



Morehouse
THE FORCE IN CALIBRATION SINCE 1925

PM-6020
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ISO/IEC 17025 / ANSI/NCSLI Z540.3 Accredited

Operation and Instruction Manual

Shackle Load Pins



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Introduction

Most shackle load pins are sensitive to even the slightest change in loading conditions yet these errors can go completely unnoticed in a standard calibration. As an example, Morehouse has observed that simply taking the load pin out of the shackle and putting it back in can produce measurement errors of up to 10% in the span. After multiple design iterations, Morehouse has redesigned the shackle load pin and in the process, taken it from the accuracy of a fish scale to an industrial precision measurement instrument. Our shackle load pins outperform the most common shackle load pins on average by at least a factor of 10!

Extremely Durable – Our shackle load pins take advantage of enhanced construction and engineered materials, making them much more durable than ‘standard’ load pins. This improved durability means greater longevity, avoiding costly replacements.

Improved Accuracy – Our shackle load pins provide superior, accurate, load readings in real time, allowing customers to get better measurements of their loads in real time.

Features and Options:

- Multiple load pins can be read by a single receiver
- Total or Individual forces can be measured
- Adjustable sample times and sleep modes available to increase battery life
- Long-range wireless communication at 2.4GHz
- Free App for Android or IOS to capture and display info on your phone
- Bluetooth option can be read by multiple phones at the same time
- Complies with ASME B30.26-6 (Detachable Load Indicating Device)

Morehouse provides a separate manual that covers the setup and software for wireless options. Unless requested otherwise, Morehouse will provide the units with the calibration access locked. However, the user is still responsible for setting up the correct units and understanding the “tare” function. If using the unamplified mV/V option, Morehouse can provide training resource from our blogs and training videos.

See datasheet PD-6020 for dimensions and capacity.

Inspection, Maintenance and Repair

- Inspect all components of the shackle load pin before use to ensure all parts are free of defect and are assembled correctly. Reinspect regularly during use.
- This item is only repairable by manufacturer.
- For general applications, it is recommended to have the unit calibrated annually
- Regular routine maintenance is limited to battery replacement, item inspection, and cleaning.
- Do not clean the loadpin with harsh or corrosive chemicals - these can damage the electronics in the loadpin.
- Since the user has the ability to modify the readings, checking the software and electronics setup against a known load before each use is good practice.
- See ASME B30.26-6 for additional industry guidelines

