

## Metallurgical /Coking Industry Sensors

Magnetostrictive sensors/Rotary encoder/Pressure transmitters





## QUALIFICATIONS



## Committed to the research and development of sensors and detection technology

Beijing TBF Electronic Technology Co., Ltd. (located in Beijing Economic and Technological Development Zone) has been committed to the research and development of level sensors and detection technologies for many years. It is a national high-tech enterprise with technology, and an intelligent technology solution provider integrating production, R&D and sales.

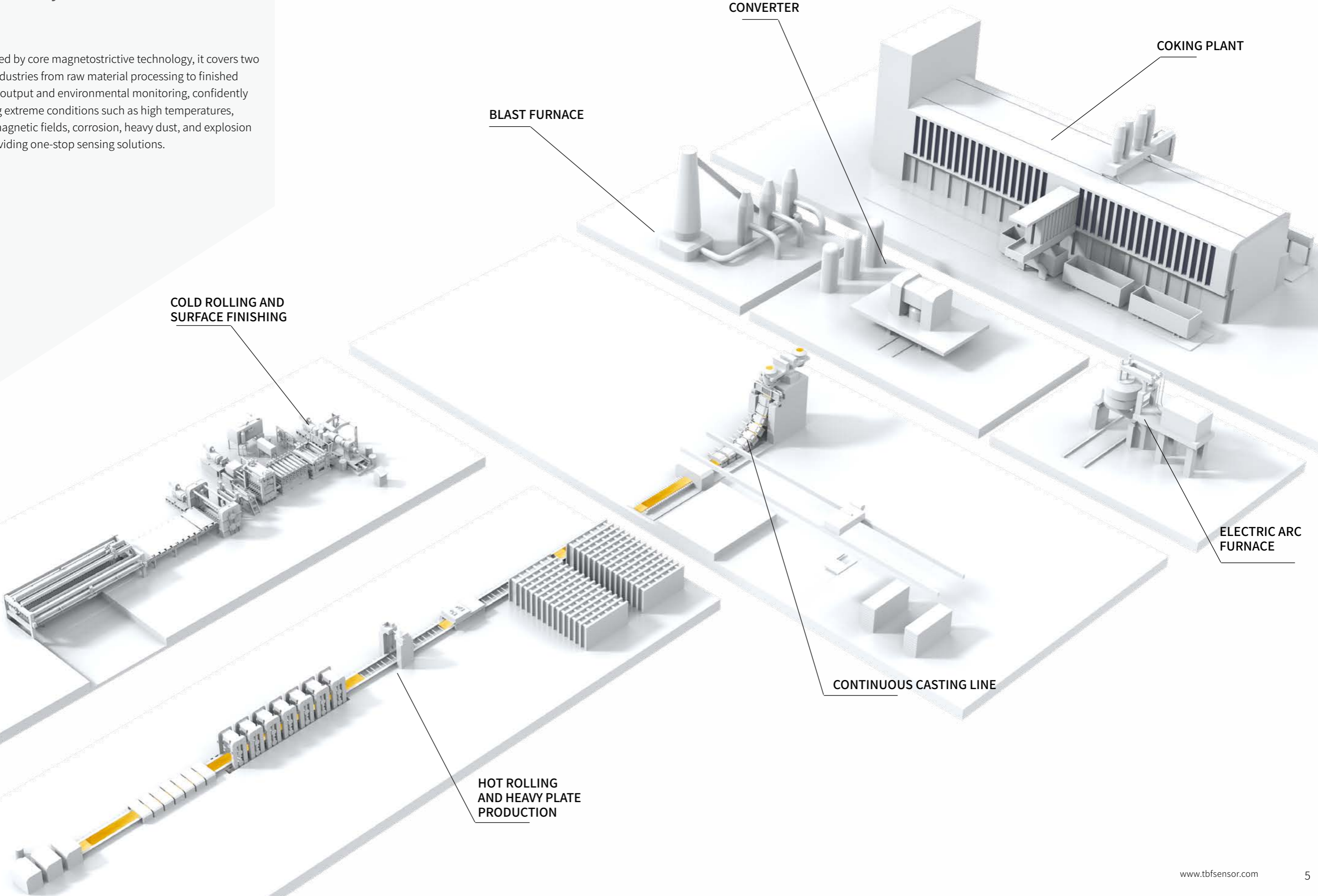
The company has four mature technology platforms: magnetostrictive sensor technology platform, rotary encoder technology platform, pressure transmitter technology platform and temperature sensor technology platform. Based on the technology platform and guided by customer needs, the company provides customers with a full range of sensing technologies through professional program design, excellent quality and rapid response ability technical product solutions.

Products are widely used in rubber and plastics, metallurgy, coking, construction machinery, maritime, coal mines, water conservancy, military industry, petroleum and petrochemical, environmental protection, clean energy and other fields.

# Metallurgy & Coking

## Full Industry Chain Sensor Solutions

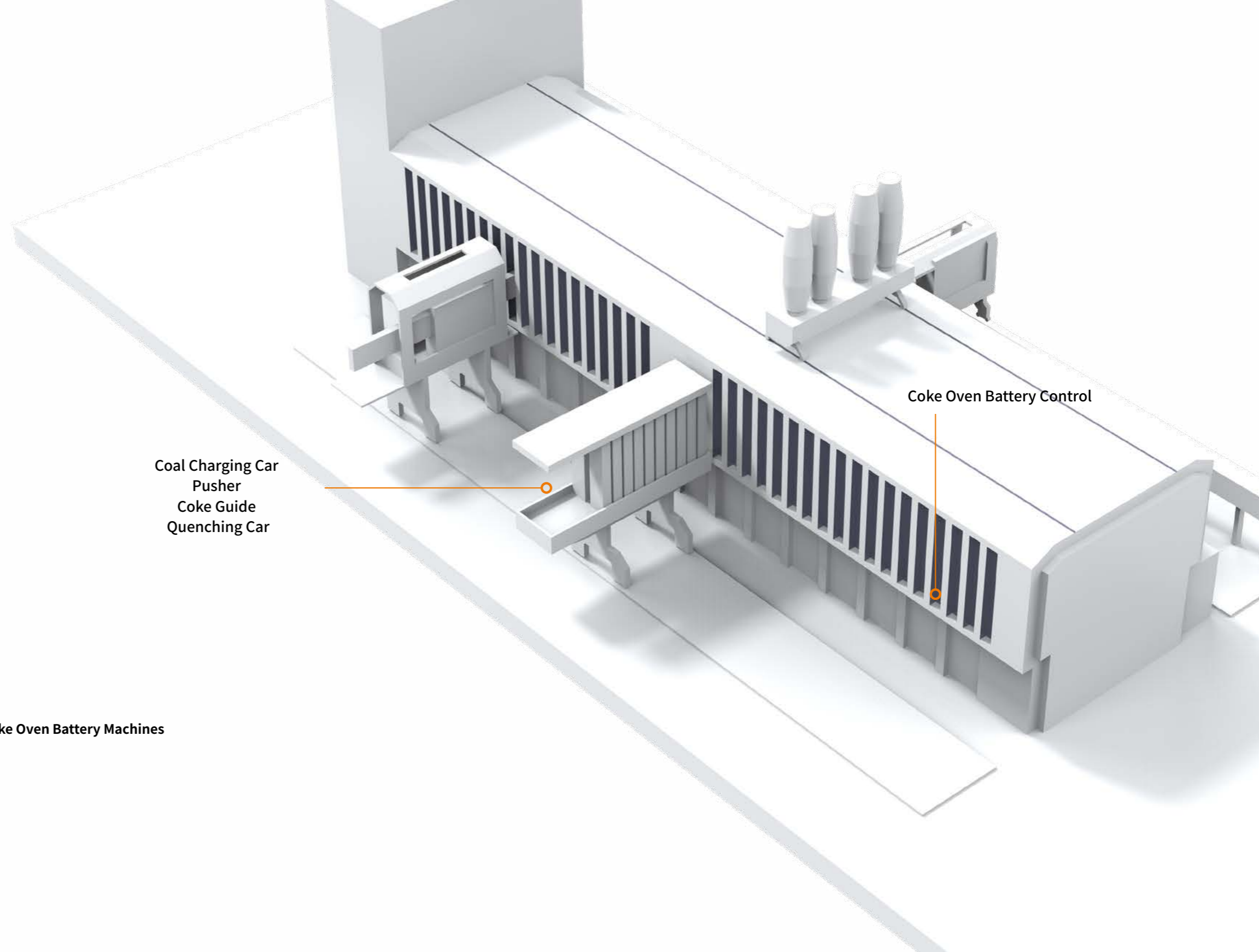
Supported by core magnetostrictive technology, it covers two major industries from raw material processing to finished product output and environmental monitoring, confidently handling extreme conditions such as high temperatures, strong magnetic fields, corrosion, heavy dust, and explosion risk, providing one-stop sensing solutions.



