![Vibration Master logo](vm vibrationmaster)

# Operating Manual
J120T Junker Test Bench

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# Contents

## Amendments

| Revision | Date | Amendment Details | Issued by |
|----------|------|-------------------|-----------|
| 1.0 | Nov. 2014 | Initial issue | MS |
| 1.1 | Jan. 2015 | Smaller editorial corrections throughout the Operating Manual | MS |
| 2.0 | Nov. 2015 | Updated with new Sleeve design | MS |
| 2.1 | Jan. 2016 | Updated with images of new Sleeve design and torque sensor | MS |
|  |  |  |  |

# 1. Introduction

## Overview

Thank you for purchasing a J120T Junker Test Bench. We have put considerable effort into designing and manufacturing this machine and we hope it will be useful to you in testing and demonstrating the self-loosening behaviour of bolted joints under vibration conditions as well as the relationship between applied torque and achieved preload, if you have selected the optional torque sensor and functionality.

Throughout this document we may refer to the J120T Junker Test Bench as "J120T", "machine" or "unit".

The J120T Junker Test Bench is capable of testing and demonstrating the self-loosening behaviour of bolted joints to several international standards and OEM specifications. The operator can effectively test and demonstrate a bolted joint's resistance to loss of preload in minutes. This makes the J120T ideal for testing in R&D and product development as well as convincing customers and is thus an indispensable tool for any fastener salesperson wishing to demonstrate fastener products in real time in front of an audience.

With the optional torque sensor installed, the J120T turns into a torque tension test unit capable of analysing the relationship between applied torque and achieved preload of bolted joints. With the software's ability to calculate the total coefficient of friction (µtot) and K (Nut Factor) in real-time, the operator receives immediate feedback on the effect of lubrication, coatings and materials in the bolted joint.

The instructions to conduct a test and demonstration are given to the machine through Vibrationmaster proprietary software embedded as firmware in the J120T and operated through any tablet computer with a browser installed and Wi-Fi connection. The results of tests and demonstrations can then be seen on the tablet screen in real-time.

## About this Manual

The J120T operator should follow all relevant safety and operating instructions when operating the machine to ensure the safety of both themselves and others around them.

In this operating manual, safety related or other important information is indicated by the use of a graphic with accompanying text, like the example shown below:

| | The user must not operate the machine unless they are totally familiar with its functions and operations. |
|---|---|

## Introduction

These warnings must be read carefully to ensure the safety of the operator and others as well as to avoid damage to the J120T.

The user will also find helpful information and hints at various points throughout the manual. These are indicated by the use of a graphic with accompanying text, like the example shown below:

| | |
|---|---|
|  | **Vibrationmaster recommends demonstrating fasteners of the entire size range from M3 to M12 ISO Metric and #4 to ½" UTS.** |

These hints represent general ideas and recommendations from the Vibrationmaster team, and may be useful when operating the J120T.

## Safety Information

The operator should follow all these safety instructions when working with the machine to ensure the safety of both themselves and others around them.

| | |
|---|---|
|  | **Fastener testing involves inherent hazards from high forces, rapid motions and stored energy. To operate the machine, users must make themselves aware of all the operations and components that might cause potential hazards.**<br><br>**Users must not operate the machine unless they are thoroughly familiar with its functions and operations.**<br><br>**Carefully read this manual and observe all safety instructions. The best safety precaution is to always have a thorough understanding of how the equipment operates and to always use good judgement.** |

The points below are general safety instructions to be followed when using the J120T:

- Before beginning the installation of the J120T, please check for any external damage. If any damage is found, do not continue with the installation and contact Vibrationmaster immediately

- Do not operate or store the machine where it will be exposed to external weather conditions

- Do not tamper with the controls or the control system software

- Do not repair or replace any part of the machine or attempt any servicing unless this is specifically recommended in the maintenance instructions contained in this manual

- Do not reach into the test area while the J120T is in operation. Wait until all motion has completely stopped before doing so.

- To minimise the possibility of electric shock, unplug the machine from the power supply before attempting any maintenance or cleaning

- Follow the demonstration setup instructions thoroughly

- Do not apply excessive torque to fasteners resulting in an achieved preload above the values specified in the machine specifications

- Use appropriate tools to tighten the fasteners

- Do not close the browser window of the tablet computer until the test in progress has completely finished

- Do not move the tablet computer beyond wireless range until the test in progress has completely finished

- Do not shut down the tablet computer until the test in progress has completely finished.

## Other Important Information

The J120T has been designed for testing and demonstrating fasteners in the size range M3 to M12 ISO Metric and #4 to ½" UTS. Extensive use of only large size fasteners will significantly increase the stress on the J120T and increase wear and tear, with the result that the machine's operating life will be reduced.

Repeated use of high preloads in the upper part of the range from 0 to 40 kN (0 to 9,000 lb) will significantly increase the stress on the J120T and increase wear and tear with the result that the machine's operating life will be reduced.

The J120T has been designed for a peak maximum preload of 40 kN (9,000 lb). Tightening the bolt and nut above the specified preload level will result in permanent damage to the J120T and must be avoided.

The J120T has been designed as a machine to test and demonstrate fastener self-loosening according to the 'Junker' DIN 65151 and 25201 standards.

When conducting a fastener test or demonstration, proper lubrication of the fastener and nut must be carried out to obtain the appropriate coefficient of friction ($\mu tot$) of 0.14. Not lubricating the fastener and nut will result in increased friction and as a result a higher $\mu tot$ value; this will significantly increase the stress on the J120T and increase wear and tear with the result that the machine's operating life will be reduced.

Adaptor parts such as the top adaptor, sleeve and test washer are all consumables and must be replaced as soon as possible if any wear or damage is evident.