Parts & Assembly Notes

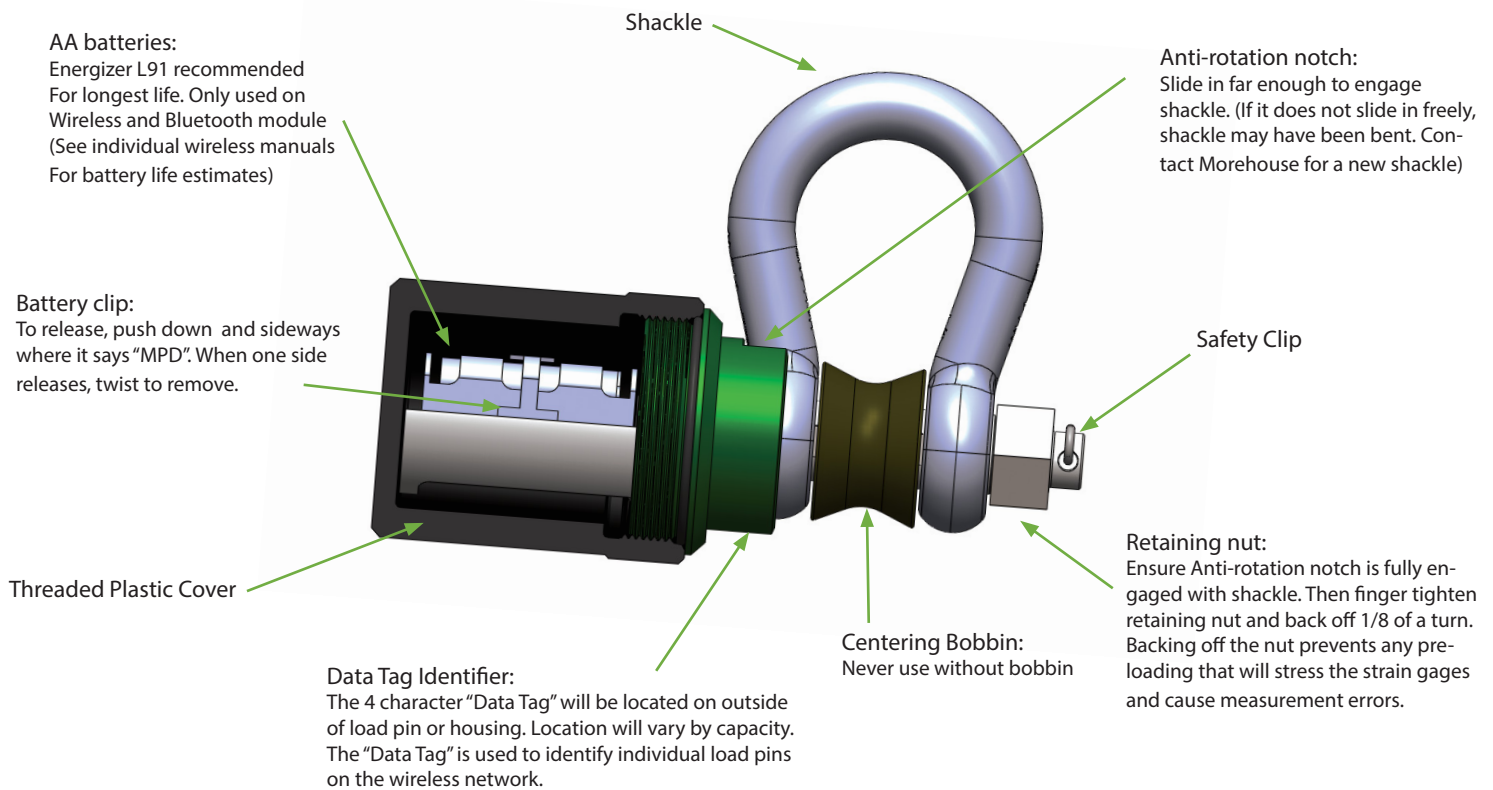


Figure 1: Shackle Load Pin Components

Safety

The knowledge required to safely use shackles is beyond the scope of this manual. Anyone using shackles should be certified to OSHA approved training standards for rigging along with additional training in their specific field of use. These shackles may not be used in a safety critical application without assessment by user and approval by cognizant notified body. Contact Morehouse if additional documentation on the product is needed for this purpose.

Good safety precautions include understanding of the following:

- Read and understand all the scenarios shown in [Figure 2-6](#): that illustrate methods to improve measurement accuracy. Incorrect use can lead to a gross under reporting of the load readings.
- Some applications, although compatible with a standard shackle, will not provide accurate measurement. Contact Morehouse for consultation about alternate measurement techniques.
- Do not use any rigging method, including those examples given in this manual, that violate the industrial safety recommendations for a given application.
- It is essential that user is familiar with the software and electronics used. Misinterpretation of the data can result in death.
- The loadpins must never intentionally be used beyond their rated capacity. If they are loaded beyond 150% of rated capacity, they must be removed from service.
- Any debris between loadpin and bobbin may cause incorrect reading.
- Never remove the Safety Pin, Retaining Nut, or the loadpin from the shackle under load.
- The included centering bobbin must be used at all times. Loading without the bobbin lowers the safety factor and will damage the loadpin.

