The dedicated sensory system for engineering machinery

SENSORS FOR MOBILE MACHINERY | 2026

Magnetostrictive Sensor - Pressure/Temperature Transmitter - Rotary Encoder - Draw Wire Sensor

www.tbfsensor.com

About US

12000m²
Production

260
Staff

>30%
Proportion of R&D staff

40+
Export country

Trusted by 1,000+ leading companies

Nationally high-tech enterprise

Founded in 2014, TBF Electronic Technology specializes in magnetostrictive linear displacement sensors,delivering reliable,certified solutions worldside.

High-reliability product solutions

Five sensing platforms,led by ultra-high-resolution magnetostrictive sensors(down to 0.1μm)designed for stable performance in demanding environments.

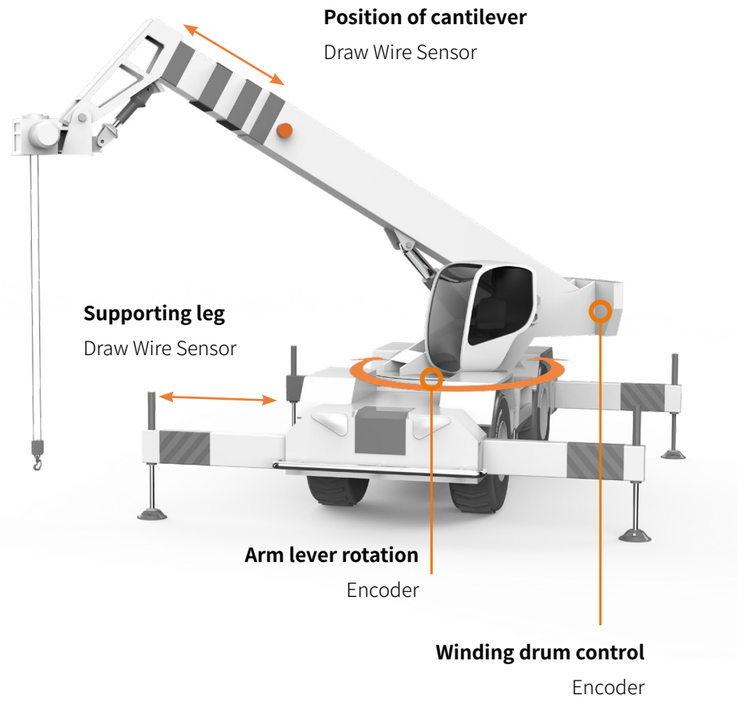
A global market presence

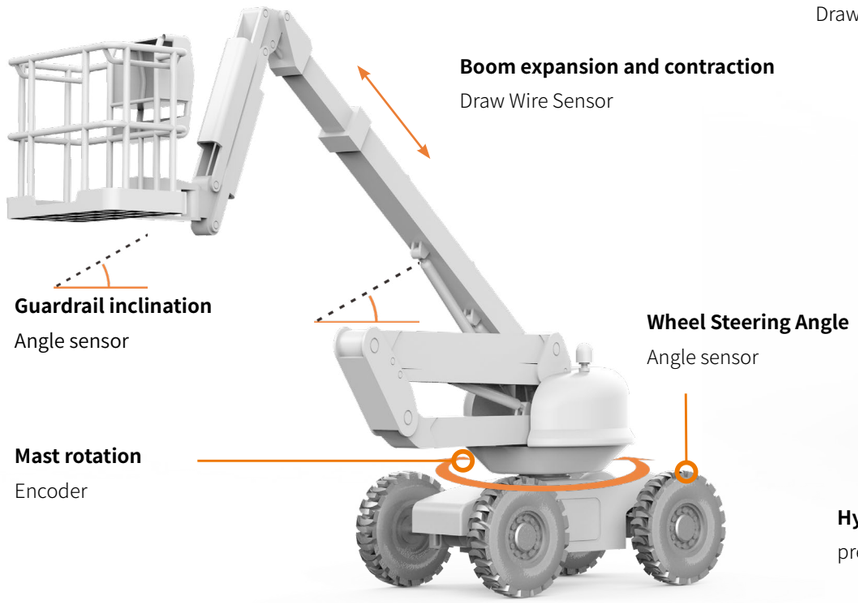
With a European subsidiary in Munich,TBF supplies customers across Europe,North America,the Middle East,and Southeast Asia,serving a global customer base that includes leading multinational industrial groups.

Industrial application -Construction machinery

With the characteristics of high precision, high reliability and fast response, accurate operation control is realized. By accurately monitoring the information such as equipment position, attitude and pressure, the construction efficiency, safety and equipment life are greatly improved.

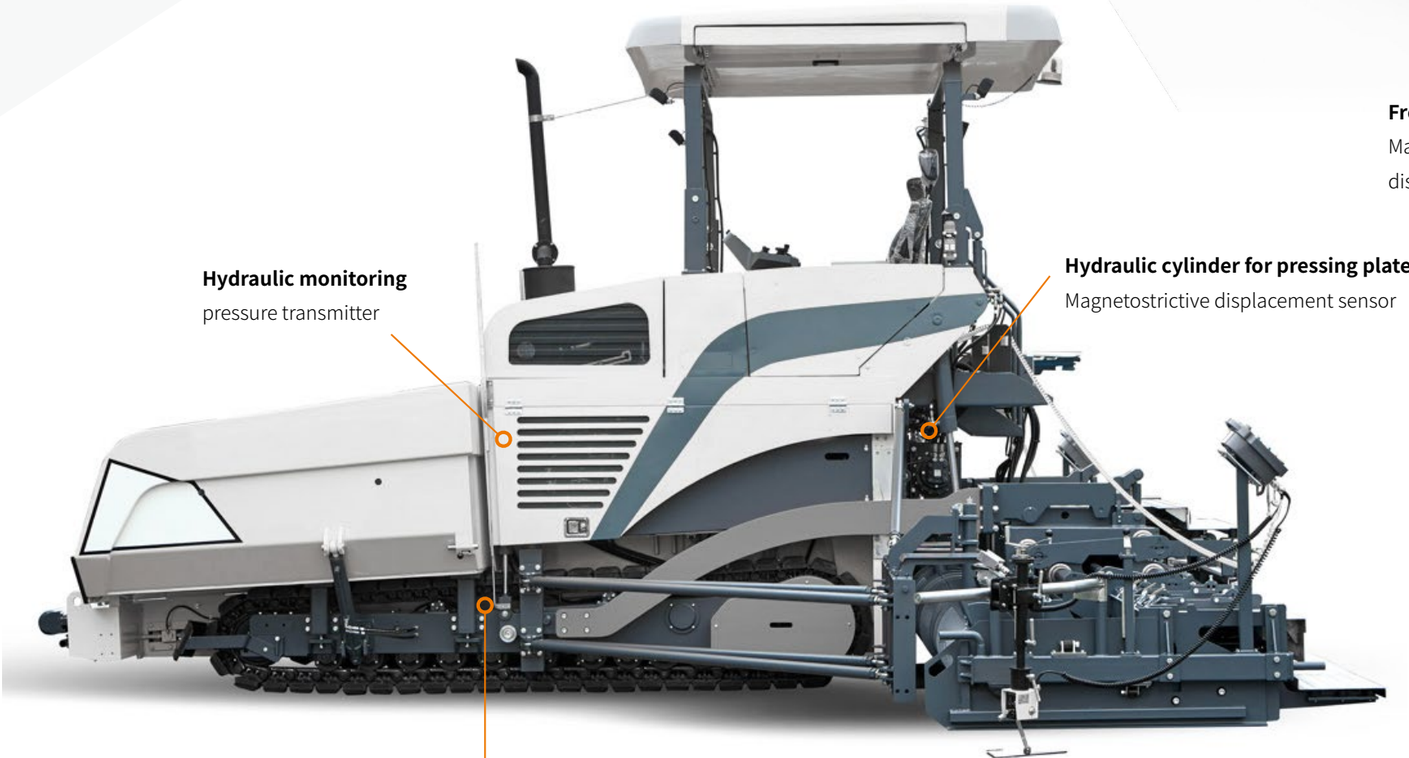
TBF products have high environmental adaptability, and can run stably under the working conditions of high temperature, high humidity, dust, high impact and strong vibration.