# Industry Applications

## — Coking Process Solutions

In response to the complex and harsh production environment of the coking industry, TEBAFO has launched customized sensor solutions. Its sensors feature excellent high-temperature resistance, tar resistance, and corrosion resistance, while also meeting explosion-proof requirements for hazardous areas. They can address common challenges such as coal dust adhesion, medium corrosion, and on-site interference. The products are widely used in key positions like coke oven equipment control, valve opening monitoring, and safety monitoring. They operate stably, are easy to maintain, and help coking enterprises reduce costs, improve efficiency, and ensure safe production.



Coal Charging Car  
Pusher  
Coke Guide  
Quenching Car

Coke Oven Battery Control

### ● Position Monitoring and Interlocking Control for Coke Oven Battery Machines

#### Displacement Monitoring

Type: T3H, T3D  
Output: Start/Stop, Profinet, EtherNET/IP  
Resolution: 0.1 $\mu$ m (highest)

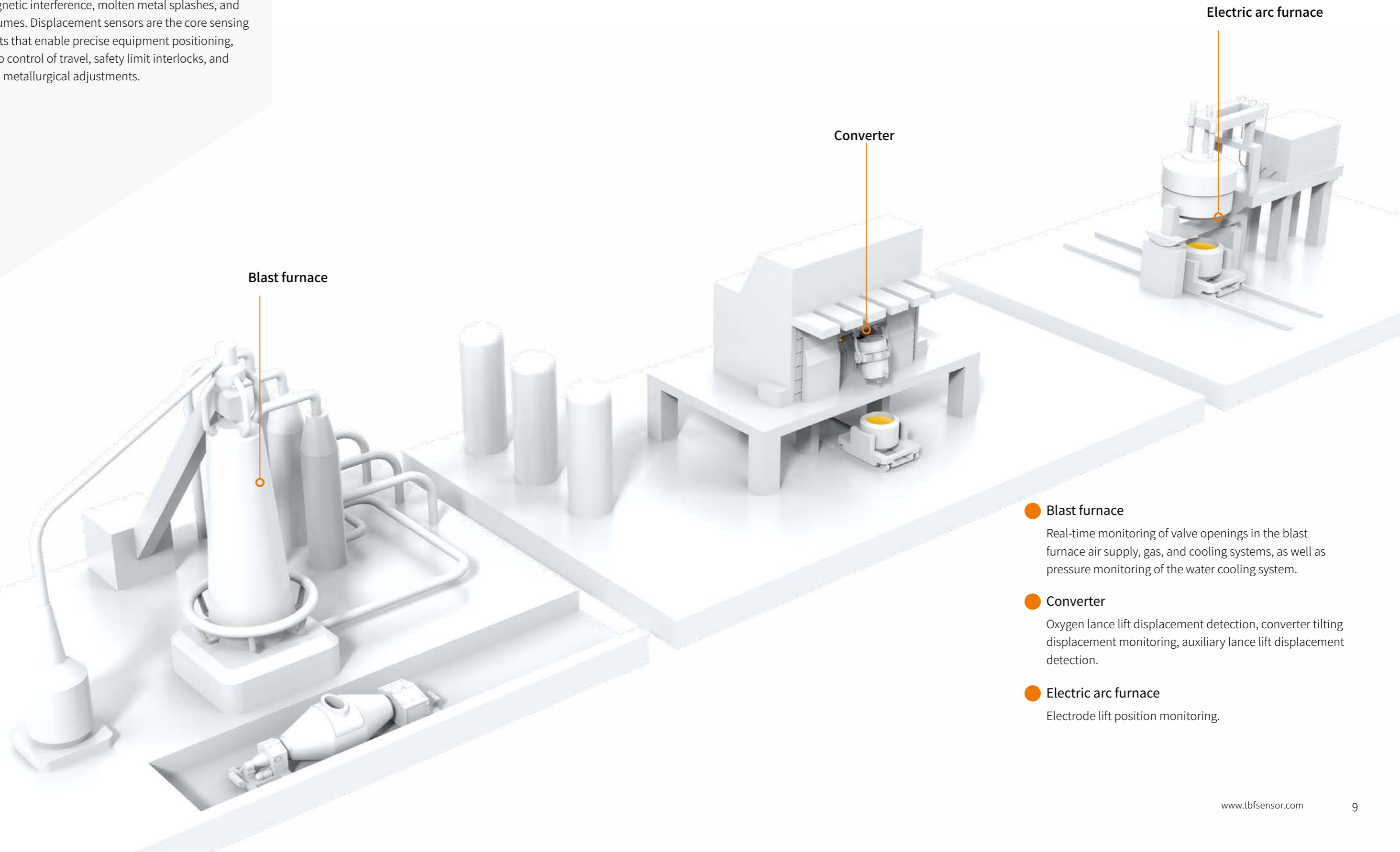
#### Rotary Measurement

Type: BNT1100  
Output: TTL, HTL

# Industry Applications

## —Smelting Process Solutions

In the processes of ironmaking and steelmaking, blast furnaces, converter furnaces, and electric furnaces all operate under extremely harsh conditions, including high temperatures, heavy dust, strong vibrations, intense electromagnetic interference, molten metal splashes, and corrosive fumes. Displacement sensors are the core sensing components that enable precise equipment positioning, closed-loop control of travel, safety limit interlocks, and automated metallurgical adjustments.



- **Blast furnace**  
Real-time monitoring of valve openings in the blast furnace air supply, gas, and cooling systems, as well as pressure monitoring of the water cooling system.
- **Converter**  
Oxygen lance lift displacement detection, converter tilting displacement monitoring, auxiliary lance lift displacement detection.
- **Electric arc furnace**  
Electrode lift position monitoring.

# Industry Applications

## — Continuous Casting Process Solution

In response to the continuous production characteristics of high temperature, high humidity, and heavy dust in continuous casting, Turck has developed a customized sensing solution. The products are widely used in key processes such as precise control of the crystallizer, billet cutting and positioning, and roll gap detection. With excellent resistance to vibration, thermal radiation, and dust, they enable closed-loop monitoring of process parameters, reduce equipment failure rates, and ensure continuous and efficient production.

