

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.

GENERAL SPECIFICATIONS

Product Name CSR Cantilevered Tension Sensing Roller	Construction Stainless Steel Center Shaft Aluminum, Steel and Stainless Steel Roller Body
Gage Resistance 350 ohms nominal	Roller Diameters 80, 89, 102, 127 and 152 mm (3.15, 3.5, 4, 5 and 6 inches)
Excitation Voltage 10 VDC maximum	Deflection at Full Load 0.15 mm to 0.17 mm (0.005 to 0.007 inch)
Output Signal 2.1 mV/V, 21 mVDC maximum 0 to 10 VDC (when powered)	Climate Class 3K3 (EN60721)
Operating Temperature -30°C to 60°C (-22°F to 140 °F)	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
Combined non-linearity and hysteresis 0.5% of full scale maximum	Mating Cable CSRCBL series with straight connector CSRCBLRA series with 90 degree cable
Temperature effect on zero 0.02% of rating per °C	RPM Pulse Output Switch 2 Pulses per revolution 30 VDC maximum, 25 mADC maximum
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)	

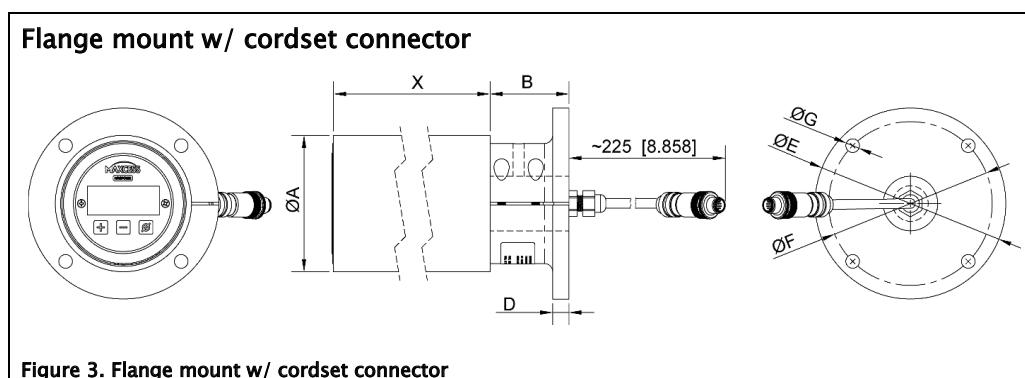
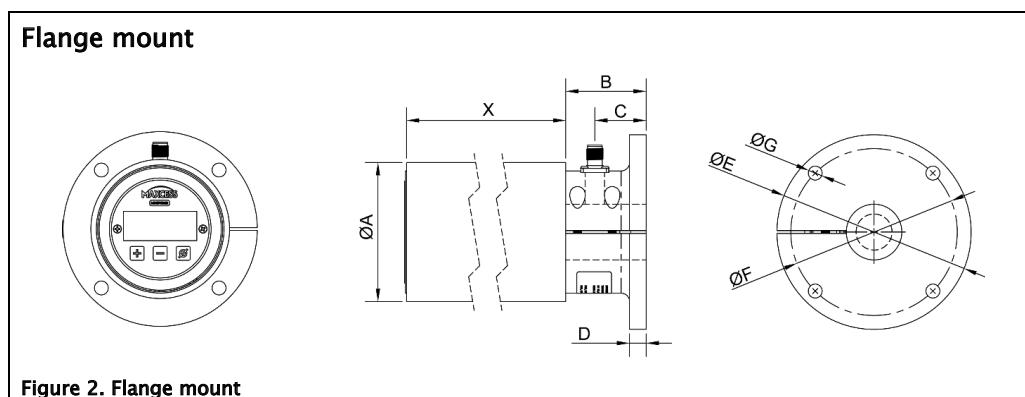
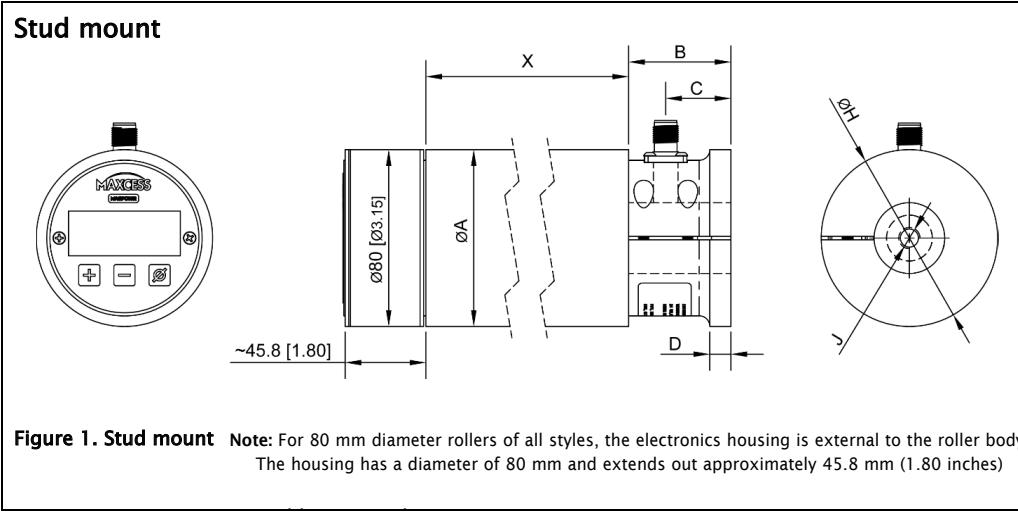


