



MAGPOWR TLC-A Load Cell

User Manual



EN

MI 850A353 B

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About these operating instructions

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Periodically there will be updates to this manual. The latest version is available on our website or by calling the number on the back of this publication.

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 for the load cells 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 from steel 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 with very low temperature drift. 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 pillow block brackets (MAGPOWR Part No. TLCA-PBK).

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, unless used with a MAGPOWR IS2 barrier.

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.

TLC-A

Shaft and roller diameters

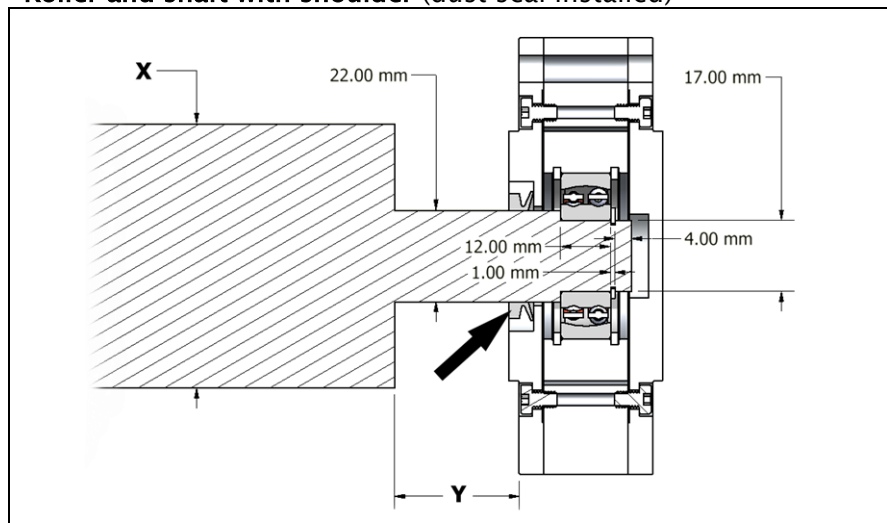
When mounting inside the machine frame, clearance is required for the installation fasteners. See dimensions illustrated below.

If 'Y' will be less than 50 mm [2.0 inches], then the roller diameter 'X' should be less than the diameter of the intended mounting bolt circle:

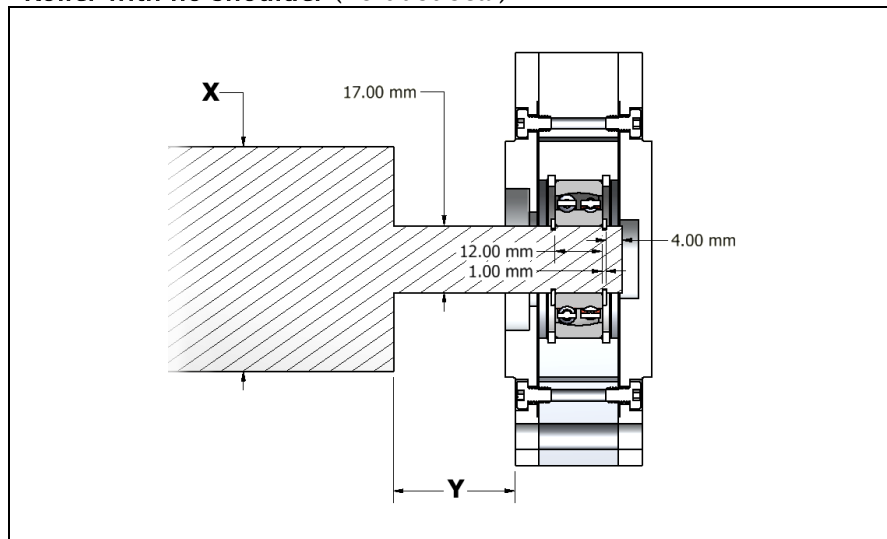
3-bolt pattern: 90 mm [3.5 inches] maximum

4-bolt pattern: 75 mm [3.0 inches] maximum

Roller and shaft with shoulder (dust seal installed)

