



CSR TENSION SENSING ROLLER

The MAGPOWR CSR series is a cantilevered tension sensing roller that uses tension sensors embedded in the roller to provide a signal proportional to tension in any unwind, rewind or intermediate web processing application.

When installed in place of a standard machine idler roller, the CSR tension sensing roller delivers precise web tension measurement with low temperature drift due to a full Wheatstone bridge construction on each load cell inside the roller.

The CSR has a built-in amplifier and is available with or without an integrated display in the end of the roll. It is also available with or without an integrated RPM sensor.



89 mm diameter shown

GENERAL SPECIFICATIONS

Product Name

CSR Cantilevered Tension Sensing Roller

Gage Resistance

350 ohms nominal

Excitation Voltage

10 VDC maximum

Output Signal

2.1 mV/V, 21 mVDC maximum
0 to 10 VDC (when powered)

Operating Temperature

-30°C to 60°C (-22°F to 140 °F)

Combined non-linearity and hysteresis

0.5% of full scale maximum

Temperature effect on zero

0.02% of rating per °C

Overload Stops Engagement

105% to 200% of full load rating

Overload Protection

5X full load rating

Repeatability

0.2% of full scale maximum

Load Ratings

50, 100, 250, 500, 750, 1000,
2200 Newtons (11, 23, 56, 112,
169, 225, 495 pounds)

Construction

Stainless Steel Center Shaft
Aluminum, Steel and Stainless
Steel Roller Body

Roller Diameters

80, 89, 102, 127 and 152 mm
(3.15, 3.5, 4, 5 and 6 inches)

Deflection at Full Load

0.15 mm to 0.17 mm (0.005 to
0.007 inch)

Climate Class

3K3 (EN60721)

Certifications

CE (EN61326-1)
TUV Rheinland of North America
to:
UL61010-1 and CAN/CSA-C22.2
#61010-1, CB Certificate to
IEC61010-1
RoHS
IP54

Mating Cable

CSRCBL series with straight
connector
CSRCBLRA series with 90 degree
cable

RPM Pulse Output Switch

2 Pulses per revolution
30 VDC maximum, 25 mADC
maximum

KEY FEATURES

- Fast and easy installation
- Optional readout in end of roll
- Optional integrated RPM sensor
- Flange and stud mount
- Flange mount with through frame pigtail
- Several diameters available between 80 and 152 mm (3.15 to 6 inches)
- Roller materials in Aluminum, Steel and Stainless Steel
- Seven load ratings
- Lengths from 250 to 1000 mm (9.9 to 39.4 inches)
- Force measurement in positive or negative direction
- Optional integrated display offers display of actual tension on end of roller, weightless load cell calibration, 0 to 10 VDC output, digital filter of output and re-zero button
- Five times overload protection in both force directions
- Works as a stand-alone unit or with any MAGPOWR tension amplifier or tension control

CSR TENSION SENSING ROLLER

DIMENSIONS

Stud mount

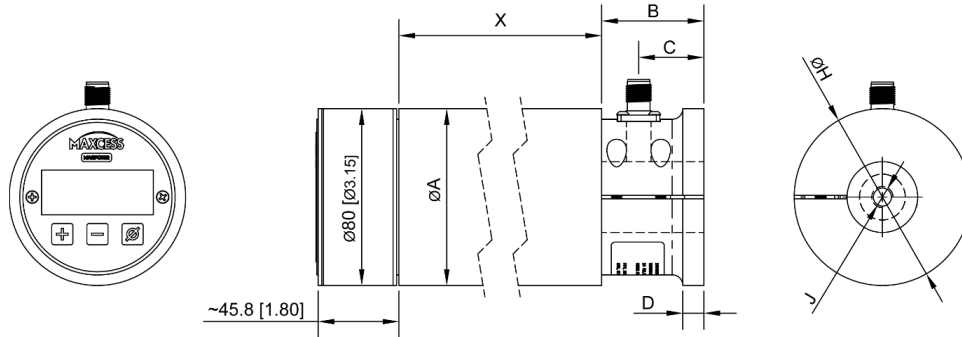


Figure 1. Stud mount Note: For 80 mm diameter rollers of all styles, the electronics housing is external to the roller body. The housing has a diameter of 80 mm and extends out approximately 45.8 mm (1.80 inches)

