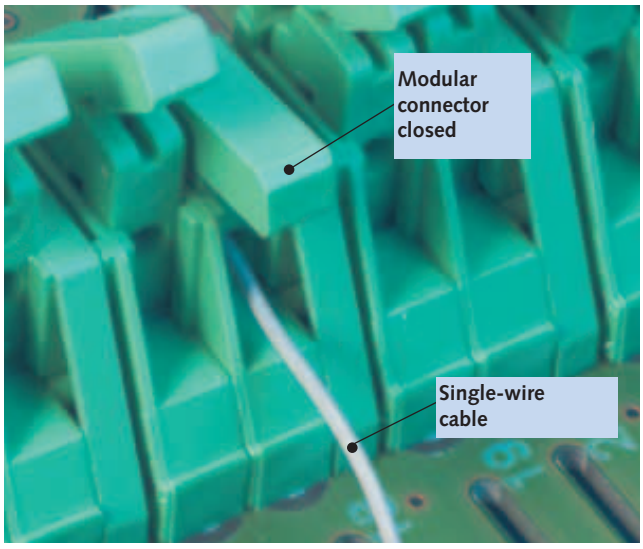
Installation
The sensor is normally secured with the mounting nut in the fitting hole; a distance sleeve can also be used for that purpose. Installation using a distance sleeve is mainly recommended for miniaturized single-wire sensors (Type 6182A... and Type 6183A...). The sensor front forms part of the cavity wall. The sensor must therefore be adapted so that its front comes exactly flush and leaves no impression on the molded part. Full details can be found in the operating instructions.

The single-wire cable must be installed completely in the mold and the multi-channel charge amplifier must be installed directly on the mold.

The single-wire cables for the mold cavity pressure sensors are connected directly to the individual charge amplifier modules by means of a cut and grip technique. The individual cable lengths can be adapted to the mold conditions.

Installing single-wire cables with multi-channel charge amplifier



Connecting single-wire cable to charge amplifier module

1) Cut the single-wire cable to length but do not remove the insulation and then feed it into the open charge amplifier module.

2) Close the clamp of the charge amplifier module so that the cable is automatically stripped of its insulation and clamped.

Mold Cavity Pressure Sensors
Only single-wire sensors are used for the multi-cavity system. The technical data together with additional installation instructions for single-wire sensors should be taken from the data sheet relevant to the basic sensor type. The multi-cavity system requires the single-wire cable to be directly installed with the multi-channel charge amplifier Type 5048A… .
For this reason, the connector (Art. No. 5.511.322) and mounting plate (Art. No. 3.520.328) listed in the data sheet for the sensor basic type are not included in the parts supplied with the multi-cavity system.

Data sheets to the sensors:
Type 6152A... (6152A_000-028e)
Type 6157B... (6157B_000-030e)
Type 6159A... (6159A_000-032e)
Type 6167A... (6167A_000-033e)
Type 6169A... (6169A_000-034e)
Type 6182A... (6182A_000-037e)
Type 6183A... (6183A_000-038e)

Processing the Measured Data
Two software tools are available for automatic processing of the measured data.

Kistler DataFlow Type 2805A... for process optimization, monitoring and documentation.

Kistler MultiFlow Type 2809A... for automatic balancing of multi-cavity molds which are equipped with hot runners.

Data sheets:
Type 2805A... (2805A_000-369e)