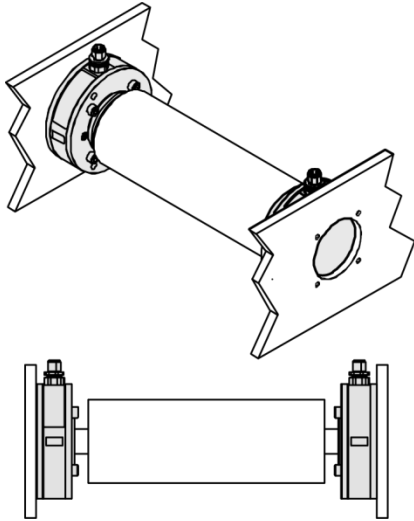


Roller with no shoulder (no dust seal)

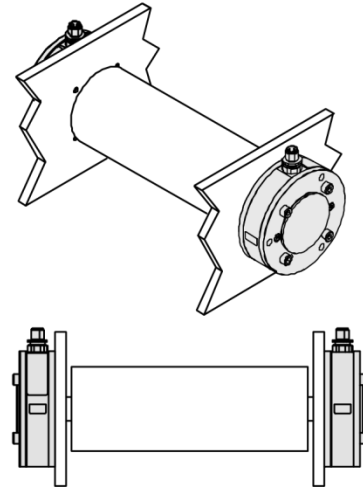


Load cell mounting options

Flange mount (on vertical machine frame)

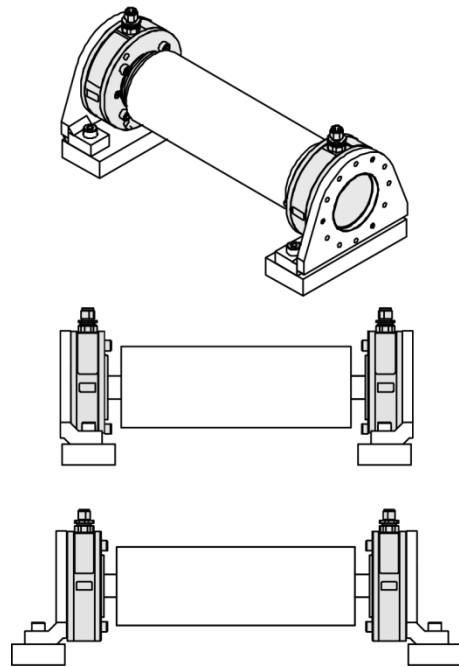


Inside frame

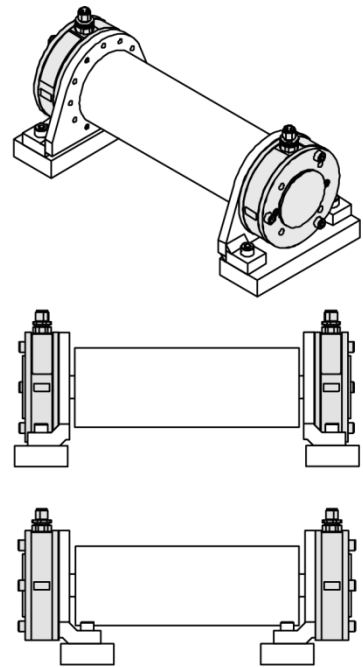


Outside frame

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



Inside brackets



Outside brackets

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.

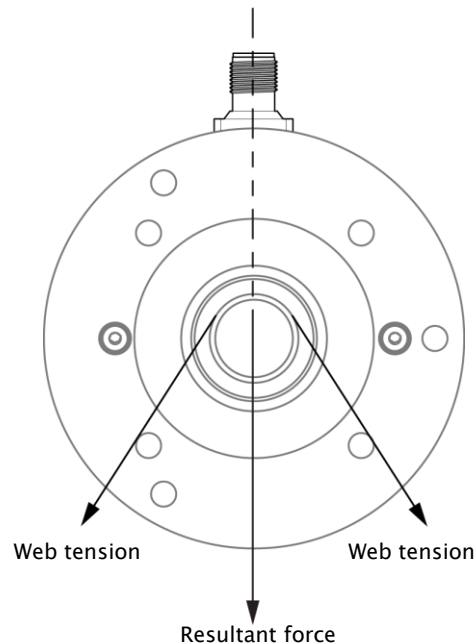


WARNING – Danger of injury from crushing.
Maintenance and repair tasks on the load cell device must be performed only when the machine has been stopped and has been secured from being turned on again.

