MAGPOWR TLC-A Load Cell

User Manual

EN

MI 850A343

CONTENT

About these operating instructions

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These load cell devices must not be installed or used in a machine or system which does not comply with the machinery directive 2006/42/EC.

These load cell devices were designed and manufactured to be installed as Partly Completed Machinery into a machine or partly completed machine.

The instructions must be read and used by all persons who have the responsibility of installing and maintaining these load cell devices.

These instructions must be retained and incorporated in the technical documentation for the machine or partly completed machinery into which the load cell device is installed.

CE marking

Only the 2006/42/EC Machinery directive applies to these devices and they are not marked with the CE sign.

Electromagnetic Compatibility (EMC)

The load cell device is inherently benign in terms of electromagnetic compatibility and the EMC directive has not been applied. The electromagnetic compatibility of the load cell device can only be assessed in connection with the entire electrical installation including the control. The machine builder who installs this partly completed machinery into a machine is responsible for compliance with the EMC directive.

Language

These are the original instructions, written in English.

Product overview

The MAGPOWR TLC-A Load Cells are extremely accurate devices used to measure tension in any unwind, rewind, or intermediate web processing application.

The load cells are to be mounted in a machine supporting an idler roll in a part of the machine where measurement of web tension is desired.

The low-profile design minimizes space requirements inside the machine frames, thus maximizing the potential for web width. Additionally, the load cells can be mounted on the outside of the machine frame, eliminating any machine space dedicated to the load cells on the web side.
TLC-A Load Cells also offer the flexibility of mounting on top of frames, using additional brackets and other accessories.

MAGPOWR TLC-A Load Cells are ruggedly constructed with mechanical overload stops in both force directions to eliminate load cell damage and the need to recalibrate even after extreme overloads. A full Wheatstone bridge arrangement of four foil strain gages is used in each load cell for the most accurate means of measuring web tension. In addition, all load cells incorporate a dual beam construction design to ensure linear output under all loading conditions.

TLC-A Load Cells can be mounted to the machine frame directly on a vertical surface or horizontally using a pillow block brackets.

TLC-A Load Cells couple to the customer's idler roll journals using internal self-aligning bearings supplied by the customer or purchased from MAGPOWR as an accessory (Part No. 30A23-4).

Instructions for use

To ensure safe and problem free installation of the load cell device, the load cell must be properly transported and stored, professionally installed and placed in operation. Proper operation and maintenance will ensure a long service life of the device.'

Only persons who are acquainted with the installation, commissioning, operation and maintenance of the system and who possess the necessary qualifications for their activities may work on the load cell. **Note:** The safety information may not be comprehensive.

Please note the following:

- The content of these operating instructions
- Any safety instructions on the device
- The machine manufacturer's specifications
- All national, state, and local requirements for installation, accident prevention and environmental protection

Information about safety instructions

The safety instructions and symbols described in this section are used in these operating instructions. They are used to avoid possible dangers for users and to prevent material damage.

SIGNAL WORD
Source of danger and its results
Avoiding dangers

The signal word **DANGER** refers to the danger of death or serious bodily injuries.

The signal word **WARNING** refers to the danger of moderate to severe bodily injuries.

The signal word **CAUTION** refers to the danger of slight to moderate bodily injuries or material damage.

The signal word **NOTICE** refers to the possibility of damage to equipment.

Symbols used

The following safety identification symbols are used in these operating instructions.

WARNING/CAUTION – General danger or important note
Reference to general hazards that may result in bodily injuries or damage to device or material.

WARNING/CAUTION – Danger due to crushing
Reference to danger of injury caused by crushing.

WARNING/CAUTION – Danger due to cutting
Reference to danger of injury caused by cutting.

WARNING/CAUTION – Danger due to voltage, electric shock
Reference to danger of injury caused by electric shock due to voltage.

WARNING/CAUTION – Danger due to hot surfaces
Reference to risk of injury caused by burning.

Basic safety information

Proper use

The load cell devices are intended to be used on machines or systems to monitor the tension in a web.

Indoor operation.

Improper use

Operation outside the technical specifications

Operation in an Ex-area or intrinsically safe area

Any other use than the proper use shall be deemed inappropriate

Installation and commissioning

Any load cell device that is damaged must not be installed or put into operation.

Only perform installation, maintenance or repair tasks on the load cell device when the machine has been stopped and is secured from being turned on.

Only perform installation, maintenance or repair tasks on the load cell device when there is no electrical power in the system.

The load cell device must be securely mounted before being placed in operation.

No modifications may be made to the load cell device.

Do not place electrical cables under mechanical strain.

Maintenance and repair

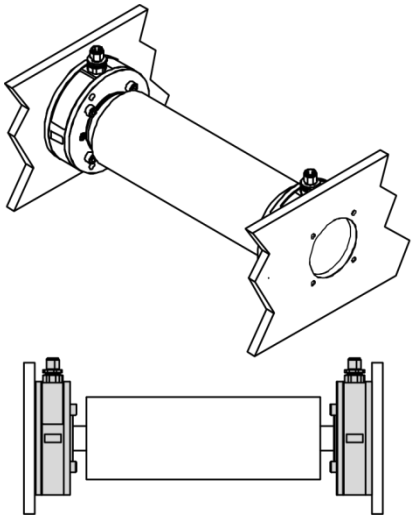
Warning – Danger of injury from crushing
Maintenance and repair tasks on the load cell device must be performed only when the machine has been stopped and has been secured from being turned on again.

