

Issue Date: **January 2016***Please Retain for Future Reference***2016-01-11**

Square Shear Beam Mounting Guidelines

Subject: Square Shear Beam Recommendations

Introduction:

Even though Digi-Star load cells are precisely calibrated, many factors can affect their accuracy. This document is written to offer the OEM general guidelines in the design of load cell mounts for their mobile scale system using square shear beam (SBS) load cells.

Also, Digi-Star is here to help in the design, installation, and testing of new and existing scale systems. The best time to ask for assistance is during the design phase, before problems can arise. With proper guidance, we at Digi-Star can help the OEM provide their customers with a reliable and easy-to-maintain Digi-Star scale system.

Figure 1 – shows a typical dimensional sales drawing for a 1000 lbs shear beam. This drawing sheet describes the important load cell dimensions and how to transfer these dimensions into a typical or generic square shear beam mount support, as shown in Figure 2. NOTE: Actual dimensions may vary by model.

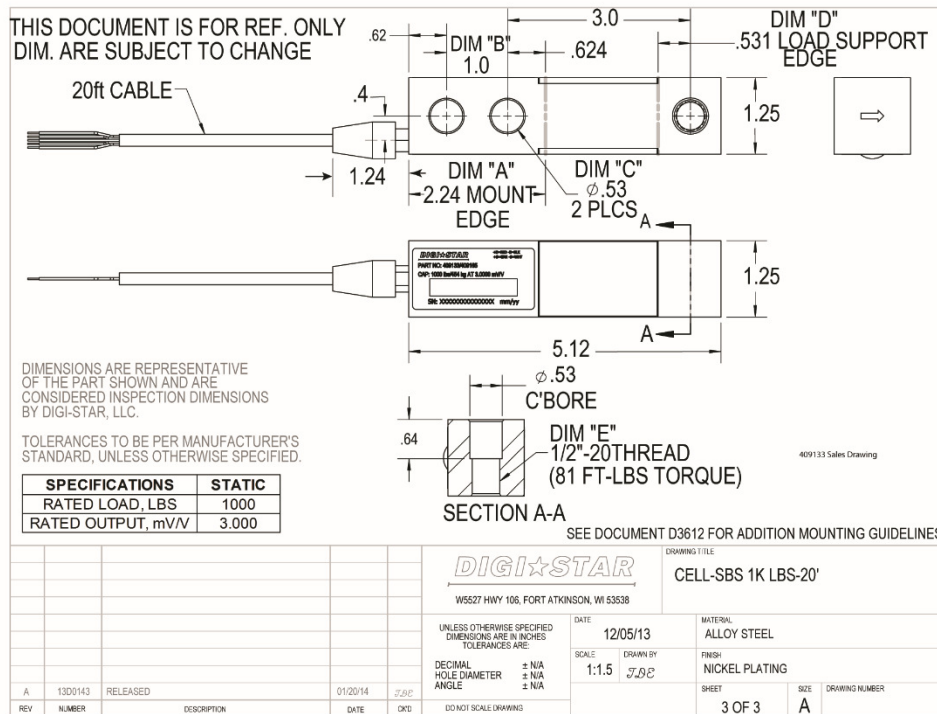


Figure 1: TYPICAL SQUARE SHEAR BEAM DIMENSION SALES DRAWING

- DIM "A": Mount Edge Location. Tolerance $\pm .031"$ (0.79 mm). This dimension is critical for proper load cell strength and accuracy.
- DIM "B": Mounting Hole Spacing.
- DIM "C": Load Cell Mounting Hole Diameter. Tolerance for Mounts $\pm .016"$ (0.41mm)
Nominal Bolt Diameter + .016" (0.41mm)
EXAMPLE: 1/2" Diameter Bolt + .016" (0.41mm) = 0.516" Diameter
- DIM "D": Maximum Load Support Edge Location. Tolerance $\pm .031"$ (0.79mm) maximum. Mount edge should not extend past this location.
- DIM "E": Load Support Bolt Torque. (ft-lbs)
- DIM "F": Minimum load cell clearance to mount. Minimum .25" (6.35mm). This allows for manufacturing support deflections and is easier to clear debris from support.
- DIM "G": Clearance of load end mounting bolt = 0.062" (1.57mm). To improve on load cell accuracy, it is recommended not to bolt the upper support solid to the load cell. A maximum of .062" (1.57mm) clearance is recommended to allow the top mount to float in a mobile application. Having the top support bolted solid to the load cell could cause high preloads due to the tolerance and misalignment of the load cell support and upper loading structure. Resulting performance issues could include erratic weight readings due to in-use zero shifting or loss of range in the indicating element. Significant pre-load

could potentially damage the load cell.