When removing or refitting the J120T in its transport trolley case, please ensure that:

- The J120T is fitted correctly into the transport case – incorrect placement can cause the protective foam to rub against and damage the carbon fibre plastic foil and protective covers

- The protective foam in the trolley case is correctly fitted

- The tablet has its screen facing away from the J120T.

Vibrationmaster recommends demonstrating fasteners using low as well as high preloads.

Vibrationmaster recommends demonstrating fasteners over the entire size range from M3 to M12 ISO Metric and #4 to ½" UTS

## 2.  Preparing the J120T for use

### Unpacking the J120T

The J120T is supplied in a shockproof and waterproof trolley case made from a high-performance resin. The case is fitted with a permanently attached regulating valve that automatically adjusts the internal air pressure without letting in water.

To open the case, press in the latch's centre tab and then pull the latch forward, as shown below:



When first receiving the J120T and opening the trolley case, please check that all the items ordered are included. As a minimum the trolley case should include:

- J120T Junker Test bench

- US power cord (NEMA 5-15P) for J120T or,

- European power cord (Plug 7/7 CEE) for J120T

- Tablet PC including power supply, power cord and manuals (if ordered)

- Torque sensor (if ordered)

- J120T Operating manual (this manual)

- Adaptors as ordered.

| | Are any items missing? If they are, please contact Vibrationmaster immediately by telephone (+352 24 55 90 68) or email (support@vibrationmaster.com). |
|---|---|

Fastener adaptors

Power cords, operating manuals and tablet PC power supply

Tablet PC

J120T

Trolley case

To prepare the J120T for use:

1. Carefully lift the J120T from the protective foam cradle and place the unit on its feet

2. The J120T should be used on a level, horizontal hard surface capable of withstanding both the equipment weight and vibrations created during fastener demonstrations

3. Make sure the J120T is positioned close to a power outlet.

> **Do not attach or detach the load washer or the torque sensor while the J120T is powered on, as this may permanently damage the measuring load amplifiers.**
>
> **Always use the lifting handles on the top and back of the machine - never lift the J120T by any of the covers.**

## Automatic voltage selection

The J120T is fitted with intelligent automatic voltage sensing relays making it able to operate on 100 V / 230 V, 50-60 Hz without any manual intervention by the operator.

## Connecting to the mains supply

The J120T is fitted with a power input socket (IEC-C14 type) and an ON-OFF switch mounted on the back end of the chassis:

Power input socket

ON – OFF switch
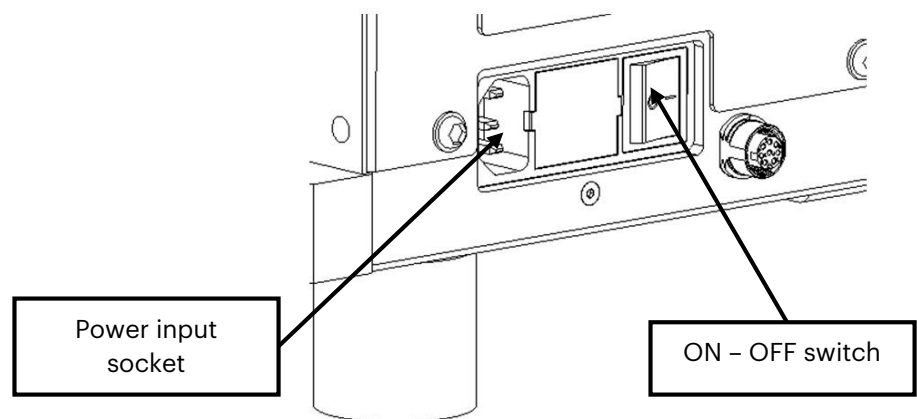
One power cord is supplied with the machine for connection to the mains supply. Connect the J120T to an earthed mains power source by using either the US or EU power cord provided. Do not use an extension cord, lead or double adaptor to power the unit.

## Fuses and their replacement

The power input socket on the left back side of the J120T machine also contains a twin fuse holder with two 5 x 20 mm slow fuses each rated at 10A.
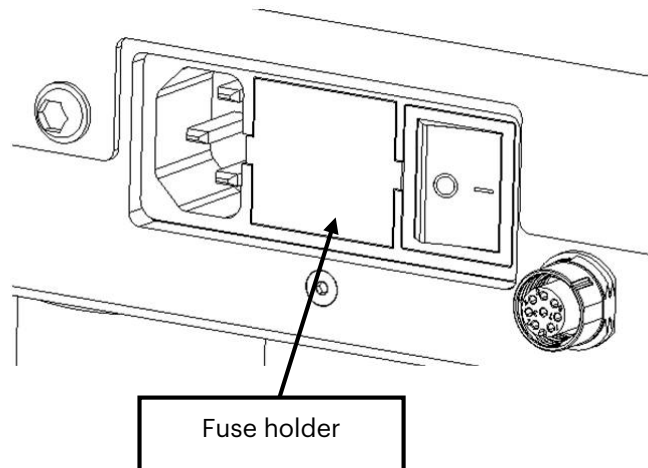


Fuse holder

To replace the fuses:

- Turn the machine OFF

- Unplug the machine's power cord

- Open the fuse holder by using a pointed object as a lever in the slot on the side of the fuse holder

- Remove and replace the faulty fuse(s)

- Refit the fuse holder by pushing it back into the power socket

- Reconnect the power cord

- Turn the machine ON.

## Wireless connecting the tablet PC

The J120T connects wirelessly to any operating system using a browser.

Please refer to the software section of this manual for further instructions on how to connect to the J120T.

