

Pressure  
Temperature  
Level  
Force  
Flow

# Applications and subsystems for **machine building**





Alexander Wiegand  
Chairman and CEO, WIKA

## About us

As a family-run business acting globally, with over 10,000 highly qualified employees, the WIKA group of companies is a worldwide leader in pressure and temperature measurement. The company also sets the standard in the measurement of level, force and flow, and in calibration technology.

Founded in 1946, WIKA is today a strong and reliable partner for all the requirements of industrial measurement technology, thanks to a broad portfolio of high-precision instruments and comprehensive services.

With manufacturing locations around the globe, WIKA

ensures flexibility and the highest delivery performance.

Every year, over 50 million quality products, both standard and customer-specific solutions, are delivered in batches of 1 to over 10,000 units.

With numerous wholly owned subsidiaries and partners, WIKA competently and reliably supports its customers worldwide. Our experienced engineers and sales experts are your competent and dependable contacts locally.

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## WIKA – Your partner in all areas of machine building

WIKA supports companies in machine building with instrumentation solutions and services for pressure, temperature, level, force and flow measurement. Through many years of close cooperation with machine-building companies across a wide range of industrial sectors, the industry-specific challenges are well known to us.

As a strong partner, we provide versatile support in the calibration, maintenance and repair of your measuring instruments – in our globally accredited DKD/DakkS calibration laboratories as well as via a mobile service that can also calibrate your instruments on-site. Furthermore, our experienced engineers provide you with fast and reliable worldwide support for demanding large-scale projects, from planning through implementation to after-sales support.

In the breadth and depth of its range, WIKA offers an outstanding selection of measurement solutions. Thus component manufacturers and also machine and equipment builders always find the optimum solution for their specific demands within the following segments:

- Textile machinery
- Presses
- Filling and packaging machinery
- Paper machinery
- Printing machinery
- Transmissions
- Woodworking machinery
- Calibration benches





# Advantages of WIKA measuring instruments

## All relevant measurands in the portfolio

- indicating or switching designs
- continuous measurement with analogue or digital output signals

## Easy to install

## Durable, even with high loads

- shock and vibration
- pressure spikes
- highly dynamic applications

## Maximum operational safety

- for your plant and your personnel
- high EMC
- all measurands available with Ex protection

## Reduced maintenance and repair effort

## High plant availability

# Time for networking

Wireless sensors are no longer simply suppliers of measured values. Rather, the sensors can, in addition, be combined with extensive intelligence, so their performance is multiplied.

WIKAI accompanies you through the 4th industrial revolution.



Industry 4.0   Cloud   Digital transformation  
 Smart Production   Real time data  
 Edge computer   Predictive Maintenance  
 Internet of things





## International approvals

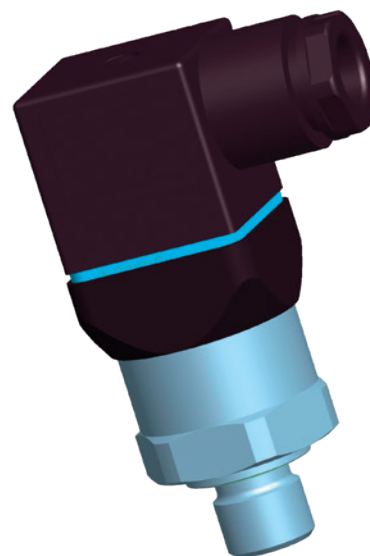
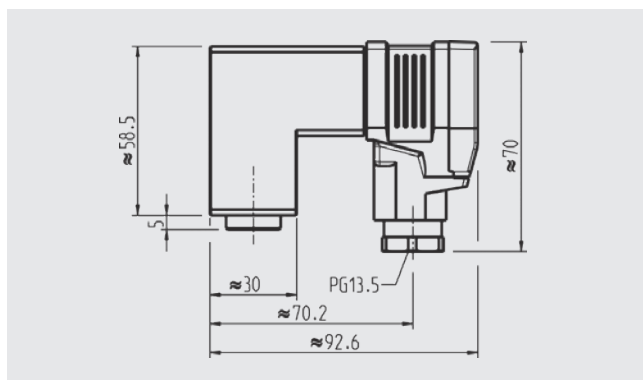
High-quality components are essential for safe and reliable production processes. The industrial instruments supplied by WIKA meet the guidelines and standards of the machine-building industry.

Rigorous testing of the instruments, by national and international authorised bodies, results in reliability and stable workflows.

WIKA instruments create the prerequisites for highly efficient processes and the avoidance of risks to people, the environment and property, certified by a wide range of approvals and certificates from various industrialised nations and test authorities.

## CAD files for your plant planning

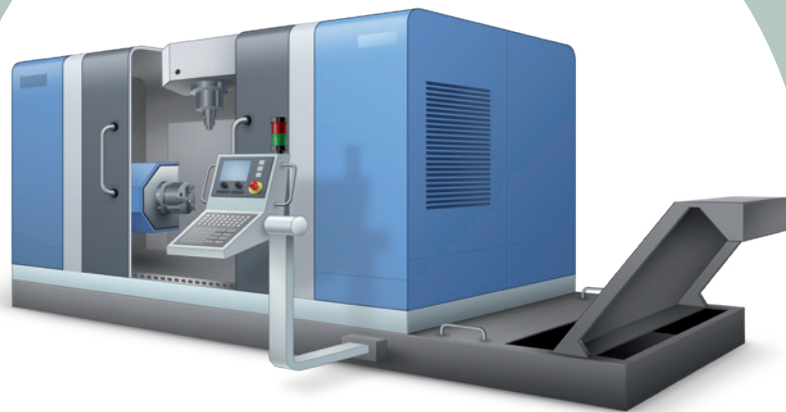
For many products, we offer CAD files (2D or 3D) in order to facilitate the integration of the instruments into your design. Various neutral and native formats guarantee compatibility with your individual planning software.



# Machine tools

This term combines turning, drilling and milling centres, presses, punches and also laser processing machines or high-pressure water jet cutters. As metalworkers ourselves, WIKA knows the challenges of different machine tools from their own experience. The cooperation between development and their own pre-manufacturing has led to products which fulfil the measurement tasks of a machine tool outstandingly. Use the experience of WIKA for the selection of the right measuring instrument and its positioning.

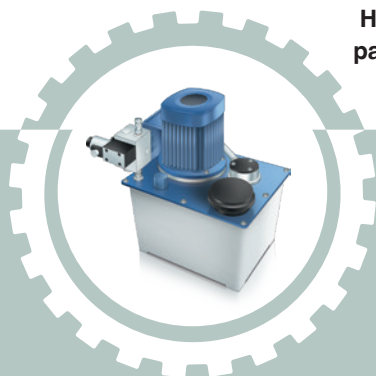
Any machine tool, besides the machine itself, consists of the oil hydraulics (e.g. for the generation of the clamping pressure), the lubrication system for the lubrication of the bearings and drives as well as the cooling lubricant system for the tool cooling.



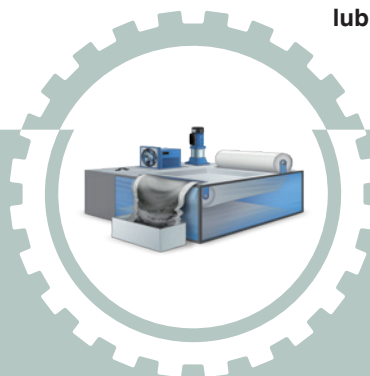
Our robust and accurate measuring instruments monitor the level in the cooling lubricant tank, the clamping force via the hydraulic pressure at the clamping cylinder, the spindle bearing temperature or also the closing force of a press. Our flow switch detects any insufficient flow of the cooling lubricant and thus protects the tool and workpiece from overheating and damage.

With presses, force is the main measured variable. In most cases, with hydraulically operated presses, the hydraulic pressure is measured and the force calculated from the piston area of the closing cylinder. A far more accurate result is provided by force transducers.

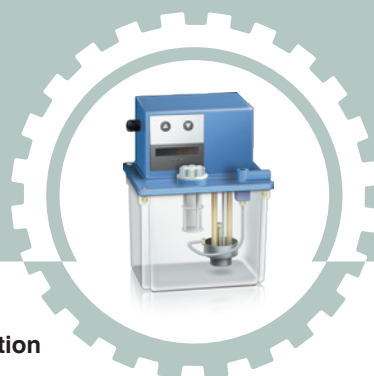
All measurement parameters can be displayed at the measuring location, transmitted to the machine control with various standard signals or reported as a switch output on a limit value being exceeded.



**Hydraulic power pack** see page 10



**Chip filter and cooling lubricant**, see pages 30 and 32



**Central lubrication** see page 14



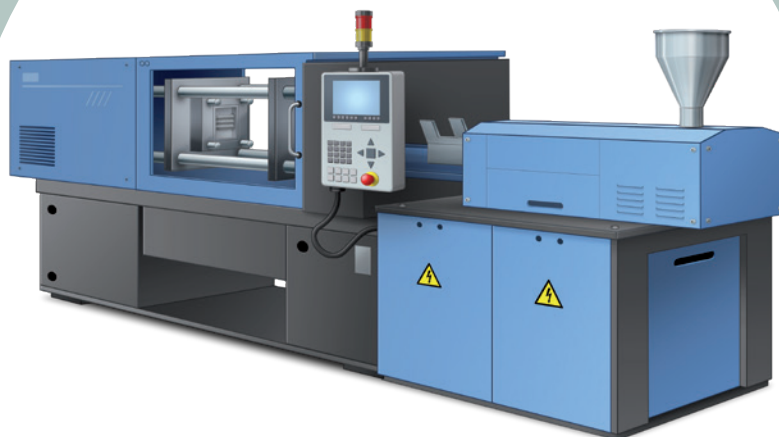
# Plastics machinery

As numerous as the products they manufacture are the designs of plastics machinery. A blow-film machine for the production of breathable or barrier films, films for heavy sacks, adhesive tapes or labels looks different from an injection moulding machine for the production of children's toys, parts for cases or transparent headlamp lenses. The common feature is the melting and moulding of plastic granules.

Basically, a distinction is made between extruders with continuous delivery of the melt and injection moulding machines, in which cavities in a mould tool are filled with a single charge of melt.

To melt the plastic granules, both types have several heating sleeves, which are mounted at intervals around the screw conveyor. Accurate temperature measurement is a prerequisite for product quality.

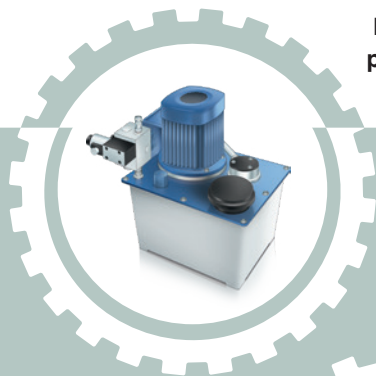
The temperature of the melt must be within narrow limits. On the one hand, there must be the ability to flow, on the other hand, if the maximum temperature is exceeded, the plastic material is damaged.



With injection moulding machines, precise pressure measurement is important for the correct tool clamping force. The approach of “the bigger the better” does not apply here. Too high a pressure will deform the tool and the injected parts will be deformed. If the pressure is too low and the tool is insufficiently closed, the melt forces the cavities apart from each other and there will be burrs on the product.