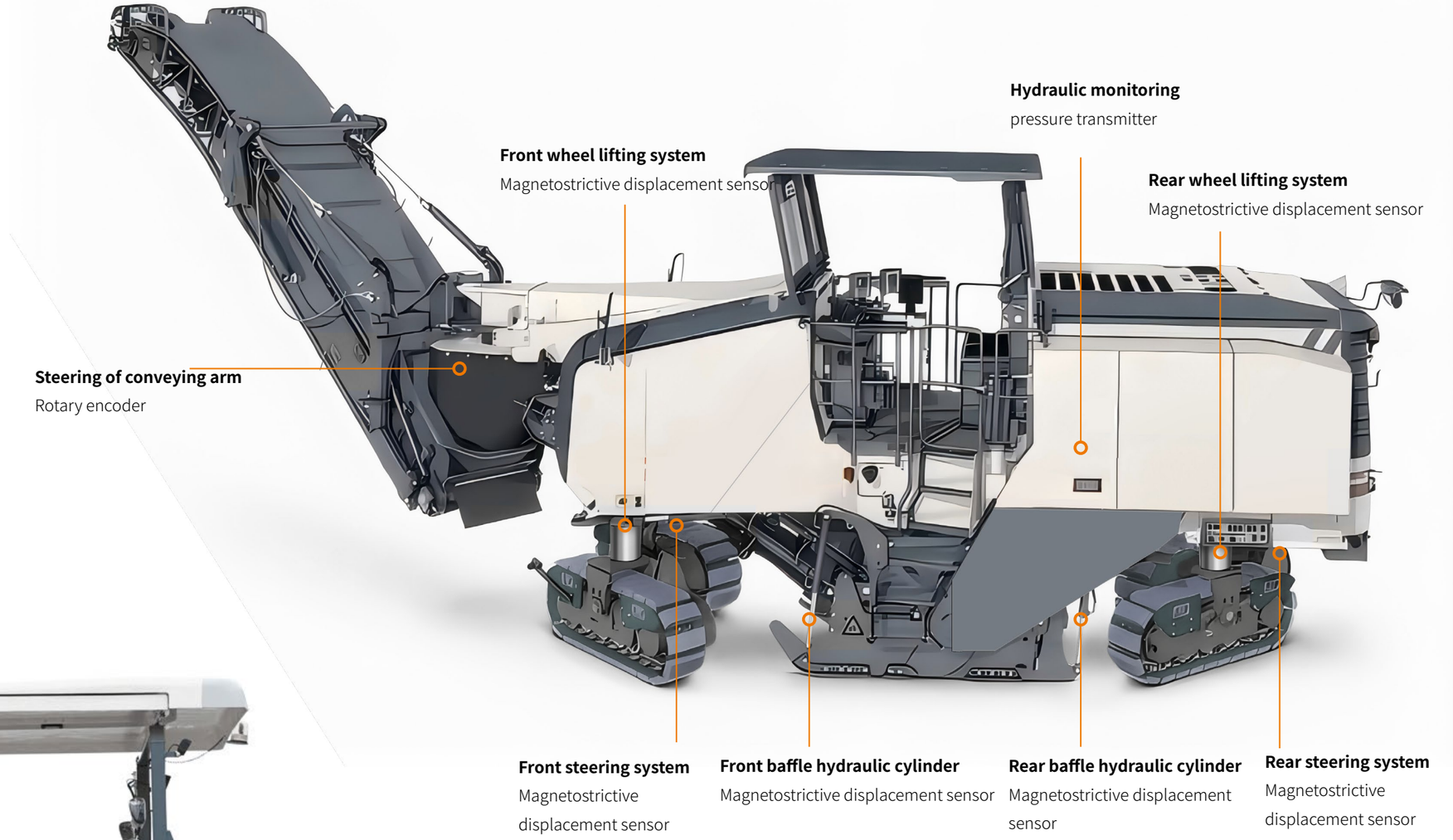




Industrial application -Road machinery

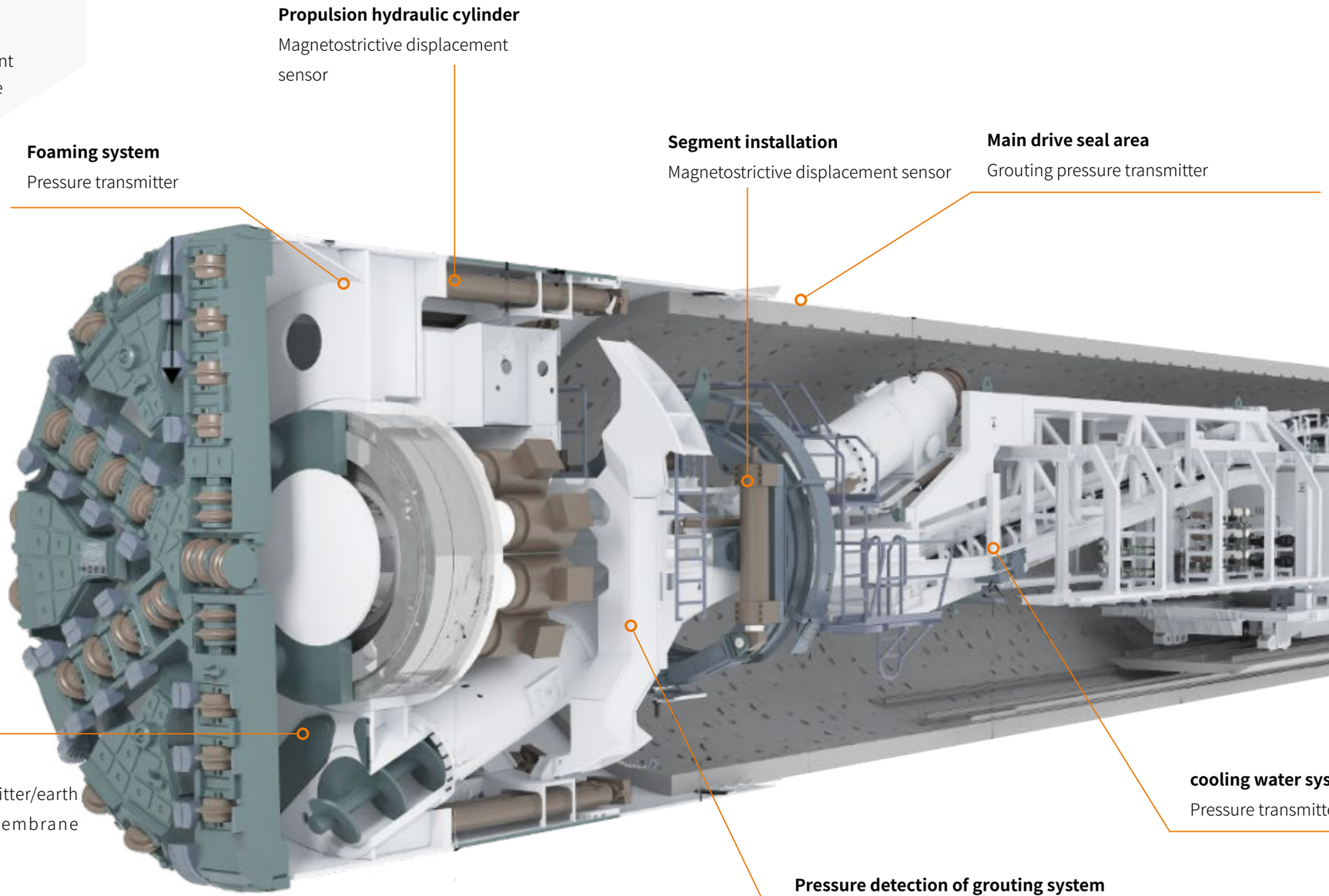
The application of sensor in road machinery (such as grader, paver, milling machine, asphalt mixing equipment, etc.) is one of the core technologies of modern intelligent construction and unmanned operation. Pass through reality Monitoring the status of the equipment in real time significantly improves the construction efficiency, safety and accuracy.

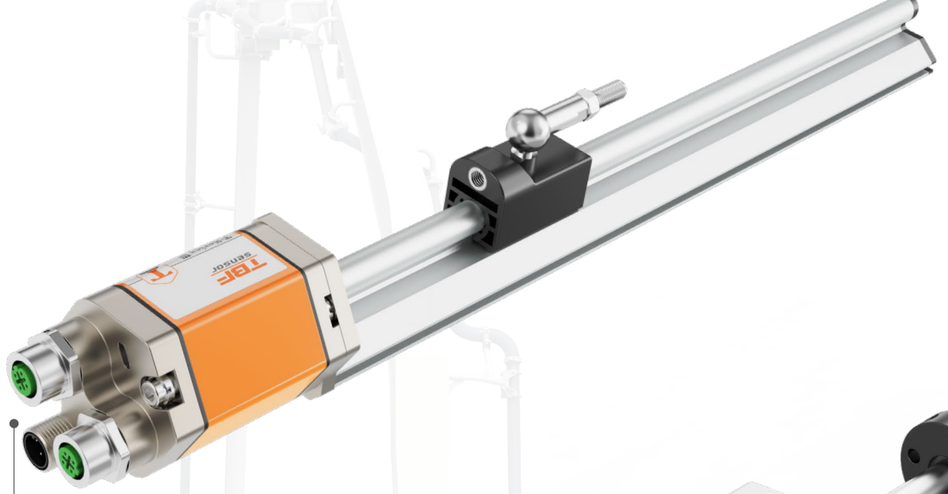




Industrial application —tunnel boring machine (TBM)

Construction safety: By monitoring the parameters of earth pressure and mud, safety problems such as ground subsidence can be avoided.
Optimize the construction process: provide data support for operators, optimize the working parameters of shield machine and improve the construction efficiency.
Fault diagnosis: it is helpful to find the equipment fault early and ensure the normal operation of the equipment.





T3P External guide rail type
Aluminum profile shell, easy to install on the machine surface or outside.

T3H Pressure-resistant outer tube type
Threaded installation, suitable for use in hydraulic cylinder or cylinder.

T3D Split type
A variety of rod types, suitable for U-shaped and other limited hydraulic cylinders.

T3F Flexible outer tube type
Flexible outer tube type, the maximum range is 20 meters, which is convenient for transportation and installation.

T-Series

Magnetostrictive displacement sensor

T-Series III is an upgraded product based on the second generation products.It has been innovated while maintaining our consistent high quality,and the new generation products are more reliable and stable,with strong performance.

- High precision: highest resolution 0.1μm
- Double anti-interference
- Resistance to shock and vibration
- Support 30 magnets online at the same time
- Polarity protection, overvoltage protection
- Enhanced monitoring and diagnosis functions
- Wide operating voltage（9VDC~36VDC)

Type	T3H	T3P	T3D	T3F
Output	Position, speed			
Measuring Range	25-7650	25-5600	25-5600	100-20000
Interface type	Analog Start-Stop SSI CANopen EtherCAT PROFIBUS PROFINET IO-Link			

precision

Interface	Resolution	Nonlinear degree	Repeatability
Analog	16 bit 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	5μm	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 degree0.02%F.S.