The TLC-A load cells must be mounted on a clean flat surface where the wrap angle of the web does not change.

The centerline of the load cell must be positioned 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 resultant force can be toward or away from the connector.
See page 4-3.



General mounting instructions

Flange mount: page 4-4

Pillow block mount: page 4-5

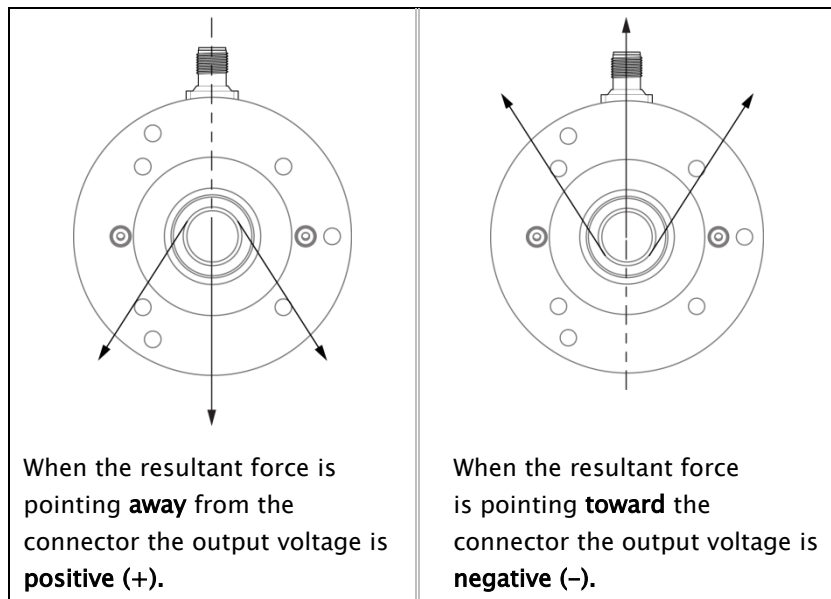
Resultant force polarity



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



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 (output voltage is negative). Exchange the black (-S) and the white (+S) wires at the device terminal block.

Flange mounting

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

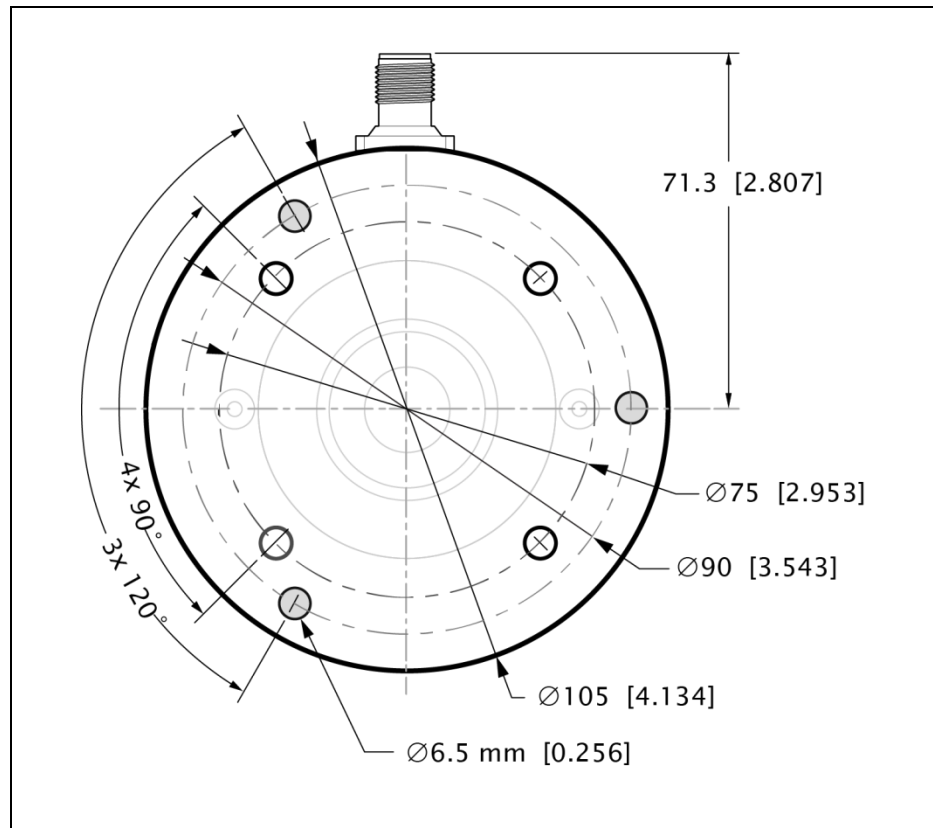
3-hole on a $\varnothing 90$ mm bolt circle