### Application Example - Crystallizer Vibration Table

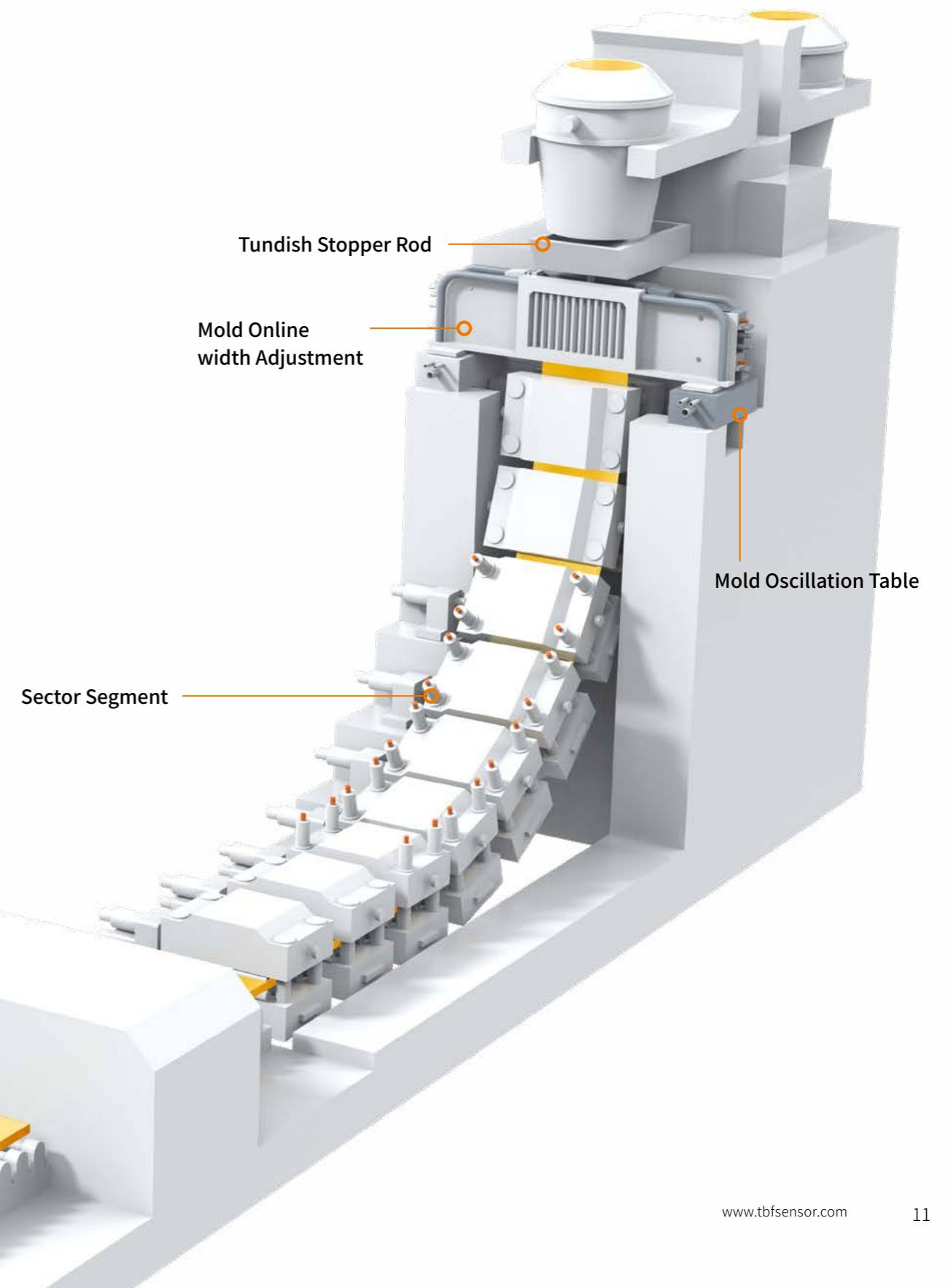
On-site, sensors are usually designed as either the 'external magnetostrictive type' or the 'internal hydraulic cylinder type.'

1. External solution (most common): installed directly below the guide beam on both sides (or one side) of the shaker, arranged along a "measuring rod" parallel to the vibration direction. A stainless steel protective cover is added outside the sensor electronics chamber, and 0.3-0.5 MPa of instrument air is supplied to form positive pressure for dust and water protection. A  $\phi 150$  mm handhole is opened on the platform directly above the sensor, allowing for replacement without dismantling the crystallizer, achieving hot swapping within 30 minutes.

2. Internal hydraulic cylinder solution (commonly used in next-generation slab continuous casting machines): installed inside the piston rod of the vibration hydraulic cylinder.

Typically, each shaker is equipped with two sensors installed diagonally so that even if one fails, the 'amplitude-frequency' closed loop can still be maintained. Keeping shaker amplitude deviation within  $\pm 0.1$  mm, ensuring that surface vibration marks on the slab are  $\leq 0.3$  mm deep, meeting surface quality requirements for high-end automotive sheets, silicon steel, and similar materials.

Interface options: generally Profibus-DP, SSI, or CANopen, depending on the control system.



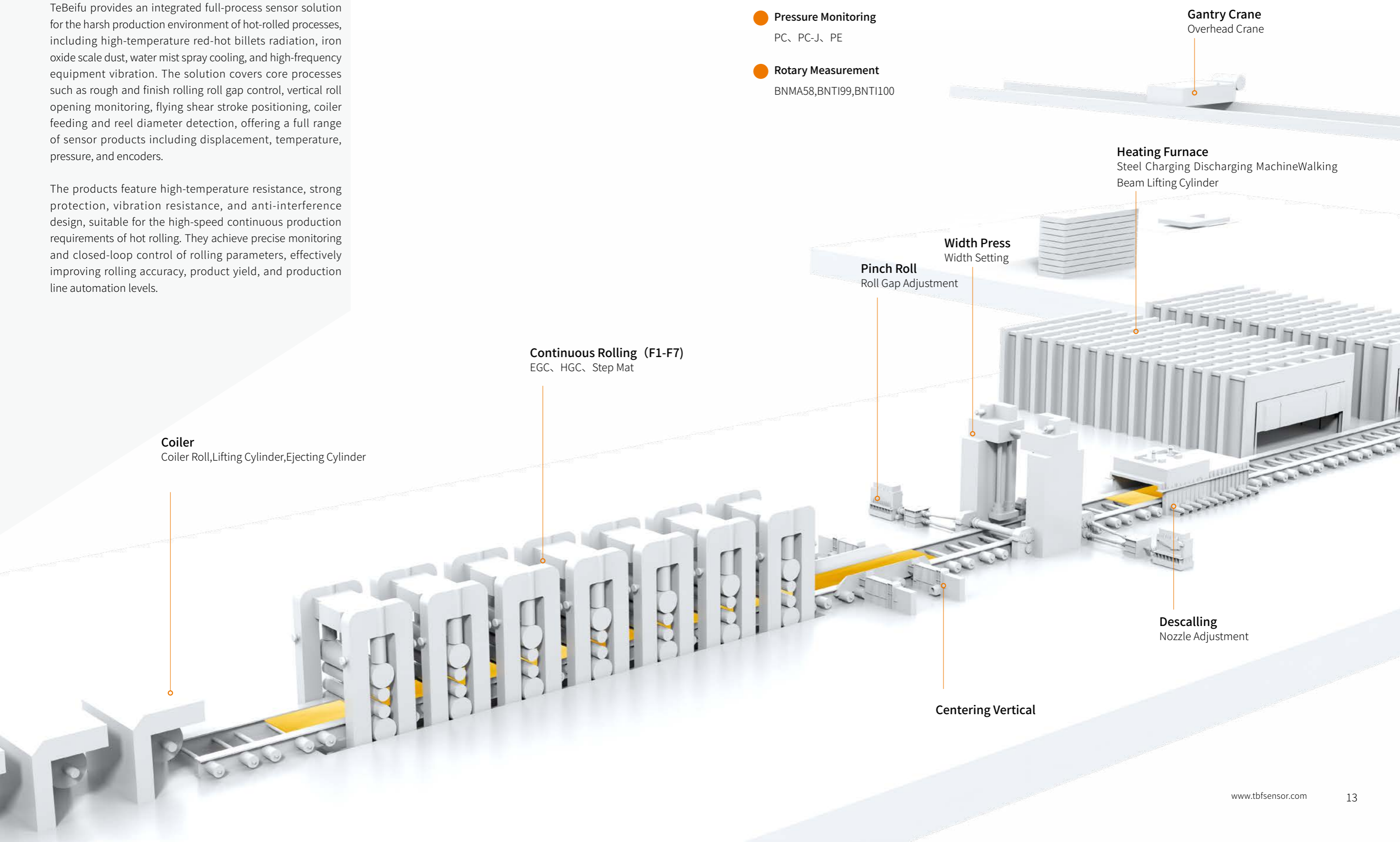
# Industry Applications

## — Hot Rolling Process Solutions

TeBeifu provides an integrated full-process sensor solution for the harsh production environment of hot-rolled processes, including high-temperature red-hot billets radiation, iron oxide scale dust, water mist spray cooling, and high-frequency equipment vibration. The solution covers core processes such as rough and finish rolling roll gap control, vertical roll opening monitoring, flying shear stroke positioning, coiler feeding and reel diameter detection, offering a full range of sensor products including displacement, temperature, pressure, and encoders.

