

# KISTLER

measure. analyze. innovate.

## Instruction manual

**Miniature melt  
pressure sensor  
Type 4004A...**





## Foreword

Thank you for choosing a Kistler quality product characterized by technical innovation, precision and long life.

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## Content

<b>1.</b>	<b>Introduction</b> .....	<b>3</b>
1.1	Tips for using the operating instructions.....	4
<b>2.</b>	<b>Important notes</b> .....	<b>5</b>
2.1	For your security.....	5
2.2	For transportation, storage and handling.....	6
2.3	On electromagnetic compatibility.....	6
2.4	Disposal instructions for electronic devices.....	6
<b>3.</b>	<b>Installation of the sensor</b> .....	<b>7</b>
3.1	General information.....	7
3.2	Accessories.....	7
3.3	Installation and positioning of the electrode.....	9
3.3.1	Sensor positioning in the hot runner.....	9
3.4	Production of the measuring hole.....	10
3.4.1	Important dimensions of the measuring hole.....	10
3.4.2	Requirements for the material quality.....	10
3.5	Mounting the sensor.....	10
<b>4.</b>	<b>Signal converter</b> .....	<b>12</b>
4.1	Electrical connections Signal converter output.....	12
4.1.1	Pin assignment ComoNeo/Scout Cable.....	12
4.2	Taring the pressure outlets.....	13
<b>5.</b>	<b>Operation</b> .....	<b>14</b>
5.1	Factory calibration.....	14
5.2	Maintenance and dismantling.....	14
5.3	Replacement of a sensor Type 4004A... ..	15

## 1. Introduction

Thank you for choosing a quality product from Kistler. Please read through this manual thoroughly to enable you to fully exploit the various features of your product.

To the extent permitted by law Kistler accepts no liability if this instruction manual is not followed or products other than those listed under *Accessories* are used.

Kistler offers a wide range of measurement products through to turnkey solutions:

- Piezoelectric sensors for measuring pressure, force, torque, strain, acceleration, shock and vibration
- Strain gage sensor systems for measuring force and torque
- Piezoelectric pressure sensors and transmitters with matching measuring amplifiers
- Matching measuring amplifiers (charge amplifiers, piezoresistive amplifiers, etc.), displays and charge calibrators
- Electronic control, monitoring and evaluation units as well as software for specific measurement applications
- Data transmission modules (telemetry)

Kistler also develops and produces measuring solutions for the application fields engines, vehicles, manufacturing, plastics and biomechanics sectors.

Our product and application brochures will provide you with an overview of our product range. Detailed data sheets are available for almost all products.

If you need additional help beyond what can be found either on-line or in this manual, please contact Kistler's extensive support organization.

## 1.1 Tips for using the operating instructions

These instructions describe the handling and installation of the miniature melt pressure sensor Type 4004A... in its various versions.

We recommend that you always read the entire operating instructions. Please keep these operating instructions in a safe place where they are available at all times.

If you lose the manual, contact your Kistler customer service center and request a replacement.

All information and instructions in this manual are subject to change at any time and without notice in line with technical progress.

Sensor modifications (conversions, retrofits, etc.) usually also result in changes to the operating instructions. In this case, ask your Kistler customer service center about the options for updating your documentation.

## 2. Important notes

Please be sure to observe the following instructions. Observing them will ensure your personal safety when working with the miniature melt pressure sensor and guarantee long, trouble-free operation.

### 2.1 For your security

This sensor is built and tested in accordance with Directive 2014/30/EU CE. It has left the factory in a technically safe condition. To maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in these operating instructions or printed on the device.



If it can be assumed that safe operation is no longer possible, the appliance must be taken out of operation and secured against unintentional start-up..

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It can be assumed that safe operation is no longer possible

- if the device shows visible damage
- if the device is no longer working
- after prolonged storage under unfavorable conditions
- after heavy transportation loads

If safe operation can no longer be guaranteed according to the features listed above, the appliance must be sent to the manufacturer or the responsible representative for repair.

