Load pin with thin-film sensor for Heavy Duty applications

Optional **ATEX**

II 2G Ex ib IIC T4/T3

Description

The rugged design of these force transducers is needed for use in harsh operating conditions such as in cranes, construction machinery and for maritime applications. The sensors are suitable for force measurement in pulleys, fork bearings and roller bearings. The force is measured either directly in the full force flow or at a torque support in these locations. Because of their structural design, measuring axles can be installed as a direct substitute for clevis pins in existing structures. Sensitive components such as connectors or electronics are given mechanically protection.

In addition to our force transducer program with bonded foils, this new force transducer with a welded thin film sensor was developed. The usage of standardised sensors, which are welded into the measuring element, makes an automated manufacturing possible. Thin film sensors, produced by very modern manufacturing technology, have all advantages of the conventional bonded foil strain gauges, but without having their substantial disadvantages (temperature drifts of the glue and creeping).

Different output signals are available: analogue standard output signals 4...20 mA, 0...10V or an mV/V output signal. The load pins meet EMC requirements acc. to EN 61326-1:2006, EN 61326-2-3:2006 and work reliable in difficult electromagnetic environment. For safety relevant applications the load pins are optionally available in a redundant version.

ATEX (Option)
Only equipment and protective systems with the corresponding certification and markings are to be put into operation in potentially explosive areas. Our force transducers with a thin-film measuring cell and integrated amplifier now have approval according to directive 94/9/EC in equipment group II (non-mining products), category 2G for zones 1 and 2 (gases). Other zones on request.

Features

- thin film implants (instead of conventional bonded foil strain gauges)
- corrosion resistant stainless steel
- integrated amplifier
- small temperature drift
- high long term stability
- high shock and vibration resistance
- for dynamic or static measurements
- good repeatability
- easy to install
- MTTFd on request

ATEX (Option)
- redundant signal output
- CANopen®
- ATEX zone 1 and 2 II 2G Ex ib IIC T4/T3

Measuring ranges

- 1t/10 KN and higher

Applications

- cranes and hoisting devices pulleys, fork bearings
- marine applications
- winches
- rope tension
- machine and plant construction

ATEX (Option)
- mining
- chemical and petrochemical industries
- dedusting and filtration units