Operating voltage	9VDC~36VDC *SSI：24VDC(-15/+20%)
Shock	T3H/T3P：150 g/11 ms T3D ：100 g/11 ms T3F ：100 g/6 ms，IEC standard 60068-2-27
Vibration resistance	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)

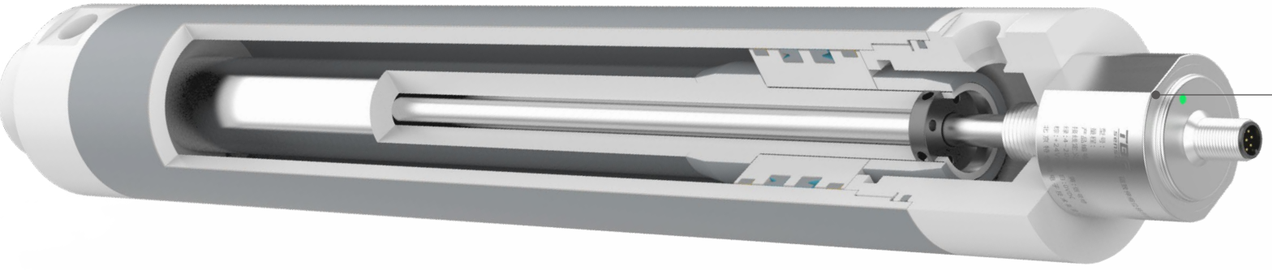
**** Depending on the controller**

For more information： www.tbfsensor.com

GB
Horizontal organization design, flange installation

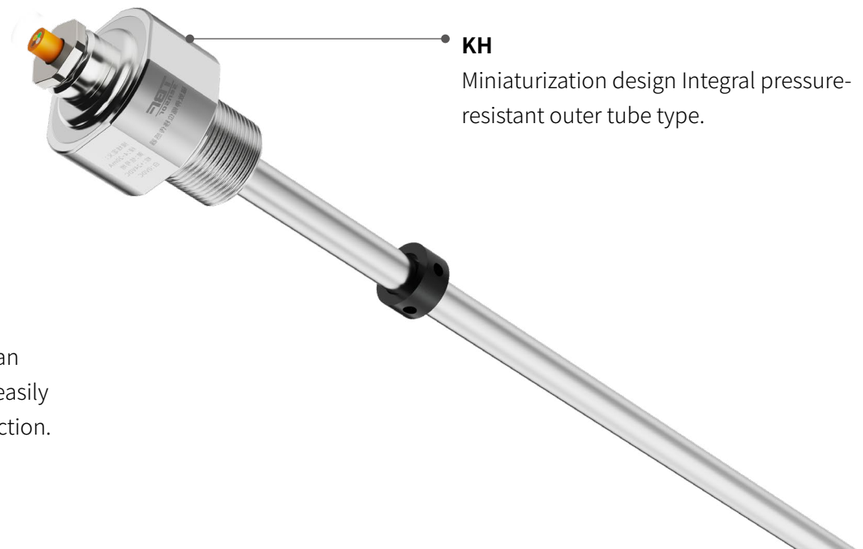
CH
All stainless steel shell, high reliability is widely used in metallurgical industry.

DH
Miniaturization designIntegral pressure-resistant outer



GA
IO-Link interface sensor with LED indication function

GBM
The electronic compartment can rotate 360 degrees, which can easily realize the required wiring direction.



KH
Miniaturization design Integral pressure-resistant outer tube type.

Integral pressure-resistant outer tube type

Magnetostrictive displacement sensor

The compact or flat electronic component shell is convenient for the sensor to be installed in a limited space;
The integrated design makes the equipment have higher durability and higher protection level(Max IP68/IP69K);
The whole machine is made of 304/316L stainless steel, which has excellent corrosion esistance and is suitable for various harsh working environments.

Output (accuracy)

Resolution	GB/GBM	CH	DH	KH	GA
Analog	16 bit D/A	16 bit D/A	16 bit D/A	16 bit D/A	16 bit D/A
Start/Stop	-	**	-	-	-
SSI	0.5μm	0.5μm	0.5μm	-	0.5μm
CANopen	2μm	-	2μm	-	-
IO-Llink	-	1μm	-	-	1μm

Nonlinear degree	⩽ ±0.02%F.S.	*KH ⩽ ±0.04%F.S.

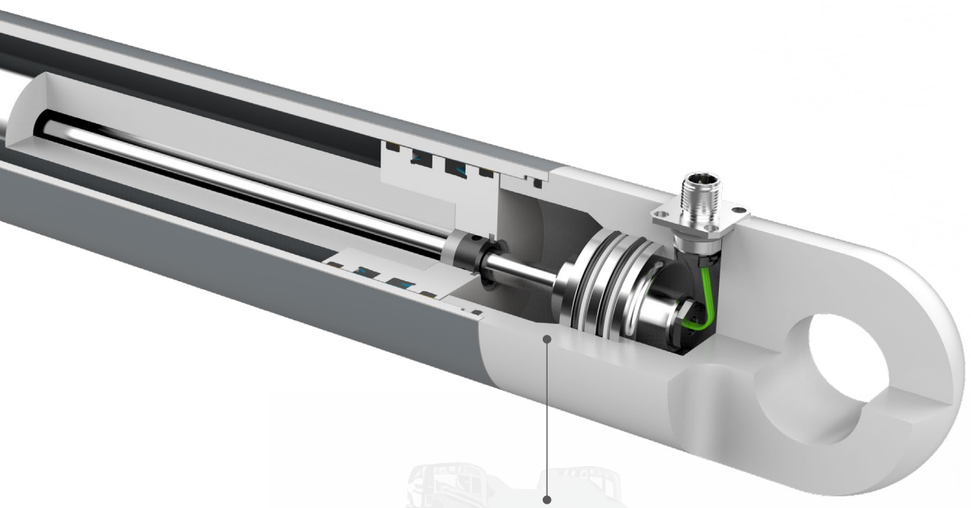
Working conditions

Operating voltage	9VDC~36VDC	*GA/GB/CH(SSI):24VDC(-15/+20%)
Temperature	-40~85°C	*CH(Start/Stop) ： -40~120°C
Ingress protection	IP68(Direct-out cable)	IP67(Aerial insertion type) *CH：IP69K
Shock	100 g/6 ms, IEC standard 60068-2-27	
Vibration	15 g/10~2000 Hz IEC standard 60068-2-6 (excluding resonance frequency)	

Effective range

Effective range	50~4500mm

**** Depending on the controller**



MH
Various sealing and fixing forms
Shock resistance and vibration resistance
Widely used in engineering equipment industry

ES
Miniaturization design

MHT
Safe and redundant design with two independent outputs.