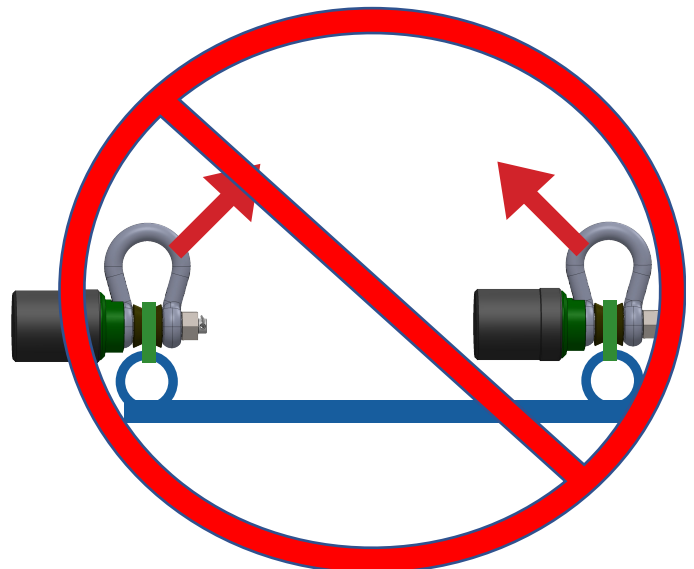
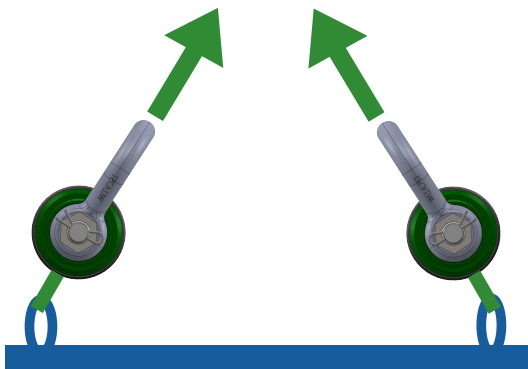
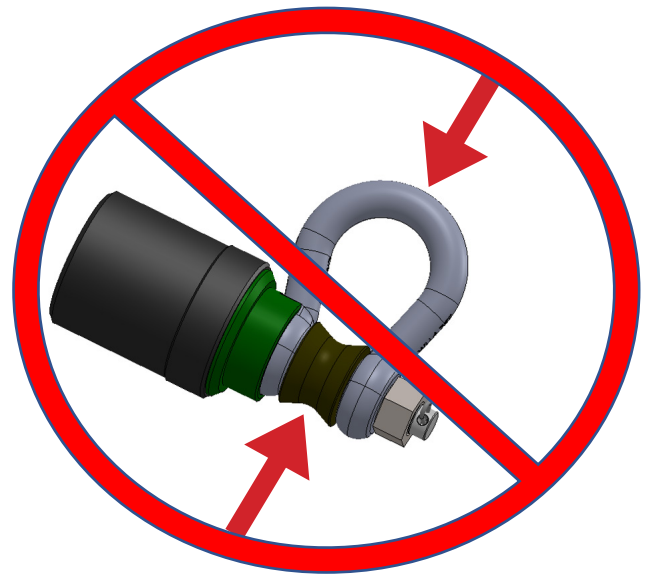
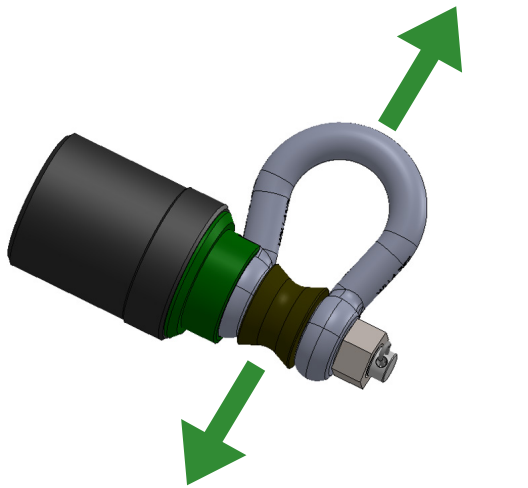
All specifications refer to new/unused product that has not been abused. Among the factors that can cause premature wear include:

- i. Customer modifications (welding, damage from dropping, grinding, non-factory supplied parts, etc)
- ii. Corrosive environments (including not cleaning after exposure to corrosive environments)
- iii. High frequency vibration can cause mechanical fatigue in a unexpectedly short time.
- iv. Shock and impact can create destructive forces that are hundreds of times greater than the weight being handled. Peak value from shock loading occurs faster than can be measured by standard equipment.
- v. Any modification to the design may impair strength and accuracy.

Loading Precautions

The entirety of the load to be measured, must be applied to the bobbin. Watch for loading conditions where all or part of the load bypasses the bobbin as these can result in loads that are much higher than shown on the readout. Applying forces to equipment and instruments is inherently dangerous. This document does not, and cannot, foresee all safety considerations in your testing and application environments. It is important to give careful consideration to any application of force.