## Choosing the correct fastener adaptors

The Junker Test bench is delivered with standard fastener adaptors. While these adaptors will accommodate the requirements of most users, they may not suit all test or demonstration purposes. Vibrationmaster offers several custom designed adaptors to fit your exact testing needs.

Standard fastener adaptors as well as custom-made fastener adaptors are described in the section Adaptors from page 16 to page 25.

| | |
|---|---|
| ⚠️ | **Using the correct type of fastener adaptors will ensure reliable and reproducible demonstration results.** |
| | **Have questions? Contact Vibrationmaster for immediate assistance at support@vibrationmaster.com** |

## 3. Mechanical System Description

### Overview



Main cover

Lifting handle

Test fixture

Front cover

Motor

Lifting handle

Chassis

Drive mechanism

The J120T is comprised of several assemblies or parts, and these are briefly described below:

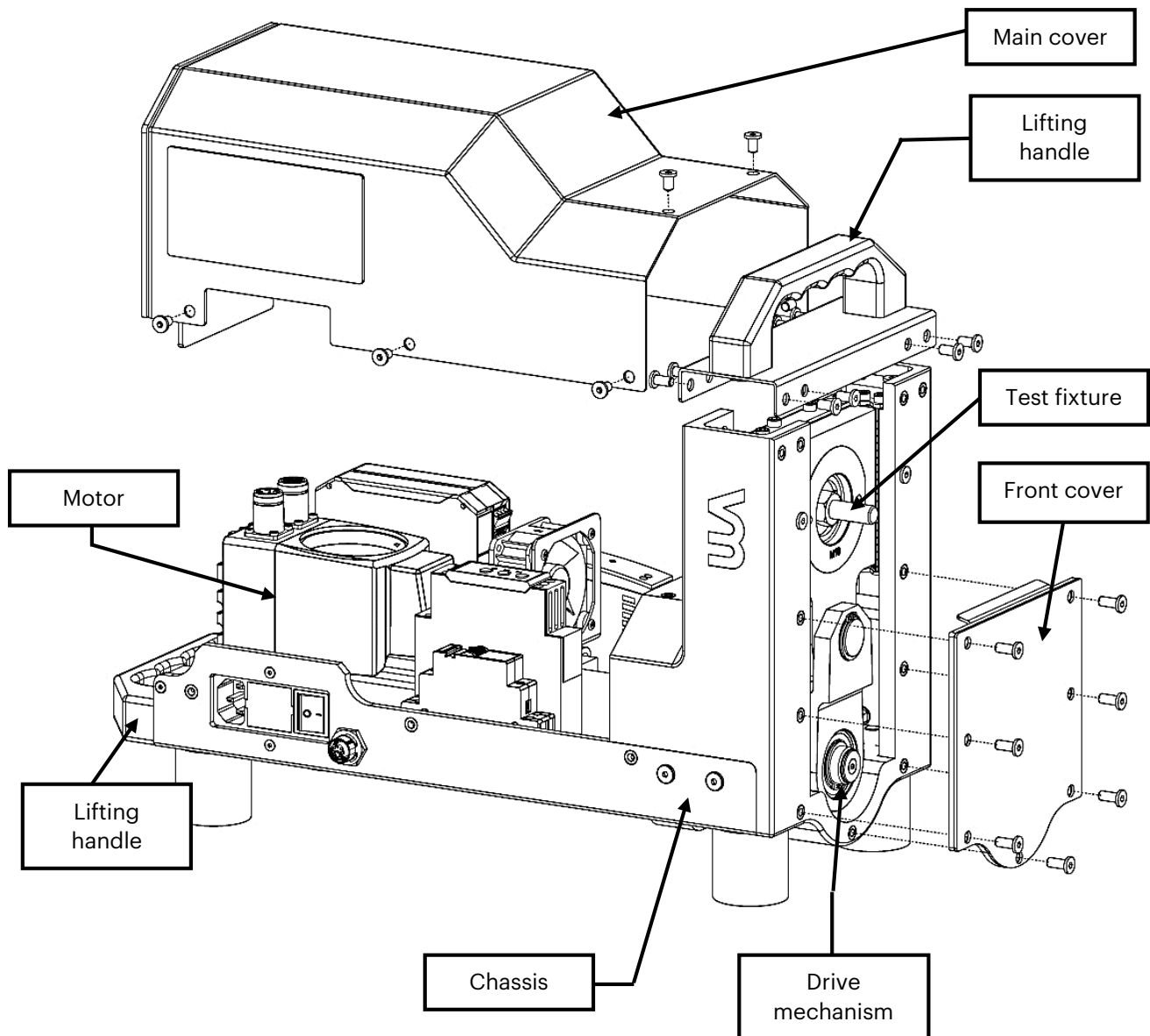**Chassis:** The machine chassis functions as a base for mounting the drive system, fixture and other components in the machine. The chassis is made from high strength aluminium alloy and is finished with anodising. The chassis stands on rubber feet and is designed to withstand all the vibration and forces produced during a fastener test or demonstration.

**Fixture:** The machine fixture consists of two groups of components, the stationary parts and moving parts. The stationary parts are integrated with the chassis and consist of needle roller bearings, an adaptor sleeve and a load cell for measuring the fastener preload. The moving part of the fixture consists of a glider plate guided in angular cage bearings. The glider plate has a seat for the top adaptor. All fixture parts are made from high quality steel and heat treated to suitable hardness levels.

**Drive system:** The mechanical parts of the drive system consist of a connecting rod and an axle with an eccentric bush. These components act as links in a four bar mechanism and convert rotary motion into translatory motion. The prime mover for this mechanism is an electric servo motor that is controlled by an operating system. All components in the drive mechanism are made from high quality steel and heat treated to suitable hardness levels.