4-hole on a $\varnothing 75$ mm bolt circle

Before installation, each machine frame must be prepared with a $\varnothing 60$ mm hole for the load cell hub and M6x1 (or 1/4 inch) threaded holes for the fasteners.

Use M6 or 1/4" bolts to mount the load cell to vertical machine frames. Minimum fastener length is 40 mm [1.6 inches].

See page 3-2 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.

One bracket per load cell required;
MAGPOWR Part No. TLCA-PBK

Fasteners

Mount load cell to pillow block bracket (kit included)

M6 bolts

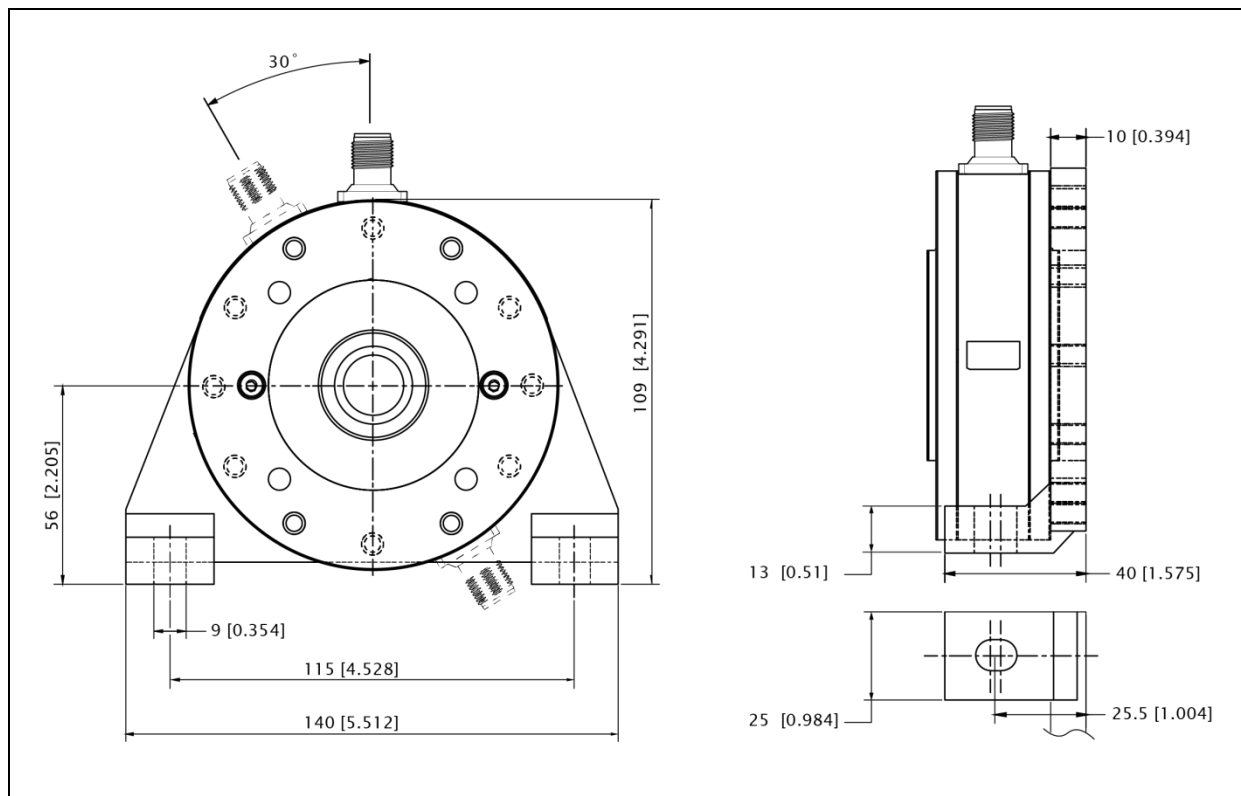
Minimum fastener length is 40 mm [1.6 inches]

Mount brackets to horizontal machine frames

M8 or 5/16" bolts

Minimum fastener length is 16 mm [0.63 inches]

Detailed installation procedures begin on page 4-6.