Each plastics machine, alongside the machine itself, includes various peripheral devices. Before the feed (the funnel) the preparation of the granulate occurs, the dedusting and drying. Particles and humidity would inevitably lead to defects in the product. The cooling of the tool is handled by tempera-

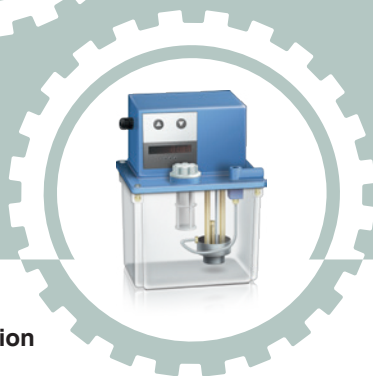
ture control units. Through the melt, the tool is continuously supplied with heat, which must be dissipated in a controlled way. The oil hydraulics drive the clamping cylinder and generate the closing force, often in excess of 10,000 kN. Easy, precise and low-wear movements are ensured by a lubrication system. Everywhere, precise, robust and reliable WIKA measuring instruments help to produce high-quality plastic products.



**Hydraulic power pack** see page 10



**Filter and dryer** see page 30



**Central lubrication** see page 14



**Temperature control unit** see page 36

# Hydraulic power packs

From fun-fair rides to workshop lifting platforms and also machine tools or plastics machinery – their operation always requires a hydraulic power pack. Only the high energy density of hydraulic machinery offers the highest forces at the lowest possible size.

The system pressure is read from a pressure gauge. Liquid-filled models are easily readable and unaffected by vibration.

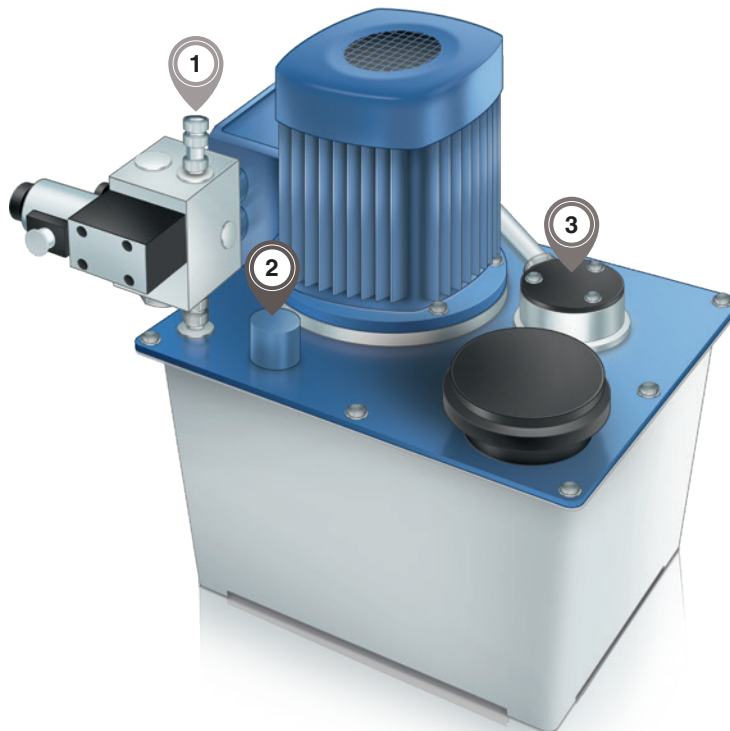
The continuous recording and maintenance of the system and control pressures is monitored by pressure switches or sensors. The PSD-4 electronic pressure switch offers a combination of switching output, analogue output and an LED display which also offers good readability in dark mounting

sites. Mechanical dampening of the pressure port protects the sensor element from pressure spikes.

The monitoring of the fill level in the hydraulic oil tank can signal oil deficiencies before the pump starts to suck in air.

With our temperature monitoring of the hydraulic oil, critical conditions can be identified early and the operational time for the oil can be extended.

Special requirements at the point of usage have been considered with our product development. For example, WIKA instruments work reliably in the gondola of a wind turbine and offer approvals for specific operating conditions or installation locations (e.g. ATEX).



## Legend – Hydraulic power packs:

- ① System pressure – Pressure
- ② Oil level in the tank – Level
- ③ Temperature of the hydraulic oil – Temperature



## Pressure

### Pressure sensor

①



A-10  
O-10  
M-10  
S-20  
IS-3  
A-1200

### Pressure gauge

①



111.10  
111.12  
113.53  
131.11  
213.53

### Pressure switch

①



PSD-4  
PSD-4-ECO



PSM01  
PSM02  
PSM03  
PSM-700

## Temperature

### Resistance thermometer

③



TR30  
TF35  
TFT35  
TFS35

## Level

### Level switch

②



OLS-C01  
OLS-C51



RLS-1000  
RLS-3000  
RLT-1000  
RLT-3000

# Linear drives

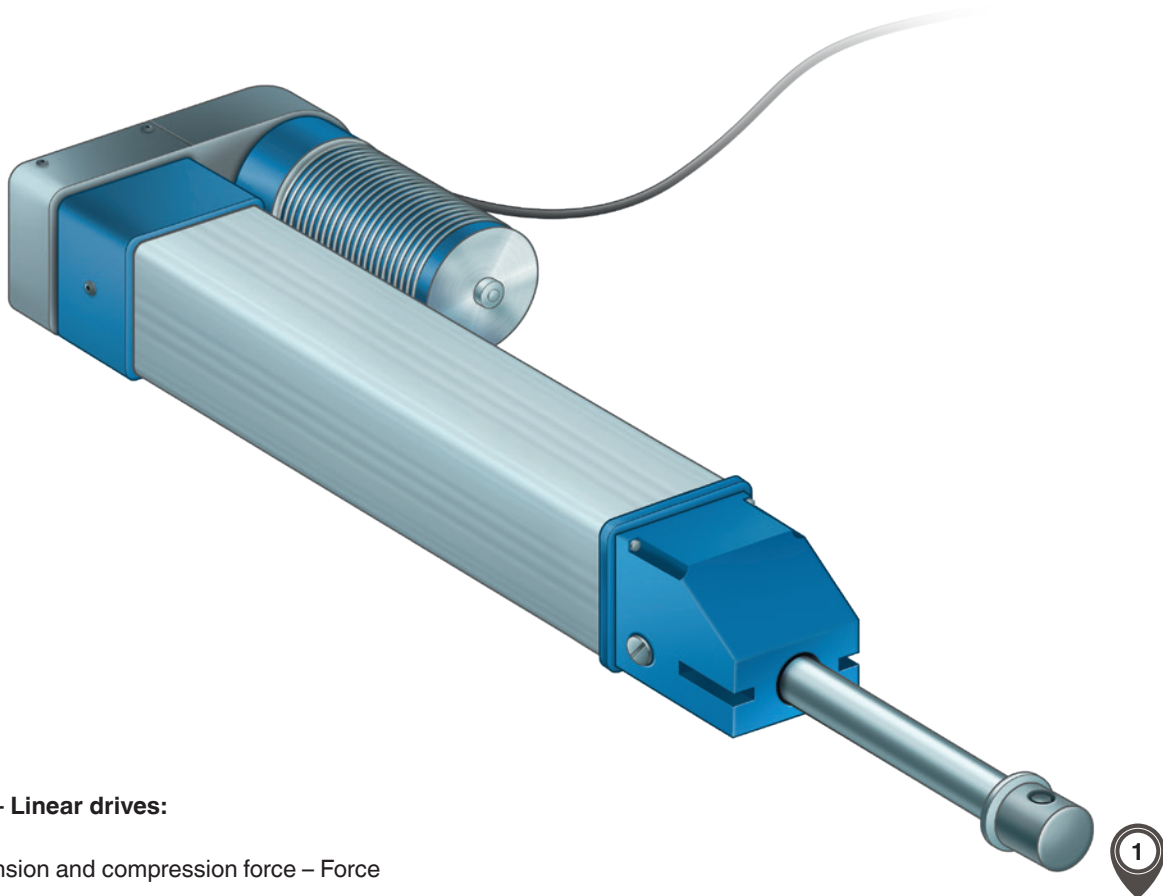
To an increasing extent, hydraulically and pneumatically powered drive elements are getting replaced with a combination of electric motors and mechanical thrust units. Indirect force measurement via the control pressure is no longer possible here.

WIKA makes the integration of the (now necessary) direct force measurement into the drive chain particularly easy for you, from miniature transducers for often limited installation space to precision force sensors. For this, the sensor can be mounted on the motor, in the middle of the line or at the press-in point itself.

Industry 4.0 and IIoT also present themselves in force measurement, with the move from indicating measuring instruments to electronic sensors. A team of specialists is available for you for special solutions.

## Application examples:

- Measuring the axial force on electric friction presses to control the mating forces
- Monitoring of overload protection in lifting cylinders
- Force measurement in electromechanical servo spindle drives
- Force measurement on punches and presses
- Force measurement on welding tongs



## Legend – Linear drives:

- ① Tension and compression force – Force

## Force

### Tension/compression force



F2301  
F2303  
F2304  
F23C1  
F23S1

### Miniature tension/compression



F2220  
F2221  
F2812  
F2808





# Lubrication systems

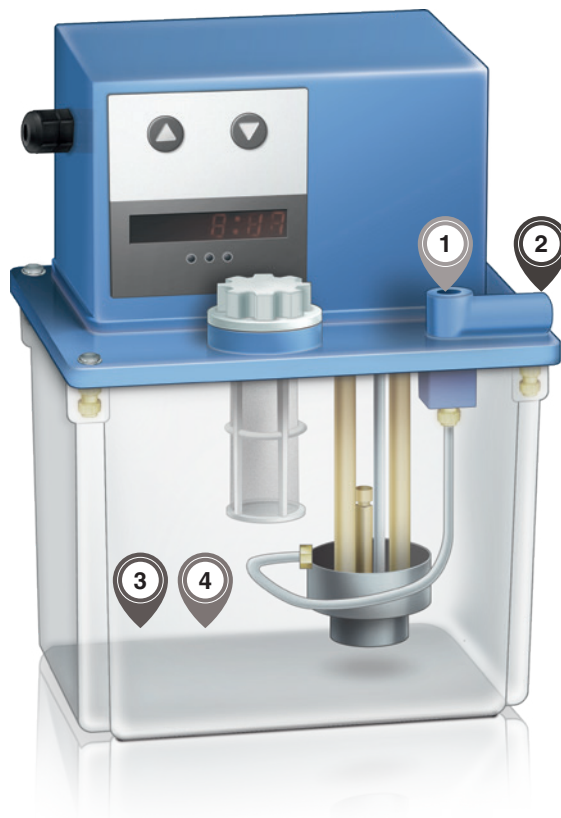
Lubrication systems with lubricating grease or oil minimise friction and wear. They improve the machine reliability and service life of all moving parts and bearings, reducing corrosion and lowering downtime.

WIKA measurement technology enables lubrication with the right quantity at exactly the right point. For this, recording the system pressure is a basic prerequisite. To ensure that the desired quantity of the lubricant is actually provided – and that no outlets are blocked – it is advisable to install a flow measuring instrument.

Your advantage: The consumption is optimised and thus also lubricant costs and environmental compatibility.

The level monitoring in the reservoir ensures uninterrupted lubrication. This can be carried out through visual inspection or automatically – for example, if the reservoir is mounted out-of-sight – with a level sensor or switch.

If the lubrication system is exposed to wind and weather, low ambient temperatures can lead to a lubricant viscosity that is too high. Here, there should be heating of the reservoir. Its control uses the measuring signal of a temperature switch (monitoring of limit values) or a temperature probe (continuous temperature measurement). Our RLS-3000 float switch offers the special feature of level and temperature measurement combined into a single instrument.