**Covers:** The machine has three protective covers fabricated from sheet metal and/or carbon fibre. The front and top cover are in aluminium and finished with glass ball blasting and anodising whereas the main cover is finished with carbon fibre or carbon fibre plastic foil.

**Machine control system:** This consists of a motor drive unit, electronic circuit and a tablet PC running Vibrationmaster proprietary browser based software. The tablet PC forms the user interface to operate the J120T.

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**The protective covers isolate the moving parts of the J120T from direct access. They are fitted for the operator's protection – never operate the J120T without the protective covers in place.**

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## Adaptors

The J120T is designed to test and demonstrate fastener locking elements ranging in size from M3 to M12 ISO METRIC and #4 to ½" UTS.

To perform tests and demonstrations on different-sized fasteners, the user will need a set of test adaptors for each size of fastener to be tested.

Your J120T is delivered with standard fastener adaptors. While these adaptors will accommodate the requirements of most users, they may not suit all test or demonstration purposes and Vibrationmaster therefore further offers custom designed adaptors to fit your exact testing needs.

The selection of fastener adaptors can be ordered in your choice of material.

## General ordering references for fastener adaptors

J12O / SW / 0 / M / 12 / 0 / 0

**Model**
J12O = fits with J12OT Test Bench

**Part**
TA = Top adaptor
TW = Test washer
SA = Sleeve with anti-rotation
SL = Sleeve without anti-rotation
SW = Sleeve washer
SI = Sleeve with insert
TI = Threaded insert

**Series**
0 = Released November 2015

**Material**
(To be defined for TI part only)
S = standard (according to drawing)
C = customer specific

**Thread pitch**
(To be defined for TI part only)

**Thread diameter**
(for Imperial form replace "/" by "."
Example: 5.16 = 5/16")

**Thread form**
M = Metric (mm)
I = Imperial (inch)

## Standard fastener adaptors included in the delivery

This set of standard fastener adaptors will allow only the nut and locking mechanism placed on the Top adaptor side to rotate while preventing the hexagonal head bolt DIN 931/933 from rotating during demonstration. The Sleeve has an inbuilt design feature that restricts the bolt from rotation as the cross flats of the hexagonal head mates with the Sleeve's inner dimension.

Orientation of bolt: Insert from Sleeve side.

Position of nut and locking mechanism: On the Top adaptor side

Type of bolt accommodated: Hexagonal head bolts according to DIN 931/933.

Length to diameter ratio: 1.7 for fastener dimensions M3 to M12 ISO Metric and #4 to ½" UTS. Higher ratios, such as 2.0 or 2.5 can be ordered.

| | |
|---|---|
| ⚠️ | **The standard fastener adaptor set can only be used with hexagonal head bolts following DIN 931/933.** |

**Top adaptor (TA)**
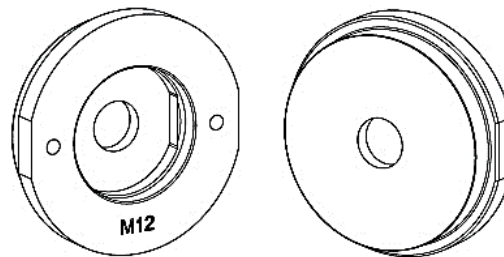


**Sleeve with anti-rotation (SA)**
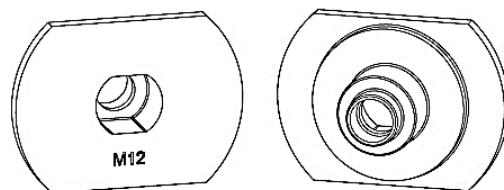


**Test washer (TW)**

## Standard fastener adaptors – install into J120T
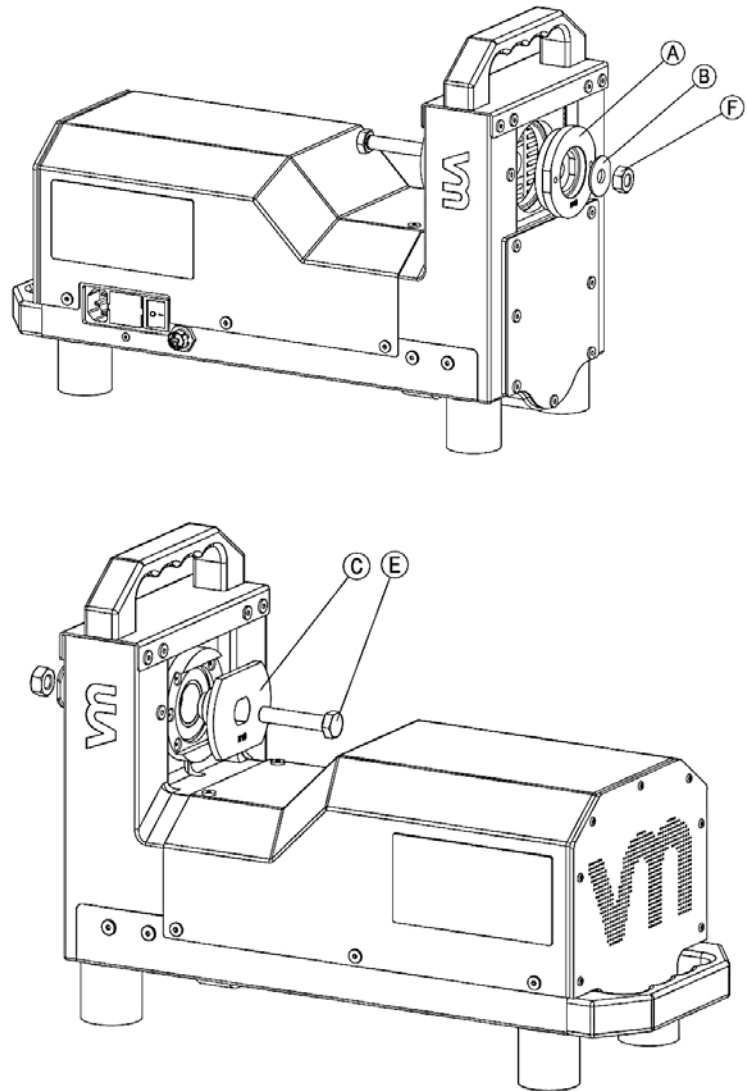


| Item | Description |
|------|-------------|
| A | Top adaptor (TA) |
| B | Test washer (TW) |
| C | Sleeve with anti-rotation (SA) |
| E | Test fastener |
| F | Test Nut (with or without securing element) |