Decommissioning

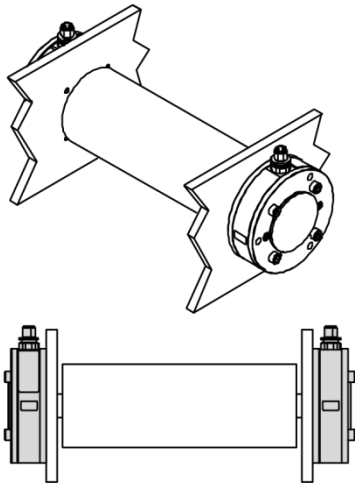
The load cell must be disposed of in accordance with all the applicable national, state and local regulations.

Mounting options

Flange mount (on vertical machine frame)

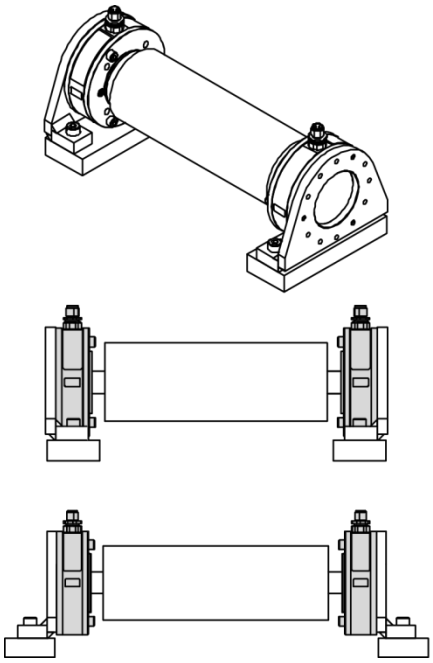


Inside frame

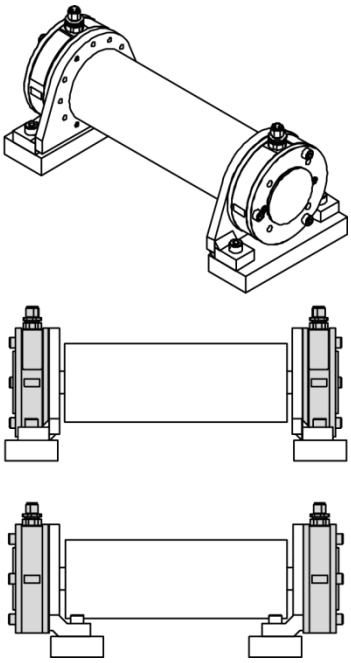


Outside frame

Pillow block mount (on horizontal machine frame; configurations vary)