## Legend – Lubrication systems:

- ① Connection of the lubrication system – Pressure
- ② Monitoring of the supply of the lubrication points – Flow
- ③ Level of the reservoir – Level
- ④ Temperature of the lubricant – Temperature

## Pressure

### Pressure sensor

1



A-10  
O-10  
A-1200

### Pressure gauge

1



111.10  
113.53  
213.53

### Pressure switch

1



PSM01  
PSM02  
PSM-700

## Temperature

### Resistance thermometer

4



TR10  
TR30  
TR31  
TR33  
TFT35  
TF35

### Dial thermometer

4



54

### Temperature switch

4



TFS35  
TSD-30

## Level

### Level switch

3



OLS-C01  
RLS-1000  
RLS-3000

## Flow

### Flow switch

2



FSD-3  
FWS

# Wind turbines

All moving parts of a windmill require reliable lubrication. The lubricant pressure is monitored by sensors or pressure switches, as well as the level and temperature.

The rotor blade adjustment and the alignment of the nacelle to the wind, but also safety functions such as the disc brakes or the maintenance bolts, are carried out hydraulically, driven by a hydraulic power pack (see page 10).

Despite often very low temperatures at the head of the wind power plant, the waste heat, e.g. of the generator and power electronics, requires air conditioning. WIKA offers suitable sensors for measuring the room temperature and for operating the refrigeration units.

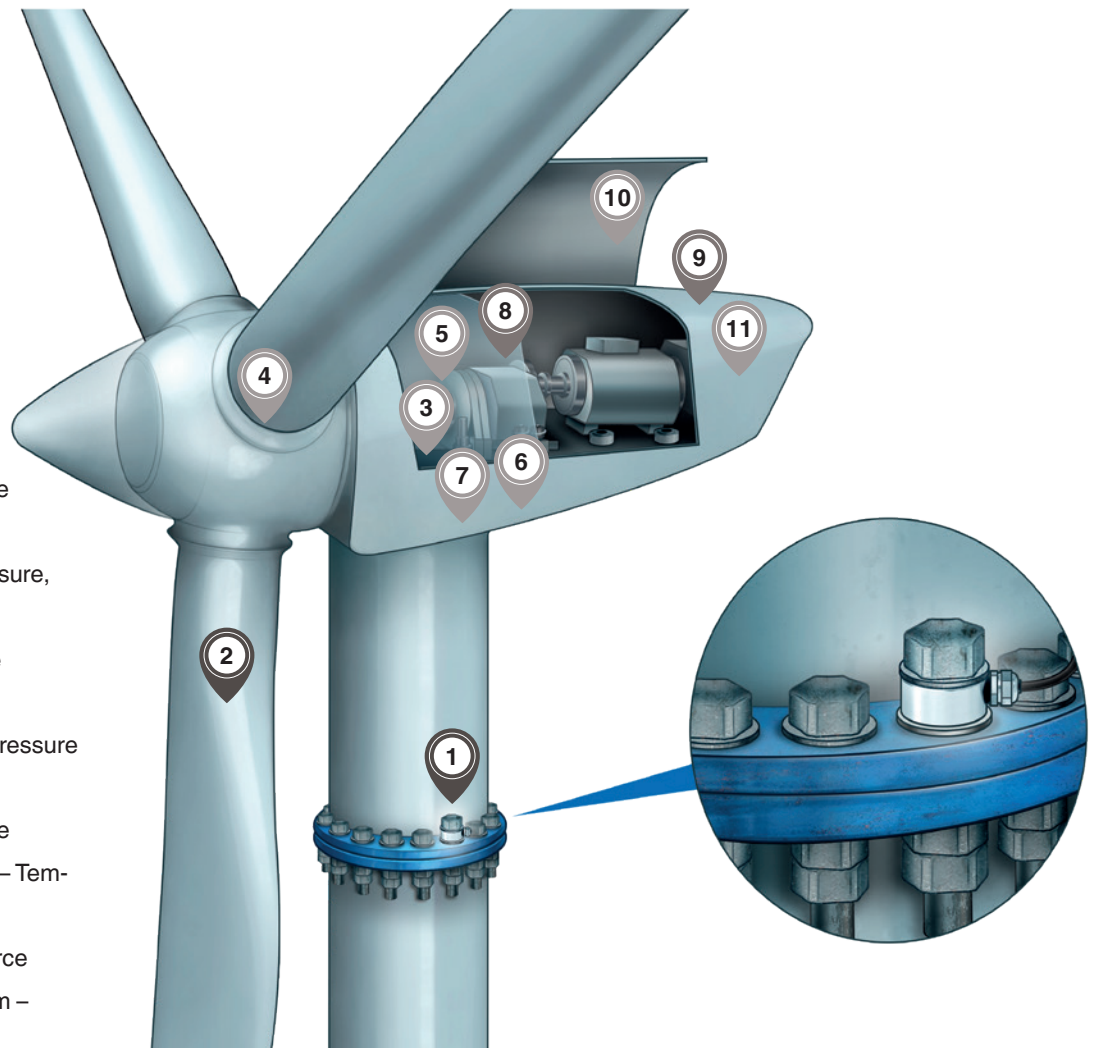
Gas extinguishing systems suppress any fire occurring. For this, pressure gauges or pressure switches ensure that the extinguishing system is ready for use, they monitor the pressure in the gas cylinders and report any critical pressure drops.

Thanks to their modular structure, windmills have numerous threaded connections that can be loosened by the strong vibrations. To monitor the tightening torques, WIKA has developed ring force transducers that are installed between the screw head and the support.

Mechanically, the rotor blades are very stressed. Strain sensors can detect material changes at an early stage.

## Legend – Wind power plants:

- ① Ring force transducer – Force
- ② Strain sensor – Force
- ③ Hydraulic power pack – Pressure, temperature, level
- ④ Blade adjustment – Pressure
- ⑤ Rotor brake – Pressure
- ⑥ Wind direction alignment – Pressure
- ⑦ Lubrication – Pressure
- ⑧ Gearbox – Level, temperature
- ⑨ Temperature control/cooling – Temperature
- ⑩ Service crane – Pressure, force
- ⑪ CO<sub>2</sub> fire-extinguishing system – Pressure





## Pressure

### Pressure sensor

③ ④ ⑤ ⑥ ⑦ ⑩



O-10  
A-10  
S-20  
A-1200  
R-1

### Pressure gauge

③ ④ ⑤ ⑥ ⑦ ⑩ ⑪



213.53  
111.10  
111.12  
116.15

### Pressure switch

③ ④ ⑤ ⑥ ⑦ ⑩ ⑪



PSM01  
PSM02  
PSM03  
PSD-4  
PSD-4-ECO  
PXS  
PGS21

## Temperature

### Resistance thermometer

③ ⑧ ⑨



TR30  
TFT35

### Temperature switch

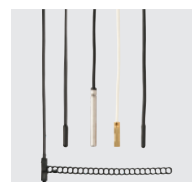
③ ⑧ ⑨



TFS35  
TFS135  
TSD-30

### Resistance thermometer

⑨



TF43

## Force

### Ring force transducer

① ② ⑩



F6215  
F9302

### Load pin

① ② ⑩



F5301  
F53S8  
F5308  
FRKPS

### Inclination sensor

① ② ⑩



N1101

## Level

### Level sensor

③



RLT-1000  
RLT-3000

### Level switch

③



RLS-1000  
RLS-3000  
OLS-C01

## SF<sub>6</sub> gas density and humidity

In order to distribute the generated electricity as efficiently as possible, SF<sub>6</sub> gas insulated switchgear is used in wind farms. Wika sensors (model GDHT-20) monitor density and the moisture content of the insulating gas. Regular use of SF<sub>6</sub> gas drying equipment (model GAD-2000) guarantees the operational safety, even with extreme air humidity, e.g. with offshore installations.

# Screw compressors

Screw compressors are the most widely used compressor design in the industry. They supply compressed air continuously, are very well controllable, extremely efficient and quiet (occupational safety, environmental protection, noise emission). There are versions with different numbers of stages, various cooling and lubricating processes or drive types.

The most common model is the single-stage, oil-lubricated rotating screw compressor. Wherever even the lowest quantities of oil in the compressed air would contaminate the product or the process, oil-less compressors are used.

At the air inlet and the compressed air outlet, pressure and temperature are measured. For this, both pressure gauges/thermometers for direct display, and also pressure sensors/resistance thermometers with Pt100 or PTC sensors are standard instrumentation. In addition, pressures and differential pressures at the suction filter and at the oil reservoir/filter are monitored.

Further temperature measuring locations are found at the oil cooler or in the area of compressed air preparation (e.g. filter dryer). Furthermore, our measuring instruments also reliably monitor the pressure and the level in the compressed air tank.



## Legend – Screw compressors:

- |  |   |
|--|---|
| ① Air inlet – Pressure                         | ⑤ Compressed air tank – Pressure            |
| ② Air inlet – Temperature                      | ⑥ Condensate in compressed air tank – Level |
| ③ Outlet of the compressor stage – Pressure    | ⑦ Compressed air outlet – Pressure          |
| ④ Outlet of the compressor stage – Temperature | ⑧ Compressed air outlet – Temperature       |

## Pressure

### Pressure sensor

1 3 5 7



O-10

### Pressure gauge

1 3 5 7



111.10  
111.12

### Pressure switch

5



PSM-520  
PSD-4

## Temperature

### Resistance thermometer

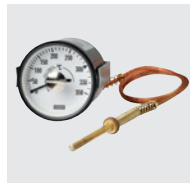
2 4 8



TF35  
TF37  
TF45  
TFT35  
TR33

### Thermometer with switch contacts

2 4 8



SB15  
SC15

### Temperature switch

2 4 8



TFS35  
TFS135

## Level

### Optoelectronic switch

6



OLS-C01  
OLS-C05

### Magnetic float switch

6



HLS-M

### Float switch

6



RLS-1000

### Continuous measurement

6



RLT-1000

# Piston compressors

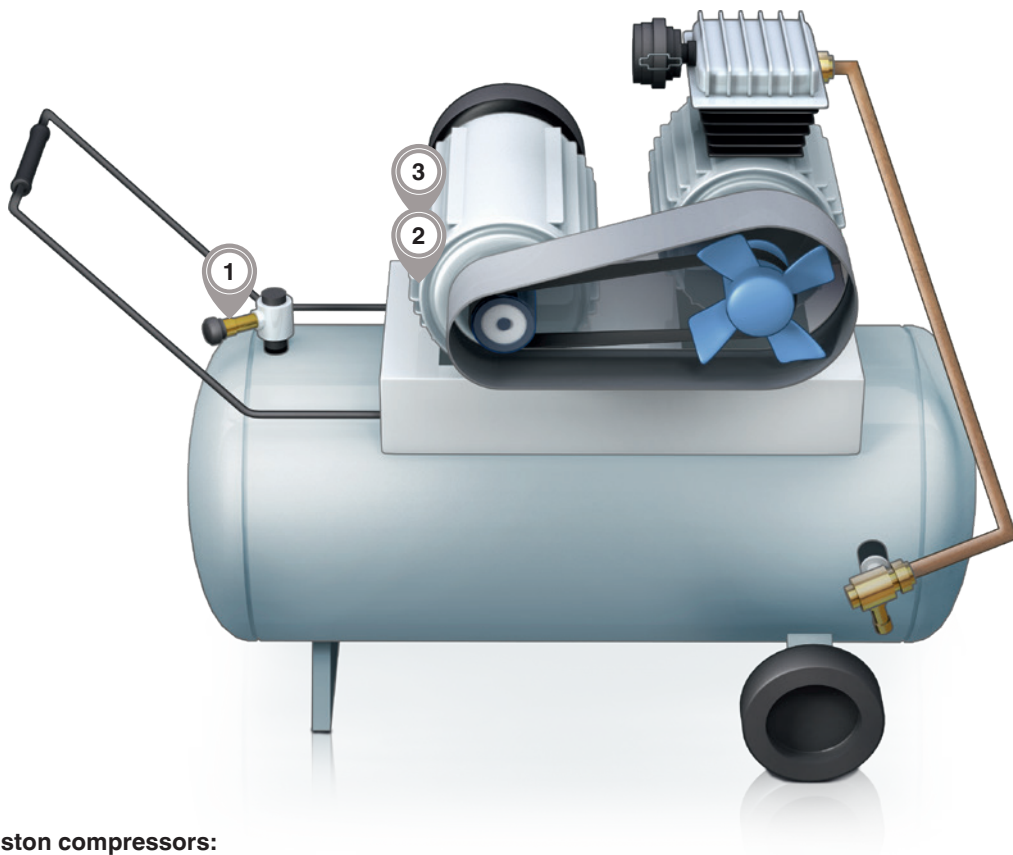
Piston compressors are 1-, 2-, 3- or 4-cylinder versions, corresponding to the compressed air demand or the level of pressure required of them. With a 2-cylinder compressor as “parallel switching”, the generated air volume is doubled. In “series switching”, where the output of the first cylinder is connected to the input of the second cylinder, higher system pressures are achieved.