## Mechanical System Description

### Standard fastener adaptors – section view of test fixture
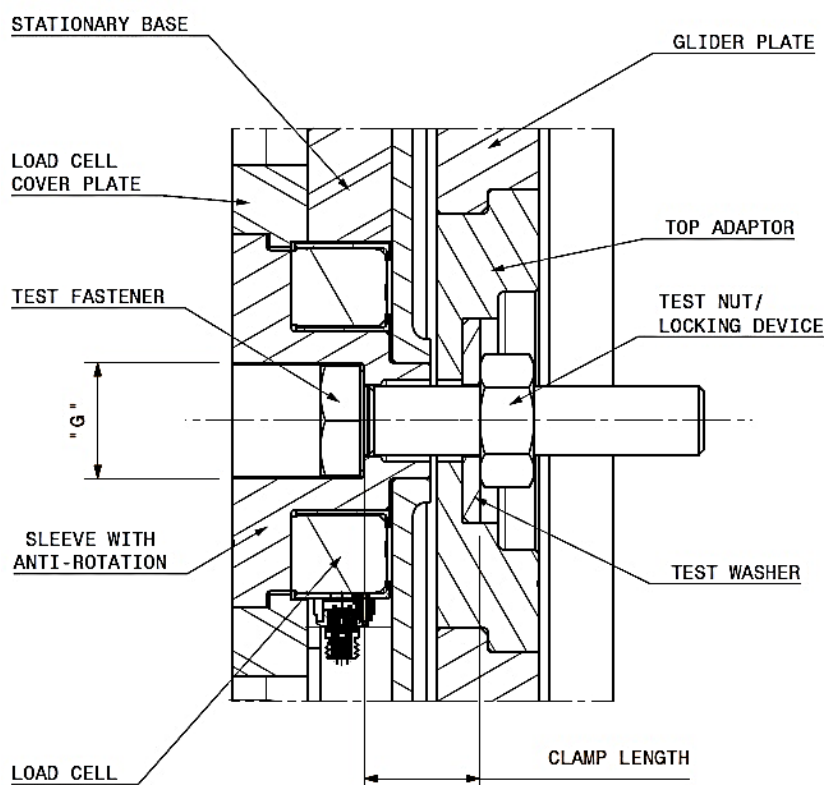


### Standard fastener adaptors – ordering references

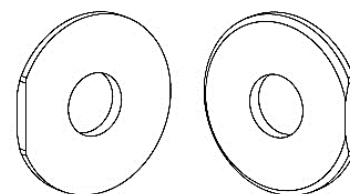| Fastener Size | Top adaptor (TA) | Sleeve with anti-rotation (SA) | Test washer (TW) | "G" Width across flat hex. Head (mm) | Clamp length (mm) |
|---|---|---|---|---|---|
| M12 | J120/TA/0/M/12 | J120/SA/0/M/12 | J120/TW/0/M/12 | 19 | 20.4 |
| M10 | J120/TA/0/M/10 | J120/SA/0/M/10 | J120/TW/0/M/10 | 17 | 17 |
| M8 | J120/TA/0/M/8 | J120/SA/0/M/8 | J120/TW/0/M/8 | 13 | 13.6 |
| M6 | J120/TA/0/M/6 | J120/SA/0/M/6 | J120/TW/0/M/6 | 10 | 10.2 |
| M5 | J120/TA/0/M/5 | J120/SA/0/M/5 | J120/TW/0/M/5 | 8 | 8.5 |
| M4 | J120/TA/0/M/4 | J120/SA/0/M/4 | J120/TW/0/M/4 | 7 | 6.8 |
| M3 | J120/TA/0/M/3 | J120/SA/0/M/3 | J120/TW/0/M/3 | 5.5 | 5.1 |
| 1/2" | J120/TA/0/I/1.2 | J120/SA/0/I/1.2 | J120/TW/0/I/1.2 | 19.1 | 21.6 |
| 3/8" | J120/TA/0/I/3.8 | J120/SA/0/I/3.8 | J120/TW/0/I/3.8 | 14.3 | 16.2 |
| 5/16" | J120/TA/0/I/5.16 | J120/SA/0/I/5.16 | J120/TW/0/I/5.16 | 12.7 | 13.5 |
| 1/4" | J120/TA/0/I/1.4 | J120/SA/0/I/1.4 | J120/TW/0/I/1.4 | 11.2 | 10.8 |
| #10 | J120/TA/0/I/#10 | J120/SA/0/I/#10 | J120/TW/0/I/#10 | 8 | 8.2 |

## Other fastener adaptors available

The J120T benefits from a versatile test fixture allowing testing a wide variety of bolted joints such as bolts of all classes, double ended studs, self-tapping screws and OEM specific assemblies to name a few. To add even more possibilities, the fastener adaptors can be delivered in materials according to your specification. Below you will find some of the fastener adaptors already designed by Vibrationmaster's engineering team.