Flange mount

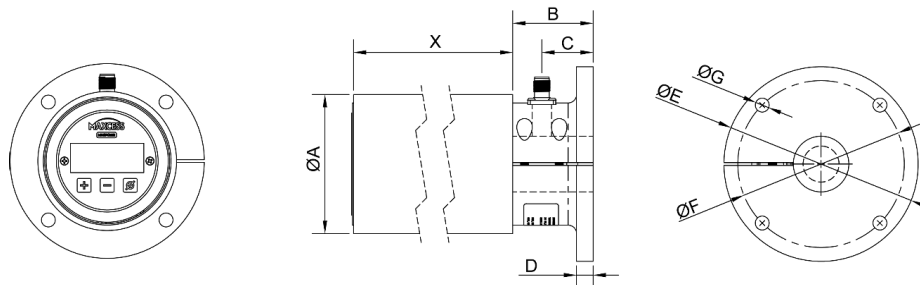


Figure 2. Flange mount

Flange mount w/ cordset connector

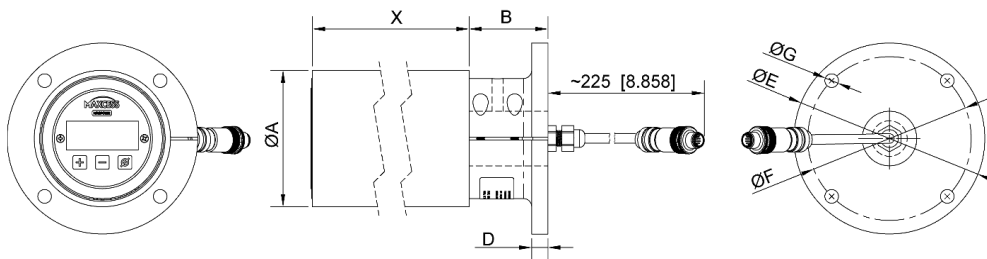
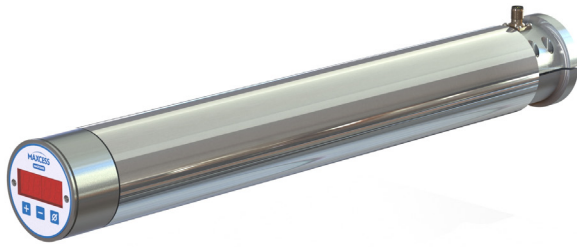


Figure 3. Flange mount w/ cordset connector

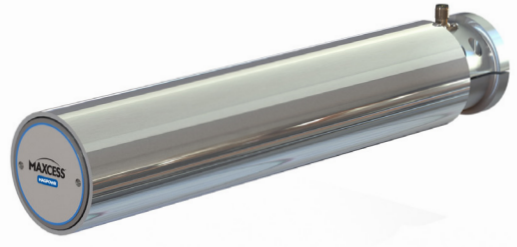
Dimensions shown in mm (inches)

A	B	C	D	E	F	G	H	J
80 (3.150)	53 (2.087)	37 (1.457)	12 (0.472)	130 (5.118)	110 (4.331)	10 (0.394)	85 (3.346)	M12, 30 DEEP
89 (3.500)	53 (2.087)	37 (1.457)	12 (0.472)	130 (5.118)	110 (4.331)	10 (0.394)	85 (3.346)	M12, 30 DEEP
102 (4.000)	58 (2.283)	37 (1.457)	12 (0.472)	140 (5.512)	120 (4.724)	10 (0.394)	100 (3.937)	M12, 30 DEEP
127 (5.000)	58 (2.283)	37 (1.457)	12 (0.472)	160 (6.299)	130 (5.118)	13 (0.512)	100 (3.937)	M16, 30 DEEP
152 (6.000)	73 (2.874)	37 (1.457)	12 (0.472)	160 (6.299)	130 (5.118)	13 (0.512)	100 (3.937)	M16, 30 DEEP

CSR TENSION SENSING ROLLER



80 mm diameter CSR with display



89 mm diameter CSR without display

MODEL NUMBERING KEY

The model number consists of the base model “29CSR” followed by optional alphanumeric characters.

29-CSR-AAAA-BBB-CCCC-D-EEE-F-GG-H-J

AAAA = Rated load in Newtons

BBB = Roller diameter in mm

CCCC = Roll face length in mm

D = Roller material
A = Aluminum
S = Steel
K = Stainless steel
Others are possible

EEE = Roller finish
000 = No finish
001 = Nickel plated
002 = Hard coated Anodize
Others are possible

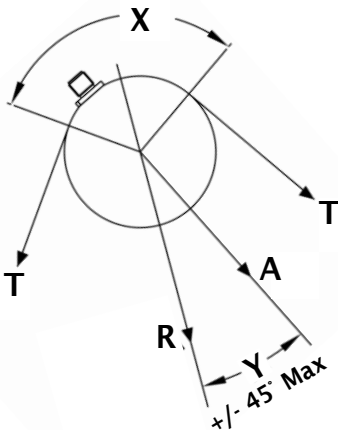
F = Balancing option
1 = G2.5 (standard)
Others are possible

GG = Roller mounting
S0 = Stud mount
F0 = Flange mount with connector on web side
FP = Flange mount with 150 mm pigtail out shaft end

H = Tension Readout
0 = No Display
D = Display

J = RPM Sensor
0 = No RPM Sensor
R = RPM Sensor

SIZING



To size and select the correct load rating of the CSR, the total load on the sensing roll must be calculated. This load consists of the tension components in the sensing plane. Using the known maximum tension and angles as shown, apply the equation below to calculate the actual load.

$$\text{LOAD} = 2T (\sin X/2)(\cos Y)$$

This is the total load, but since we need to be able to read tension transients, the “T” should be multiplied by 1.35 to add 35% measuring capability. The final equation for load rating required for the CSR is:

$$L = 2.7T (\sin (X/2)(\cos Y)$$

After calculating L, select a CSR with a load rating greater than L.