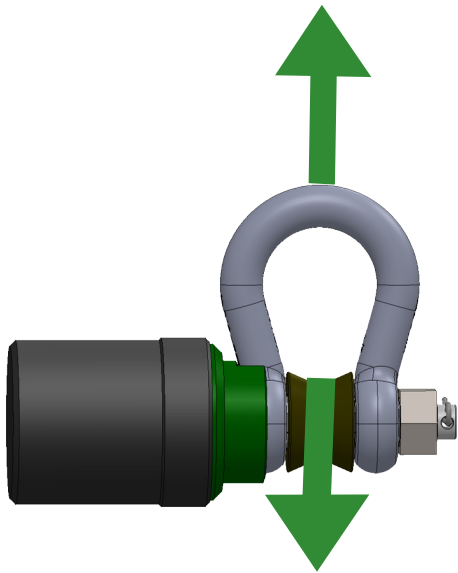
Figure 2: Apply In-Line Tension Loads Only



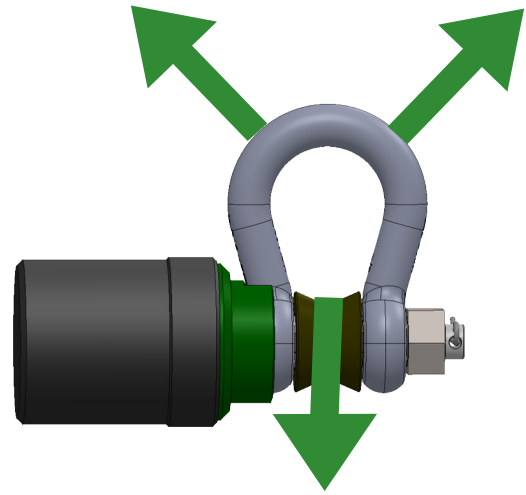
Loading Precautions

The entirety of the load to be measured, must be applied to the bobbin. Watch for loading conditions where all or part of the load bypass the bobbin. This can result in loads that are much higher than show on the readout.

Figure 3: Loading Conditions

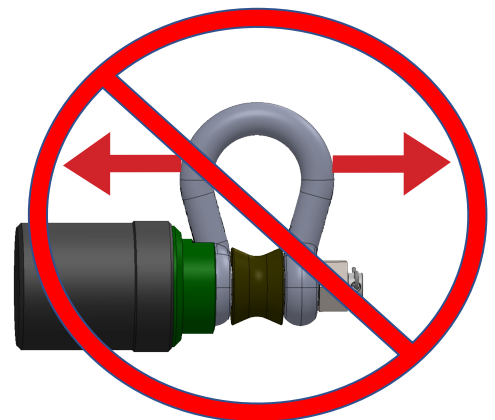
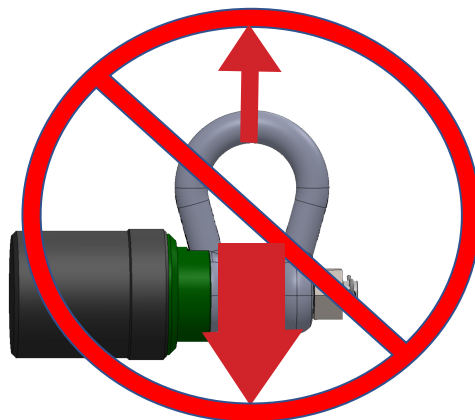
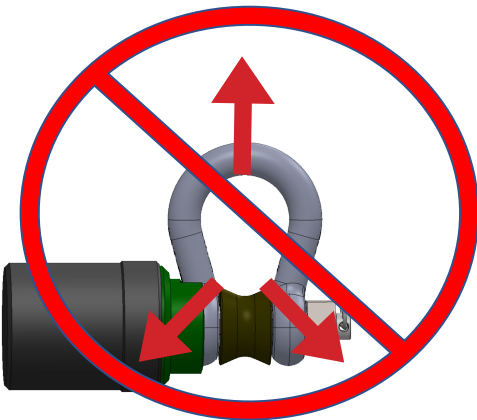


Here, part of the downward load is against the bobbin and part is against the shackle.



Avoid loading the bobbin with loads that are wider than the bobbin.