Typical Square Shear Beam Mounting Dimensional:

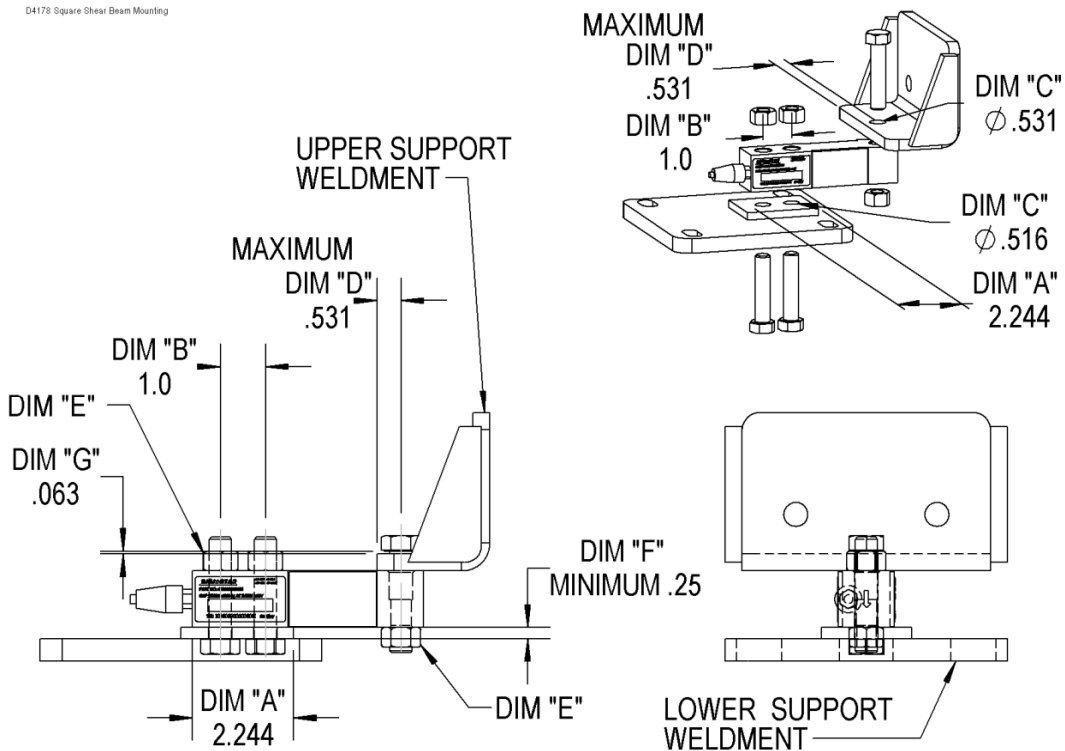


Figure 2: TYPICAL SQUARE BEAM MOUNTING DIMENSIONS
(ACTUAL DIMENSIONS MAY VARY BY MODEL)

Square Shear Beam Typical Mount Configuration:

Figures 3-7 Show Examples of Shear Beam Mount Supports

D4178 Square Shear Beam Mounting 2

Figure 3: MOUNT OPTION #1

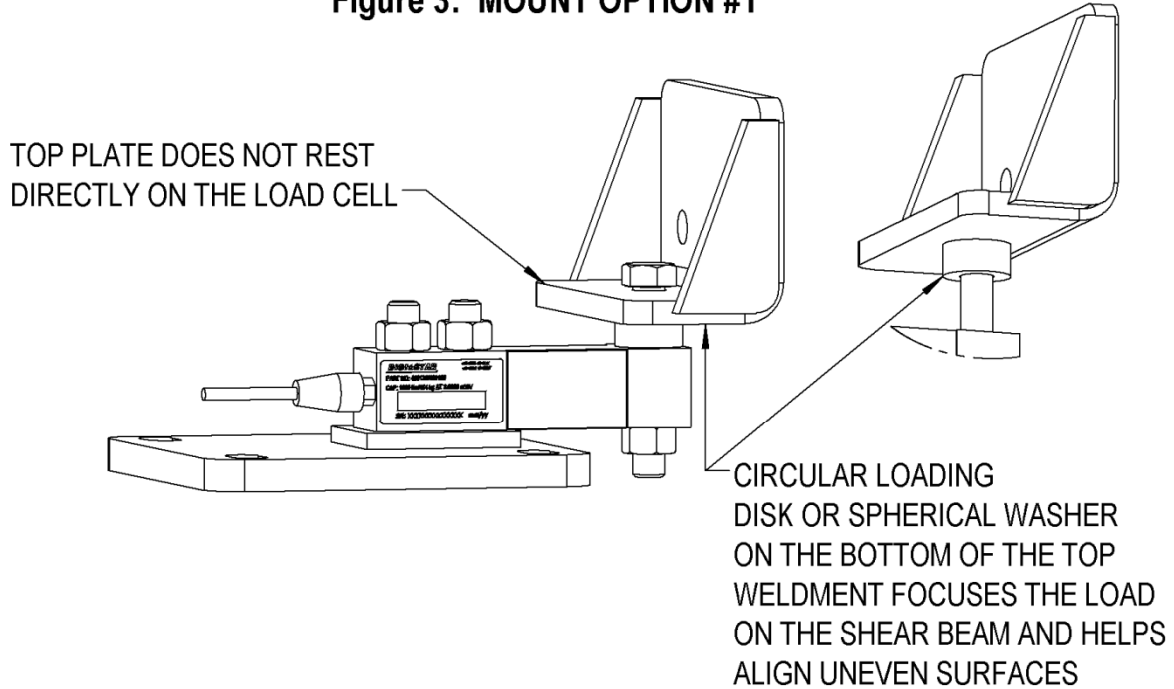


Figure 4: MOUNT OPTION #2

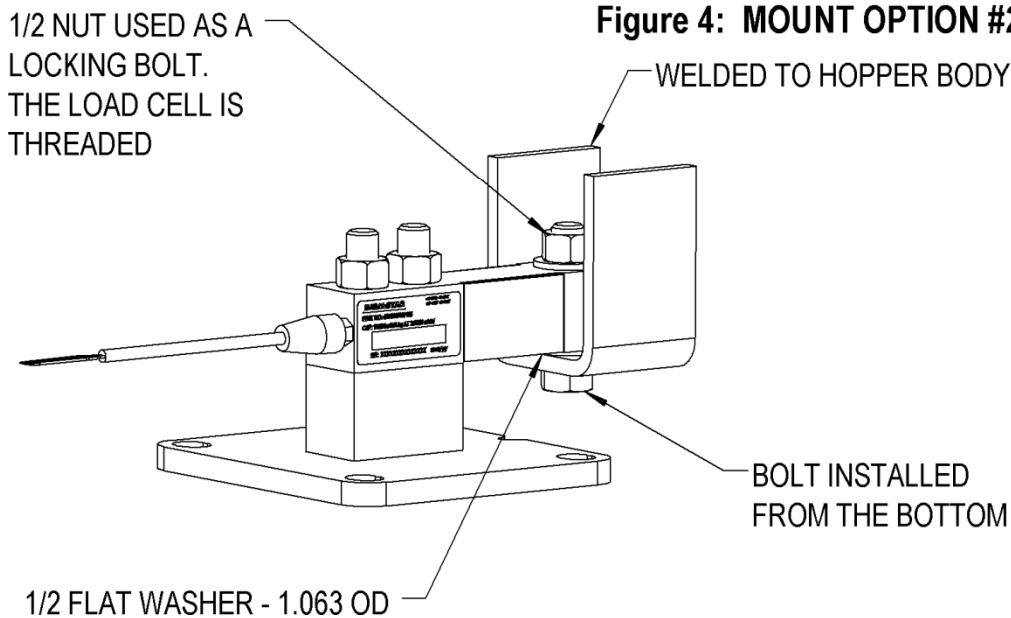
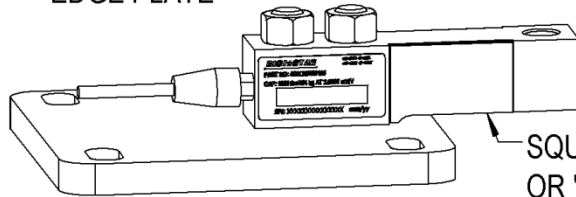
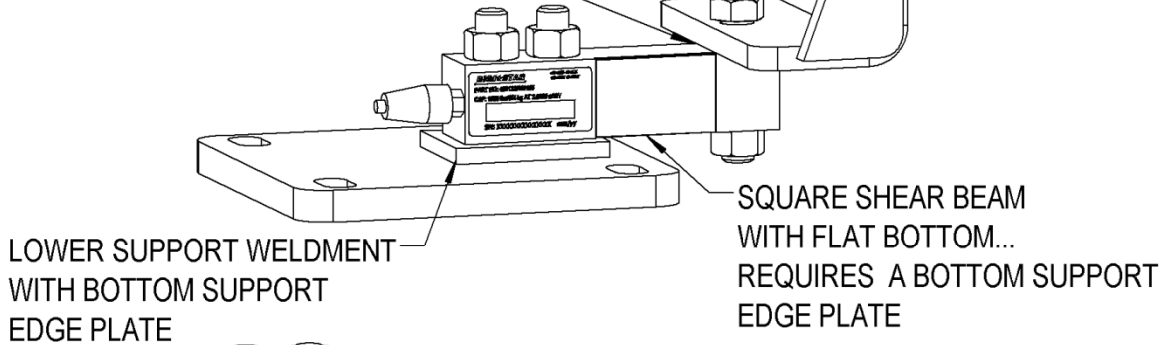