A piston compressor consists of a crankshaft, a connecting rod, a cylinder and piston and a valve head. The crankshaft is driven via a V-belt, usually by an electric motor.

There are small models which only consist of a motor with cylinder/piston. However, most compressors have a compressed air tank, in order to maintain a stable system pressure to the compressed air consumer.

The operation of compressed air tools leads to dropping pressure in the tank. When the pressure drops below the lower limit, the motor starts; when the upper limit is exceeded, the motor automatically switches off. Pressure switches ensure a stable system pressure within the set limits (switch points).

The pressure in the tank, so the available working pressure, and thus also the function of the On/Off switch, is reliably indicated by the WIKA pressure gauge



## Legend – Piston compressors:

- ① Compressed air tank – Pressure
- ② Working air – Pressure
- ③ Compressed air input in the tank – Pressure

## Pressure

### Pressure gauge

① ②



111.10  
111.12  
213.53

### Pressure switch

③



PSM01  
PSM02



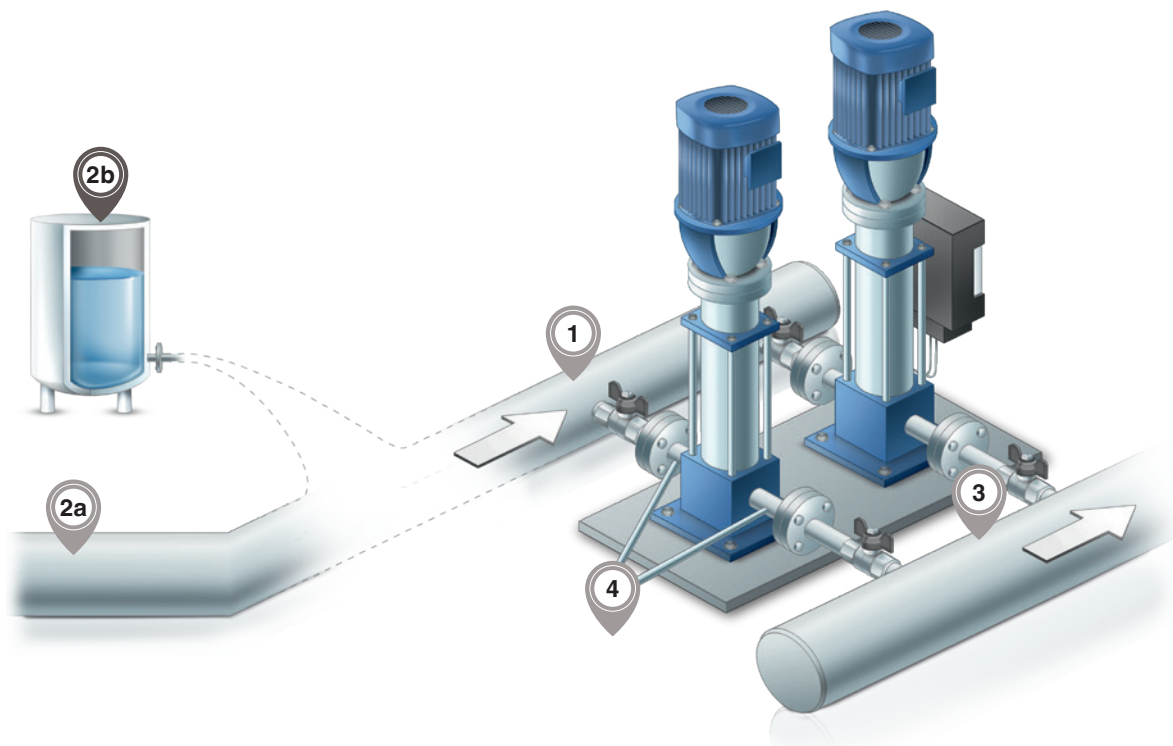
# Pumps and systems

The first pumps ensured the supply of drinking water to people, thus increasing the quality of life. Today, pumps supply the widest range of media in many processes and designs. The safe monitoring and automatic control of output pressures and delivery volumes is important. Specially for these measuring tasks, WIKA offers the right portfolio for each application and each pump.

Our pressure switches protect centrifugal pumps with insufficient input pressure against dry running.

Pressure sensors measure the pressure at the output and allow a constant system pressure through energy-efficient speed control. They detect pressure rises when running against a closed valve or gate, thus protecting the pump.

Diaphragm pumps are frequently used with aggressive or toxic media. Here, reliable diaphragm monitoring by pressure switches or process transmitters ensures the protection of people and the environment.



## Legend – Pumps and systems:

- ① Input pressure – Pressure
- ②a Dry run protection – Pressure
- ②b Dry run protection – Level
- ③ Output pressure – Pressure
- ④ Pump performance – Differential pressure



## Pressure

### Pressure sensor

3



A-10  
IS-3  
O-10

### Pressure gauge

1

3



113.53  
131.11  
213.53  
232.50  
233.50

### Pressure switch

2a

3



PSM-520  
PSD-4-ECO



PSM01  
PSM02

## Level

### Submersible pressure sensor

2b



LS-10  
LF-1

### Level switch

2b



OLS-C01



RLS-1000  
RLS-2000  
RLS-3000  
RLS-6000

# Water jet cutting

Water jet cutting is used in many sectors of industry and the materials to be processed are almost unlimited: Metal, stone, glass, composite materials or even food.

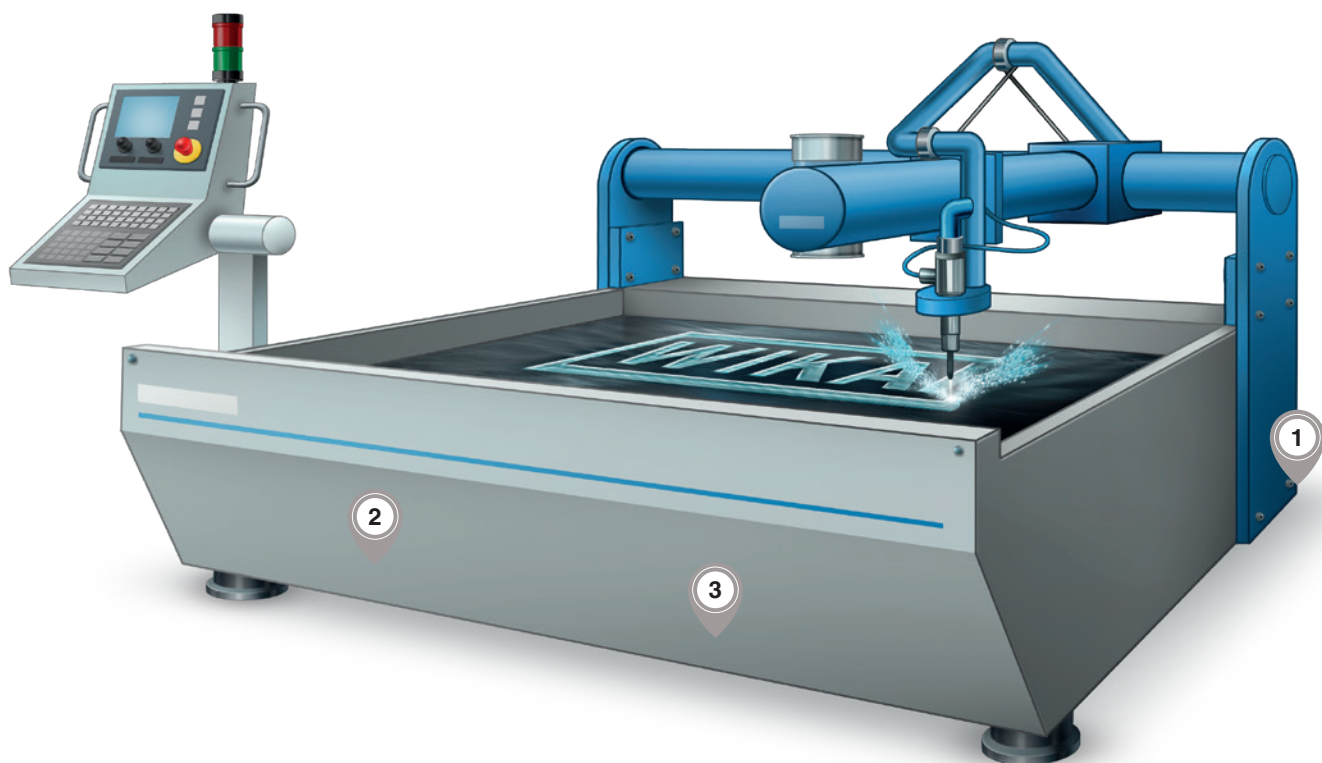
Cutting with water pressure offers advantages over plasma cutting or laser cutting.

- It does not introduce any heat into the material, so there is no structural change.
- The edges are so precise that post-processing is usually unnecessary.
- The gap width is only small.
- The shapes of the cutting contours are almost unlimited.

In addition, there are no tooling costs for water jet cutting, in contrast to machining with a punch.

In abrasive water jet cutting, an abrasive is added to the coherent high-pressure water jet. Modern water jet cutting systems work with up to 6,000 bar water pressure and the jet leaves the cutting nozzle at 3 times the speed of sound.

To protect the pump from cavitation and dry running, an adequate water flow is required. WIKA has the right switches both for monitoring the inlet pressure and also for temperature monitoring.