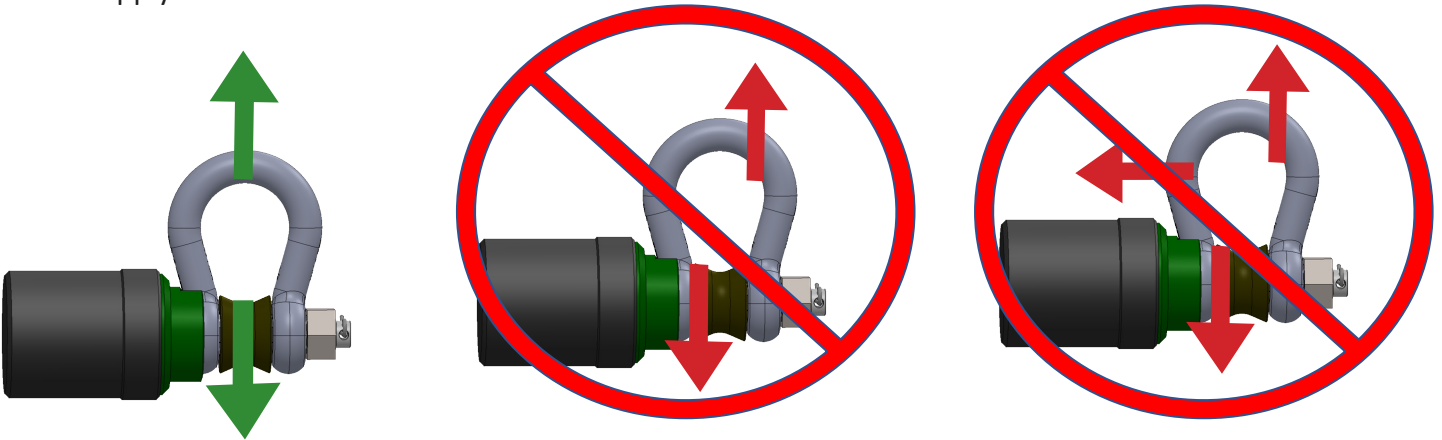
Avoid loading the shackle with side loads that will not be measured.



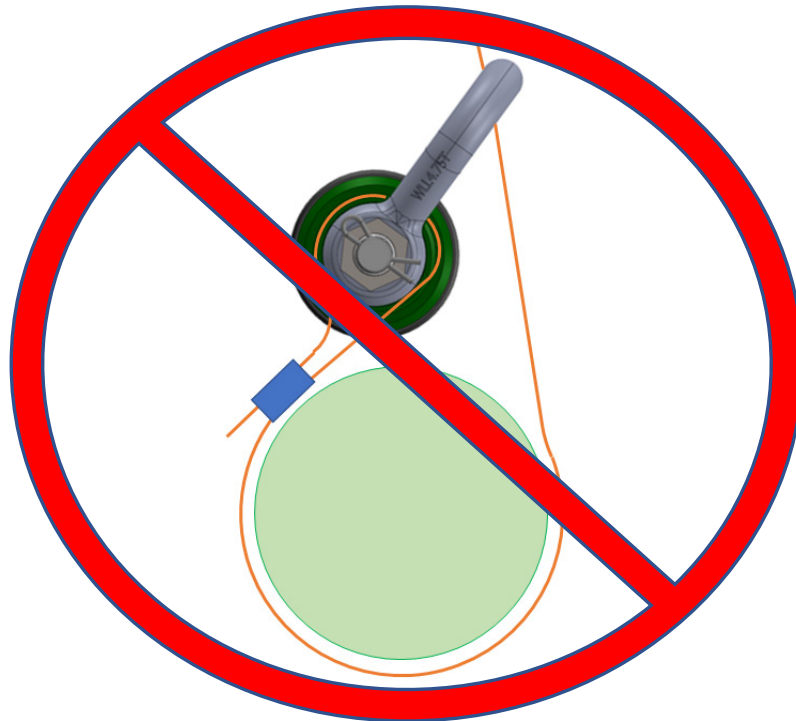
Loading Precautions

Figure 4: Unbalanced Side Load Conditions

Do not apply unbalanced or side loads.