Bearing and shaft installation

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

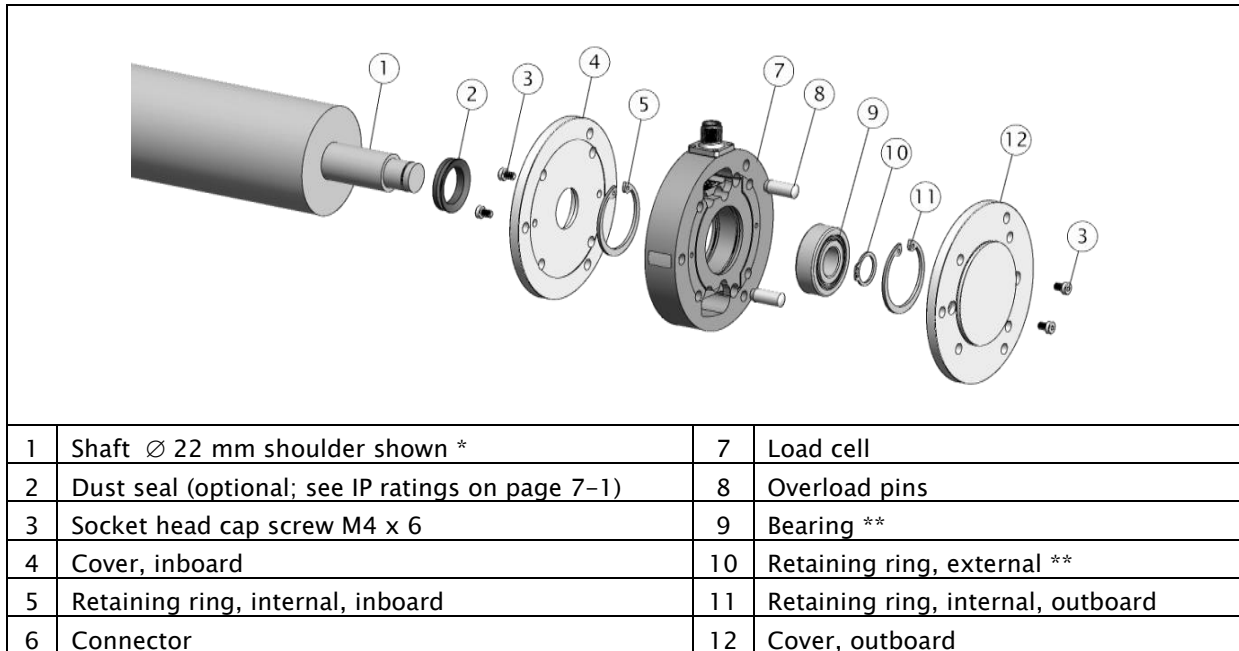
The bearing is supplied by the customer or it can be ordered separately from MAGPOWR (Part No. 30A23-4). All MAGPOWR TLC-A load cells are shipped with two large internal retaining rings to secure the bearing in the load cell.

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

For a shaft with a 22 mm to 17 mm shoulder, 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.

A dust seal is available for the 22 mm shaft only.

Thermal expansion of the shaft can be accommodated by using the two internal retaining rings in *only one load cell*.