KEY FEATURES

- 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

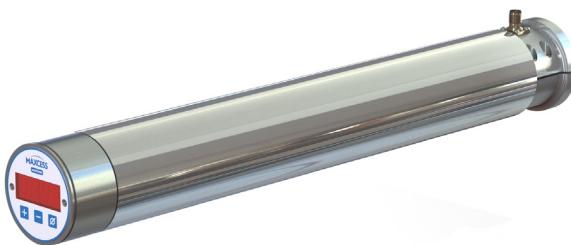
DIMENSIONS



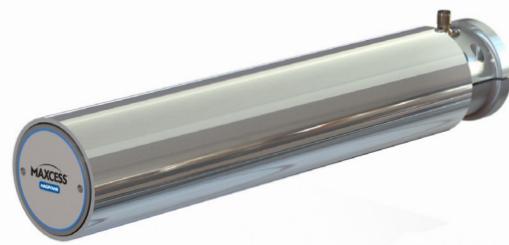
Dimensions shown in mm (inches)

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

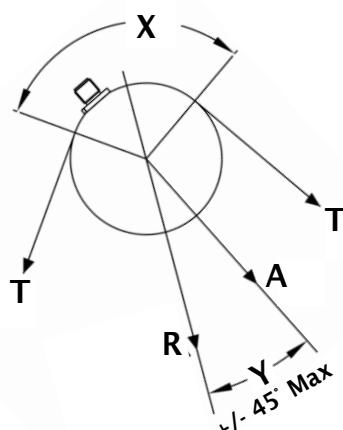
 D = Display

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)

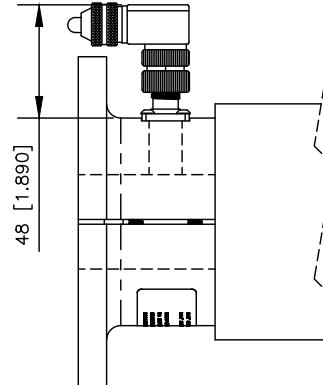
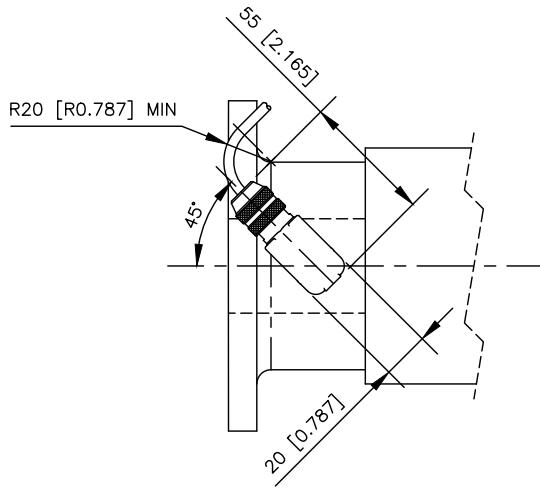
Note: connector is always aligned with the center line of the sensing roller

L= calculated minimum force rating

CSR TENSION SENSING ROLLER

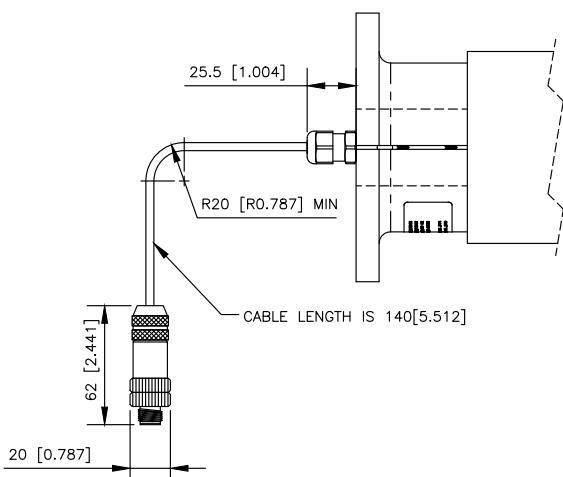
CABLES AND CONNECTORS

CSR WITH 90° CABLE

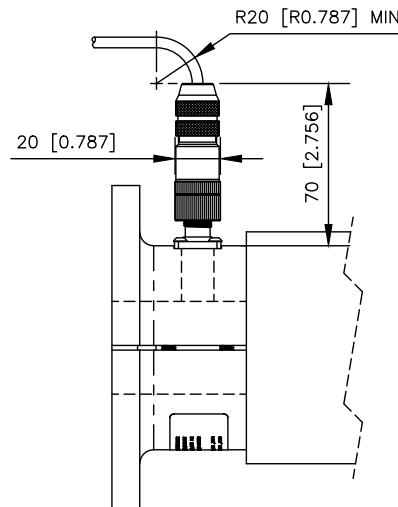


90° connector can not be used with flange mounted rollers with 127 or 152 mm diameters

CSR WITH PIGTAIL OPTION



CSR WITH STRAIGHT CABLE



Dimensions shown in mm (inches)

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