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Dimensions

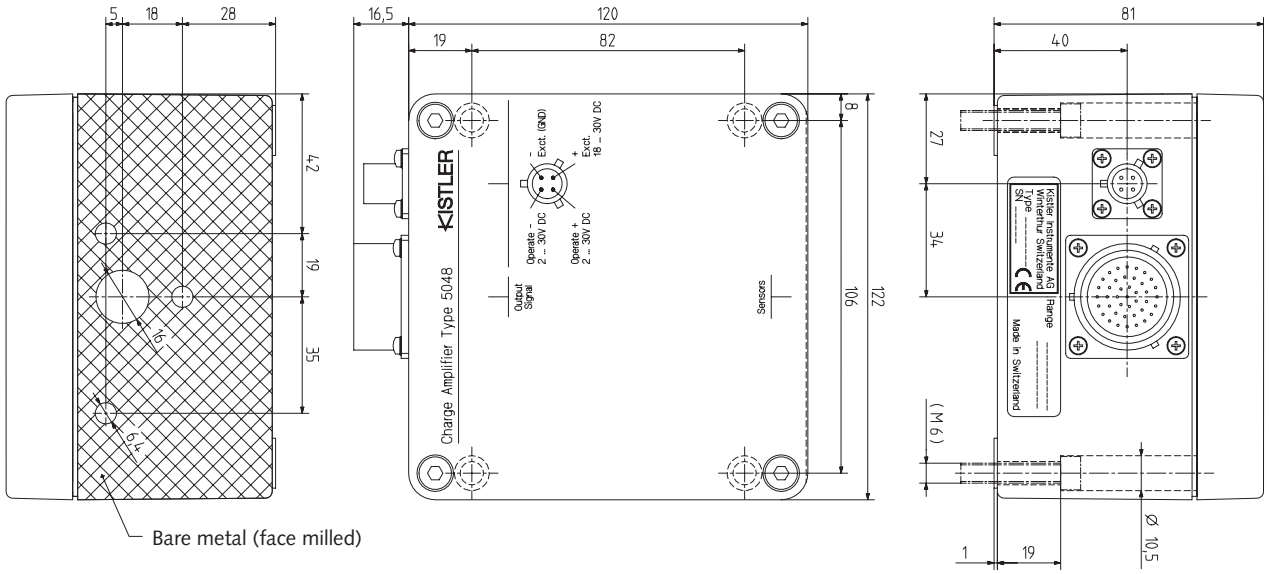

Fig. 1: 8-channel charge amplifiers Type 5048A…

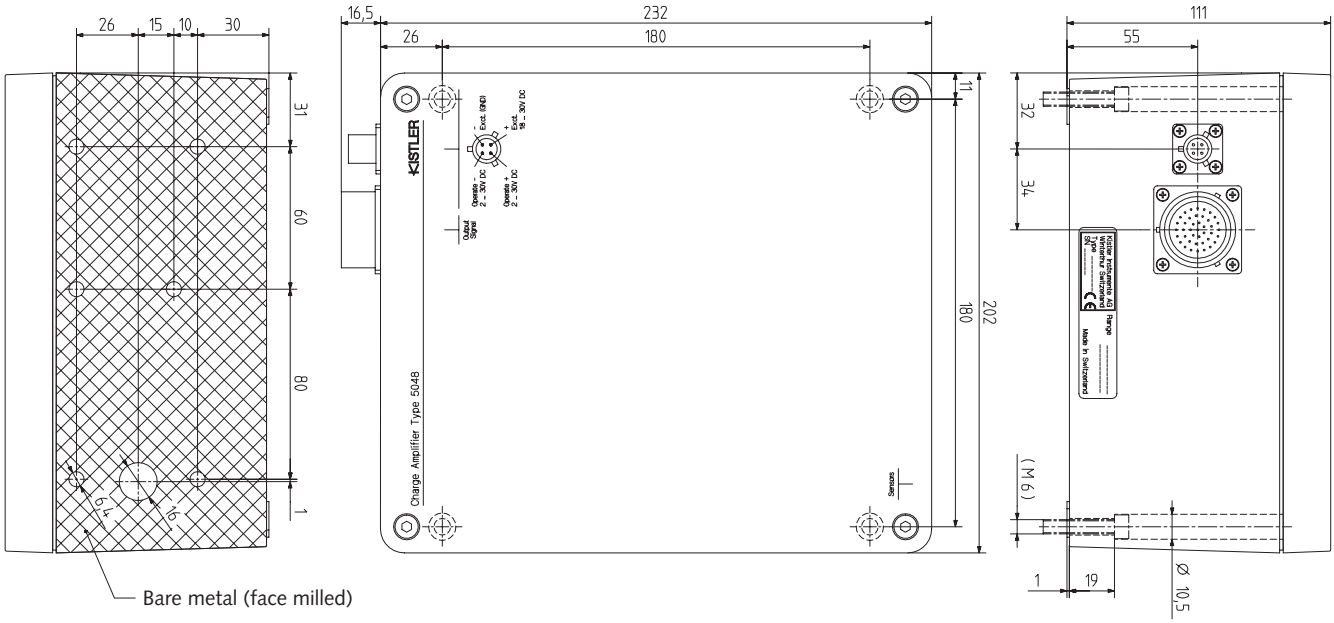

Fig. 2: Multi-channel charge amplifiers Type 5048A… (16, 24 or 32 channels)

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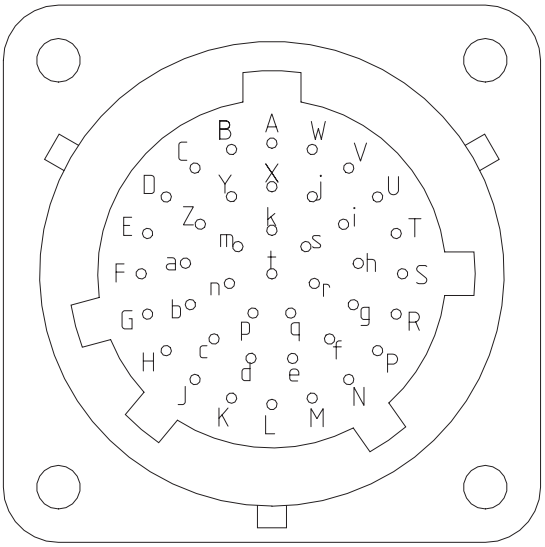
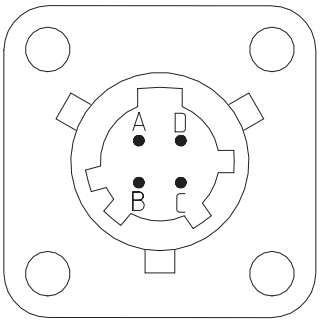


Fig. 3: MIL 41-pole equipment plug for charge amplifier Type 5048A...