Figure 5: SHEAR BEAM MOUNT OPTION #3

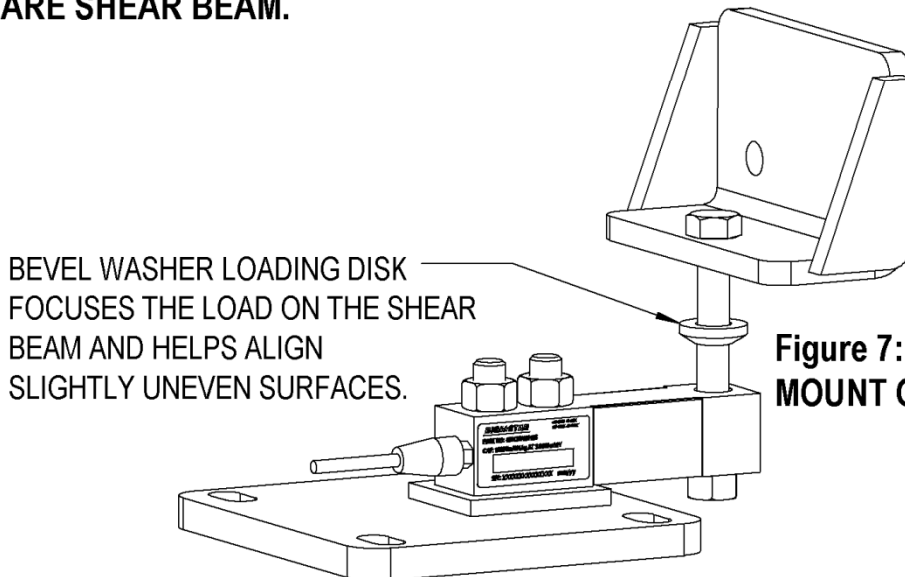
D4178 SQUARE SHEAR BEAM
MOUNTING 3

NOTE: CLEARANCE BETWEEN
HEAD OF BOLT AND UPPER SUPPORT.
ALLOWS UPPER SUPPORT TO FLOAT
TOP SUPPORT RESTS
DIRECTLY ON LOAD CELL



**Figure 6: MOUNT OPTION
#4- PISTOL GRIP OPTION
SQUARE SHEAR BEAM.**

SQUARE SHEAR BEAM WITH CUT OUT BOTTOM
OR "PISTOL GRIP" OPTION. WITH THIS OPTION,
THE LOAD CELL COULD REST DIRECTLY ON A
BOTTOM PLATE AND DOES NOT REQUIRE A
SUPPORT EDGE PLATE.



**Figure 7:
MOUNT OPTION #5**

Square Shear Beam Mounting Misalignment:

This section highlights misalignment issues that can be found during the assembly process due to manufacturing or assembly errors. Generally, it is not recommended to correct the misalignment by forcing the top loading bracket into position by over tightening the mounting bolt. This could create excessive pre-load on the load cell and may result in performance issues. The preferred method to correct mounting misalignment is to install shims to fill the linear gaps and/or to tighten the top bracket loading bolt so that it just makes contact. Finally, Digi-Star is here to assist in the design of mounting square shear beams and offer solutions to misalignment issues and possibly recommend alternate load cell styles that might work better.