The products feature high-temperature resistance, strong protection, vibration resistance, and anti-interference design, suitable for the high-speed continuous production requirements of hot rolling. They achieve precise monitoring and closed-loop control of rolling parameters, effectively improving rolling accuracy, product yield, and production line automation levels.

- **Displacement Monitoring**  
T3H, T3D, CH, T3F  
Output: Profibus-DP, SSI, CANopen  
Resolution: 0.1μm(highest)
- **Pressure Monitoring**  
PC, PC-J, PE
- **Rotary Measurement**  
BNMA58, BNTI99, BNTI100



**Coiler**  
Coiler Roll, Lifting Cylinder, Ejecting Cylinder

**Continuous Rolling (F1-F7)**  
EGC, HGC, Step Mat

**Pinch Roll**  
Roll Gap Adjustment

**Width Press**  
Width Setting

**Heating Furnace**  
Steel Charging Discharging Machine  
Walking Beam Lifting Cylinder

**Descaling**  
Nozzle Adjustment

**Centering Vertical**

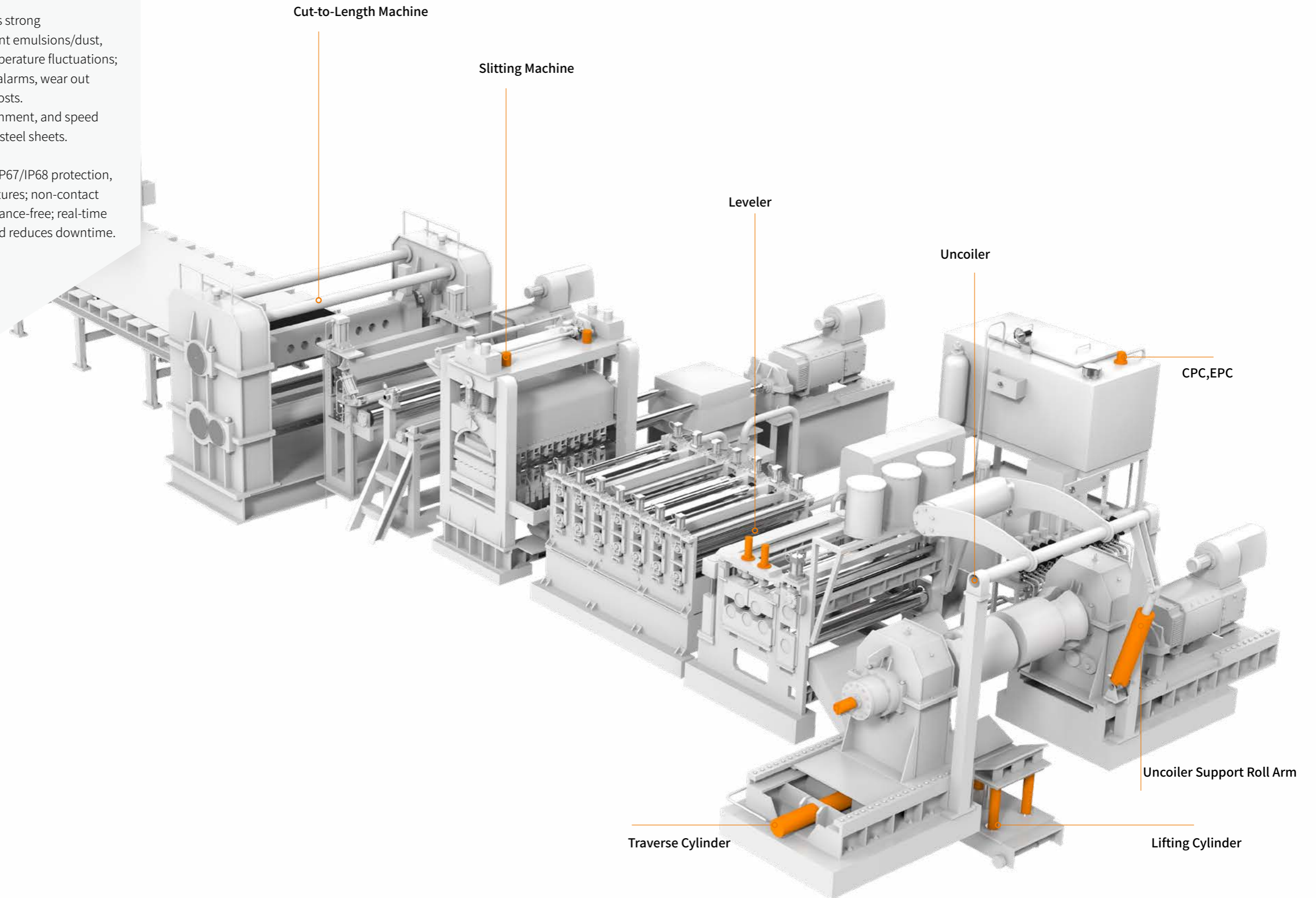
**Gantry Crane**  
Overhead Crane

# Industry Applications

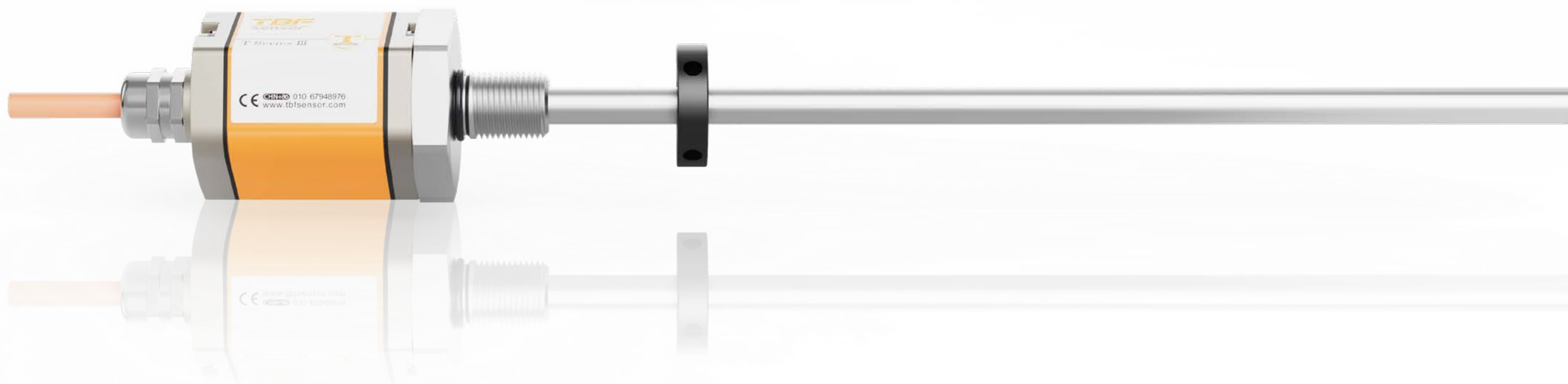
## —Cold Rolling Process Solutions

The cold rolling workshop experiences strong electromagnetic interference, abundant emulsions/dust, high-speed movement, and large temperature fluctuations; Traditional sensors are prone to false alarms, wear out quickly, and have high maintenance costs. Insufficient accuracy in thickness, alignment, and speed control affects the quality of high-end steel sheets.