The appliance must be disconnected from all power sources before maintenance, repair or replacement of parts.

## 2.2 For transportation, storage and handling

- Check the packaging of the electrode and the supplied parts for transportation damage. Report any damage to the transport company and the responsible Kistler representative immediately upon arrival of the goods
- Protect the electrode from contamination during storage. Place the supplied covers on the connections and measuring head
- If an electrode is not connected when installed, the electrical connections must be protected against contamination
- The electrode should only be used under the specified operating conditions (see data sheet). It must be protected from excessive mechanical stress (shock, vibration) and soiling

## 2.3 On electromagnetic compatibility

The measuring chain is CE-compliant in accordance with Directive 2014/30/EU and meets the requirements of the currently valid regulations. To ensure electromagnetic compatibility (EMC) for the measuring chain, particular attention must be paid to the connection of the inputs and outputs, the cable shielding and the routing of the cables.

This means in particular:

- Do not lay cables parallel to interfering lines
- Use shielded cables
- Use metal plug housings
- Ensure good connection between shielding, connector housing and device housing
- Compliance with EMC standards, also on the machine side

## 2.4 Disposal instructions for electronic devices



Do not discard old electronic instruments in municipal trash. For disposal at end of life, please return this product to an authorized local electronic waste disposal service or contact the nearest Kistler Instrument sales office for return instructions.

Please contact your Kistler Sales Center if you have any questions about disposal.

Contact addresses and further information can be found at [www.kistler.com](http://www.kistler.com)



## 3. Installation of the sensor

### 3.1 General information

To ensure that the sensors function properly, it is essential that you follow the instructions in the operating instructions and adhere to their guidelines.



A poor sensor mounting hole can result in large zero point shifts, changes in sensitivity or, in extreme cases, destruction of the sensor.

### 3.2 Accessories

The following accessories are available for the sensor:

#### Cables

Connection cable between signal converter and A/D converter with...

- ... open ends, cable length 2 m  
Order number: 1200A227A2



- ... D-SUB 15-pin connector for ComoNeo/Scout and two 4004A... electrodes, cable length 2 m  
Order number: 1200A229A2





- Extension cable between sensor and signal converter, cable length 1m / 2m / 5m  
Order number: 4785A41-1.00 / 2.00 / 5.00

**Assembly aids**



- Torque wrench 1300A4004



- Jaw insert for torque wrench 1300A4004SW7



- Auxiliary tool for removing the seal from the bore 4193Q03



- Seal 55189010

## 3.3 Installation and positioning of the electrode

### 3.3.1 Sensor positioning in the hot runner

The closer the sensor is placed to the cavity, the more relevant the data is in relation to the component produced.

When using several sensors in a hot runner, the same positioning in the hot runner nozzles is important for the comparability of the data.

Whether one or more sensors should be installed depends on the desired area of application. This can vary greatly depending on the application.