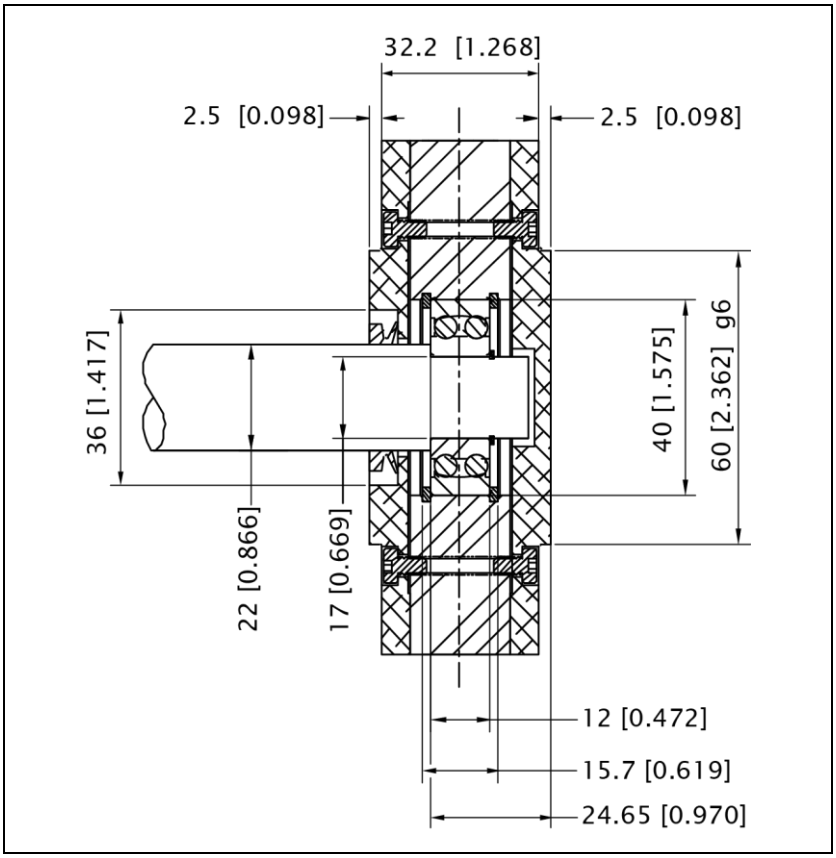
Inside frame



Outside frame

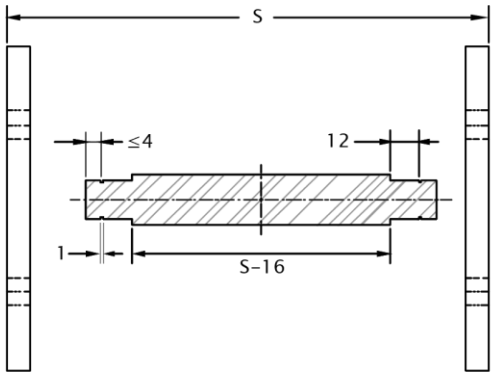
Product dimensions

TLC-A

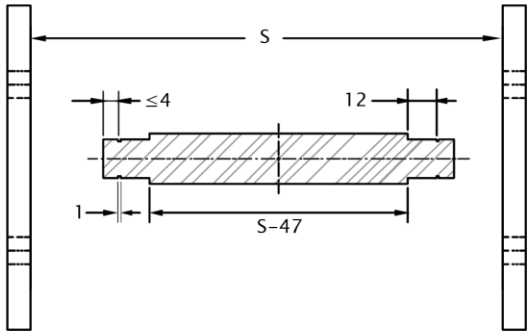


Shaft length requirements

(for reference only)



Mount outside machine frames



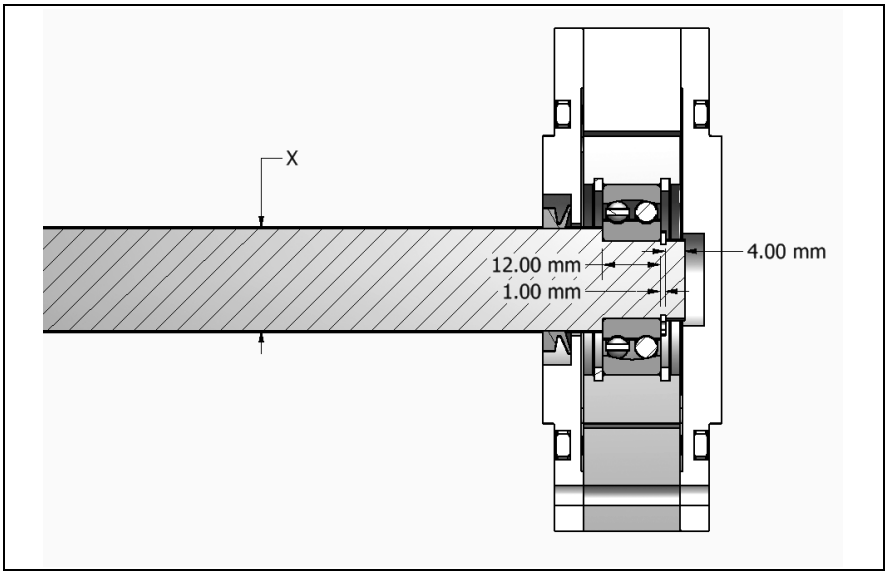
Mount inside machine frames

Shaft options

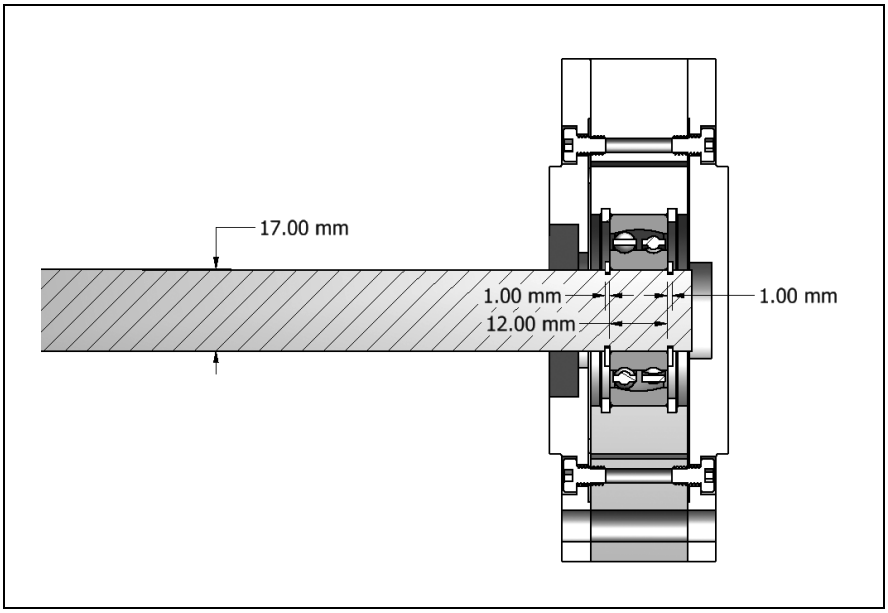
X = recommended roll diameter for installation clearance when mounting inside the machine frame

3-bolt pattern: 76.5 mm maximum diameter
4-bolt pattern: 63.5 mm maximum diameter