## Sleeve without anti-rotation

This set of fastener adaptors uses the standard Top adaptor (TA) and Test washer (TW), a Sleeve without anti-rotation (SL) and a Sleeve washer (SW).

When using these fastener adaptors, the bolt head and the nut and locking mechanism are free to rotate.

The Sleeve washer (SW) is installed bellow the fastener head into the Sleeve to avoid deterioration of the Sleeve caused by the possible rotation of the fastener during test and demonstration.

Orientation of bolt: Insert from Sleeve side.

Position of nut and locking mechanism: On the Top adaptor side

Type of bolt accommodated: Any. See table below for space restriction "øC".

Length to diameter ratio: 1.7 for fastener dimensions M3 to M12 ISO Metric and #4 to ½" UTS. Higher ratios, such as 2.0 or 2.5 can be ordered.

### Sleeve without anti-rotation (SA)
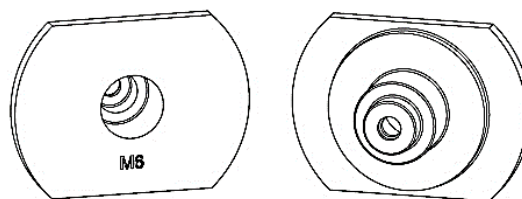


### Sleeve washer (SW)

## Mechanical System Description

## Sleeve without anti-rotation – install into in J120T



| Item | Description |
|------|-------------|
| A | Top adaptor (TA) |
| B | Test washer (TW) |
| C | Sleeve without anti-rotation (SL) |
| D | Sleeve washer (SW) |
| E | Test fastener |
| F | Test Nut (with or without securing element) |