* \varnothing 17 mm if not using dust seal

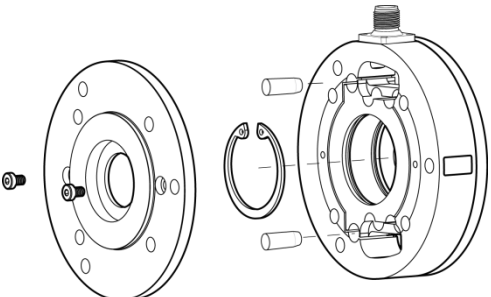
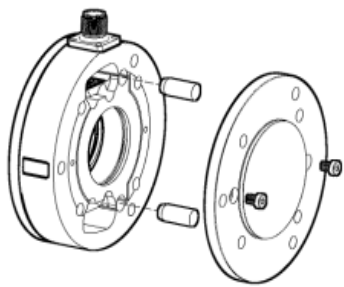
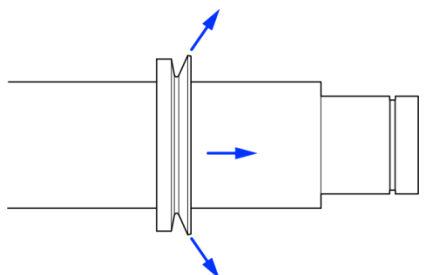
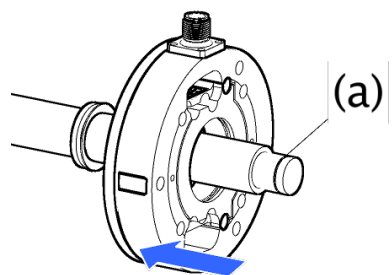
** Customer supplied or purchase from Maxcess

Note: Items 5 and 11 are the same part number, and are distinguished here by description.

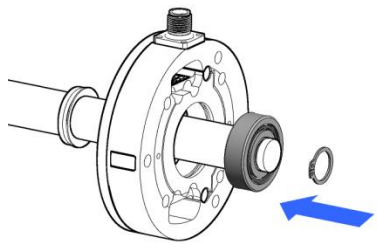
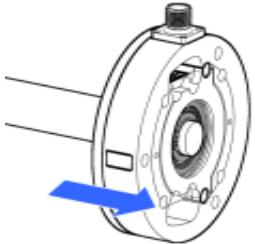
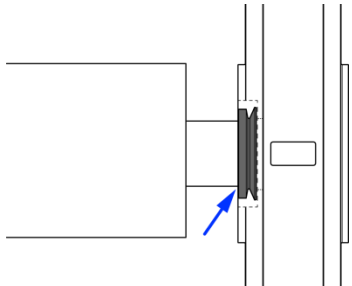
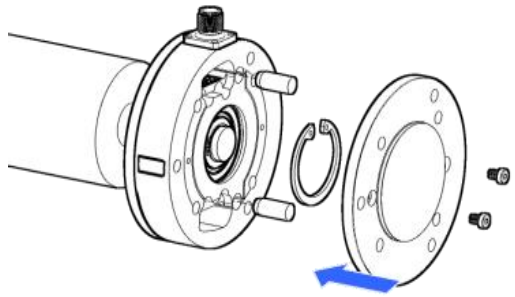
*Bearing and shaft installation – continued***Inside machine frame**

Use the illustration on page 4-6 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 large retaining rings to secure the bearing; a floating load cell uses none.

	<p>On one load cell only:</p> <ol style="list-style-type: none"> 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 large retaining rings are for a fixed load cell only.
	<ol style="list-style-type: none"> 2. Remove two M4 screws and outboard cover. (Note the overload pins.)
	<ol style="list-style-type: none"> 3. If using a dust seal (22 mm shaft only), install it on the shaft as shown.
	<ol style="list-style-type: none"> 4. Slide the load cell assembly onto the shaft until the snap ring groove (a) is accessible. <p><i>Continued next page</i></p>