Shaft with roller (X diameter)



17 mm diameter shaft



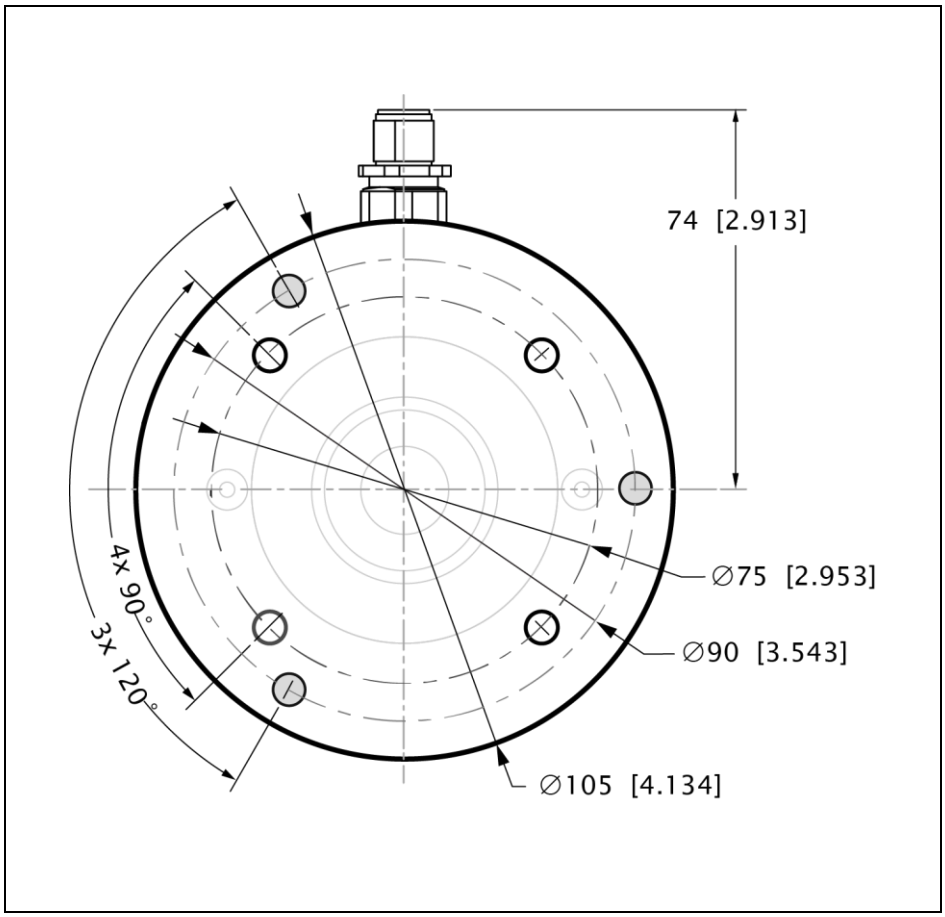
Flange mounting

The TLC-A Load Cell can be mounted with one of two bolt patterns:

3-hole on a ∅90 mm bolt circle
4-hole on a ∅75 mm bolt circle

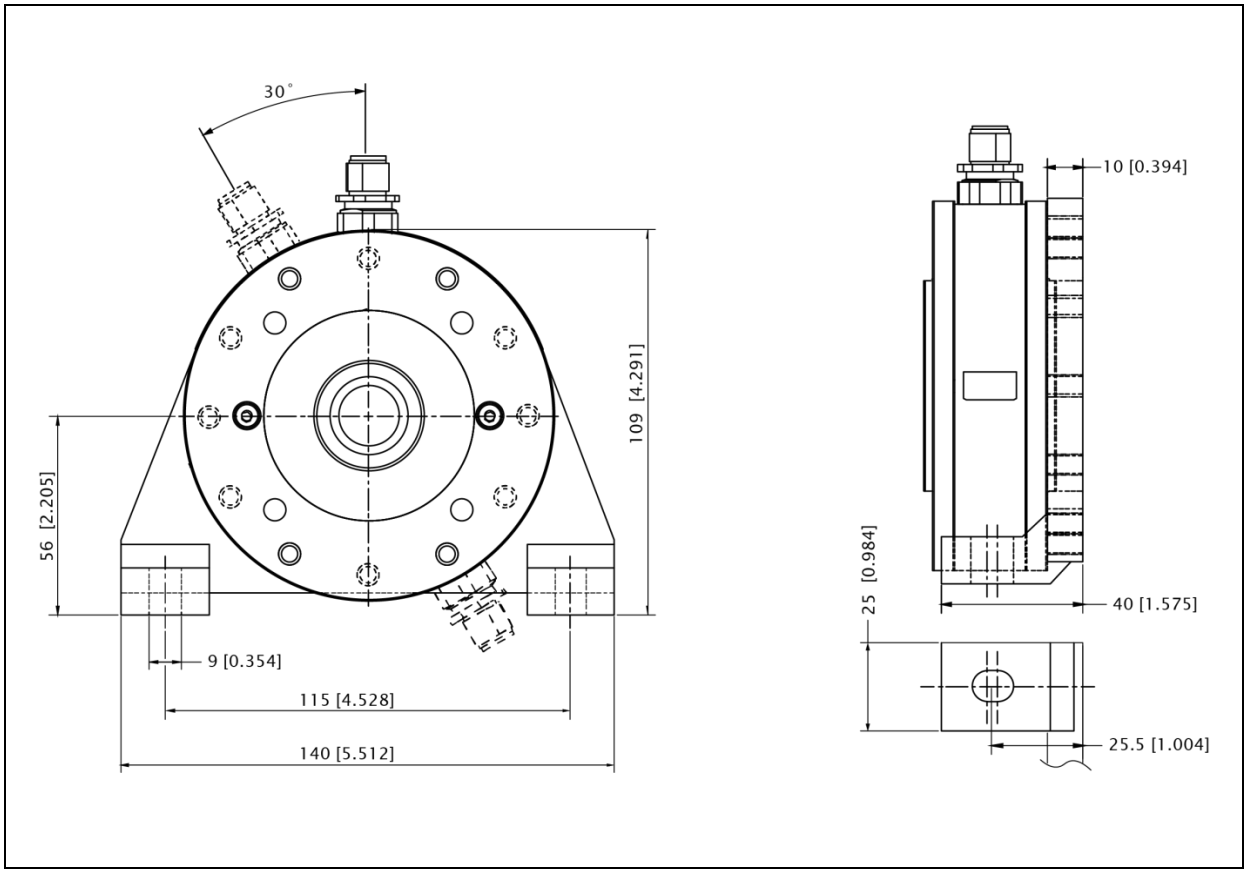
Before installation, each machine frame must be prepared with a ∅60 mm hole for the load cell hub and M6 (or 1/4 inch) threaded holes for the fasteners.