A full range of industrial sensors with IP67/IP68 protection, anti-interference, and oil-resistant features; non-contact measurement, wear-free and maintenance-free; real-time closed-loop control improves yield and reduces downtime.



## T-Series III



### T Series III

The T-Series III. is an evolution based on the second generation of products, which is innovative while maintaining our usual high quality, and the new generation is more reliable and more powerful.

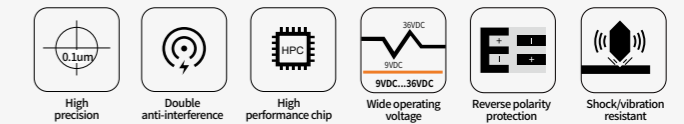
- + The new generation of sensors has been significantly upgraded in terms of vibration resistance, with excellent vibration and shock resistance, and can ensure the accuracy of data measurement under high shock and vibration operating conditions.
- + High precision: highest resolution 0.1 $\mu$ m.
- + The product can be used for a long time up to 120° C.
- + Double anti-interference
- + The rugged metal housing with IP68 protection allows for maximum reliability in harsh environments.
- + The electrical interface is diverse to meet the electrical connection of supporting equipment.



# T3-Series

## Magnetostrictive displacement sensor

- High precision: highest resolution 0.1μm
- Double anti-interference
- Resistance to shock and vibration
- Polarity protection, overvoltage protection
- Enhanced monitoring and diagnosis functions
- Wide operating voltage (9VDC~36VDC)



Type	T3H	T3P	T3D	T3F
<b>Output</b>	Position/Velocity			
<b>Measuring length</b>	25-7650	25-5600	25-5600	100-20000
<b>Interface type</b>	Analog Start-Stop	SSI CANopen	EtherCAT PROFINET IO-Link	EtherNet/IP IO-Link
<b>precision</b>	Interface	Resolution	Nonlinear degree	Repeatability
	Analog	16 位 D/A	0.01%F.S.	0.001%F.S.
	SSI	0.1μm	0.01%F.S.	0.001%F.S.
	Start/Stop	**	0.02%F.S.	0.001%F.S.
	CANopen	1μm	0.01%F.S.	0.001%F.S.
	Profibus-DP	1μm	0.01%F.S.	0.001%F.S.
	Profinet	0.5μm	0.01%F.S.	0.001%F.S.
	IO-Link	1μm	0.01%F.S.	0.001%F.S.
EtherCAT	0.5μm	0.01%F.S.	0.001%F.S.	
EtherNet/IP	1μm	0.01%F.S.	0.001%F.S.	

T3F Nonlinear degree 0.02%F.S.

<b>Operating voltage</b>	9VDC~36VDC *SSI: 24VDC(-15/+20%)
<b>Shock</b>	T3H/T3P: 150 g/11 ms T3D : 100 g/11 ms T3F : 100 g/6 ms, IEC standard 60068-2-27
<b>Vibration resistance</b>	T3H/T3P: 30 g/10~2000 Hz T3D : 10 g/10~2000 Hz T3F : 5 g/10~2000 Hz IEC standard 60068-2-6 (excluding resonance frequency)

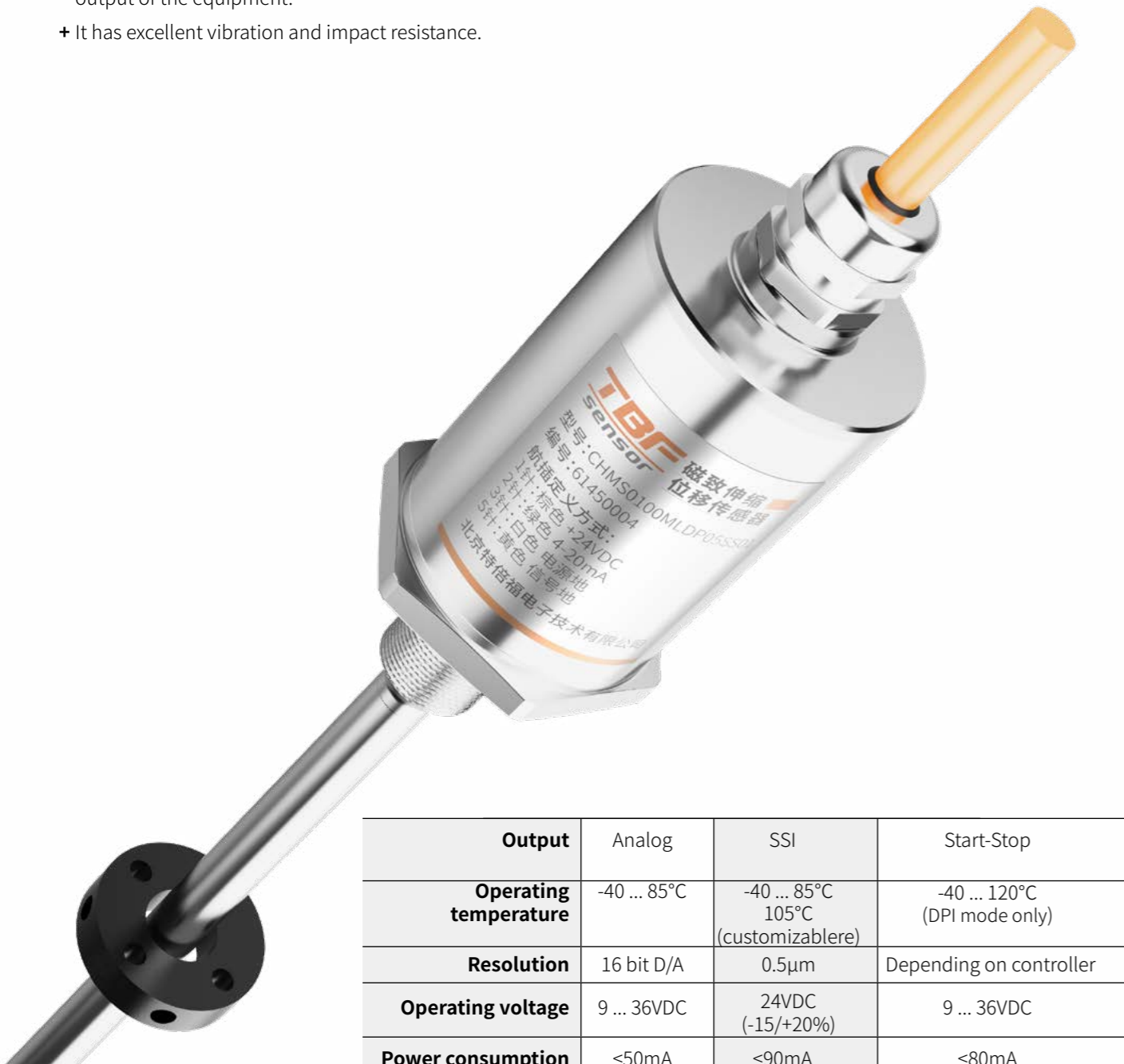
\*\* Depending on the controller

# C-Series

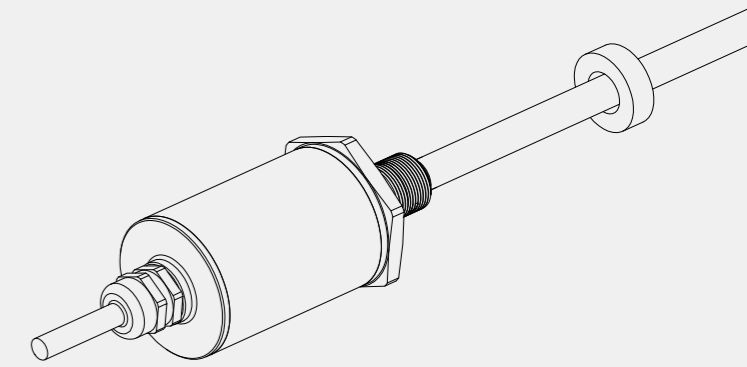
## CH type

Measurement range 50 ... 4500mm

- + The pressure-resistant outer tube type sensor is used in high-pressure environments.
- + The material of the whole machine is made of stainless steel, which has excellent corrosion resistance.
- + Straight-line measurement: Absolute output, no need to reset to zero.
- + The equipment has a double shielding structure with anti-interference function to ensure the stability of the signal output of the equipment.
- + It has excellent vibration and impact resistance.



