Radialforce sensor CF - COMP

Centrifugal-force- and weight-force compensated
radial-force and tensile-force sensor

The Tensometric - Sensor CF- COMP is predestinated to measure forces inside rotating stranding machines.

- the measuring roller weight is compensated
- exclusively the radial-force and thereby the tensile-force is measured, neither the centrifugal-force nor the weight of the measuring roller .
- optional mounting position
- optimal application as radial-force- or as sensor in a 3-roller tensile-force measuring system.
- simple mounting, as well into existing machines

Till today	Radialforce - sensors had to be fitted in a position, that the centrifugal-force and the measuring-roller-weight should not falsify the measurement. Therefor, pulleys had sometimes to be added in the machines.
Disadvantages	A very less useful-power-signal had to be accepted. Connected modules had to amplify this less power-signal. But in this way, undesirable interference were amplified additionally, p.e. : temperature factors. By using sensors having less nominal loads, the overload-protection often were not sufficient enough.
What is new ?	**Adjustment in a force-neutral-zone is no longer necessary**. **The useful-measuring-signal is intensified, by it, lower gain of the amplifier is necessary.** **Stable design can be applied.** **A high overload protection is guaranteed.**
Construction-characteristics	**centrifugal - force compensated measuring-system, optional mounting position** **precise measurement** **easy installation** **temperature stability** **high effective overload-protection** **very light construction by alu-alloy** **tested up to 80 G by radius 0,8m**

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Description

The radial-force sensors series CF - COMP and CF - COMP - E are precise and reliable measuring instruments with high overload - protection and long time stability.

Please see fig. 3 : **derive advantage from installation sensors CF - COMP into the rotating stranding machine**

Function: For measuring tensile forces on running material,
a ball-bearing mounted roller is mounted on the journal-bearing.
This measuring-roller has to be mounted in a position,
that the material which is measured, will deviated in a defined angle.
Here are angle of contacts, of the material which is measured
- around the measuring roller-, between 3° and 180° possible.
The resulting radial-forces, due to the deviation, are measured by the sensor.
The radial force is proportional to the tensile force, in the material which is measured.
Corresponding to this radial-force, the nominal load of the sensor is to select.

Application: Tensile-force measurement on : optical fibres, wires, cables, ropes, belts etc.

Characteristics: Centrifugal-force and weight-force compensated measuring- system
Guide-rollers or pulleys are mounted on the journal-bearing and used for measurement
Dimension of the journal-bearing and/or the measuring - roller
can be adjusted to your needs

Measuring range: By the angle of contact, of the material to be measured around the measuring roller,
the measuring range is destined.
The resulting forces will be measured.

Fixing: by means of 4 screws M8

Series CF-COMP: Strain-gage, full-bridge
the sensor transforms the - on the measuring-roller -
active radial force into a proportional electric signal.
Electrical connection via 5 pol. male-connector

Series CF-COMP- E: Strain-gage, full-bridge, sensor with built-in amplifier.
The sensor transforms the - on the measuring-roller - active radial-forces-,
into a proportional electric output-signal of 0 V up to +10 V.
Adjusting screws for the electrical zero (Offset) and for the calibration (Gain)
are accessible from outside, by means of a screw-driver.
Electrical connection via 5 pol. male-connector.

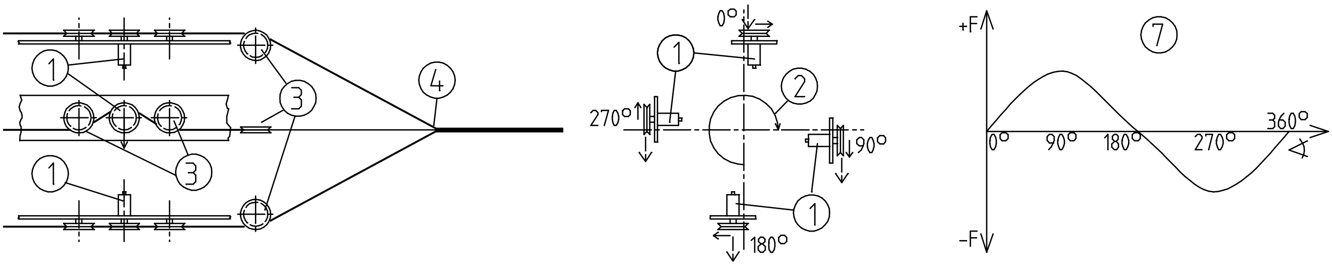
Accessories available: Connection cable,
amplifier with or without indicating the tensile forces,
rollers

Illustration without CF - COMP

Fig. 1 and Fig. 2 show typical application of measuring tensile forces in rotating stranding-machines.
Here the problems are clear illustrated,
which occur by using not compensated radial-force sensors.