EE

Embedded type

Magnetostrictive displacement sensor

In order to meet the integrated application in the cylinder, the product can be embedded in the hydraulic cylinder, and the equipment provides a variety of installation and fixation methods such as thimble type, double seal type and single seal type.

Output (accuracy)

Resolution	EE	ES	MH	MHT
Analog	16 bit D/A	16 bit D/A	16 bit D/A	16 bit D/A
Start/Stop	-	-	-	-
SSI	0.5μm	-	-	-
CANopen	-	100μm	0.5μm	0.5μm

Nonlinear degree	EE	⩽ ±0.02%F.S.
	ES	⩽ ±0.04%F.S.
	MH/MHT(Analog)	⩽ ±0.04%F.S.
	MH/MHT(CANopen)	⩽ ±0.02%F.S.

Working conditions

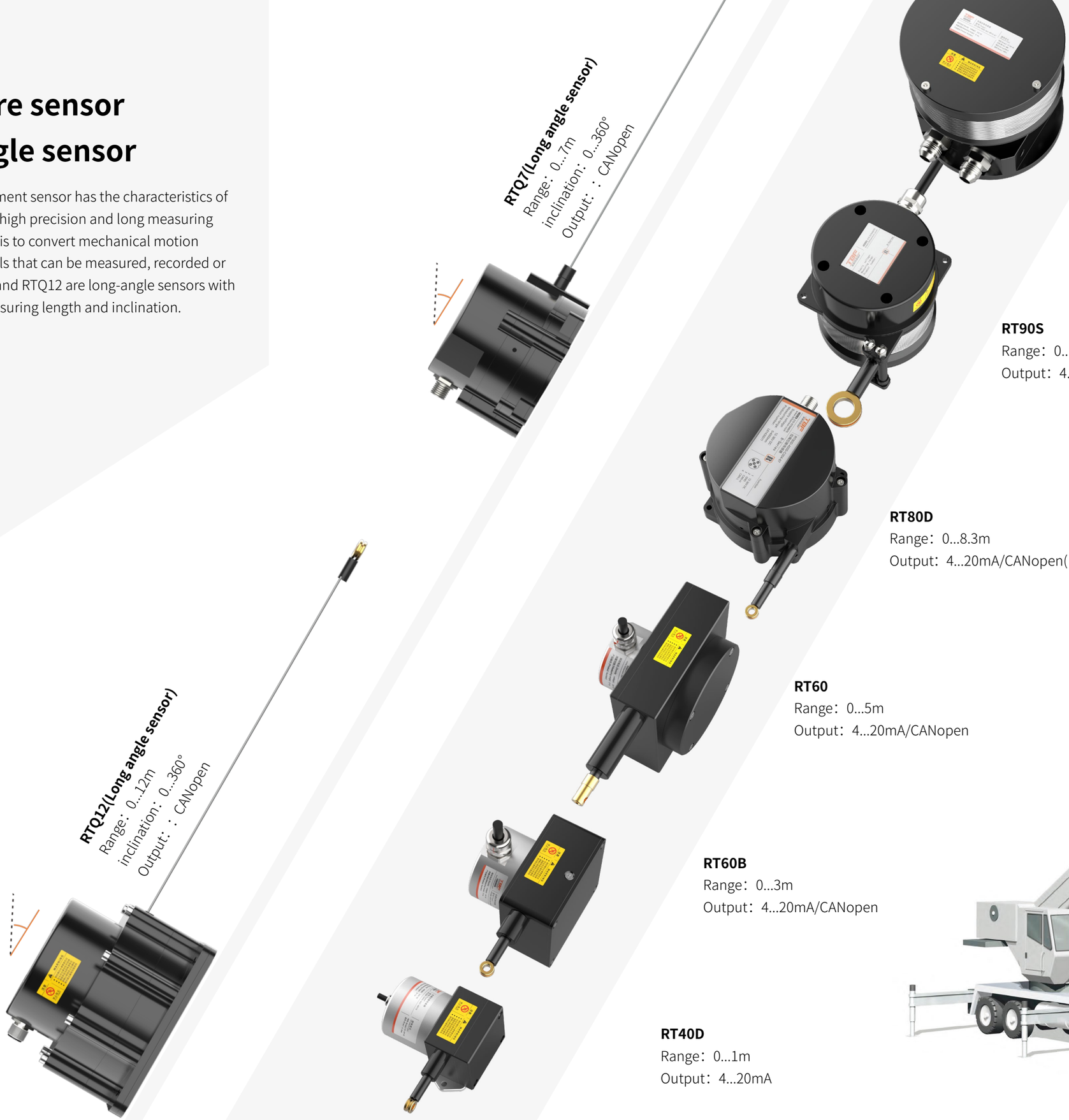
Operating voltage	9VDC~36VDC	
Temperature	EE/ES	-40~85°C
	MH/MHT	-40~85°C（105°C customized）
Ingress protection	IP68(Direct-out cable) IP67(Aerial insertion type) IP69K	
Shock	100 g/6 ms, IEC standard 60068-2-27	
Vibration	15 g/10~2000 Hz IEC standard 60068-2-6 (excluding resonance frequency)	

Effective range

EE/MH/MHT	50~4500mm
ES	50~2500mm

Draw wire sensor
Long angle sensor

The cable displacement sensor has the characteristics of compact structure, high precision and long measuring stroke. Its principle is to convert mechanical motion into electrical signals that can be measured, recorded or transmitted. RTQ7 and RTQ12 are long-angle sensors with the function of measuring length and inclination.