Output	Analog	SSI	Start-Stop
Operating temperature	-40 ... 85°C	-40 ... 85°C 105°C (customizable)	-40 ... 120°C (DPI mode only)
Resolution	16 bit D/A	0.5µm	Depending on controller
Operating voltage	9 ... 36VDC	24VDC (-15/+20%)	9 ... 36VDC
Power consumption	<50mA	<90mA	<80mA



## CH Technical Parameter

Output: Analog, SSI, Start-Stop

### Input

Measured data	Position
Measurement range	50mm ... 4500mm
<b>Resolution</b>	
Resolution	Depends on the output
None-Linearity	<±0.02%F.S.
Repeatability	<±0.002%F.S.
Temperature coefficient	<30ppm/°C

### Mounting

Mounting position	Any
Thread	Metric M18x1.5, metric M20x1.5, metric M24x1, 3/4"-16UNF-3A

### Design/Material

Electronics housing	Stainless steel 304
Measuring rod	Stainless steel 304/316L
Operating pressure ratings	35MPa (continuous), 70MPa (peak)

### Electrical connection

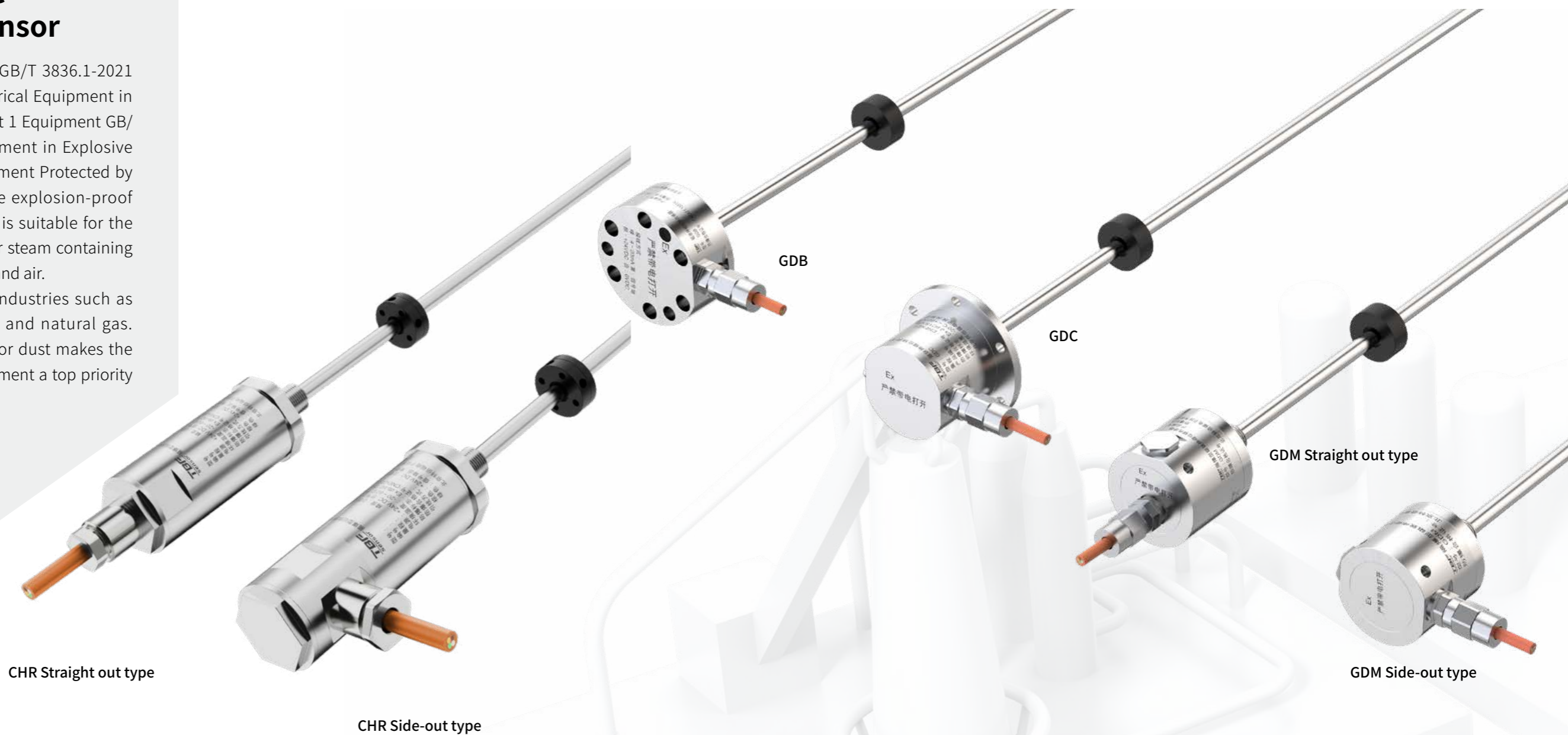
Wiring connection	Connector is fitted/Straight out cable
Polarity protection	Up to -36VDC
Overvoltage protection	Up to +36VDC
Dielectric strength	500 VDC (DC ground to machine ground)

### Operating conditions

Magnet velocity	Any
Humidity	90 % relative humidity, no condensation
Protection max.	IP67/IP68, IP69K
Shock	100 g/11 ms, IEC standard 60068-2-27
Vibration	15 g/10 ... 2000 Hz, IEC standard 60068-2-6 (resonant frequencies excluded)
EMC	Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2

# Magnetostrictive displacement sensor

This product conforms to GB/T 3836.1-2021 General Requirements for Electrical Equipment in Explosive Gas Environments Part 1 Equipment GB/T 3836.2-2021 Electrical Equipment in Explosive Gas Environments Part 2 Equipment Protected by Flameproof Enclosure "d". The explosion-proof mark is Ex db IIC T5 Gb, which is suitable for the formation of combustible gas or steam containing Class II A, B and C T1-T5 groups and air. It is mainly used in high-risk industries such as petroleum, chemical industry and natural gas. The existence of explosive gas or dust makes the explosion-proof design of equipment a top priority in safety production.



<b>EX explosion proof type</b>	GDB	GDC	GDM	CHR
<b>Category</b>	explosion proof type Pressure-resistant outer tube, high protection level, used in potential explosive environment, obtained IECEx, ATEX international certification			explosion proof type
<b>Domestic certification</b>	WEx d IIB T5 Gb	Ex d IIC T5 Gb	Ex d IIC T5 Gb	Ex db IIC T5 Gb
<b>International certification</b>	EU certification I M2 Ex db I Mb, II 2G Ex db IIC T5 Gb international certification Ex db I Mb, Ex db IIC T5 Gb			
<b>Measuring length</b>	50~4500mm			50~4500mm
<b>Output signal type</b>	4-20mA; 20-4mA; 0-20mA; 20-0mA; 0-10VDC; 10~0VDC; 0-5VDC; 5~0VDC			



# Encoder

## Compact, Standard, Heavy-Duty

In the metallurgical and coking industries, the products are used for a long time in harsh environments with high dust, high humidity, extreme temperature and mechanical stress.