See page 4-2 for maximum roller diameters when mounting inside the machine frame.



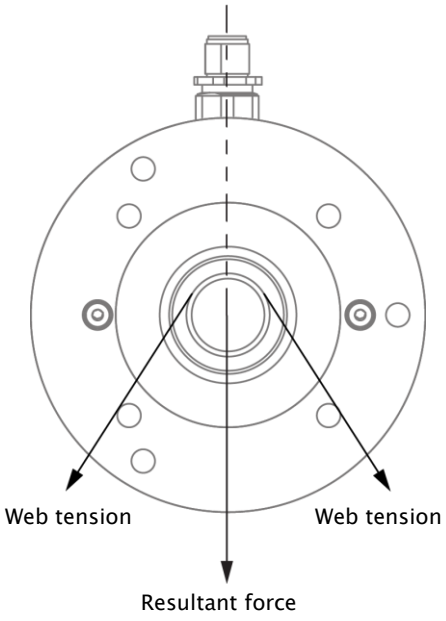
Pillow block mounting

When using the optional pillow block bracket, the load cell can be rotated in 30° increments to align the resultant force with the connector.



General installation

	CAUTION – Possible damage to load cell. Do not hammer on the load cell.
	CAUTION – Possible damage to load cell. Do not disassemble the load cell – there are no serviceable parts inside the unit.
	WARNING – Danger of injury from crushing. Maintenance and repair tasks on the load cell device must be performed only when the machine has been stopped and has been secured from being turned on again.



General

Select a clean flat surface on the machine frame where the wrap angle of the web does not change. Position the vertical centerline of the load cell so that it bisects the wrap angle of the web. The load cell must be rotated so that the resultant force is aligned with the connector.

The force can be toward or away from the connector.
See page 5-2.

Flange mount

Bore a 60 mm hole into the frame to center the load cell. Position the vertical centerline of the load cell so that it bisects the wrap angle of the web. Fasten it to the machine frame with a three or four bolt pattern.

Pillow block mount

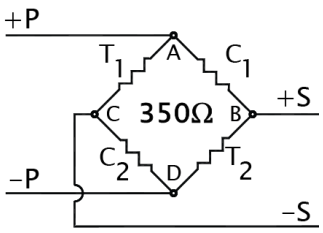
Mount the pillow block bracket to the vertical machine frame using two bolt. Then mount the load cell to the bracket using three bolts. A series of holes is provided in the bracket to allow alignment of the load cell with the resultant force; the centerline of the load cell must bisect the wrap angle of the web.

See page 4-4 for mounting dimensions.

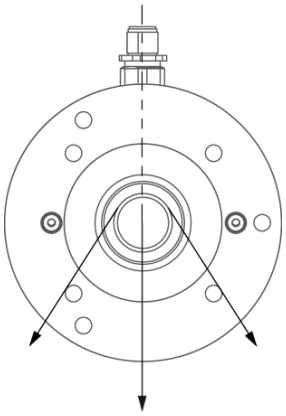
Resultant force polarity

The label on the load cell indicates the output polarity based on the resultant force direction in relation to the connector.