## Legende – Water jet cutting:

- ① Water intake – Pressure
- ② High-pressure pump – Pressure, Temperature
- or
- ③ Hydraulics and pressure booster – Pressure, temperature, level

## Pressure

### Pressure switch

①



PSM-520  
PSM02

### Pressure sensor

②

③



HP-2  
S-20  
A-10  
A-1200  
IS-3

### Pressure gauge

②

③



213.53

## Temperature

### Resistance thermometer

③



TF35  
TFS35  
TR10-D  
TR33

## Level

### Float switch

③



RLS-1000  
RLT-1000  
GLS-1000



# Tank level measurement

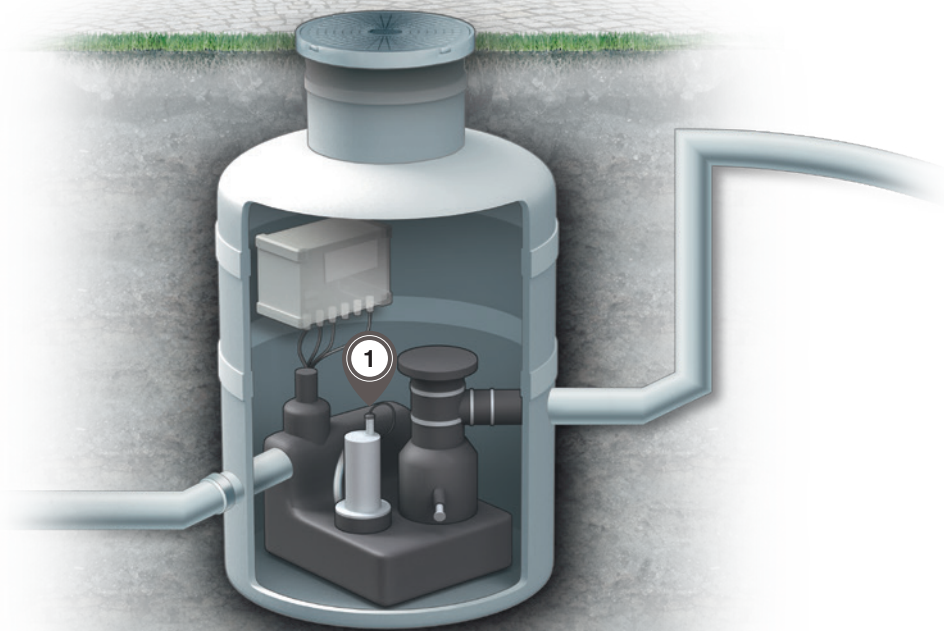
Whenever liquid media circulate from and into a storage tank in the circuit, for example the cooling lubricant of a machine tool or when liquids are conveyed from a tank or delivered into a tank, the filling height in the tank is a relevant control variable.

This can be designed as a simple on/off control of the pump using a float switch or an optoelectronic level switch. Frequently, a continuously measuring submersible pressure sensor (hydrostatic pressure of the liquid column in the tank) is also used to operate an energy-efficient speed-controlled pump.

For all installations, the customer requires a “fit and forget” solution. The plant must function 100 % reliably, resistant against the widest variety of media and insensitive to solids. Of course this also applies to float switches and submersible pressure sensors

The pictured example of a sewage lifting system shows the challenging task of maintenance-free level measurement with an extremely solids-laden medium.

Here WIKA, in close cooperation with our customers, has developed a solution with unique reliability.



**Legend – Tank level measurement:**

① Level

## Level

### Submersible pressure sensor ①



LS-10  
LF-1

### Optoelectronic switch ①



OLS-C01  
OLS-C02

### Bypass ①



BNA

### Float switch ①



RLS-6000



HLS-M



# Weighing technology

Load cells are designed as a special form of force sensor for use in weighing devices, such as in platform, filling, belt and packaging scales, dynamic test systems and also electronic price labelling and industrial scales. These load cells are very easy to integrate and enable very high measurement accuracies of between 0.01 % and 0.05 %  $F_{nom}$ .

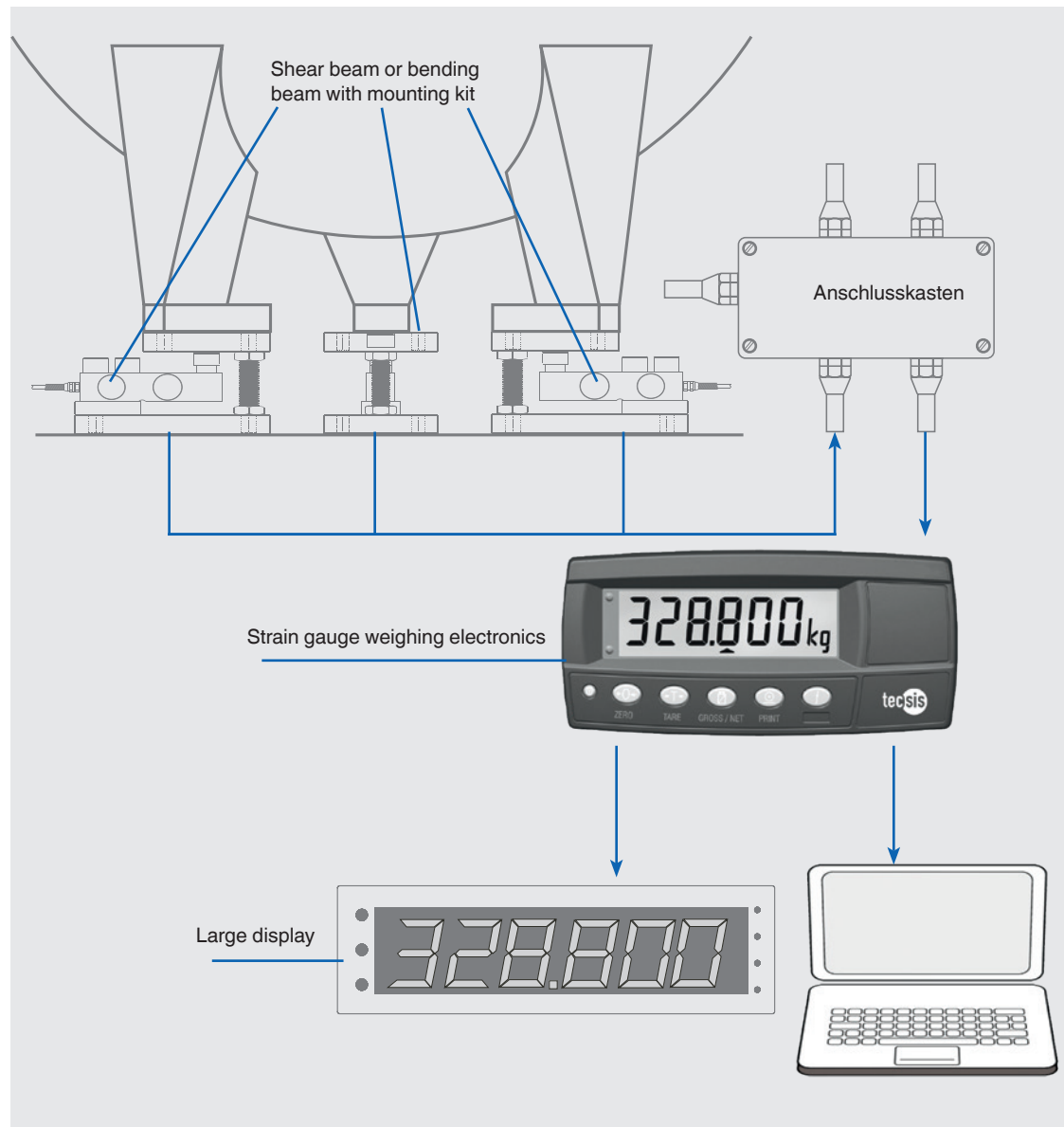
For the different requirements, WIKA has all the typical load cell geometries within its portfolio. For these, there are, naturally, matching mounting kits as well as complete weighing modules also available.

A typical application is the batch process, in which different proportions of different components are dosed and later mixed. The highly accurate and very stable WIKA load cells enable the portions to be dosed quickly and precisely. A special feature of our load cells is their insensitivity to lateral forces.



## Legend – Weighing technology:

- ① Weight force measurement – Force





## Force

### Load cell



F4801  
F4802  
F4818

### Bending beam/shear beam



F3831  
F3833  
F3301  
F33C1  
F33S1

### Special force transducers



F9302

## Accessories

### Electronics



E1930  
E1931



# Filter systems

The usage of filters is as diverse as the requirements for their monitoring. The filter of a ventilation system, whose contamination produces a differential pressure of a few millibars, requires different instrumentation than a cartridge filter for oil hydraulics.

The reliability of WIKA pressure measuring instruments enables the efficient and interference-free operation of the plant. Your advantage: The energy consumption is optimised and thus also operating costs and environmental compatibility.

## Hydraulic filter application

Particles in hydraulic oil lead to a markedly higher wear of all moving parts, such as hydraulic pumps and motors, valve pistons or in the cylinder. Therefore, one or more filters in the circuit are among the most important components.

Installation is often in the return line to the tank, where the pressure level is low and the discharge is made against atmospheric pressure. Here a gauge pressure transmitter monitors the filter contamination.

If one wants to protect specific components such as the hydraulic motor, then the filter must be fitted in front of these components. For the monitoring of these, one requires differential pressure measurement – measurement of the pressure drop (the contamination) across the filter.

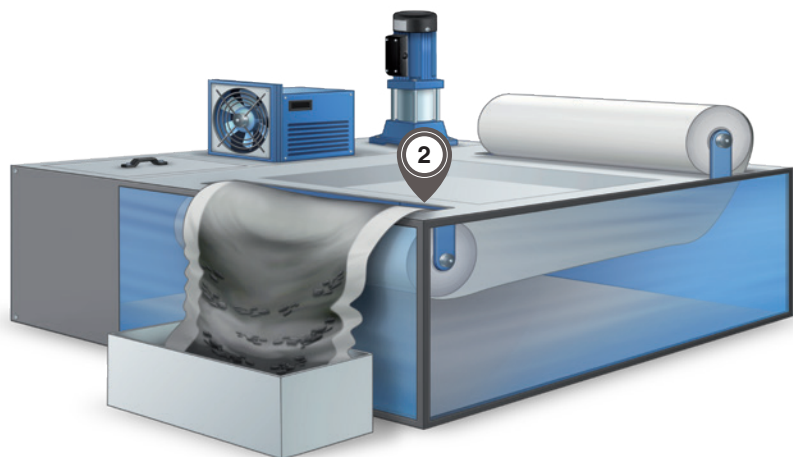
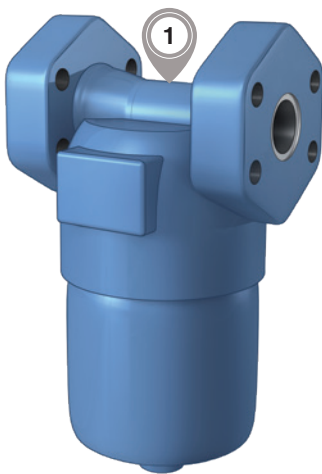
## Machine tool application

With the machining of a metal part in a machining centre, chips are produced. This is transported by the cooling lubricant in the machine tool to a conveying system which then transfers it from the processing area.

The chip separator separates the solid chips and the liquid cooling lubricant so that it can be returned to the circuit. The chips are sent for recycling and should also be as “clean” as possible.

A problem is frequently the float switch in the chip separator of the belt filter, which controls the further transport on the belt filter. The chips accrued are held on this and can no longer be washed away. This leads to an overflow of the cooling lubricant, with corresponding effort in the cleaning of the hall – and also the risk of accidents due to the slippery floor.

Our manufacturing depth enables us to develop solutions and test them in our own pre-manufacturing. We understand what reliability means.



## Legend – Hydraulic filter/machine tool:

- ① Contamination of the filter – Pressure
- ② Contamination of the filter – Level (backing up of cooling lubricant)

## Pressure

### Pressure sensor

①



A-10  
S-20  
A-1200

### Pressure gauge

①



111.10  
111.12  
213.53  
113.53  
DPS40  
DPGS40  
A2G-05

### Pressure switch

①



PSD-4  
PSD-4-ECO  
PSM02

## Level

### Level switch

②



RLT-1000  
RLS-1000  
RLS-6000  
HLS-M



# Cooling lubricant systems

When machining, the cooling lubricant emulsion fulfils three important functions in a machine tool: It lubricates at the machining point, cools the tool (drill, cutter) and supports the chip removal.