### APPLICATION

- Pusher Machine Positioning and Control
- Four-Machine Interlocking
- CDQ (Coke Dry Quenching) Equipment Monitoring
- Tilting Control
- Overhead Crane Positioning
- Roll and Motor Speed Monitoring



**Standard Encoder  
BNMA58**  
Diameter: 58mm  
Single lap resolution: 8...16bit  
Number of pturns: < 24bit  
Interface: SSI/SSI+increment, CANopen/  
CANopen+increment



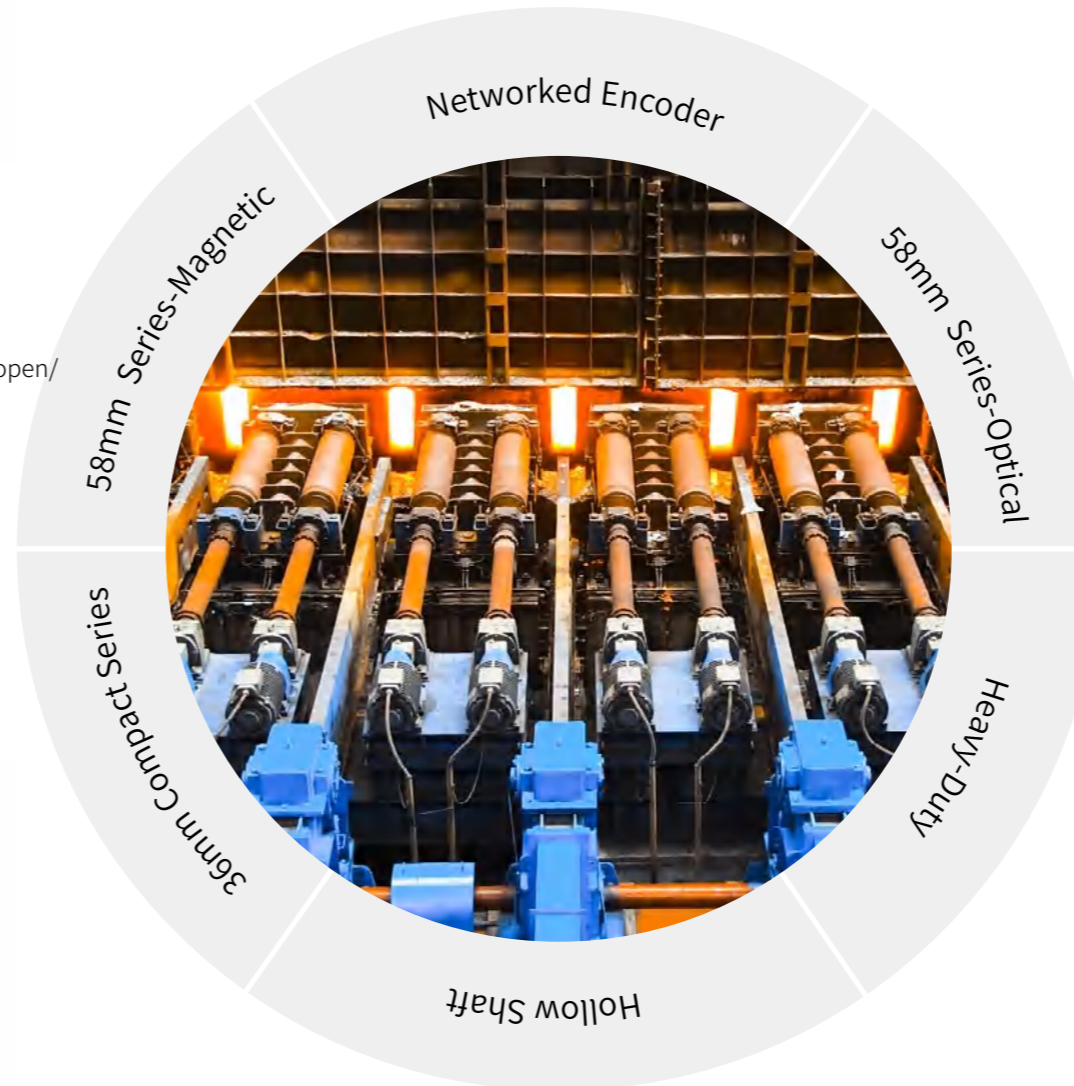
**Networked Encoder  
BNMA58**  
Diameter: 58mm  
Single lap resolution: 8...16bit  
Number of pturns: < 24bit  
Interface: Profinet



**Standard Encoder  
BNTI58**  
Diameter: 58mm  
Single lap resolution: 5000PPR  
Output: TTL/HTL



**Compact Encoder  
BNMA36**  
Diameter: 36mm  
Single lap resolution: 12...14bit  
Number of pturns: 13bit  
Interface: SSI, SSI+increment,  
CANopen



**Heavy-Duty Encoder  
BNTI100**  
Diameter: 99.5mm  
Resolution: 1024/5000PPR  
Output: TTL/HTL



**Hollow Shaft Encoder  
BNTI99**  
Diameter: 99mm  
Resolution: 1024/5000PPR  
Output: TTL/HTL

# Pressure transmitter series

## Pressure transmitter, digital display pressure, pressure switch

Adopting international advanced metal sputtering film pressure core, high-precision silicon pressure core and high-precision silicon flat film core, the equipment has high long-term stability, small temperature drift, wide temperature range, high precision and high pressure impact resistance.

### Digital pressure transmitter

The electronic compartment can rotate freely 330°  
Analog+Two-way switch output



### Hessman digital display pressure transmitter

Adapting hessman connector of pressure transmitter



Type	PC-T / PE-T	PC / PE / PC-J
Name	Digital pressure transmitter	Hessman digital display pressure transmitter
Explain	Digital display pressure transmitter with integrated display; The electronic compartment can rotate freely by 330 degrees.	Adapted to hessman connector of pressure sensor, it can set pressure unit, zero/full position correction point, upper/lower range and other functions.