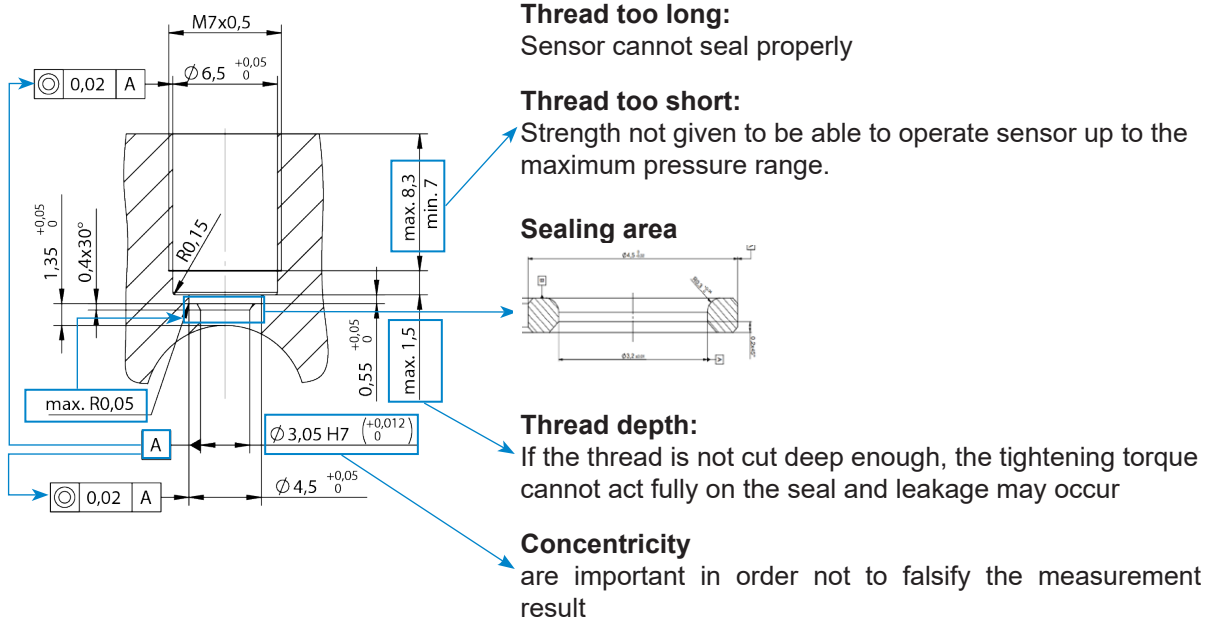
Examples of this are:

- The assessment of the melt quality
- Behavior of the melt during closing and opening of the needles
- Cascade connection
- Compensation of pressure differences when circumstances change

If you have any questions about positioning, please do not hesitate to contact your local Kistler representative.

### 3.4 Production of the measuring hole

#### 3.4.1 Important dimensions of the measuring hole



#### 3.4.2 Requirements for the material quality



The material in which the sensor is installed must have the following properties:

	Unit	Min	Max
Hardness	HRC	40	55
Tensile strength	Mpa	1 200	1 820

### 3.5 Mounting the sensor

#### Step 1

Clean the bore. Important here is

- That the 3.05mm hole has no residue that could jam the sensor
- The sealing area is clean and even
- The thread is smooth-running, otherwise the torque applied is not sufficient to press the seal sufficiently onto the sealing surface => leakage

**Step 2**

Bore 3.05mm with limit plug gauge, check thread with thread gauge.

**Step 3**

Coat the thread and sealing surface of the sensor with a little copper paste, Molykote or high-temperature grease.

**Step 4**

Screw the sensor into the hole by hand. When screwing in the sensor, ensure that it moves smoothly until the sealing surfaces meet. Increased effort is a sign that the hole was not made according to specifications or that the sensor is damaged. A height measurement of the sensor can provide information as to whether the sensor could be screwed in to the end or whether it is protruding in the hole.

**Step 5**

Tighten the sensor with the torque wrench Tightening torque: 7 Nm. It is important that the bore and sensor have the same temperature level, otherwise the sensor may not be able to be released. It is recommended to wait at least 2 minutes before tightening after reaching the temperature level.

**Step 6**

Before the first measurement, the electrode must be tared, see 4.2 Taring the pressure outputs

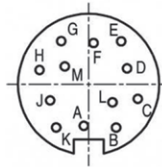
**In operation:**

If the sensor starts to leak after some time or after a large temperature change, the sensor can be retightened with max. 7 Nm.

## 4. Signal converter

The signal converter has a maximum operating temperature of 75 °C. The installation location should therefore be selected in such a way that the signal converter cannot overheat.

### 4.1 Electrical connections Signal converter output



Pin	Signal	Cable color
A	Exct GND (-)	white
B	Signal GND (-)	brown
C	Tara	green ***
D	Signal Out 1 pressure range 1	yellow
E	Signal Out 2 pressure range 2	gray
F	Not connected	pink
G	Not connected	blue
H	Exct 18 ... 30 VDC	red
J	Signal Out 3 Temperature	black

\*\*\* If connected, the manual connection may no longer be used.