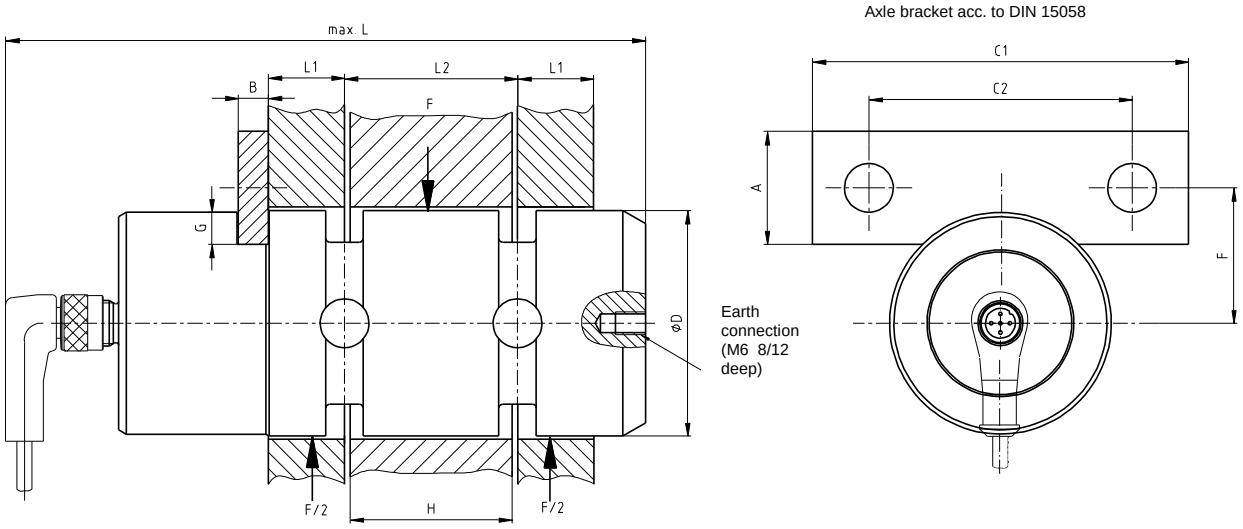
Model: F5308, F53C8

Technical data

Model	**F5308**	**F53C8 ATEX** [1] **(Option)**
Nominal load F_{nom}	1t/10 KN and higher	
Limit load	200 % F_{nom}	
Breaking load	> 500 % F_{nom}	
Non-linearity (typical) [2]	≤± 1% of F.S.	
Hysteresis	≤± 0,2 % of F.S.	
Cross sensitivity (Signal with 100% F_{nom} at 90°)	≤± 5 %	
Stability (annual, typical)	≤± 0,1 % of F.S.	
Nominal deflection (typical)	<0,1mm	
Nominal temperature range	-20 … 80°C (optional -40 ... 120°C)	
Service temperature range	-30°C … 80°C (optional -40°C … 80°C)	-30°C … 80°C
Storage temperature	-40°C … 85°C	
Temperature effect - span - zero signal	0,2 % F_{nom} / 10K 0,2 % F_{nom} / 10K	
Vibration resistance	20g, 100h, 50...150Hz acc. to DIN EN 60068-2-6	
Protection type (acc. to EN 60 529/IEC 529)	IP67 (optional IP69k)	
Emission	acc. to EN 61326-1:2006, EN 61326-2-3:2006	
Interference resistance	acc. to EN 61326 (optional EMC ruggedized version >200 V/m)	
Electrical protection	Reverse voltage, overvoltage and short-circuit protection	
Analogue output - Output signal	4 … 20 mA; 2-wire 0 … 10 V DC; 3-wire Redundant signal 2 x 4 … 20 mA; 2-wire Redundant signal 2 x 0 … 10 VDC; 3-wire **CANopen®** *Protocol acc. CiA DS-301 V.402,* *Device profile DS-404 V. 1.2* *Configuration of device address and baud rate* *Sync/Async, Node/Lifeguarding, Heartbeat;* *Zero point and full scale up to ±10% by entries into object directory*	
- Electron. Life-Test	optional	
- Current consumption	Current output 4 … 20 mA: signal current; Voltage output approx. 8 mA CANopen®: <1W	
- Power requirement	10 ... 30 V DC for current output 14 ... 30 V DC for voltage output 12 … 30 VDC for CANopen®	
- Burden	≤ (UB–6 V)/ 0.024 A for current output > 10 kΩ for voltage output	
- Response time	≤ 2 ms (within 10 % … 90 % F_{nom})	
Electrical connection	Circular connector M 12x1, 4-pin / CANopen® 5-pin (other connectors like CIR or MIL plugs optional)	
Material of measuring device	corrosion resistant stainless steel ultrasonic tested 3.1 material / (optionally 3.2)	
Options	Certificates, stress analysis, finite element analysis, provision of 3D-CAD files (e.g. STEP, IGES) on request	

[1] The force transducers with ignition protection type “ib” must only be supplied using galvanically-isolated power supplies.
Suitable supply isolators are also optionally available: EZE08X030003 (1-channel) und EZE08X03000x (2-channel).
[2] Depending on application specific geometry

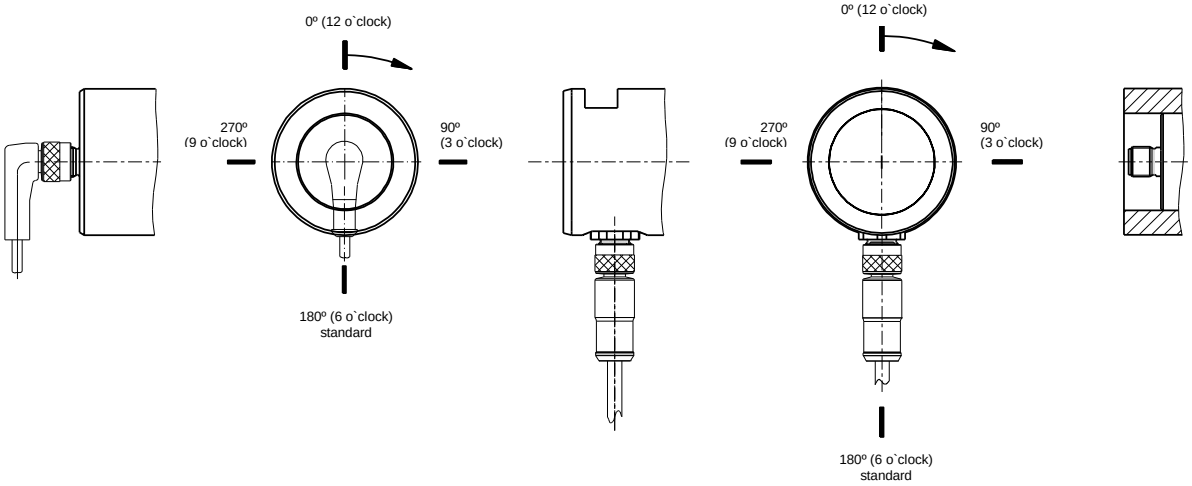
Installation sketch of a load pin F5308/F53C8



The dimensions for the load pins are according to the customer requirements of the existing bearing.

Connecting Options (described with M12x1 plug)

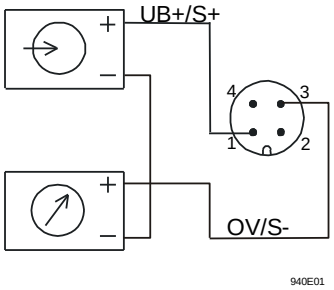
1. Axial plug (optionally aligned)
2. Radial plug (D≥45)
3. Recessed plug (D≥50)



Electrical connection

Output Signal 4..20mA (2-wire)

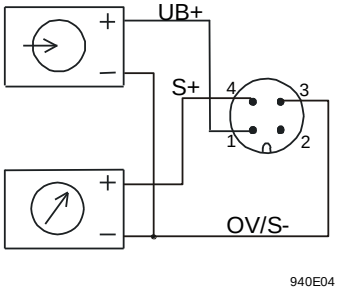
Circular connector M12x1, 4-pin



4..20mA (2-wire)	Pin
Supply: UB+	1
Supply: 0V	3
Signal: S+	1
Signal: S-	3
Screen	thread M12x1

Output Signal 0...10V (3-wire)

Circular connector M12x1, 4-pin



0..10V (3-wire)	Pin
Supply: UB+	1
Supply: 0V	3
Signal: S+	4
Signal: S-	3
Screen	thread M12x1

CANopen®

Circular connector M12x1, 5-pin

CANopen®	Pin
Supply: UB+ (CAN V+)	2
Supply: 0V (CAN GND)	3
Bus-Signal: CAN-High	4
Bus-Signal: CAN-Low	5
Screen	1

Subject of technical changes