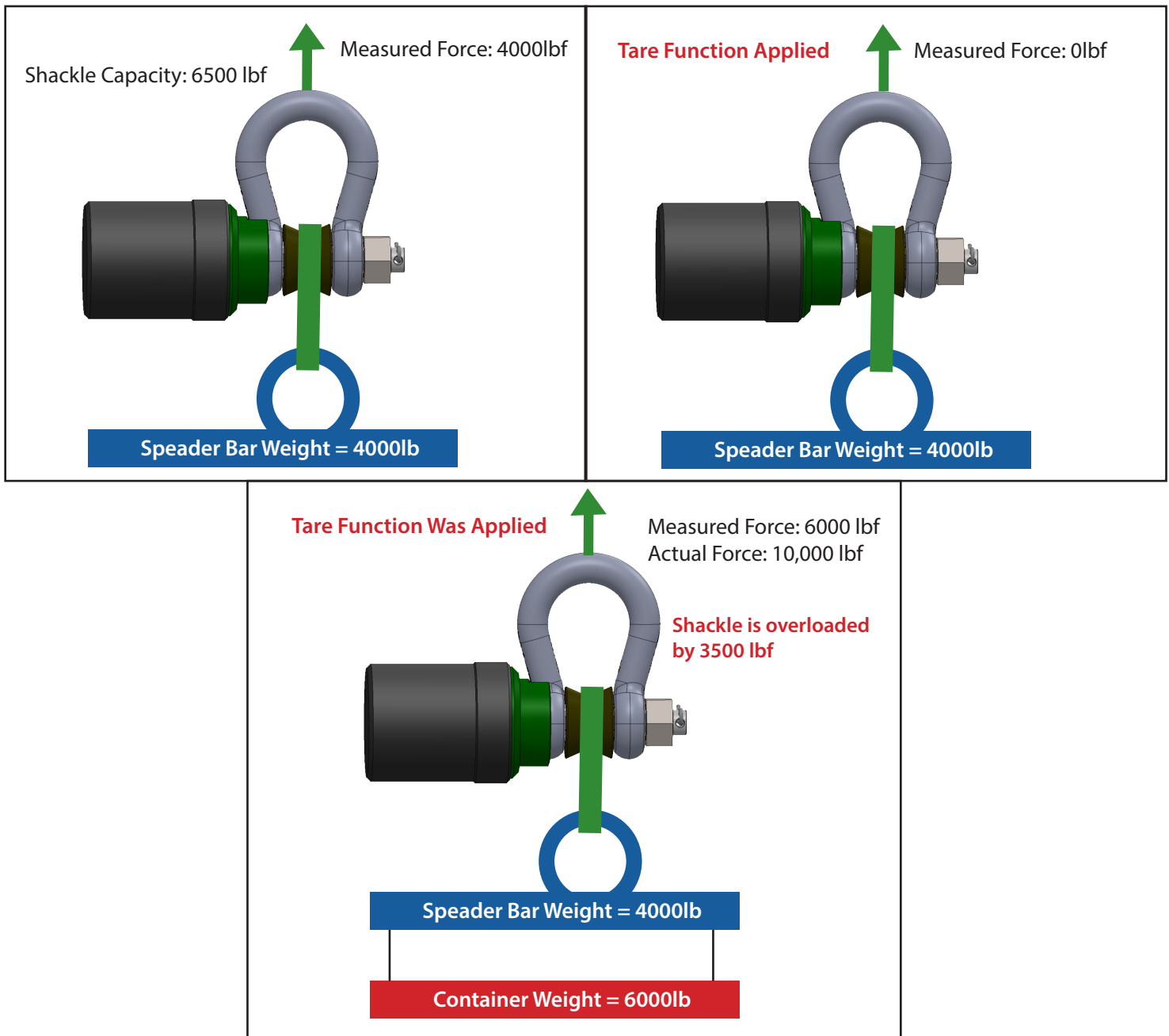
Do not rig as a sling, readout will not measure correct load.



Tare Function Precautions

It is recommended to only use the tare function to re-zero the output with no applied load. If it is used to remove the weight of fixturing from the reading, the user can get confused as to the total weight being lifted.