RT120S
Range：0...4m
Output：4...20mA，CANopen

RT90S
Range：0...3.5m
Output：4...20mA

RT80D
Range：0...8.3m
Output：4...20mA/CANopen(Redundant output)

RT60
Range：0...5m
Output：4...20mA/CANopen

RT60B
Range：0...3m
Output：4...20mA/CANopen

RT40D
Range：0...1m
Output：4...20mA

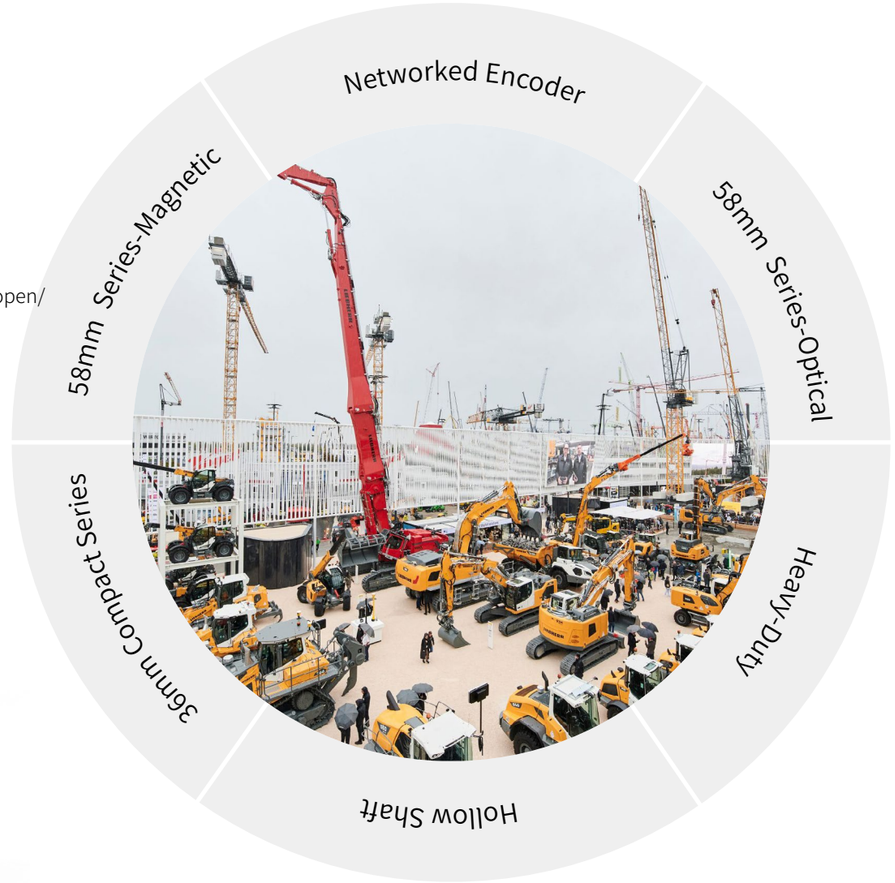
Encoder

Compact,Standard,Heavy-Duty

Encoder is used to record the angle and rotation speed, so as to realize accurate control, facilitate real-time monitoring and adjustment of component state, and thus improve the automation degree and work efficiency of construction machinery.

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

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



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

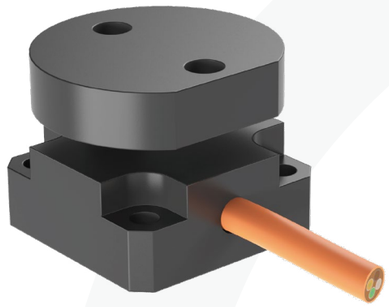
Inclination sensor

It can be used in the application field of pursuing safety and high stability under harsh environmental conditions. A 3-axis gyroscope and a high-performance microcontroller are integrated inside. It can measure the attitude angle of xyz axis at the position where the sensor is installed, and can achieve stability in harsh environment.Fixed sensing.

Angle sensor

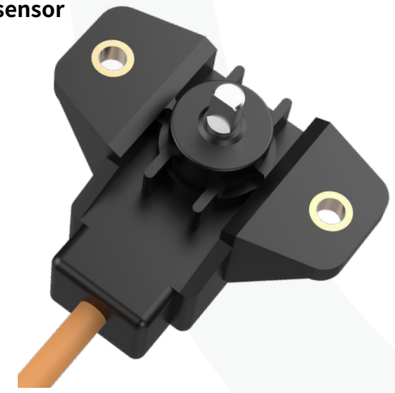
The angle sensor is a device for measuring the rotation angle, which measures the change of the angle based on the physical principle. When there is a change between the rotating magnetic field and the Hall sensor, the Hall sensor can measure different magnetic field signals to determine the rotation angle.

QM Angle sensor

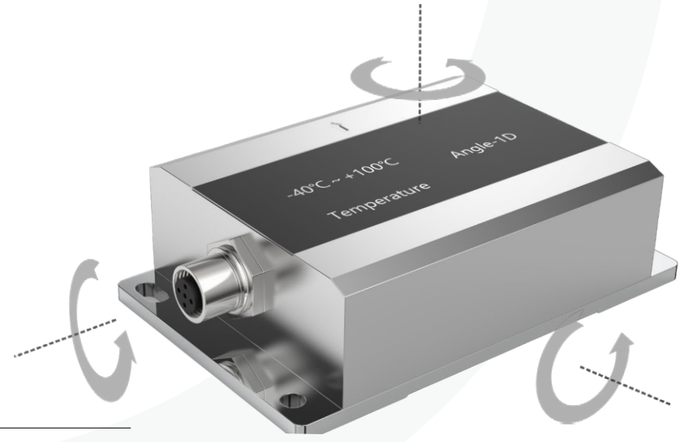


BNS74 Angle sensor

QF Angle sensor



DAT12076-1D Angle temperature sensor

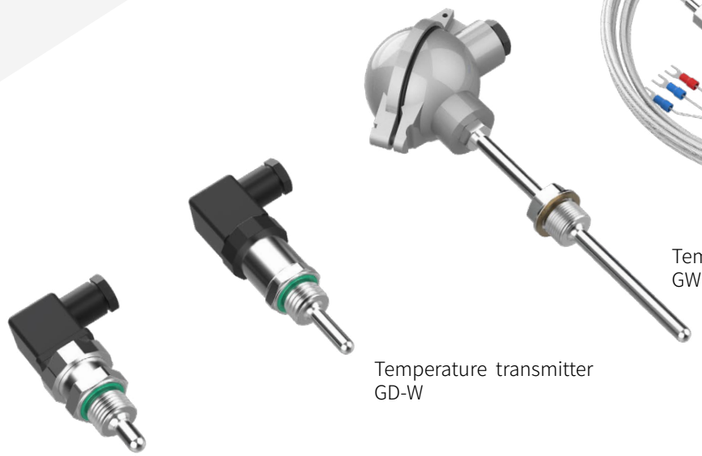


Type	QM Angle sensor	QF Angle sensor	BNS74 Angle sensor	DAT12076 Angle temperature sensor
Measurement data	Angle	Angle	Angle	Inclination and temperature
Output:	Analog	Analog	CANopen	CANopen
Measuring range	0° -360°	0° -90°	0~360°	X-axis: -180° ...+180°, Y-axis:-90° ...+90°, Z-axis:0...360° Temperature:-40°C ...+100°C
Resolution	Angle：0.09°	Angle：0.1°	0.1° /0.01° /0.001°	Inclination：0.1° Temperature: 0.1°C

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

Temperature measuring range	-50~300°C (normal -50~250°C)					
Graduation number/resistance value		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		
Measurement Error	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 | ）		
Response time	Rod diameter mm	5	6	8	10	12
	Thermal response time s （T 0.5)	⩽ 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

Pressure transmitter series

Pressure transmitter、digtial 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.