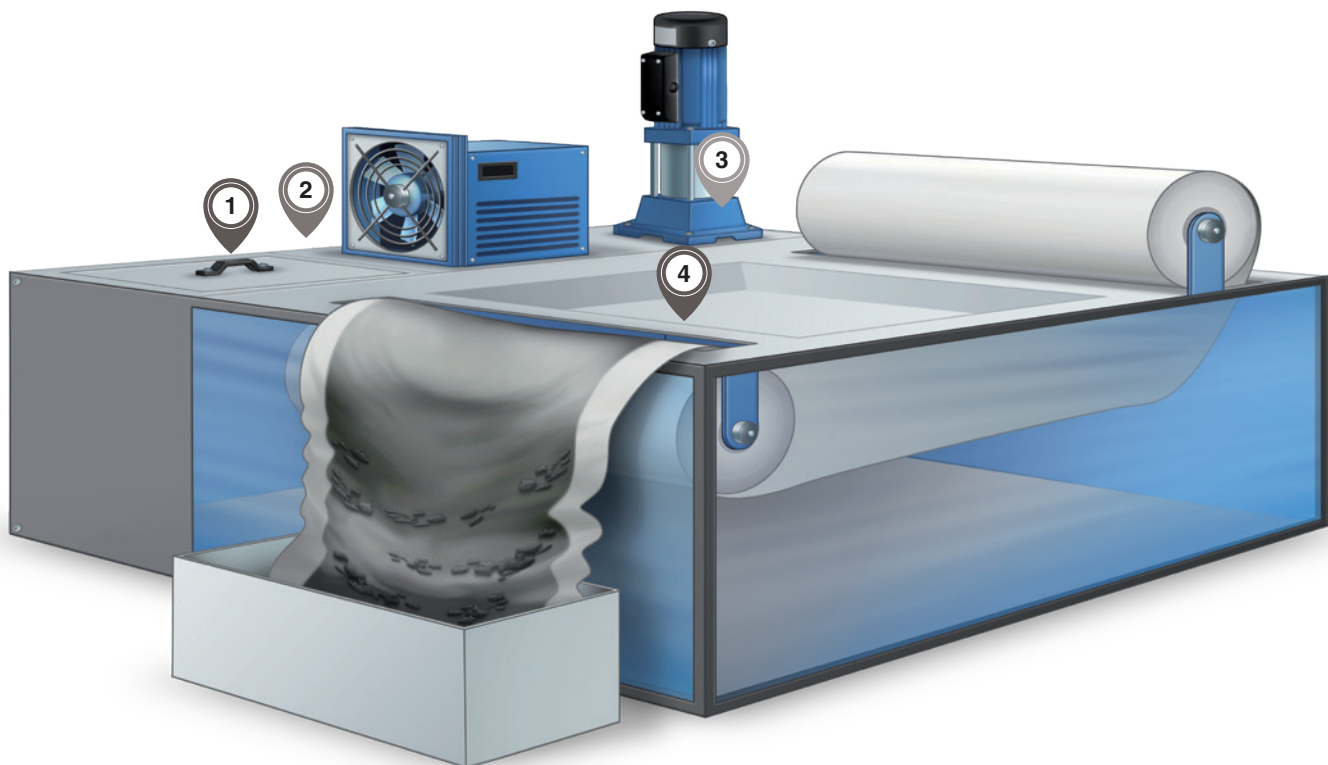
The system consists of the components

- Chip conveyor
- Chip filter
- Tank/pump unit

Evaporation, depletion through build-up on the chips and the introduction of foreign oils change the level in the tank and the concentration in use.

The level control, the refilling and the documentation can occupy a full-time employee in larger metalworking companies. Automation of these activities fulfils the requirements of TRGS 611 and brings further advantages in the spirit of Industry 4.0, such as the prompt detection of leaks due to conspicuous loss of cooling lubricant or the impending “tipping” of the cooling lubricant. It can be counteracted at an early stage and saves having to replace the cooling lubricant.

WIKA's broad portfolio covers the important measurands, through instruments such as float switches and temperature probes.



## Legend – Cooling lubricant system:

- ① Level in the tank – Level
- ② Temperature of the cooling lubricant – Temperature
- ③ Transport of the cooling lubricant – Pressure
- ④ Contamination of the filter – Level (backing up of cooling lubricant)

## Pressure

### Pressure sensor

3



A-10  
S-11  
A-1200

### Pressure gauge

3



111.10  
111.12  
213.53  
113.53

### Pressure switch

3



PSD-4  
PSD-4-ECO  
PSM02

## Temperature

### Resistance thermometer

2



TR10-C  
TF35  
TFT35

### Dial thermometer

2



A52  
32

### Temperature switch

2



TFS35  
TSD-30

## Level

### Level switch

1

4



RLT-1000  
RLS-1000  
RLS-6000  
HLS-M



# Granulate preparation

The drying and dedusting on the granules is a basic precondition for the manufacturing of superior plastic parts.

Due to product abrasion, many plastic granules already contain dust and fibres (angel hair) when delivered. These cause a reduction in quality in the end product, especially in optical and high-gloss parts, or it can lead to plant downtime through product clogging. Pressure measurement from WIKA monitors the vacuum of the deduster.

A particular challenge is to dry hygroscopic thermoplastics to the optimum residual humidity for processing. This is only possible using air processing with an extremely low dew point and thus a minimal absolute water content. Tempera-

ture measuring instruments from WIKA support the energy-efficient operation of the dryers. Our level measuring instruments monitor the filling height in the drying vessel, and pressure measuring instruments secure the air supply to the blower.

As a plastics processor with over 30 of our own injection moulding machines, WIKA understands these challenges. The cooperation of our development and manufacturing has led to products which fulfil the measurement tasks of granulate preparation outstandingly.



## Legend – Deduster & dryer:

- ① Heated air – Temperature
- ② Filling the vessel - Load cell
- ③ Air flow – Pressure
- ④ Dust removal - Vacuum



## Pressure

### Pressure sensor

③ ④



A-10  
R-1  
A-1200

### Pressure gauge

③ ④



111.10  
111.12  
212.20  
611.10  
PGS25

### Pressure switch

③ ④



PSD-4  
PSD-4-ECO  
PSM02

## Temperature

### Dial thermometer

①



A50  
A52  
SC15

### Resistance thermometer

①



TF35  
TF37  
TF45  
TFT35  
TR33

### Temperature switch

①



TFS35  
TFS135

## Force

### Load cell

②



F4801  
F4802  
F4818

### Bending beam/shear beam

②



F3831  
F3833  
F3301  
F33C1  
F33S1



# Temperature control units

Temperature control units are frequently used in the plastics and rubber industries. In these applications, they preheat the tools to operating temperature and dissipate the heat generated by the material during series production, thus avoiding overheating of the tool and damage to the product. Further application areas are in the chemical and pharmaceutical industries, in the food & beverage and packaging industries, metalworking or wood processing.

A plastics machine frequently runs in continuous operation (24/7). The safe operation relies, in a large part, on the quality of the temperature control.

Temperature control units have an external connection to a circuit, such as in the temperature control of an injection moulding tool in the plastics industry, and they are available as immersion baths, such as those used in laboratories or for quality assurance. The designs stretch from standard series production instruments through to project-designed temperature control plants (frequently multi-circuit systems) for production processes, for which large volumes of heat are required and possibly large quantities of heat must be removed.

**A temperature control unit consists of the following main components:**

- Vessel with heater and heat exchanger
- Recirculation pump
- Temperature controller

The versions cover cooling instruments down to  $-150\text{ }^{\circ}\text{C}$ , to heating systems (thermal oil heaters) up to  $+400\text{ }^{\circ}\text{C}$ . As a heat transfer medium, water, glycol or thermal oils are used.

A level switch ensures that the heat transfer medium in the tank is sufficiently full and also controls the automatic refilling. If there is sufficient heat transfer fluid in the vessel, the circulation pump conveys it through the load and back to the vessel. In the tank, the actual temperature is measured and fed through to the temperature controller. If the actual temperature exceeds the set point, the solenoid valve from the cooling water connection opens and cools the heat transfer medium in the tank to the set temperature. In the opposite case, the heat transfer medium is heated, usually with an electric cartridge heater.

## Legend – Temperature control unit:

- ① Level in the tank – Level
- ② Temperature in the vessel – Temperature
- ③ Temperature in the inlet line – Temperature
- ④ Pressure in the inlet line – Pressure
- ⑤ Flow measurement for the process - Flow
- ⑥ Temperature in the return line – Temperature



## Pressure

### Pressure sensor

④



A-10  
S-20  
M-10  
R-1  
A-1200

### Pressure gauge

④



111.10  
111.12  
213.53  
113.53

### Pressure switch

④



PSD-4  
PSD-4-ECO  
PSM02

## Temperature

### Resistance thermometer

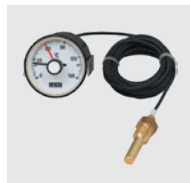
② ③ ⑥



TF35  
TF45  
TFT35  
TR10-C

### Dial thermometer

② ③ ⑥



50  
32  
SC15  
52

## Level

### Submersible pressure sensor

①



LS-10

### Float switch

①



RLT-1000  
RLS-1000

### Optoelectronic switch

①



OLS-C01

## Flow

### Flow switch

⑤



FSD-3

# High-pressure test benches

Many machine components are subjected to an internal pressure during operation, e.g. valves and fittings, pressure accumulators, hydraulic hoses or fuel lines. The tests on and with these components are carried out during product development and later in series production for quality assurance. While one wants to determine the maximum values until destruction with testing in the laboratory, in production it is the function that is checked, e.g. the internal and external leak tightness (leakage tests).

Spindle pumps are one type of pump used in high-pressure test benches. No volume flow is generated here, but rather, the fluid is compressed. With a spindle pump, the high

pressure can be set very precisely. The comparison with the test item requires a reference such as a high-pressure gauge or a high-pressure sensor, which enables automatic logging. WIKA offers pressure measuring instruments up to 15,000 bar for electronic pressure sensors and up to 6,000 bar for high-pressure gauges.

Industry 4.0 is also appearing in high-pressure test benches with the change from indicating measuring instruments to electronic sensors, which enable automated and reproducible tests.



**Legend – High-pressure test benches:**

- ① Power pack – Pressure, temperature, level
- ② Pressure booster – Pressure

## Pressure

### Pressure switch

①



PSM-520  
PSM02  
PSM-700

### Pressure gauge

①

②



PG23HP  
213.53  
213.53  
113.53

### Pressure sensor

①

②



HP-2  
IS-3  
S-20  
A-10  
A-1200  
P-30  
CPT6020

## Temperature

### Resistance thermometer

①



TF35  
TFS35  
TR10-D  
TR33

## Level

### Submersible pressure sensor

①



RLS-1000  
RLT-1000  
GLS-1000

## Calibration – For quality measurement in the test laboratory

### Digital pressure gauge



CPG1500

### Process calibrator



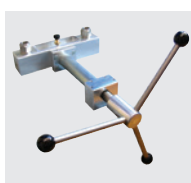
CPH7000  
CPT7000

### Micro calibration bath



CTB9100-165

### Hand spindle pump



CPP1000-M

# Cranes and hoists

When moving large loads, reliable monitoring ensures both operational safety (overload) and protection of operating personnel (occupational safety).