For example, if the maximum tension is 25 pounds, the angle Y is 0 degrees, the wrap angle is 90 degrees and the resultant force is away from the connector, the resulting CSR rating is:

$$L = 2.7(25)(\sin(90/2)(\cos 0)$$

$$L = 47.7 \text{ pounds (212.2 Newtons)}$$

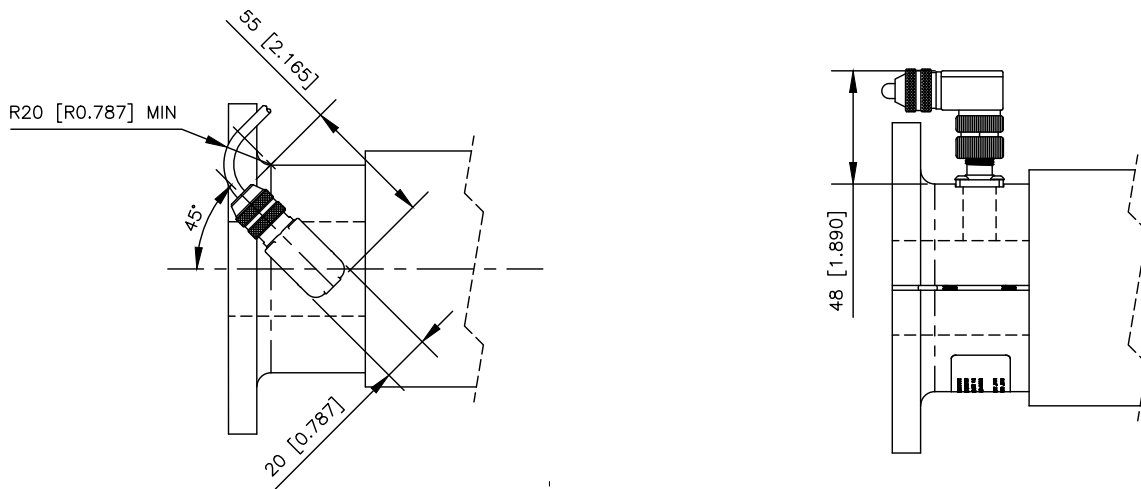
Use CSR with 250 Newton rating (56 pounds)

T = web tension
X = web wrap angle
A = center line of sensing roller
R = resultant force direction from web tension that bisects the wrap angle
Y = angle between wrap angle midpoint (R) and the load cell center line (A)
Note: connector is always aligned with the center line of the sensing roller
L = calculated minimum force rating

CSR TENSION SENSING ROLLER

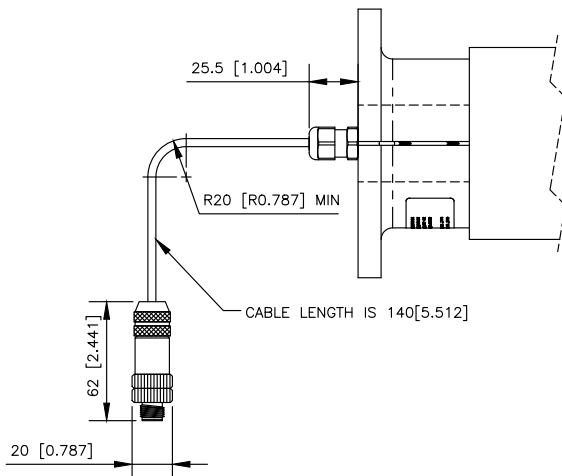
CABLES AND CONNECTORS

CSR WITH 90° CABLE

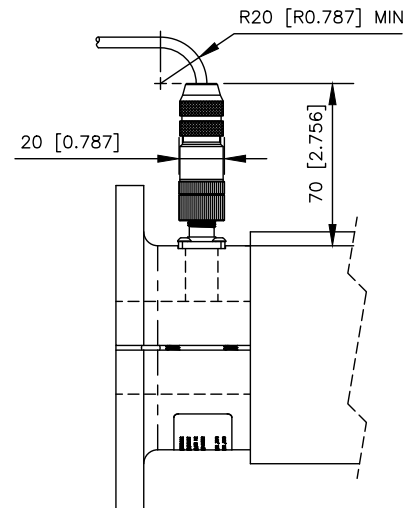


90° connector can not be used with flange mounted rollers with 127 or 152 mm diameters

CSR WITH PIGTAIL OPTION



CSR WITH STRAIGHT CABLE



Dimensions shown in mm (inches)



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