## Sleeve without anti-rotation – section view of test fixture
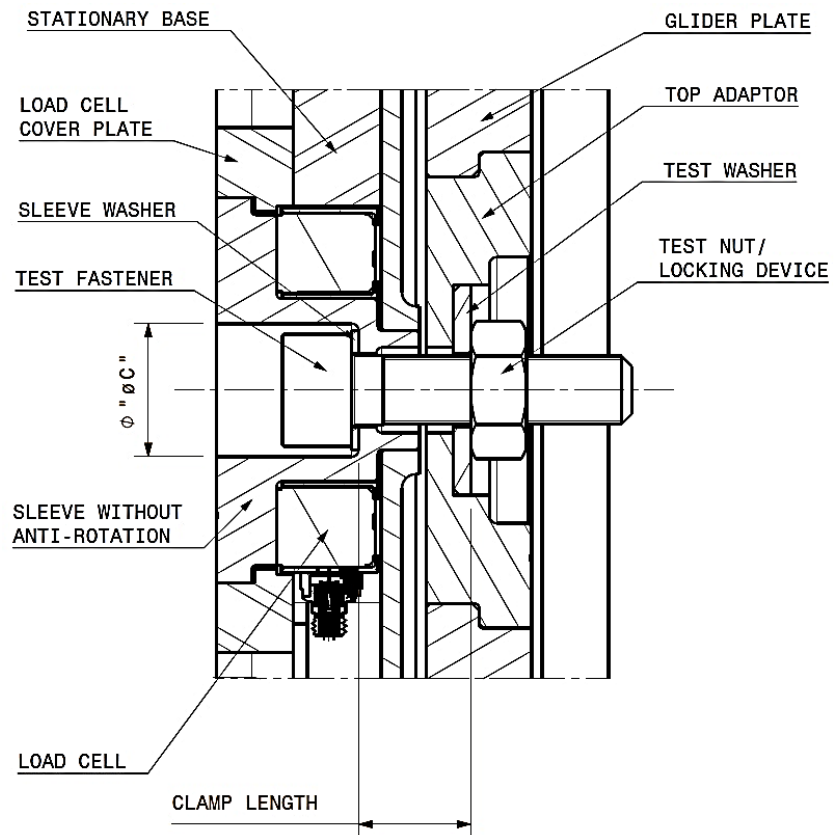


## Sleeve without anti-rotation – ordering references

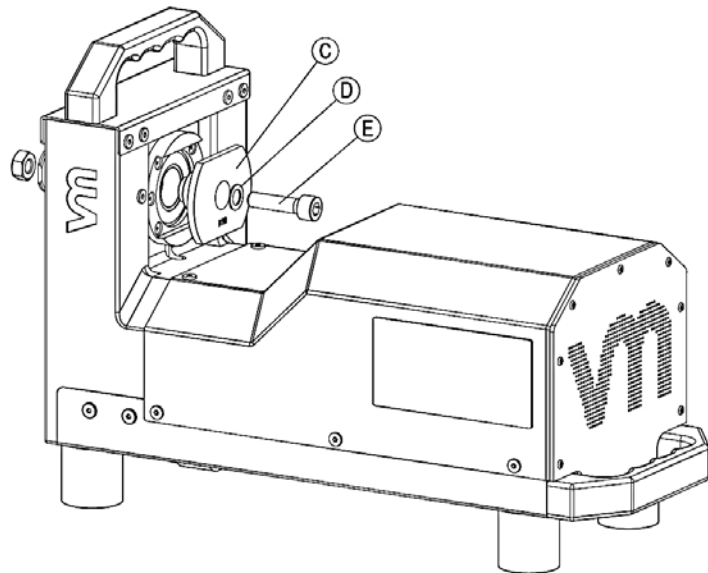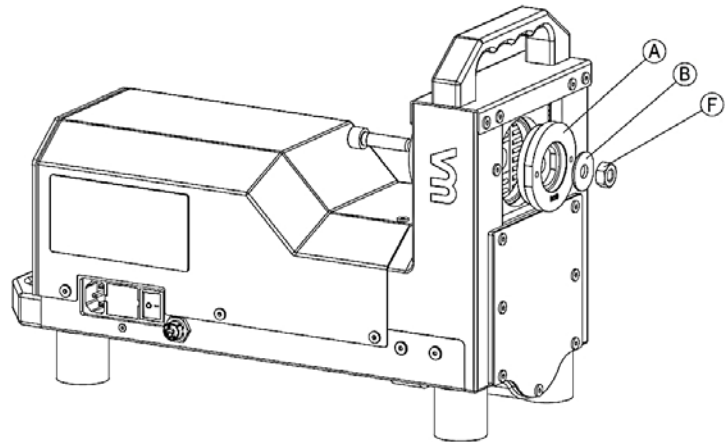| Fastener Size | Top Adaptor (TA) | Sleeve without anti-rotation (SL) | Test washer (TW) | Sleeve washer (SW) | "øC" fastener head max ø. (mm) | Clamp length (mm) |
|---|---|---|---|---|---|---|
| M12 | J120/TA/O/M/12 | J120/SL/O/M/12 | J120/TW/O/M/12 | J120/SW/O/M/12 | 22 | 20.4 |
| M10 | J120/TA/O/M/10 | J120/SL/O/M/10 | J120/TW/O/M/10 | J120/SW/O/M/10 | 19 | 17 |
| M8 | J120/TA/O/M/8 | J120/SL/O/M/8 | J120/TW/O/M/8 | J120/SW/O/M/8 | 15 | 13.6 |
| M6 | J120/TA/O/M/6 | J120/SL/O/M/6 | J120/TW/O/M/6 | J120/SW/O/M/6 | 13 | 10.2 |
| M5 | J120/TA/O/M/5 | J120/SL/O/M/5 | J120/TW/O/M/5 | J120/SW/O/M/5 | 13 | 8.5 |
| M4 | J120/TA/O/M/4 | J120/SL/O/M/4 | J120/TW/O/M/4 | J120/SW/O/M/4 | 11 | 6.8 |
| M3 | J120/TA/O/M/3 | J120/SL/O/M/3 | J120/TW/O/M/3 | J120/SW/O/M/3 | 9 | 5.1 |
| 1/2" | J120/TA/O/I/1.2 | J120/SL/O/I/1.2 | J120/TW/O/I/1.2 | J120/SW/O/I/1.2 | 22.3 | 21.6 |
| 3/8" | J120/TA/O/I/3.8 | J120/SL/O/I/3.8 | J120/TW/O/I/3.8 | J120/SW/O/I/3.8 | 18 | 16.2 |
| 5/16" | J120/TA/O/I/5.16 | J120/SL/O/I/5.16 | J120/TW/O/I/5.16 | J120/SW/O/I/5.16 | 15 | 13.5 |
| 1/4" | J120/TA/O/I/1.4 | J120/SL/O/I/1.4 | J120/TW/O/I/1.4 | J120/SW/O/I/1.4 | 12 | 10.8 |
| #10 | J120/TA/O/I/#10 | J120/SL/O/I/#10 | J120/TW/O/I/#10 | J120/SW/O/I/#10 | 12 | 8.2 |
| #8 | J120/TA/O/I/#8 | J120/SL/O/I/#8 | J120/TW/O/I/#8 | J120/SW/O/I/#8 | 12 | 7.1 |
| #4 | J120/TA/O/I/#4 | J120/SL/O/I/#4 | J120/TW/O/I/#4 | J120/SW/O/I/#4 | 9 | 4.8 |

## Sleeve with threaded insert

This fastener adaptor set is used to simulate the bolt or self-tapping screw being tightened into a blind hole. The set is comprised of the standard Top adaptor (TA) and Test washer (TW) together with Sleeve with insert (SI) and Threaded insert (TI).

The Sleeve with insert is equipped with a shaft-clamping unit to fixate the Threaded Insert. It allows the threaded insert to be easily and quickly exchanged.

The Threaded insert can be made in the material of your choice such as steel, aluminium, and plastics. The Threaded insert can further be pre-tapped or you may use the Threaded Insert without thread for testing and demonstrating self-tapping screws.

Orientation of bolt: Insert from Top adaptor side.

Position of nut and locking mechanism: included into the Threaded insert.

Type of bolt accommodated: Any.

Length to diameter ratio: 1.7 for fastener dimensions M3 to M12 ISO Metric and #4 to ½" UTS. Higher ratios, such as 2.0 or 2.5 can be ordered.