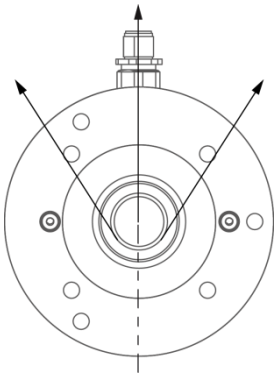
Default wiring



Cable wiring diagram		
+Power	Pin 1 (A)	Red
+Signal	Pin 2 (B)	White
-Signal	Pin 3 (C)	Black
-Power	Pin 4 (D)	Green



When the resultant force is pointing **away** from the connector the output voltage is **positive (+).**



When the resultant force is pointing **toward** the connector the output voltage is **negative (–).**

Reversed polarity

Newer MAGPOWR readout devices and tension controllers automatically sense output polarity regardless of the load cell orientation. If your device does not support polarity auto-sensing, you will need to manually reverse the polarity if the resultant force is pointing toward the connector (ouput voltage is negative). Exchange the black (-S) and the white (+S) wires at the device terminal block.

Bearing and shaft installation

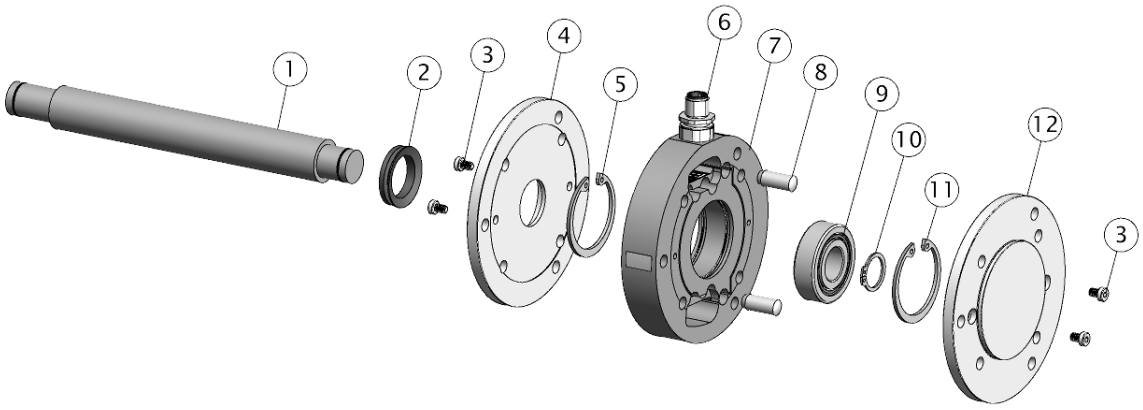
The TLC-A load cell is designed to use a 17 mm bore 1203 self-aligning bearing. These bearings can be used for both live and dead shaft applications.

The bearing is supplied by the customer or it can be ordered separately from MAGPOWR (Part No. 30A23-4). All MAGPOWR TLC-A load cells are shipped with two larger retaining rings to secure the bearing in the load cell.

The shaft (17 mm diameter only) is held in place by smaller retaining rings installed in grooves on each side of the bearing.

For large diameter rollers, the shaft is held by a retaining ring outboard of the bearing and a machined shoulder inboard (shown below). See illustrations on the following pages for installation procedure.

Thermal expansion of the shaft is accommodated by using the two internal retaining rings in *only one set of load cells.*



1	Shaft ∅ 22 mm shoulder shown *	7	Load cell
2	Dust seal (optional)	8	Overload pins
3	Soc hd cp scr M4 x 6	9	Bearing ***
4	Cover, load cell, inboard	10	Retaining ring, shaft ***
5	Retaining ring, bearing, inboard **	11	Retaining ring, bearing, outboard **
6	Connector	12	Cover, load cell, outboard

* ∅17 mm if not using dust seal

** Shipped inside the load cell

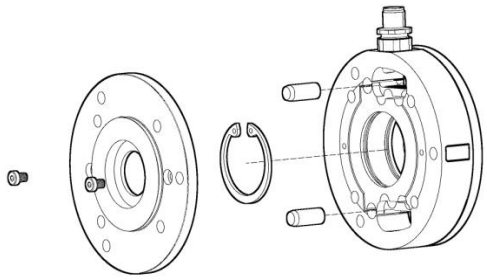
*** Customer supplied or purchase from Maxcess

Load cell installation

Inside machine frame

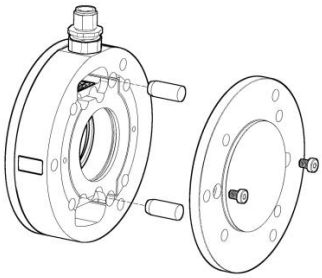
Use the illustration on page 5-3 for reference.

Note the overload pins that are loose inside the covers. Ensure that they are in place before reinstalling the covers. NOTE: A fixed load cell uses two retaining rings; a floating load cell uses none.

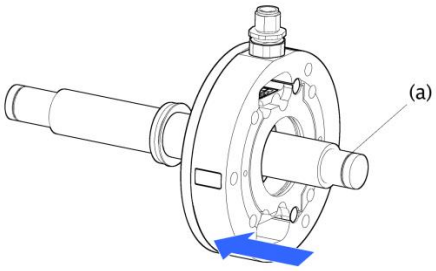


On one load cell only:

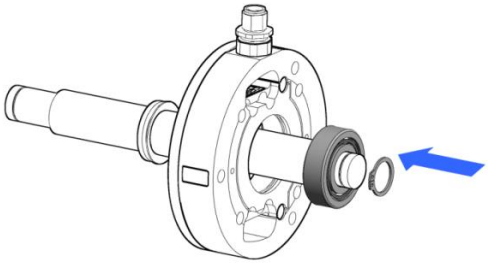
1. Remove two MR screws and the inboard cover and install the inboard retaining ring.