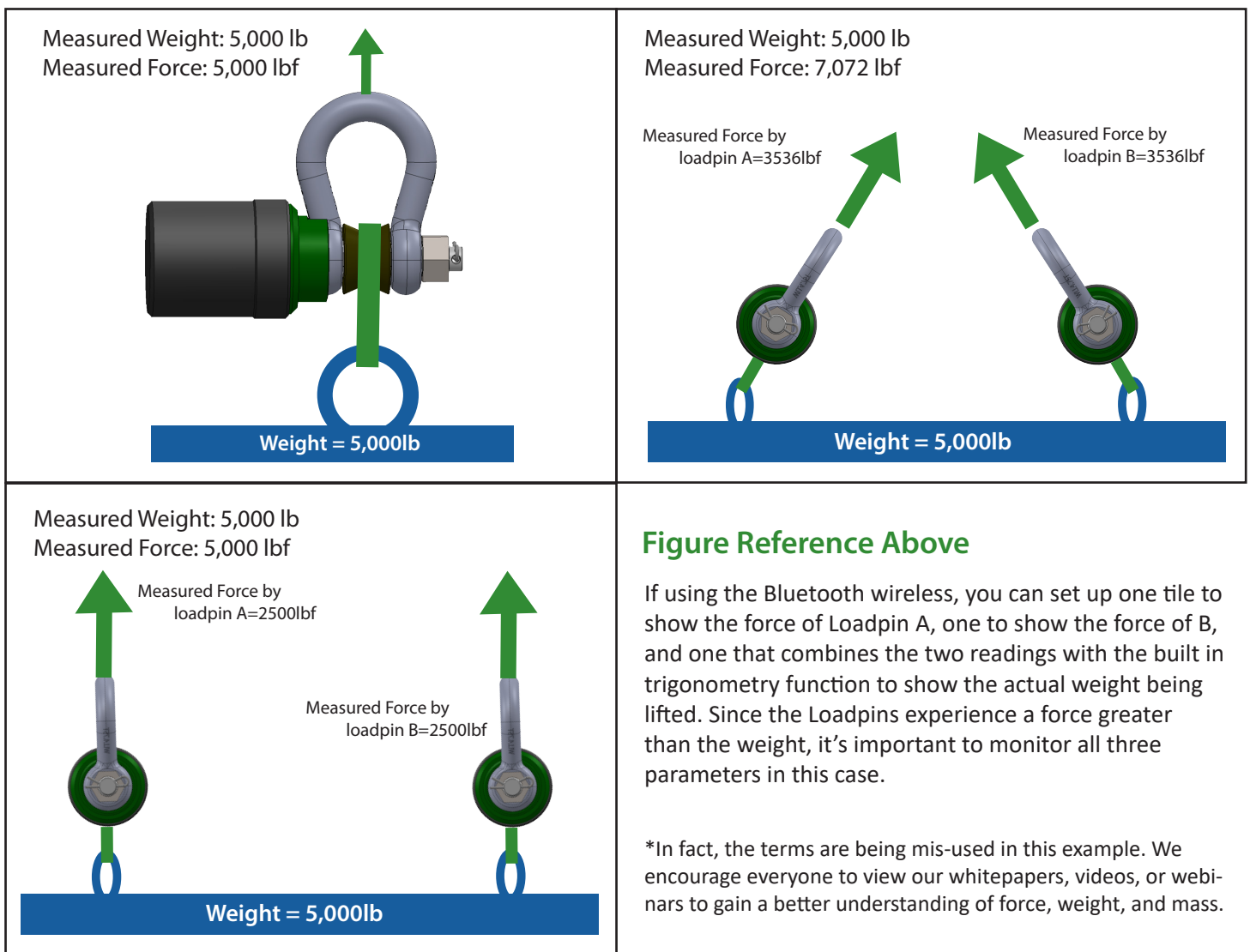
Figure 5: Dangers of Using Tare Function



Force Versus Weight

For accurate readings, it is critical to understand the difference between Force and weight. The correct definitions and nuances of these terms will not be explained here.* The 3 examples below illustrate why the difference matters when using a shackle loadpin or any loadcell.

Figure 6: Force vs Weight



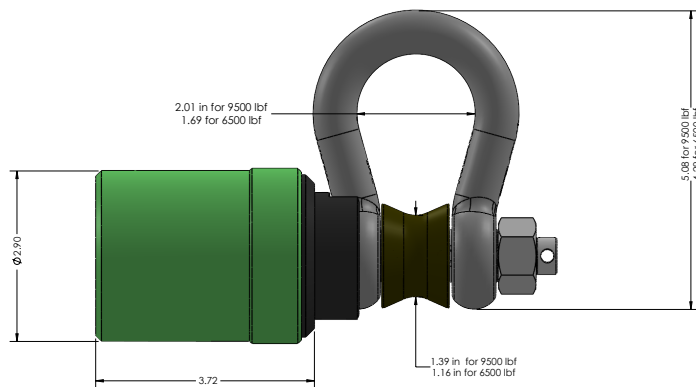


Specifications

Below you will find the technical, wireless and device specifications about Morehouse Shackle Load Pins. Morehouse engineering personnel are readily available to answer any technical questions.