#### 4.1.1 Pin assignment ComoNeo/Scout Cable

When using the 1200A229A2 connection cable, programming on the ComoNeo/Scout is as follows:

ComoNeo/Scout	4004
Channel 1 or 9	Sensor 1 Pressure range 1
Channel 2 or 10	Sensor 1 Pressure range 2
Channel 3 or 11	Sensor 1 Temperature
Channel 4 or 12	Sensor 2 Pressure range 1
Channel 5 or 13	Sensor 2 Pressure range 2
Channel 6 or 14	Sensor 2 Temperature

## 4.2 Taring the pressure outlets

The 4004 is equipped with an automatic tare function. This performs a tare every time the sensor is deenergized after the electronics have booted up (approx. 30 seconds). The currently measured pressure is thus set to 0 bar. It is therefore important that the sensor is only at atmospheric pressure (approx. 1 bar absolute pressure) during a tare cycle, as otherwise the measurement will be falsified by the applied pressure (offset).

Taring should always be carried out before starting a measuring series after the following conditions have been met:

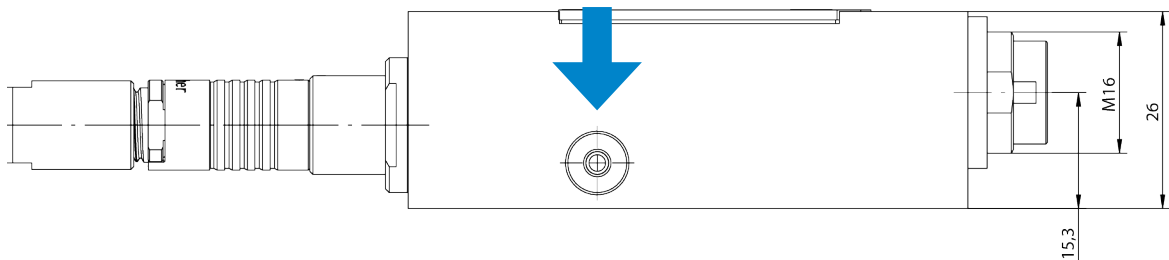
- The signal converter is at operating temperature (10 minutes after switching on the power supply)
- The sensor is at operating temperature (the temperature in which the measurement is to take place).
- Only atmospheric pressure acts on the sensor



Please note that the button on the housing must no longer be pressed when taring is connected via the machine.

Failure to comply with these points can lead to deviations of the absolute measured pressure (offset).

Taring is achieved by applying voltage (>3.2 ... 30 VDC) on pin C or by pressing the button on the signal converter for at least 0.1 seconds.



## 5. Operation

These measuring chains are equipped with a signal converter which converts the measured bridge resistance into a voltage signal according to specifications.

### 5.1 Factory calibration

The sensors were calibrated at the factory in the installed state using the correct torque.

During calibration, the sensor is pressurized with a lowviscosity oil up to the maximum pressure below the maximum permissible temperature and thus not only calibrated, but also checked for leaks. In most cases, leaks in nozzles are due to an improperly produced bore. Improper use of the electrode can lead to inaccuracies in the measurement or to its destruction.

### 5.2 Maintenance and dismantling

**Maintenance:**

The measuring chain does not require any maintenance. However, it is recommended that the measuring chain is periodically calibrated by Kistler to confirm its reliability.

**Dismantling:**

To be able to remove the sensor, the installation hole must be brought to operating temperature. The sensor can then be loosened and unscrewed. After disassembly, the sensor tip must be freed from melt residue while hot.

The seal remains on the sensor during removal. If the seal is to remain in the mounting hole, it can be removed using extraction tool type 4193Q03. As a result, a new seal Mat. No. 55189010 must be inserted. We recommend having the seal fitted by a Kistler repair center in order to guarantee its correct fit and tested tightness.



### 5.3 Replacement of a sensor Type 4004...

The sensors of Type 4004... electrodes can only be replaced as a whole (sensor with signal converter). Using a sensor on a signal converter that does not have the same serial number leads to considerable measurement inaccuracy. führt zu erheblichen Messungenauigkeit.