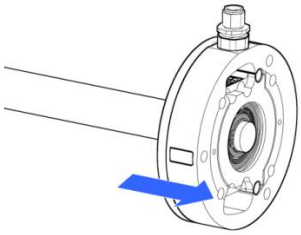
2. Remove two M4 screws and outboard cover.



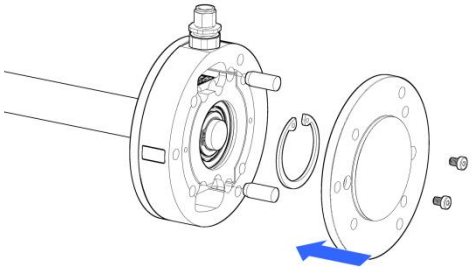
3. If using a dust seal, install it on the shaft.
4. Slide the load cell assembly onto the shaft until the snap ring groove **(a)** is accessible.



5. Install the bearing on the shaft and secure with the snap ring.



6. Slide the load cell assembly back over the bearing. Push the dust seal, if installed, against the inboard cover to provide a proper seal.



7. Install the outboard retaining ring.
8. Ensure that the overload pins are in place and reinstall the outboard cover.

➡ Repeat this procedure at the other end of the shaft. **To maintain the axial play required for thermal expansion, do not install the two large retaining rings in the other load cell.**

Continued on next page.

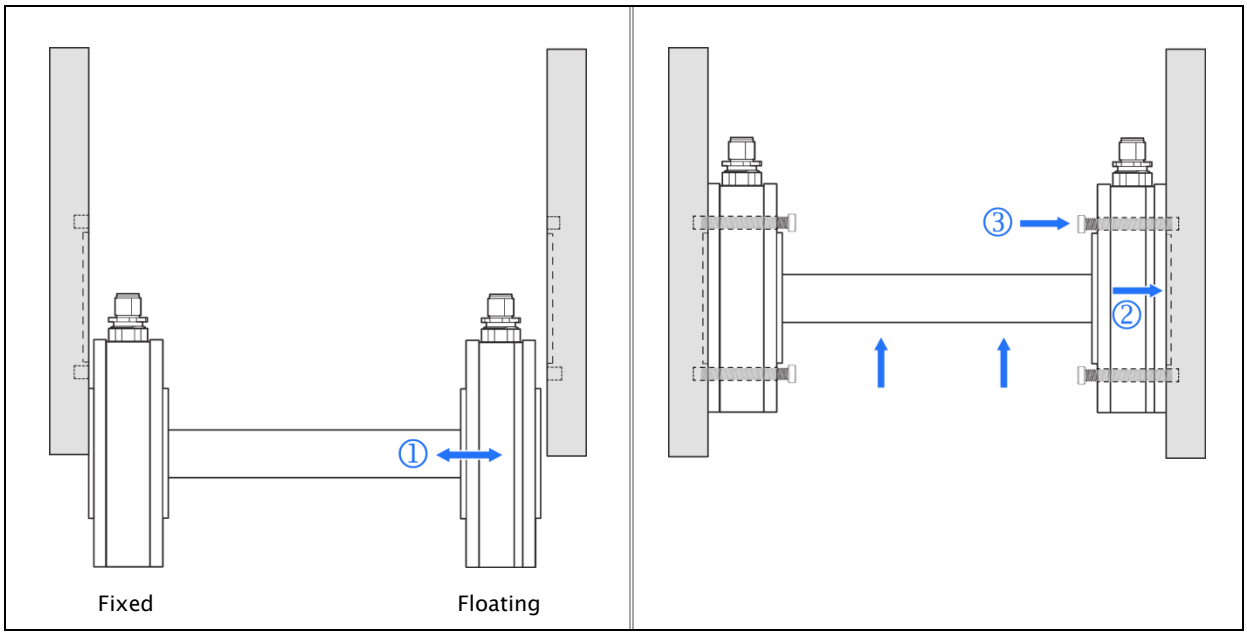
Inside machine frame mounting
continued

Before installation, each machine frame must be prepared with a ∅60 mm hole for the load cell hub and M6x1.0 threaded holes for the fasteners. See page 4-3 for the bolt circle dimensions.

To maintain axial play required for thermal expansion, you must have one fixed and one floating load cell when mounting inside the machine frames. See the assembly instructions on page 5-4.

Installing the shaft assembly

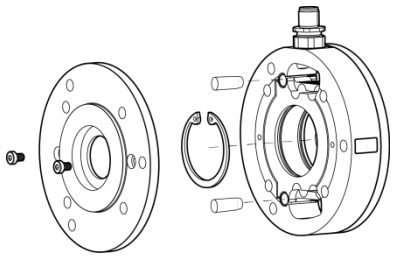
1. Align the shaft assembly between the machine frames and slide the floating load cell inboard until the hubs fit between the frames. There will be some axial clearance to allow for fit. If the assembly will not fit between the frames, check the shaft length. See page 4-1.
2. Slide the load cell up until the hubs fit into the registers in the frames.
3. Secure the load cells with fasteners.