### PC-type pressure transmitter

High precision silicon pressure core  
Measuring range:-1~600Bar



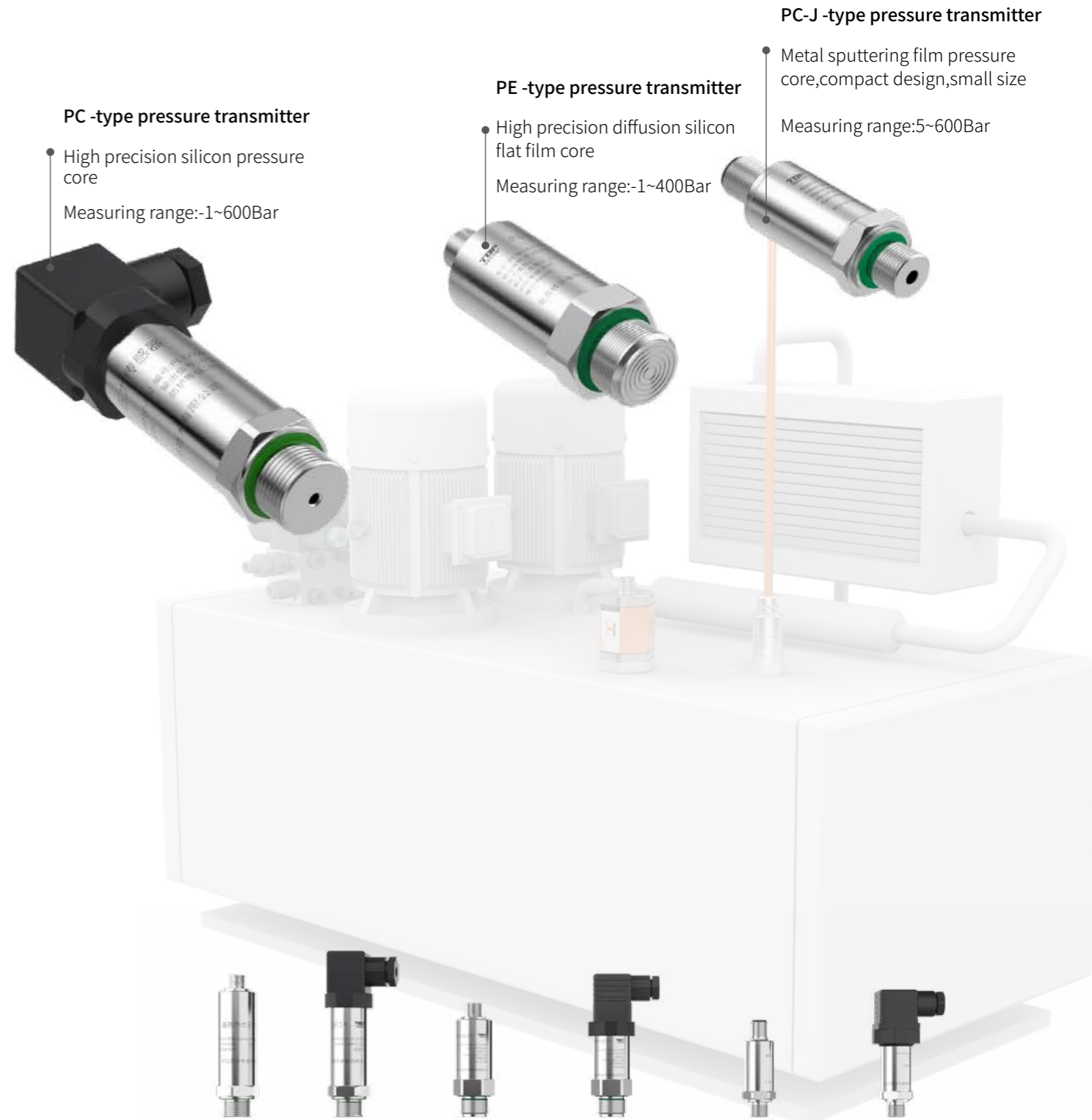
### PE-type pressure transmitter

High precision diffusion silicon flat film core  
Measuring range:-1~400Bar



### PC-J-type pressure transmitter

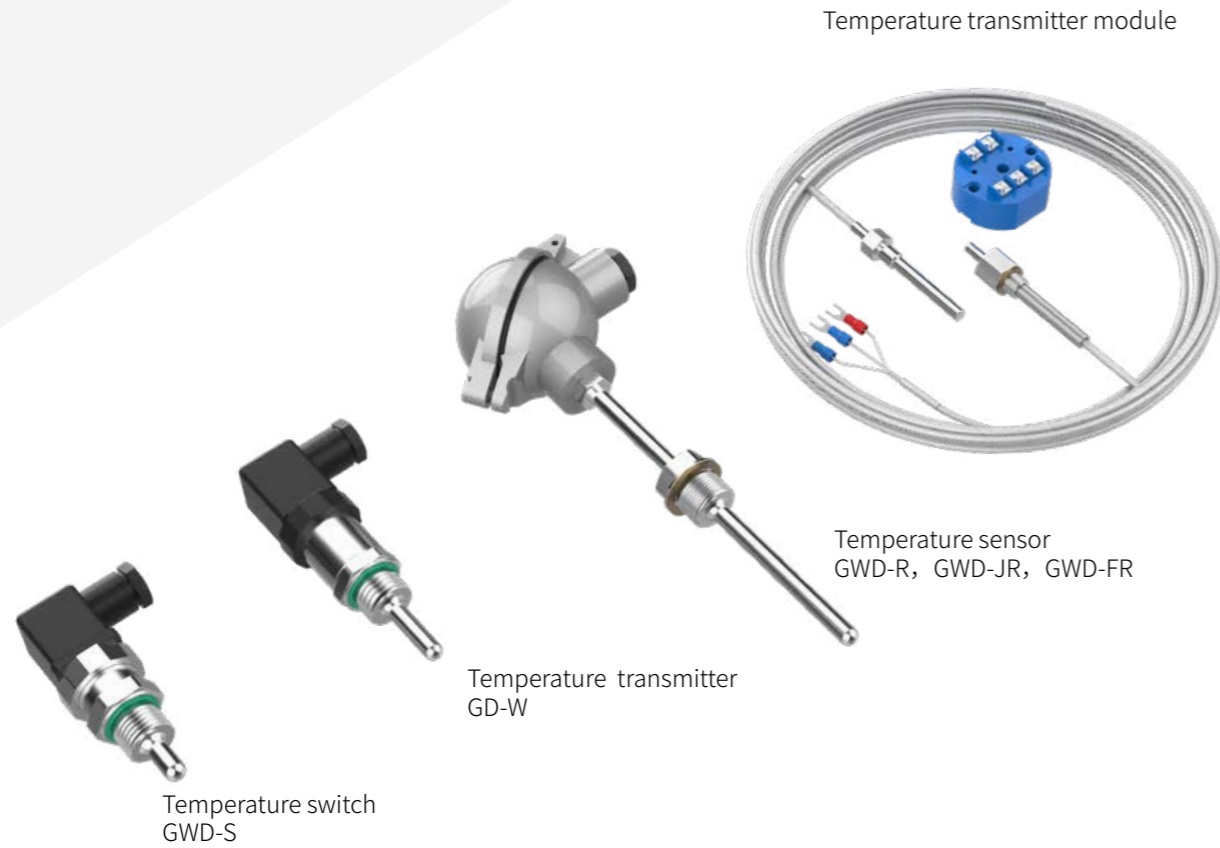
Metal sputtering film pressure core, compact design, small size  
Measuring range:5~600Bar



Type	PC	PE	PC-J
Pressure core	Diffused silicon	Diffused silicon flat film	Metal sputtering film
Measuring range	-1~600Bar	-1~400Bar	5~600Bar
Pressure Type	Gauge pressure, absolute pressure and sealed gauge pressure	Gauge pressure and absolute pressure	Gauge pressure

# Temperature Series

Temperature sensor/Transmitter/Switch  
Liquid level temperature sensor



Temperature transmitter module

Temperature sensor  
GWD-R, GWD-JR, GWD-FR

Temperature transmitter  
GD-W

Temperature switch  
GWD-S

<b>Temperature measuring range</b>	-50~300°C (normal -50~250°C)					
<b>Graduation number/resistance value</b>		The standard resistance value R at 0°C	The standard resistance value R at 100°C			
	PT100	100.00	138.51			
	PT1000	1000.00	1385.1			
<b>Measurement Error</b>	Grade	Error of resistance at zero degree%		Temperature error °C		
	A	±0.06		± (0.15+0.002   t   )		
	B	±0.12		± (0.30+0.005   t   )		
<b>Response time</b>	Rod diameter mm	5	6	8	10	12
	Thermal response times (T0.5)	≤ 8	≤ 15	≤ 30	≤ 30	≤ 30

# Liquid level temperature series

—Precise monitoring of liquid level and temperature, stable and reliable.

The float-type liquid level temperature sensor adopts the integrated design of float and temperature probe, which can measure liquid level height and liquid temperature at the same time, and has the characteristics of simple structure, corrosion resistance, strong antiinterference and long service life.



Type	LH-YT	YW
Liquid level range	40...2000mm	50...4500mm
Temperature range	-40...125°C	-40...125°C
Output	4 channels of NPN/PNP+2 channels of analog signals	Analog, CANopen



Beijing Tebeifu Electronic Technology Co., Ltd.  
Building 6, Dazu Enterprise Bay,  
8th yard of Liangshuihe 2nd street, BDA P.R.China  
Tel: +86 10-67948976/67948916  
Fax:+86 10-67948979  
Mailbox: sale@tbfsensor.com  
Web: www.tbfsensor.com

---

TBF Electronic Technology GmbH(German branch )  
Felix-Wankel-Str.1, 85221 Dachau, Germany  
Tel: +49 (0) 8131 337578-0  
E-mail: info@tbfsensor.de  
Web: en.tbfsensor.com

Website



Wechat