Digtial 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	Digtial pressure transmitter	Hessman digital display pressure transmitter
Explain	Digital display pressure transmitter with integrated display; The electronic compartment can rotate freely by 330 ° .	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

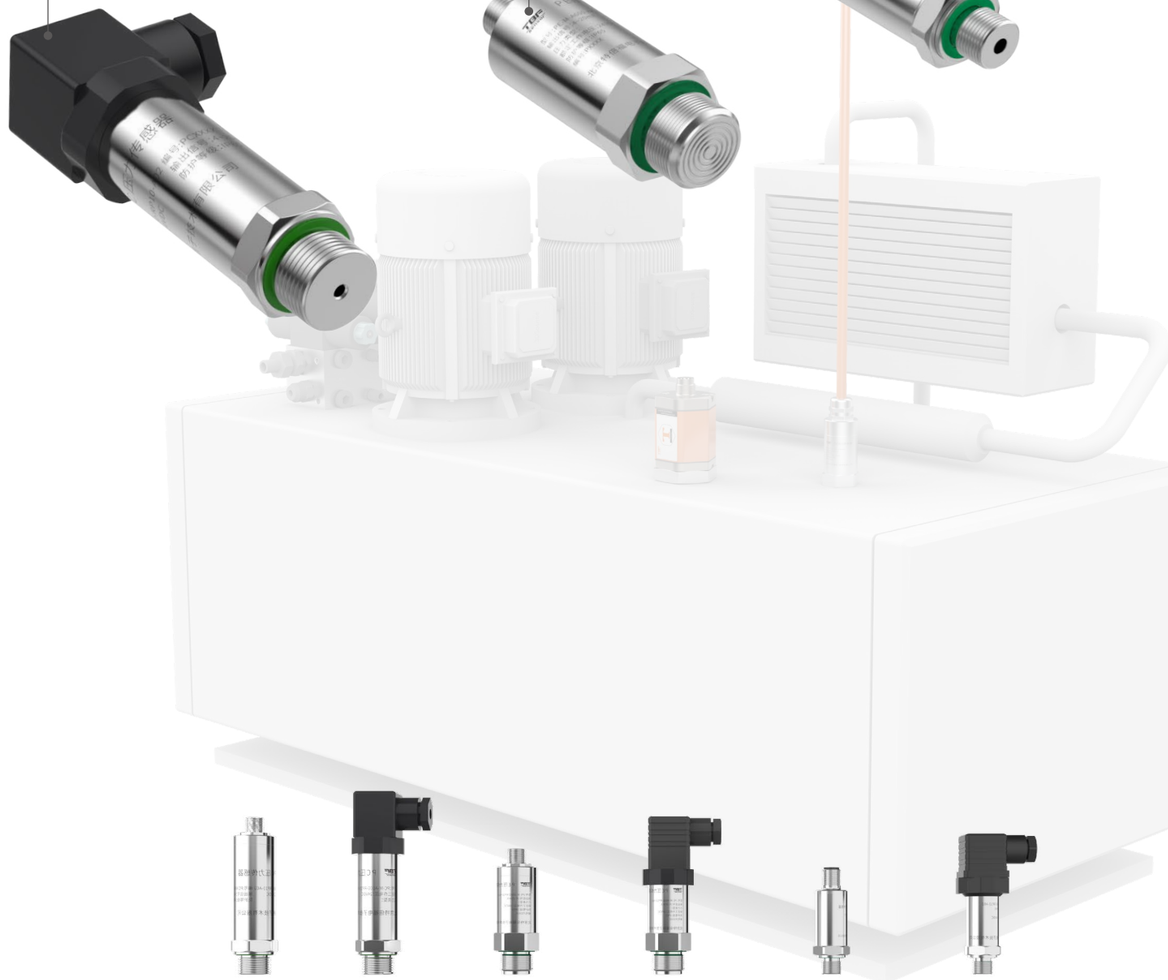
- High precision silicon pressure core
- Measuring range:-1~600Bar

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

Pressure transmitter series

It is used to monitor the earth pressure in the earth cabin of shield machine, that is, the pressure of mud or soil. This is a very important parameter in the construction of shield machine, because it directly reflects the stability of soil and the tunneling conditions of shield machine.

Earth pressure monitoring: measure the pressure of the soil in front of the shield machine in real time to help the operator control the advancing speed and direction of the shield machine.
Mud parameter monitoring: including mud density, viscosity and other parameters to ensure that the mud performance meets the construction requirements.







	PT Soil pressure transmitter	PT(D86) Soil pressure transmitter	LP Grouting pressure transmitter	PF Mud water pressure transmitter	PNJ Mud transmitter	PSY01 Ceramic membrane piezometer	PF-H Circulating pipeline pressure transmitter
Measurement data	Pressure, temperature	Pressure, temperature	Pressure	Pressure	Pressure	Pressure	Pressure
Pressure type	Gauge pressure and absolute pressure						
Output:	4~20mA；0~5V；1~5V；0~10V	4~20mA；0~5V；1~5V；0~10V	4~20mA；0~5V；0~10V	4~20mA；0~5V；0~10V	4~20mA；0~5V；0~10V	4~20mA HART	4~20mA；0~5V；0~10V
Supply voltage	12-32VDC	8-36VDC	12-32VDC	12-32VDC	12-32VDC	12-32VDC	12-32VDC
Measuring range	0~0.6MPa、0~1.0MPa、-0.1~1.6MPa (Other ranges can be stomized.) temperature：-30-100℃	Pressure：0~1.0MPa (Other ranges can be customized.) temperature：-30-100℃	- 0.1~4MPa (Other ranges can be customized.)	0~1.0MPa 、0~1.6MPa、 -0.1~1.5MPa (Other ranges can be customized.)	0~1.6MPa (Other ranges can be customized.)	- 0.1~4MPa (Other ranges can be customized.)	- 0.1~1.5MPa (Other ranges can be customized.)
Measurement accuracy	pressure：±0.5%F.S. temperature：±1℃	pressure：±0.5%F.S. temperature：±1℃	±0.5%F.S.	±0.5%F.S.	±0.5%F.S.	±0.3%F.S.	±0.5%F.S.
Overload pressure	200%F.S.	200%F.S.	200%F.S.	200%F.S.	200%F.S.	200%F.S.	200%F.S.
Working temperature	0℃～70℃	0℃～70℃	0℃～70℃	0℃～70℃	0℃～70℃	-20℃～70℃	0℃～70℃
Procedure linkag	flanged connection	flanged connection	lathedog	G2 threaded connection	Install thread R 2"，tail thread R 11/2"	G1 1/2、G2	R 1 1/2"
Type of TBM	Soil pressure shield machine	Soil pressure shield machine	Mud shield machine	Dual-mode shield machine	Dual-mode shield machine	Dual-mode shield machine	TBM Universal