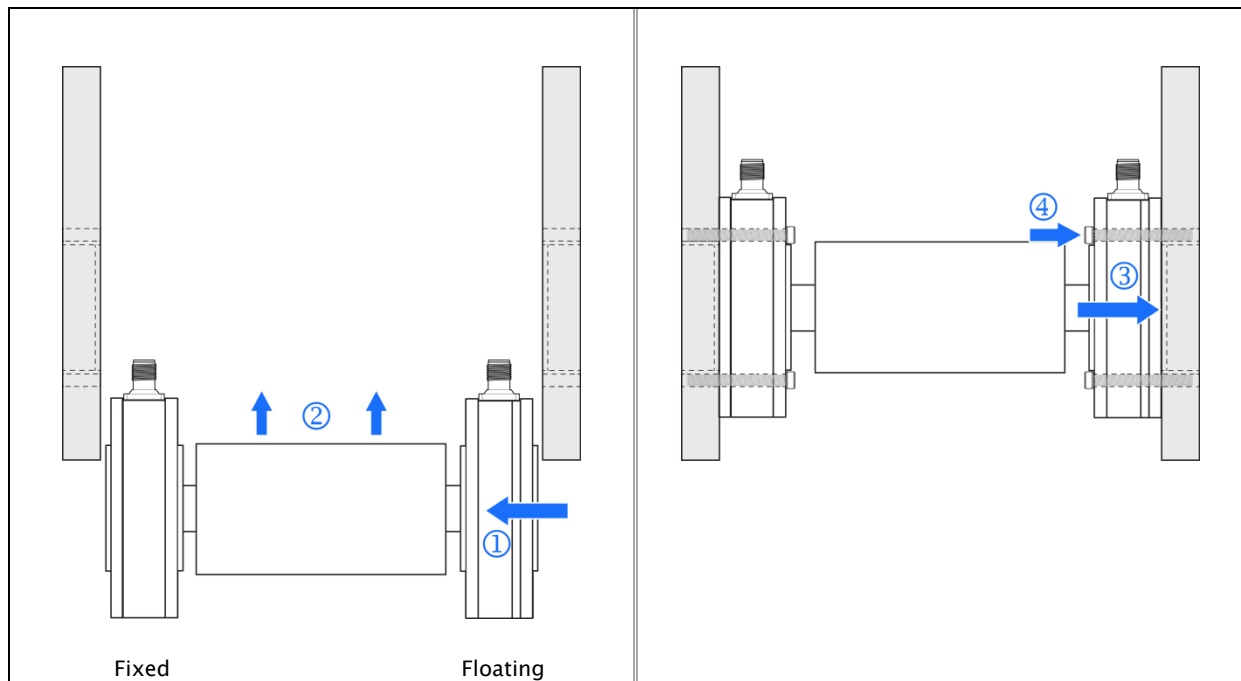
Bearing and shaft installation*Inside machine frame mounting - continued*

	<p>5. Install the bearing on the shaft and secure with the snap ring.</p>
	<p>6. Slide the load cell assembly back over the bearing.</p>
	<p>7. Push the dust seal into the pocket of the cover until inboard faces are flush. Do not over-compress.</p>
	<p>8. Install the outboard retaining ring. 9. Ensure that the overload pins are in place and reinstall the outboard cover.</p>
<p>➡ Repeat this procedure at the other end of the shaft.</p> <p>➡ To maintain the axial play required for thermal expansion, do not install the two large retaining rings in the other load cell.</p>	

Continued next page

Bearing and shaft installation***Inside machine frame mounting – continued*****Installing the shaft assembly**

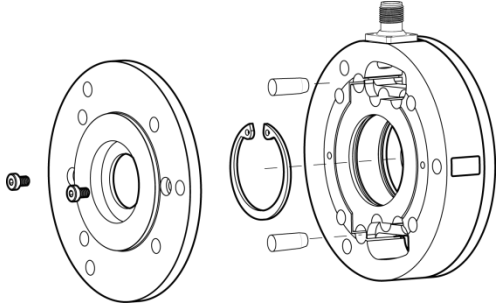
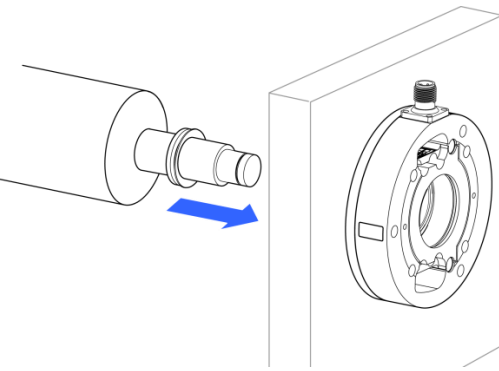
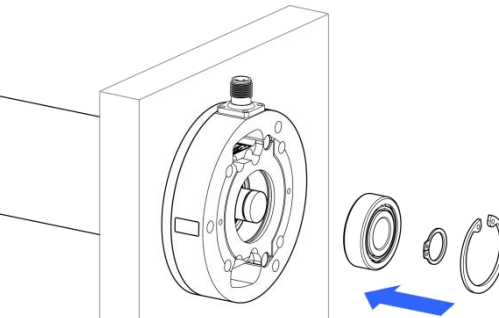
1. Align the shaft assembly between the machine frames and slide the floating load cell inboard until the hubs fit between the frames. There will be some axial clearance to allow for fit. If the assembly will not fit between the frames, check the shaft length. See page 3-1.
2. Slide the shaft assembly up until the hubs align with the registers in the frames.
3. Make sure the hubs are engaged in the frame.
4. Secure the load cells with fasteners (minimum fastener length is 40 mm [1.6 inches]).