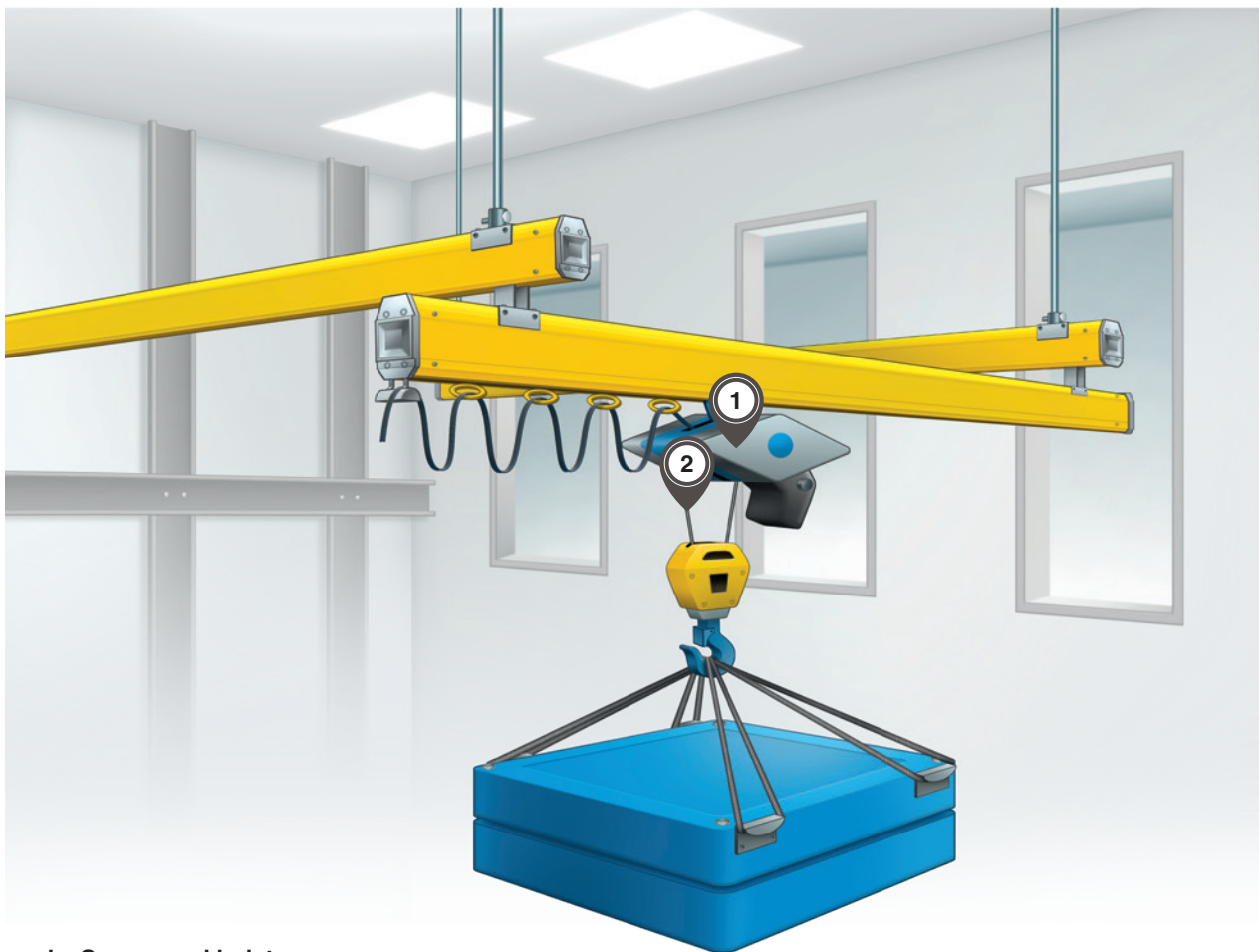
## Indoors

In factories, heavy loads are often moved by overhead cranes. For monitoring, WIKA offers both continuously measuring load pins that replace non-measuring retaining bolts, as well as tension/compression force transducers that are positioned directly in the force flow, each with a suitable overload switch. The chain hoist test set offers a quick and easy safety check of the friction clutch.

## Outdoors

Outdoor applications are, for example, harbour cranes or maritime applications such as cranes on supply ships or oil rigs. Our instruments are certified to DNV GL.

The requirements for safety controls are described in the machinery directive (2006/42/EC), for example, overload controls or emergency stop switches. WIKA has developed the first system solution for overload protection in crane systems certified in Germany. This consists of up to eight redundant force transducers, a central control and the associated user software.



## Legend – Cranes and hoists:

- ① Load measurement – Force
- ② Friction clutch testing - Force



## Force

### Load pin

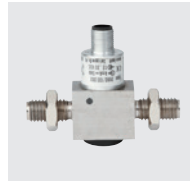
①



F5301  
F53S1  
F5308

### Compression force

①



F2301  
F7301

### Special force transducer

②



F9204  
F9304

### Chain hoist test set

②



FRKPS

## Overload protection certified in accordance with EN ISO 13849-1

### Safety electronics



ELMS1

### Limit switch



EGS01  
EGS80

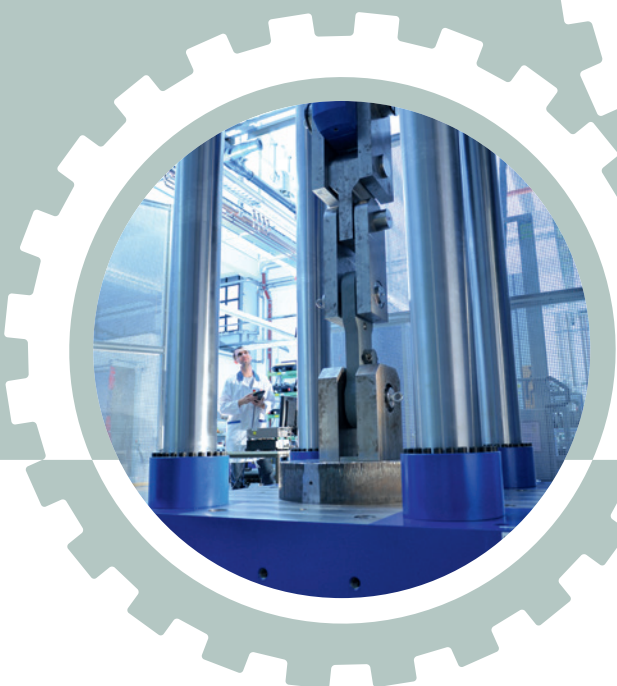


# General machine building

The close cooperation with our customers enables instruments that meet individual requirements in a very special way and reliably ensure machine functionality. This increases the performance of equipment and strengthens the competitiveness and market position of our customers.

Our developments with more than 20,000 partners in the machine-building sector have led to a globally unique product programme covering the entire range of instrumentation requirements. The pictures show a selection of further application areas for which we have already implemented specific measurement technology.

## Calibration benches



## Presses

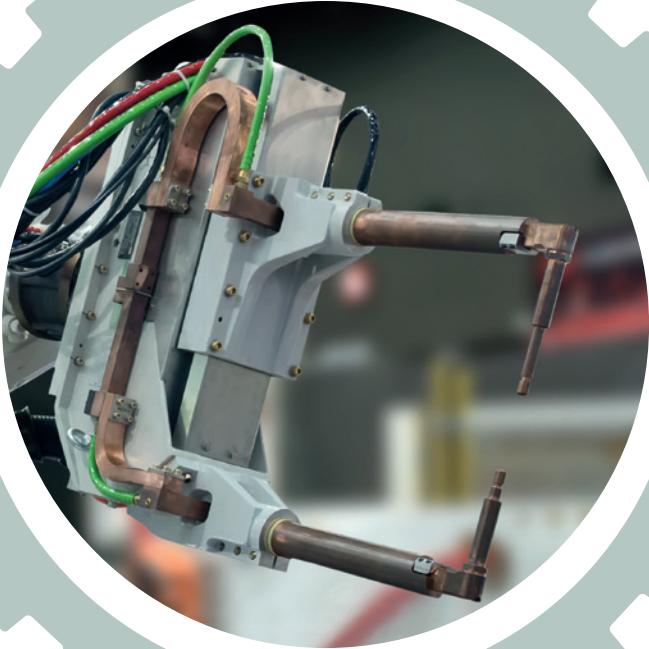


## Woodworking machinery

Textile machinery



Welding tongs



Packaging machinery



# Diaphragm seals

Diaphragm seals are always used when the conditions at the point of usage deviate from the permissible specifications for the pressure measuring instrument. These are, for example:

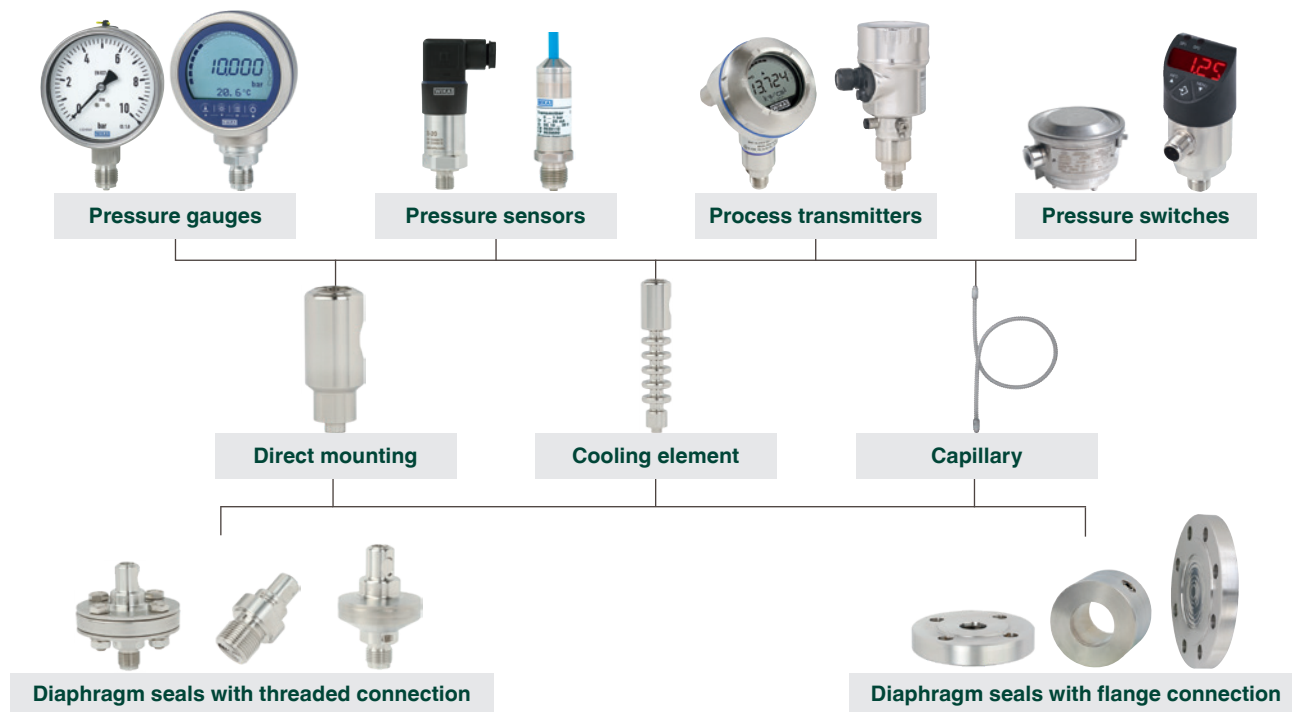
- Too low or too high temperatures of the media
- Aggressive media
- Particle-laden media (also where there is scale formation in the hot-water systems)
- Abrasive media
- Highly viscous media

A further application is the connection of the measuring location with a remotely mounted pressure measuring instrument.

Diaphragm seals are delivered by WIKA as ready-to-use, filled systems. These consist of the diaphragm seal itself (the process connection), the mounting element and the pressure measuring instrument. All components are perfectly matched to one another.

The combined systems can withstand a pressure of 10 mbar up to 3,600 bar at extreme temperatures (-130 ... +400 °C) and with a wide variety of media, thus enabling accurate pressure measurements under extreme conditions.