Fig. 1 Radialforce - sensors are fitted in the machine,
that centrifugal-forces not appear in the measuring-direction

Fig. 1



1	= Sensor with mounted measuring-roller
2	= Rotation-direction
3	= Aux. rollers
4	= Stranding-point
7	= Diagram
long arrow	= weight of the measuring roller
short arrow	= positive measuring-direction of the sensor

Till today rotation -, Although here the sensors are arranged in a manner, that the centrifugal-force - caused by the
is placed at 90° of the force - direction, nevertheless during rotating the machine at 360°,
the weight of the mounted measuring-roller will be included in the measurement.
At 90° - the measuring-roller-weight has an influence in positive measuring-direction
At 270° - the measuring-roller-weight has an influence in negative measuring-direction
Consequently the measuring-roller-weight doubles the measuring-result
and for this quantity the measured tensile forces will increased.
Diagram 7 shows the influence of the measuring-roller-weight on the measurement.

CF-COMP **This effect does not occur by using Tensometric Sensor CF-COMP .**
The Tensometric Sensor CF-COMP is weight-compensated.
It is measuring the tensile force of the material exclusively !

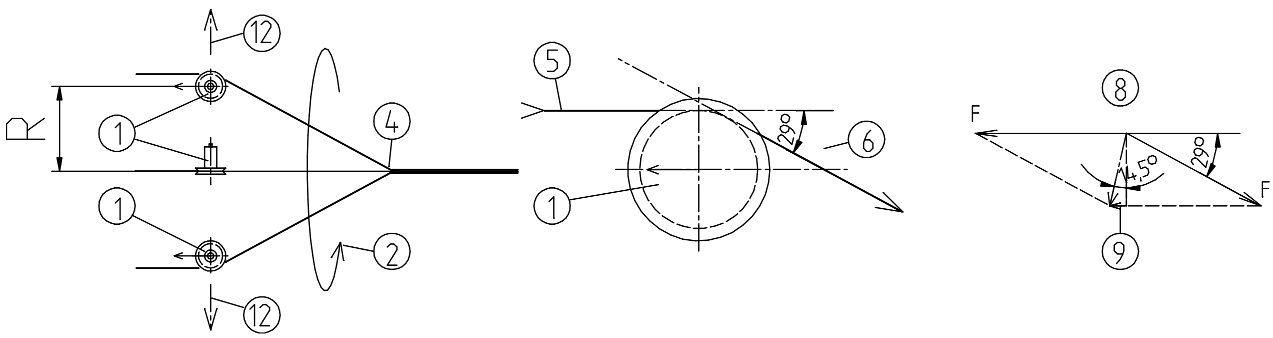
Illustration without CF - COMP

Fig. 2 In the rotating stranding machine, the pulleys which guide the wires to the stranding -point, are running in radial - force - sensors.

Till today To avoid that the sensors measure the centrifugal - force, which influence the measuring - roller during rotating, the force - direction of the sensors is placed to 90°. The disadvantage of this arrangement is the less resulting force - component in the measuring - direction of the sensor.

Installation of Radial - Force sensors into a rotating stranding - machine.

Fig. 2



A shows installation of a sensor into the stranding machine

B shows the situation at the measuring-point

C The force-diagram illustrates force-proportion at one measuring-point

1 = Sensor with mounted measuring-roller
2 = Rotation - direction
4 = Stranding - point
5 = Material to be measured
6 = Angle of contact of the material to be measured around the measuring roller
8 = Forcediagram
9 = Resulting force in measuring direction

The force, which is measured by the sensor is illustrated by arrow 9.
You can see that the measured force is only a fraction of the tensile force.