SHACKLE SPECIFICATIONS		
Shackle Capacity	6,500 lbf	9,500 lbf
Overload w/o Damage	9,750 lbf	14,250 lbf
Breaking Load	5X	5X
Accuracy	0.50%	0.50%
Temperature Range, F	-40F to 140F	-40F to 140F
Environmental	IP67	IP67

Dimensions



DIMENSIONS		
Shackle Capacity	6,500 lbf	9,500 lbf
Telemetry Battery Cover Height (in/mm)	3.72 / 94.48	3.72 / 94.48
Telemetry Battery Cover Diameter (in/mm)	2.90 / 73.66	2.90 / 73.66
Internal Shackle Diameter (in/mm)	1.69 / 42.92	2.01 / 51.05
Shackle Height (in/mm)	4.29 / 108.96	5.08 / 129.03
Load Bobbin Center Diameter	1.16 / 29.46	1.39 / 35.30

Wireless Operation

Morehouse Shackle 2.4 GHz Wireless Load Pins work with the T24 Telemetry products. The data sent by the loadpin can be utilized by a variety of other receivers such as displays, analog output converters, and relay modules. Some options increase the already outstanding range.

WIRELESS SPECIFICATIONS			
SIGNAL	BLUETOOTH	2.4Hz Long Range WIRELESS	mV/V
Receiver	Free App for Android and iOS	USB Dongle or Handheld	Contact Morehouse
Power Source	2 x AA	2 x AA	10V (15V max)
Battery Life, Continuous use Energizer L91	1 sample every 10 seconds: 8 yrs (10 samples per second: 1 month)	1 sample every 2 hrs: 2 yrs (3 sample per second: 3 weeks)	N/A
Range (ft with no obstructions)	300' for iPhone 7 (varies by phone)	2000'	N/A

Device/Application	Number of Shackles Paired
Bluetooth Phone App	12 max
Free Windows Program 2.4 Ghz Wireless	100 max
Handheld Receiver (Low & High End)	1 / 12 max

Telemetry Manual Overview

Morehouse Wireless and Bluetooth capable Shackle Load Pins work with the T24 and B24 Telemetry products. We offer both manuals on our website or contact sales for more information.

T24 Telemetry Products

The T24 Telemetry range of products provide remote measurement of a variety of inputs allowing the results to be relayed to a computer or PLC or to feed the data into other T24 modules that provide their own outputs such as analogue, ASCII serial or LED display for example. The radios operate on the licence free 2.4GHz band and are approved for FCC, IC and European use. The flexible transmission rates and low power usage allows for long battery life for remote modules. Free Toolkit software provides simplified configuration of modules and other free software provides logging and visualisation functionality for Windows PCs.

B24 Telemetry Products

The B24 Bluetooth Telemetry range provides access to quality measurements on a mobile platform such as a phone or tablet. The delivery mechanism is 'Bluetooth Low Energy' (Also known as 'Bluetooth Smart' or BLE) which utilises the flexibility and availability of Bluetooth receivers while maintaining the low power requirements of embedded systems. B24 is built upon two complimentary principles of BLE, broadcast advertising data which enables users to deliver the same data to multiple receivers simultaneously and low power connections which can be used in a point to point system. B24 is available in OEM bare board formats and with environmentally sealed enclosure with integrated battery holder.

Bluetooth & 2.4 GHz Wireless

Bluetooth Wireless

One to One:

Many to One:

One to Many:

Many to Many:

Multiple phones can receive the loadpin signal. Everyone involved in the lifting operation can monitor the loadpin simultaneously.

Approximate Range: 100 meters
(varies with phone)

2.4GHz Wireless

One to One:

Many to One:

OR

Approximate Range: 600 meters

For units with Bluetooth Wireless transmitters:

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. (Part. 15.21)

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.

For Units with 2.4 GHz wireless transmitters:

Contains FCC ID: VHARA24 - This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operated the equipment.