D4188 Square Shear Beam mounting Recommendations Misalignment 2

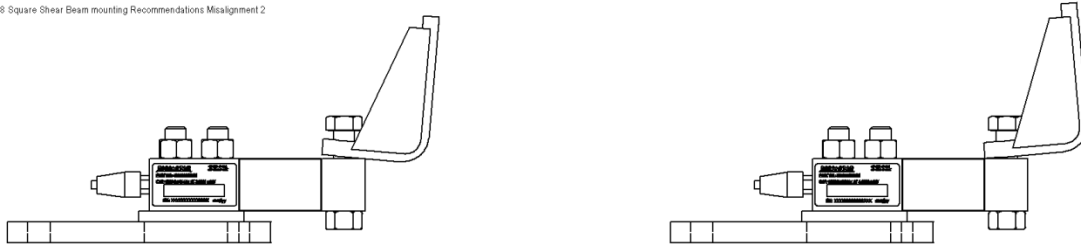


Figure 8: TYPICAL MISALIGNMENT OF TOP LOAD SUPPORT

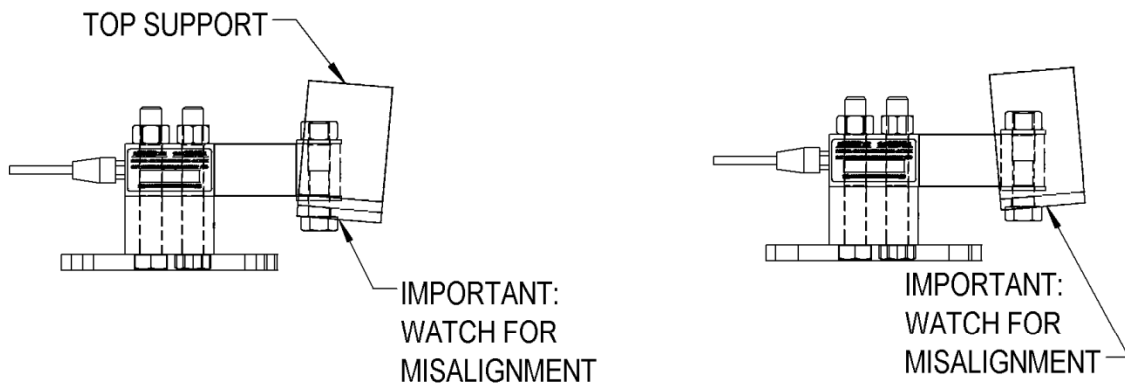
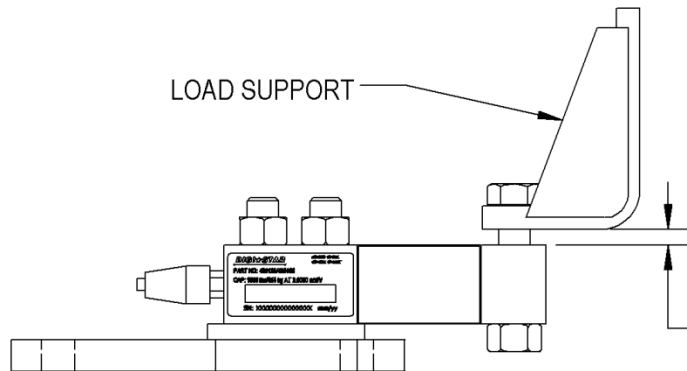


Figure 9: TYPICAL MISALIGNMENT OF BOTTOM LOAD SUPPORT

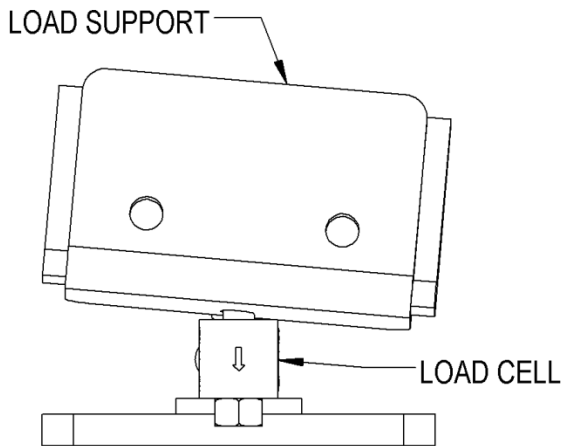
ANGULAR MISALIGNMENT
(TOP SUPPORT DOES NOT SIT FLAT ON LOAD CELL)

D4178 Assy Mounts Twisted Misalignment



DO NOT TIGHTEN UPPER MOUNT BOLT TO FORCE SUPPORT INTO POSITION; THIS WILL RESULT IN EXCESSIVE LOAD CELL PRELOAD. A BETTER SOLUTION IS TO ADD SHIMS TO REDUCE THE MISALIGNMENT GAP.

LINEAR MISALIGNMENT
(SUPPORT IS PARALLEL TO TOP OF LOAD CELL, BUT A GAP EXISTS.)



LOAD CELL OR SUPPORT MUST BE SHIFTED TO MAKE BOTTOM OF SUPPORT PARALLEL WITH TOP OF LOAD CELL.

TWISTED OR OFF CENTER MISALIGNMENT
(TOP SUPPORT IS NOT PARALLEL TO TOP OF LOAD CELL)

Figure 10: TYPICAL MISALIGNMENT OF LOAD SUPPORT