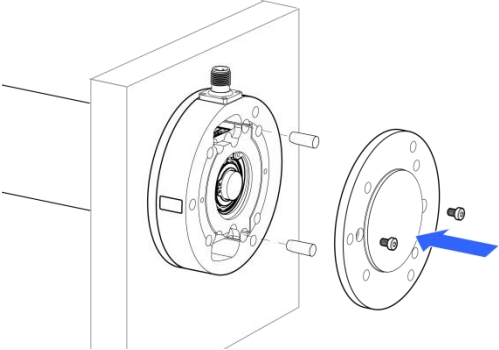
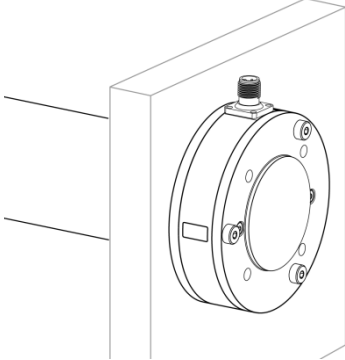
*Bearing and shaft installation - continued***Outside machine frame**

Use the illustration on page 4-6 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 large retaining rings to secure the bearing; a floating load cell uses none.

	<p>On one load cell only:</p> <ol style="list-style-type: none"> 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. <p>NOTE: The large retaining rings are for a fixed load cell only.</p>
	<ol style="list-style-type: none"> 2. With the outboard cover removed, align the load cell with the mounting holes in the machine frame. 3. If using a dust seal (22 mm shaft only), install it on the shaft. 4. Insert the shaft through the machine frame and into the load cell until the snap ring groove for the bearing is accessible.
	<ol style="list-style-type: none"> 5. Install the bearing onto the shaft and secure it with the small retainer ring. 6. Install the large retaining ring. <p><i>Continued next page</i></p>

Bearing and shaft installation***Outside machine frame mounting – continued***

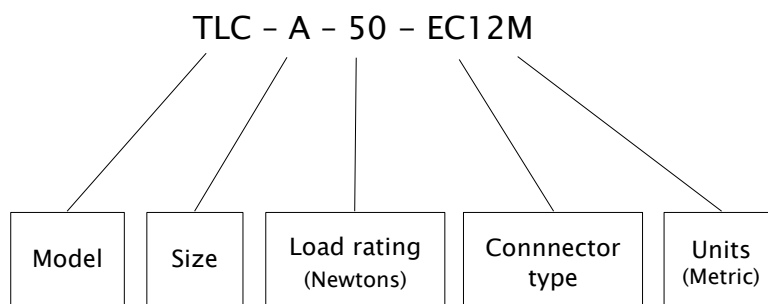
	<p>7. Ensure the overload pins are in place and reinstall the outboard cover.</p>
	<p>8. Fasten the load cell to the machine frame using customer provided fasteners. Minimum fastener length is 40 mm [1.6 inches].</p>
<ul style="list-style-type: none">➡ Repeat the procedure at the other end of the shaft.➡ 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 (Part No. 30A23-4), application of fluorosilicone grease **at least once annually** is recommended.

Model number key



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

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	1.5 mV/V, 15 mVDC maximum at full load rating with 10 VDC excitation.
IP rating	IP67 with dust seal IP57 without dust seal
Operating Temperature	-25° C to 80° C [-13° F to 176° F]
Temperature effect on zero	0.02% of rating per °C
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	MAGPOWR mating cable LCC series, or mating connector Part No. 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

OR
Siemensstrasse 13-15
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