Our programme is rounded off by test certificates and approvals for specific applications.



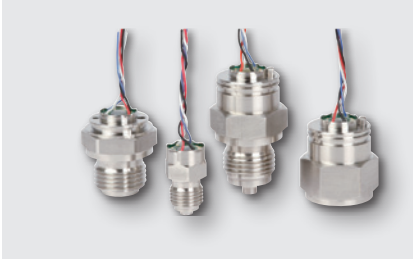
# Pressure sensor assemblies and modules

## Customer-specific electronic pressure measurement solutions

We see ourselves not only as a provider of top quality measurement technology, but also as a highly competent partner that is able to create individually designed solutions together with you. We are ready to develop products for you that are tailor made to cater for your individual needs. Create your perfect pressure sensor solution together with us. Here, the experience from a multitude of completed projects is incorporated - thus we can refer back to numerous proven solutions and components. As required, we will adapt our systems to your individual application or develop new ones.

### TTF-1

#### Metal thin-film pressure sensor assembly



Non-linearity (± % of span)	≤ 0.5
Measuring range	0 ... 10 to 0 ... 1,000 bar
Special feature	<ul style="list-style-type: none"> <li>■ Excellent resistance to media</li> <li>■ Welded measuring cell</li> </ul>
Signal	mV/V
Data sheet	PE 81.16

### SCT-1

#### Ceramic pressure sensor element



Non-linearity (± % of span)	≤ 0.5
Measuring range	0 ... 2 to 0 ... 100 bar
Special feature	Excellent resistance to media
Signal	mV/V
Data sheet	PE 81.40

### SPR-2, TPR-2

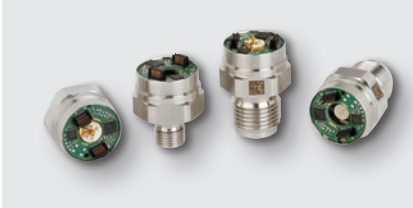
#### Piezo pressure sensor element and pressure sensor assembly



Non-linearity (± % of span)	≤ 0.3
Measuring range	0 ... 0.4 to 0 ... 16 bar 0 ... 0.4 to 0 ... 16 bar abs.
Special feature	<ul style="list-style-type: none"> <li>■ Gauge and absolute pressure measurement</li> <li>■ High output signal</li> <li>■ High overload safety</li> </ul>
Signal	mV/V
Data sheet	PE 81.62

### TI-1

#### Piezo or metal thin-film pressure sensor module



Non-linearity (± % of span)	≤ 0.125 BFSL
Measuring range	0 ... 0.4 to 0 ... 1,600 bar 0 ... 0.4 to 0 ... 40 bar abs. -1 ... 0 to -1 ... +59 bar
Special feature	<ul style="list-style-type: none"> <li>■ Processed signal</li> <li>■ High variance in process connections</li> </ul>
Signal	Analogue and digital
Data sheet	PE 81.57

### MPR-1

#### Pressure sensor module



Non-linearity (± % of span)	≤ 0.125 or 0.25
Measuring range	0 ... 0.4 to 0 ... 25 bar 0 ... 0.4 to 0 ... 25 bar abs.
Special feature	<ul style="list-style-type: none"> <li>■ 19 mm spanner width for limited mounting space</li> <li>■ No calibration necessary, due to compensated output signal</li> </ul>
Signal	Analogue and digital
Data sheet	PE 81.64

Talk to us – we are happy to provide you with advice!

# Accessories



**Repeater power supplies and temperature controllers**



**DI25**  
Digital indicator for panel mounting



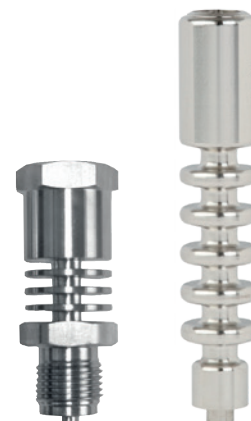
**EGS80**  
Digital limit switch



**M12 x 1 Kabel**  
Cable assemblies



**910.14, 910.17**  
Adapters and sealings



**Cooling elements**





**910.16**

Instrument mounting bracket



**910.10, 910.11, IV10**

Stopcocks and shut-off valves



**IV50, IV51**

Valve manifolds for differential pressure measuring instruments



**910.14, 910.17**

Adapters and sealings



Pressure lines



**910.33**

Adhesive label set for red and green circular arcs



# Calibration instruments



**CPG1500**

**Precision digital pressure gauge**

Measuring range: -1 ... 10,000 bar

Accuracy  
(% of span): bis zu 0,05 FS

Special feature:

- Integrated data logger
- WIKA-Cal compatible
- Data transfer via WIKA-Wi-reless
- Password protection possible
- Robust case IP65

Data sheet: CT 10.51



App „myWIKA device“  
Play Store



**CPH6300**

**Hand-held pressure indicator**

Measuring range: 0 ... 0.025 to 0 ... 1,000 bar

Accuracy: 0.2 %, 0.1 % (optional)

Special feature:

- Robust and waterproof case with IP65, IP67
- Integrated data logger
- Differential pressure measurement

Data sheet: CT 12.01



**CPH7000, CPH7000-Ex**

**Portable process calibrator**

Measuring range: -1 ... 25 bar (-1 ... 10,000 bar with CPT7000)

Accuracy: 0.025 % FS

Special feature:

- Integrated pressure generation
- Measurement of pressure, temperature, current, voltage, ambient conditions
- Supply of pressure, current and voltage
- Calibration function/data logger/switch test

Data sheet: CT 15.51



**CPP30**

**Pneumatic hand test pump**

Measuring range: -950 mbar ... +35 bar

Medium: Ambient air

Special feature:

- Pressure and vacuum generation switchable
- Compact dimensions

Data sheet: CT 91.06



**CPP700-H**

**Hydraulic hand test pump**

Measuring range: 0 ... 700 or 0 ... 1,000 bar

Medium: Oil or water

Special feature:

- Integrated medium reservoir
- Ergonomic handling

Data sheet: CT 91.07



**CPG-KITH, CPG-KITP**

**Hydraulic or pneumatic service kit**

■ Simple testing and adjustment of pressure measuring  
■ Kit consists of a CPG1500 reference instrument and a CPP-700H hand pump (hydraulic  $P_{max}$  700 bar) or CPP-30 (pneumatic  $P_{max}$  30 bar)



**DG-10**

**Precision digital pressure gauge**

Measuring range: ■ 0 ... 5 to 0 ... 700 bar  
■ -1 ... +5 to -1 ... +10 bar

Accuracy  
(% of span): ≤ 0.5 % FS ±1 digit

Special feature: ■ Robust stainless steel case,  
nominal size 80 mm  
■ Battery operation (2 x 1.5 V  
AA cell)  
■ Option: Rotatable instrument  
head, backlighting

Data sheet: PE 81.66



**CPH7650**

**Portable pressure calibrator**

Measuring range: -1 ... 6,000 bar with CPT6000  
Supply elec. pump: -0.85 ... +20 bar

Accuracy: 0.025 % FS

Special feature: ■ Calibration function  
■ Generation/measurement of 4  
... 20 mA and DC 24 V voltage  
supply for transmitters  
■ Interchangeable reference  
sensors CPT6000  
■ High-performance electric pump

Data sheet: CT 17.02



**CTB9100**

**Micro calibration bath**

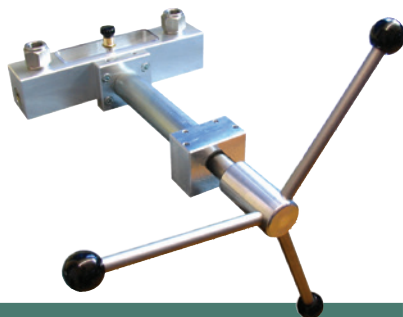
Measuring range: -35 ... +255 °C

Accuracy: ±0.2 ... 0.3 K

Stability: ±0.05 K

Special feature: ■ Short heating and cooling  
times  
■ Easy to use

Data sheet: CT 46.30



**CPP1000-M**

**Hydraulic hand spindle pump**

Measuring range: 0 ... 1,000 bar

Medium: Oil or water

Special feature: ■ Smooth-running internal precision  
spindle  
■ Compact dimensions

Data sheet: CT 91.05

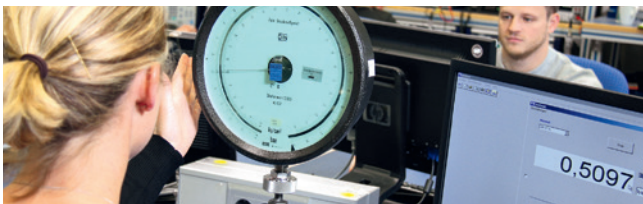
# Calibration service

Our calibration laboratories have been calibrated for pressure and temperature for over 30 years. Since 2014, our calibration laboratory has also been accredited for the electrical measurands DC current, DC voltage and DC resistance. Since 2020, our calibration laboratory has also been accredited for force. Recently, factory calibration for length measuring instruments has been expanding our portfolio.

- ISO 9001 certified
- DKD/DAkkS accredited (in accordance with DIN EN ISO/IEC 17025)
- Cooperation in the DKD/DAkkS working groups
- Over 60 years of experience in pressure and temperature measurement
- Highly qualified, individually trained personnel
- Latest reference instruments with the highest accuracy

## Manufacturer-independent calibration – fast and precise for ...

### Pressure



- -1 bar ... +10,000 bar
- Calibration using working standards (precise electrical pressure measuring instruments) or high-accuracy reference standards (pressure balances)
- With an accuracy of 0.003 % ... 0.01 % of reading
- In accordance with the directives DIN EN 837, DAkkS-DKD-R 6-1 or EURAMET cg-3

### Temperature



- -196 ... +1,200 °C (to +1,600 °C possible with factory calibration)
- Comparative calibration in calibration baths and tube furnaces with an accuracy of down to 1.5 mK
- Calibration at fixed points of ITS90 with the smallest possible measurement uncertainties
  - Triple point of mercury (-38.8344 °C)
  - Triple point of water (0.01 °C)
  - Melting point of gallium (29.7646 °C)
  - Solidification point of tin (231.928 °C)
  - Solidification point of zinc (419.527 °C)
  - Solidification point of aluminium (660.323 °C)
- In accordance with the appropriate DKD/DAkkS directives

### Current, voltage, resistance



- DC current from 0 mA ... 100 mA
- DC voltage from 0 V ... 100 V
- DC resistance from 0 Ω ... 10 kΩ
- In accordance with the directives VDI/VDE/DGQ/DKD 2622



## Manufacturer-independent calibration – fast and precise for ...

### Force



- 1 kN ... 200 kN  
(500 N ... 6 MN possible with 3.1 inspection certificate)
- With a system accuracy of 0.5 % in tension and compression force direction
- In accordance with directive DIN EN 10204
- DKD/DAkkS accredited (in accordance with DIN EN ISO/IEC 17025)

### Length



- Factory calibration
- Replacement of the measuring device if required
- Calibration of special-purpose gauges in accordance with customer drawings
- Calibratable measuring devices
  - Caliper gauges to 800 mm
  - Testing pins to 100 mm
  - Ring gauges and plug gauges to 150 mm
  - Tapered thread gauges to 150 mm
  - Gauge blocks to 170 mm  
(also possible as a set)
  - others on request

## Seminars and trainings



Are you interested in a product, calibration or software training? As an individual or as a group; on-site at your company or at WIKAI? Then speak to us. Together with you, our certified trainers can design precisely the course contents that you need for your requirements.

We look forward to meeting you!

**Service team**  
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