Product overview

The dedicated sensory system for engineering machinery

Magnetostrictive displacement sensor
Draw Wire Sensor
Angle/inclination sensor
Process state monitoring-Temperature
Encoder
Pressure transmitter

Position detection-magnetostrictive displacement sensor

Bild	Type	Range	Electrical interface
	T3H	50...7650	Analog, SSI, Start/Stop, CANopen, EtherNet/IP, IO-Link, PROFIBUS, PROFINET, EtherCAT
	T3D	50...5600	Analog, SSI, Start/Stop, CANopen, EtherNet/IP, IO-Link, PROFIBUS, PROFINET, EtherCAT
	T3F	100...20000	Analog, SSI, Start/Stop, CANopen, EtherNet/IP, IO-Link, PROFIBUS, PROFINET, EtherCAT
	CH2	50...4500	Analog, SSI, Start/Stop
	DH2	50...5600	Analog, SSI, CANopen
	K	50...5600	Analog
	GB	50...4500	Analog, SSI, Start/Stop, CANopen
	GBM	50...4500	Analog, SSI, Start/Stop, CANopen
	MH	50...4500	Analog, CANopen
	ES	50...2500	Analog, CANopen

Position detection-draw wire sensor

Draw Wire Sensor	Type	Range	Electrical interface
	RT40D	0..1m	Analog
	RT60	0...5m	Analog CANopen
	RT60B	0...3m	Analog CANopen
	RT120S	0...4m	Analog CANopen
	RT80D	0...8.3m	Analog CANopen
	RT90S	0...3.5m	Analog
	RT175	0...12m	Canopen SSI
Long angle sensor	**Type**	**Range**	**Electrical interface**
	RTQ7	Range：0...7m Inclination：0...360°	CANopen
	RTQ12	Range：0...12m Inclination：0...360°	CANopen

Monitoring of angle/inclination

Angle sensor	Type	Range	output
	QM	0...360°	Analog
	QF	0...90°	Analog
	BNS74	0...360°	CANopen
Inclination sensor	**Type**	**Range**	**output**
	DAT12076 (uniaxial/biaxial/triaxial)	Inclination:0...360° Temperature:-40°C ....+100°C	CANopen

Rotational position monitoring-encoder

Absolute value	Type	Output	Resolution
	BNMA36 (magneto-electricity)	CANopen	Single circle：12-14bit Multi-circle：13bit
	BNMA58 (magneto-electricity)	Profinet	Single circle：12-16bit Multi-circle：⩽ 20bit
Increment	**Type**	**Output**	**Resolution**
	BNTI58 (photoelectricity)	TTL / HTL Channel：A A- B B-Z Z-	10000、5000、2500、1250 8192、4096、2048、1024 7200、3600、1800、900 PPR
	BNTI99 (photoelectricity)	TTL / HTL Channel：A A- B B-Z Z-	5000 PPR
	BNTI100 (photoelectricity)	TTL / HTL Channel：A A- B B-Z Z-	1024 PPR
Absolute value+increment	**Type**	**Output**	**Resolution**
	BNMA58 (magneto-electricity)	SSI/SSI+increment CANopen/CANopen+increment increment Channel：A A- B B-	Single circle：8-16bit，Multi-circle：⩽ 24bit increment：512PPR、1024PPR、2048PPR、4096 PPR (Other values can be customized)
	BNMA36 (magneto-electricity)	SSI/SSI+increment increment Channel：A A- B B-	Single circle：12-14bit，Multi-circle：13bit increment：512PPR、1024PPR、2048PPR、4096 PPR (Other values can be customized)

Process state monitoring-temperature

Temperature series	Name	Type	Range	Output
	Temperature switch	GWD-S	-20~120°C	SPST
	Temperature transmitter	GD-W	0~100°C	Analog
	Temperature sensor	GWD-JR	-50~300°C	Resistance signal
	Temperature sensor	GWD-R	-50~250°C	Resistance signal
	Temperature sensor	GWD-FR	-50~250°C	Resistance signal
	Liquid level temperature sensor	YW	Liquid level：50...4500mm temperature：-40...125°C	Analog
	Liquid level temperature sensor	LH-YT	Liquid level：40...2000mm temperature：-40...125°C	4-way switch value+2-way Analog

Process state monitoring-pressure

Liquid, gas	Type	Range	Output
	PC-J	5...600Bar	Analog current output, analog voltage output
	PE	-1...400Bar	Analog current output, analog voltage output，RS485
	PC	-1...600Bar	Analog current output, analog voltage output
	PE-T	-1...400Bar	Analog+Two-way switch output
	PC-T	-1...600Bar	Analog+Two-way switch output

Sludge water and earth pressure	Type	Range	Pressure type
	PT (Earth pressure transmitter)	0...0.6MPa、0...1.0MPa 、-0.1...1.6MPa (Customizable) temperature：-30-100°C	Gauge pressure absolute pressure
	PT(D86) (Earth pressure transmitter)	0...1.0MPa （Customizable） temperature：-30-100°C	Gauge pressure absolute pressure
	LP (Grouting pressure transmitter	-1...4MPa （Customizable）	Gauge pressure absolute pressure
	PF (Mud water pressure transmitter)	0...1MPa、0...1.6MPa 、-0.1...1.5MPa (Customizable)	Gauge pressure absolute pressure
	PNJ (mud pressure transmitter)	0...1.6MPa （Customizable）	Gauge pressure absolute pressure
	PSY01 (Ceramic membrane piezometer)	-0.1...4MPa （Customizable）	Gauge pressure absolute pressure
	PF-H (Circulating pipeline pressure transmitter)	-0.1...1.5MPa（Customizable）	Gauge pressure absolute pressure

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