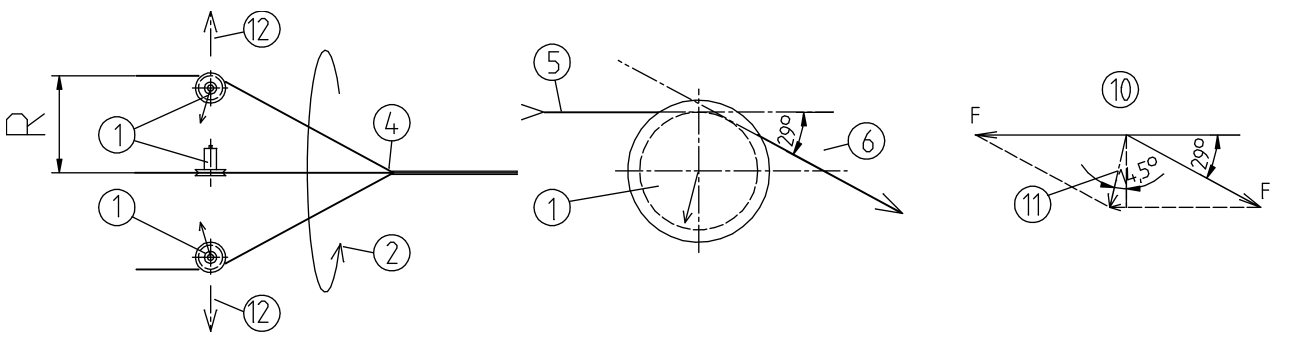
Illustration with CF - COMP

Fig. 3

Here we illustrate the advantages of

Tensometric CF - COMP - Sensors

by using them in rotating stranding machines



A shows the installation of a sensor into the stranding machine

B shows the situation at the measuring point

C The force diagram illustrates the force proportion at one measuring point

1 = Sensor with mounted measuring roller
2 = Rotation - direction
4 = Stranding point
5 = Material to be measured
6 = Angle of contact of the material to be measured around the measuring roller
10 = Force digram
11 = Resulting forces in measuring direction

CF - COMP

Tensometric Sensors CF- COMP can be adjusted that way,
that the resulting forces are in sphere-direction of the sensor.
An essential higher user-signal is obtained, interference-factors are strong reduced.

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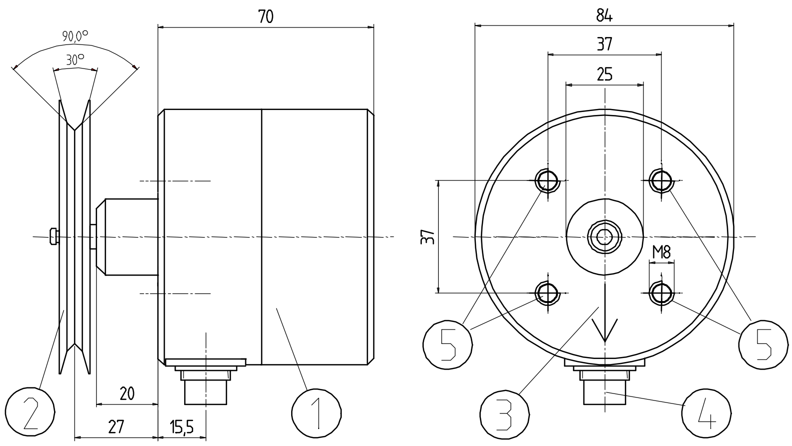
Technical data :

Radialforce sensor series CF - COMP and CF - COMP - E
Dimensions:



1 = Sensor
2 = Measuring roller
3 = Measuring direction
4 = Plug
5 = Fixing thread

CF - COMP

Realisation the measured data via strain-gages, electrical connection via 5-pol. male connector

Nominal loads:	50 N, 100 N, others upon request		
Measuring principle:	strain-gage, full-bridge	*Resistance input:*	500 Ohm
Measuring range:	1 % up to approx.115%	*Resistance output:*	500 Ohm
Error in measurement:	< ± 0,5%	*Reference-voltage:*	10 V
Overload-protection:	min. 500N	*Max. service-voltage:*	10 V
Charact. Value:	1,5 mV / V	*Coeff. of temperature:*	< ± 0,01% / °C
Value tolerance:	< ± 0,2 %	*max. error in linearity:*	< ± 0,2 %
Nom. temp. range:	+ 5°C ...+ 60°C	*Protection:*	IP 50
Volume of delivery:	Sensor, 5 pol. male-connector, Instr. manual		

CF - COMP - E (CF - COMP with built-in amplifier)

Realisation the measured data via strain-gages, the amplifier is built-in.
By ordering this types, the desired service voltage must be indicated.
Service-voltage and output-signal are galvanically separate. Electrical connection via 5-pol. plug.

Nominal loads:	15 N, 50N, 100N, others upon request		
Measuring range:	1 % up to approx. 115%	Coeff. of temperature	
max. error in linearity:	< ± 0,2 %	*- of the zero:*	< 0,035 % / °C
Overload-protection:	min. 500 N	*- of the measuring range:*	< 0,05 % / °C
Service voltage:	5 V ± 10 % < 90 mA	*Output-signal:*	0 ... ± 10V
	12 V ± 10% < 70 mA		
	24 V ± 10% < 40 mA		
Protection:	IP 50	*Adjusting range ZERO:*	± 20% of the nominal load
Nom.temp. range:	+ 5°C ... + 55°C	*Adjusting range Calibration:*	± 20% of the nominal load
Volume of delivery:	Sensor, Instruction manual		

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