Outside machine frame

Use the illustration on page 5-3 for reference.

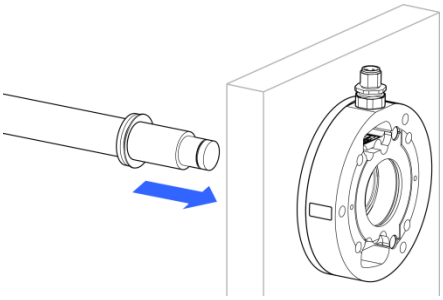
Note the overload pins that are loose inside the covers. Ensure that they are in place before reinstalling the covers. NOTE: A fixed load cell uses two retaining rings; a floating load cell uses none.



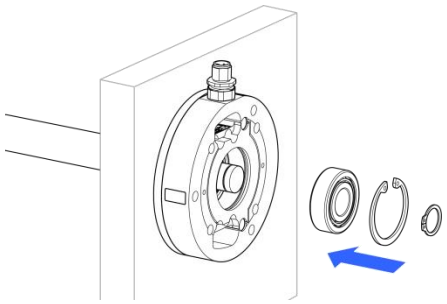
On one load cell only:

1. Remove the inboard cover and install the inboard retaining ring. Note the overload pins that are loose inside the cover. Ensure that they are in place before reinstalling the cover.

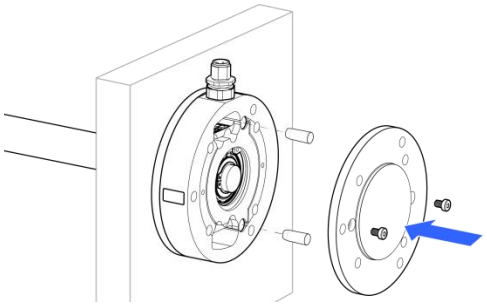
   NOTE: The retaining rings are for a fixed load cell only.



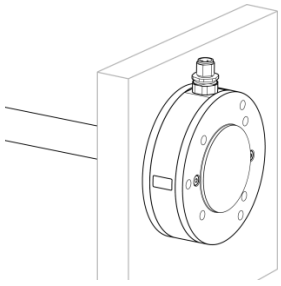
2. With the outboard cover removed, align the load cell with the mounting holes in the machine frame.
3. If using a dust seal, install it on shaft.
4. Insert the shaft into the through the machine frame and into the load cell until the snap ring groove for the bearing is accessible.



5. Install the bearing onto the shaft and secure it with the small snap ring.
6. Install the large retaining ring.



7. Ensure the overload pins are in place and reinstall the outboard cover.



8. Fasten the load cell to the machine frame.

➡ Repeat the procedure at the other end of the shaft. **To maintain the axial play required for thermal expansion, do not install the two large retaining rings in the other load cell.**

Maintenance

No maintenance is required for the model TLC-A load cells other than periodic lubrication of the bearings on the live shaft applications.

For MAGPOWR supplied bearings (P/N 30A23-4), application of fluorosilicone grease at least once annually is recommended.

Model number key

Model – Size – Load rating – Connector type – Units type

Series	TLC
Size	A
Load rating	Newtons
Connector type	EC12
Units type	Metric

Available models

Model number	Load Rating		
TLC-A-50-EC12M	50 N	11.25 lbf	5.10 Kg
TLC-A-100-EC12M	100 N	22.50 lbf	10.2 Kg
TLC-A-250-EC12M	250 N	56.25 lbf	25.5 Kg
TLC-A-500-EC12M	500 N	112.5 lbf	51.0 Kg

8-1 SPECIFICATIONS

Product specifications

Warning – Do not use the devices outside of their rated specifications

Gage resistance	350 ohm
Gage type	Metal foil, full wheatstone bridge
Excitation voltage	10 VDC maximum
Output signal	15 mVDC maximum at full load rating with 10VDC excitation.
IP rating	IP54
Operating Temperature	10° C to 60° C [50° F to 140° F]
Temperature effect on zero	0.02% of rating per °C [.01% of °F]
Combined non-linearity and hysteresis	0.5% of full scale maximum
Repeatability	0.2% of full scale maximum
Overload stops engagement	105% to 150% of full load rating
Overload protection	10X full load rating
Deflection at full load	0.17 mm [0.007 in.]
Cable connector	93289-004; MAGPOWR mating cable LCC series , or mating connector Part #12B220-1
Climate class	3K3 (EN60721)
Certification	RoHS CE UL (with IS2)

Service requests and replacement parts

To request service or to get replacement parts, contact one of the following addresses:

Fife Corporation
222 West Memorial Rd.
Oklahoma City, OK, 73114, USA
Phone: 1.405.755.1600
Fax: 1.405.755.8425
Web: www.maxcessintl.com

Fife-Tidland GmbH
Max-Planck-Strasse 8
65779 Kelkheim
Deutschland
Telefon: +49.6195.7002.0
Fax: +49.6195.7002.933
Web: www.maxcess.eu

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