A	OUT	CH2	M	OUT	CH31	Z	OUT	CH12	k	OUT	GND
B	OUT	CH4	N	OUT	CH27	a	OUT	CH16	m	NC	-
C	OUT	CH6	P	OUT	CH25	b	OUT	CH22	n	NC	-
D	OUT	CH10	R	OUT	CH21	c	OUT	CH26	p	NC	-
E	OUT	CH14	S	OUT	CH19	d	OUT	CH32	q	OUT	CH17
F	OUT	CH18	T	OUT	CH13	e	OUT	OPERATE	r	GND	-
G	OUT	CH20	U	OUT	CH9	f	OUT	CH29	s	GND	-
H	OUT	CH24	V	OUT	CH7	g	OUT	CH23	t	NC	-
J	OUT	CH28	W	OUT	CH5	h	OUT	CH15			
K	OUT	CH30	X	OUT	CH1	i	OUT	CH11			
L	OUT	SUMME	Y	OUT	CH8	j	OUT	CH3			



A + Exct. 18 … 30 V DC
B – Exct. (GND)
C – Operate (GND)
D + Operate

Fig. 4: MIL 4-pole equipment plug for charge amplifier Type 5048A...

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Scope of Delivery Including Accessories

	Art. No./Type
• Charge amplifier	5048A (According to order)
• Sensors	Type and number according to order
• Identification plate	3.520.907
• Cable for Types 6152AA,6152AAA,6152AC, 6152ACA, 6157BA, 6157BC	1666A1
6159A..., 6159AU6, 6167A..., 6169A...	1666A2
6182A..., 6183A...	none
• Mounting nut for Types 6152AA,6152AAA,6152AC, 6152ACA	6453
6157BA, 6157BC, 6159A..., 6159AU6, 6167A..., 6169A...,	6457
6182A..., 6183A...	none
• Spacer sleeve for Types 6182A..., 6183A...	3.710.057
• Checking tool for Types 6182A...	3.050.243
6183A...	3.050.241

Note: Cable, mounting nut, spacer sleeve and checking tools will be included according to the number of ordered sensors.

Optional Accessories	**Type**
• Connection Cable for Charge Amplifier with open ends	1700A59
• Connection Cable for Reset/Operate and excitation voltage with open ends	1700A62
• DataFlow software for visualizing and monitoring the injection molding process, cable for connecting Type 6829A... and DataFlow, see data sheet for Type 2805A... (2805A_000-369e)	2805A...

Ordering Key Example:
Multi-cavity mold with 16 sensors of the Type 6182A... . The 16 sensors determine the multi-channel charge amplifier with 16 measuring channels.

The amplifier measuring range is selected as follows:
- The sensitivity of the sensor must be taken from the data sheet concerned: in this example, the sensitivity is E =2,5 pC/bar for the sensor Type 6182A... .
- Based on the injection molding application, the pressure range to be observed is selected up to 2 000 bar. The maximum pressure range of the sensor listed in the data sheet must be noted!

The amplifier measuring range is calculated as:
2,5 pC/bar x 2 000 bar = 5 000pC

The system selected now has the article number:
Type 6829A 11E 16B2

Spare Parts
Sensors and cables must be ordered seperatly. Cable Type number for sensors (6152...): Art. No. 7.620.315. Cable Type number for (6159...): Art. No. 7.620.314.

The sensors Type 6182A... and Type 6183A... will be delivered with integrated cable. When ordering please specifiy the average sensitiviy or the serial number of the system. The Type number of the amplifier will be provided on request.

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Ordering Key

Sensor-/Charge Amplifier

Type 6829A ☐ E ☐ ☐ ☐

Sensor basic type *

Type 6152AA with single-wire cable	**01**
Type 6152AAA with single-wire cable	**02**
Type 6152AC with single-wire cable	**03**
Type 6152ACA with single-wire cable	**04**
Type 6157BA with single-wire cable	**05**
Type 6157BC with single-wire cable	**06**
Type 6159A with single-wire cable	**07**
Type 6159AU6 with single-wire cable	**08**
Type 6167A with single-wire cable	**09**
Type 6169A with single-wire cable	**10**
Type 6182A	**11**
Type 6183A	**12**

* The sensor basic type is supplied together with single-wire cable for multi-cavity applications.

Number of sensors

Minimum 4 Sensors	**04**
Maximum 32 Sensors	**32**

Multi-channel charge amplifier Type 5048

8 measuring channels	**A**
16 measuring channels	**B**
24 measuring channels	**C**
32 measuring channels	**D**

Amplifier measuring range

2 500 pC	**1**
5 000 pC	**2**
10 000 pC	**3**
20 000 pC	**4**
Other measuring ranges on request	**9**

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