### Sleeve with insert (SI)
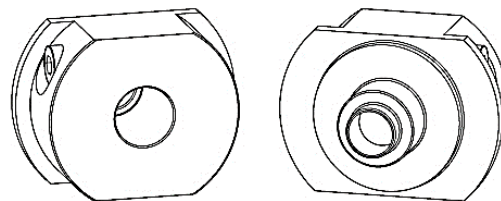


### Threaded insert (TI)
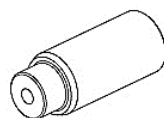
## Sleeve with threaded insert – install into J120T
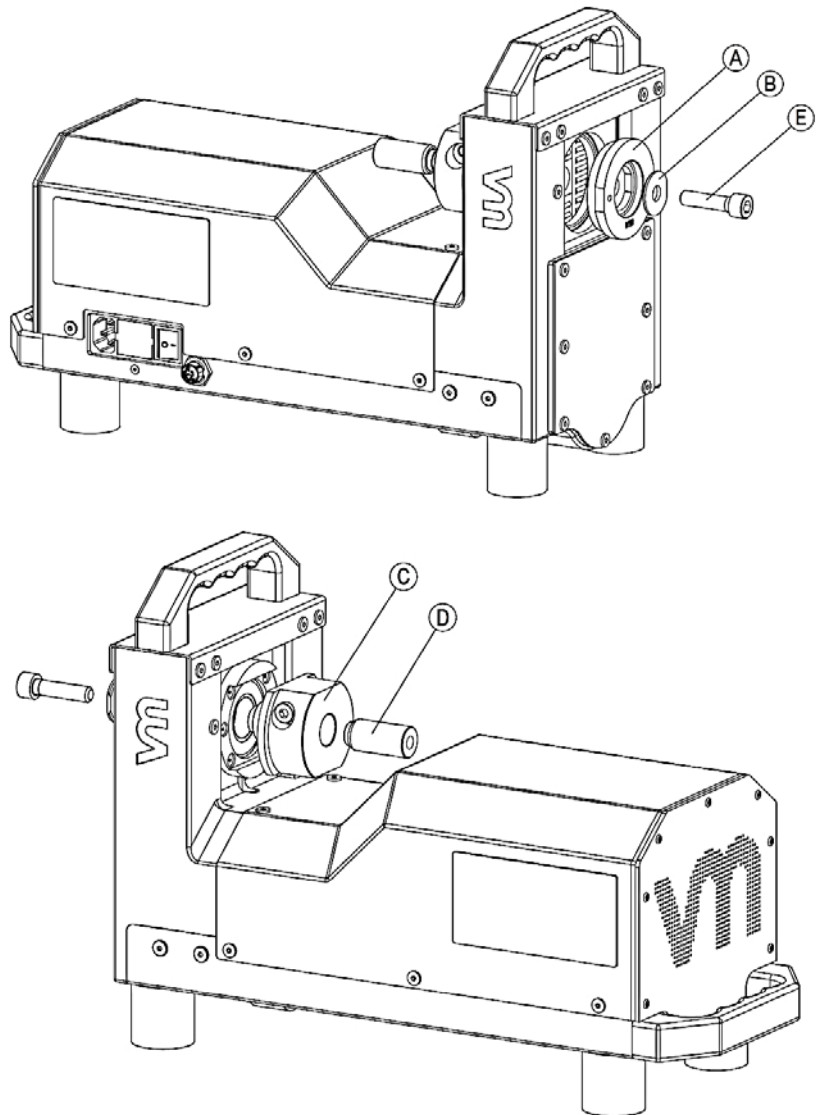


| Item | Description |
|------|-------------|
| A | Top adaptor (TA) |
| B | Test washer (TW) |
| C | Sleeve with insert (SI) |
| D | Threaded insert (TI) |
| E | Test fastener |

## Mechanical System Description

### Sleeve with threaded insert – section view of test fixture



### Sleeve with threaded insert – ordering references

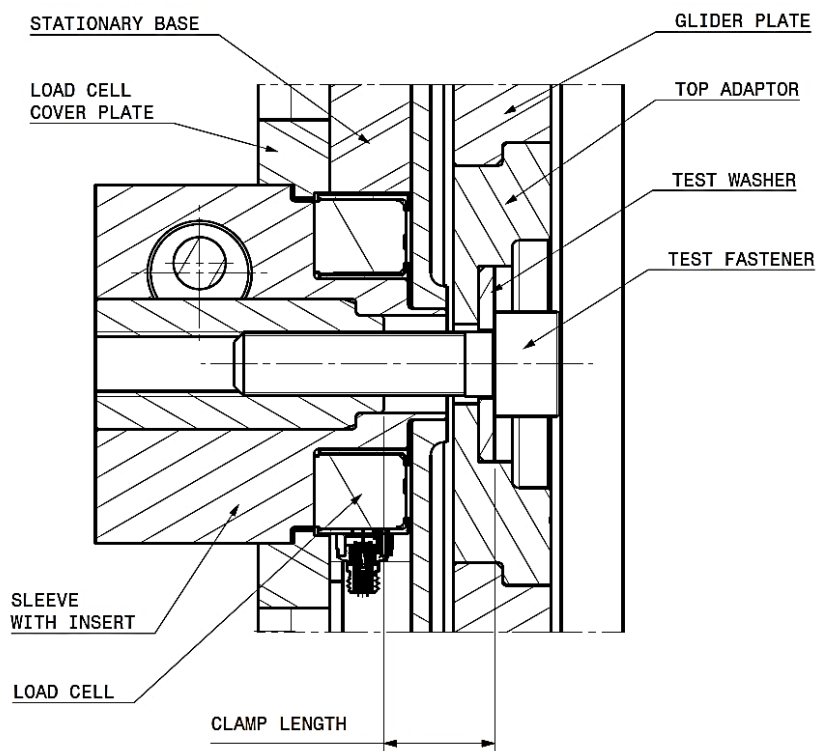| Fastener Size | Top Adaptor (TA) | Sleeve with insert (SI) | Test washer (TW) | Threaded insert (TI) | Clamp length (mm) |
|---|---|---|---|---|---|
| M12 | J120/TA/0/M/12 | J120/SI/0/M/12 | J120/TW/0/M/12 | J120/TI/0/M/12/1.75/S | 20.4 |
| M10 | J120/TA/0/M/10 | J120/SI/0/M/10 | J120/TW/0/M/10 | J120/SI/0/M/10/1.5/S | 17 |
| M8 | J120/TA/0/M/8 | J120/SI/0/M/8 | J120/TW/0/M/8 | J120/SW/0/M/8/1.25/S | 13.6 |
| M6 | J120/TA/0/M/6 | J120/SI/0/M/6 | J120/TW/0/M/6 | J120/SW/0/M/6/1/S | 10.2 |
| M5 | J120/TA/0/M/5 | J120/SI/0/M/5 | J120/TW/0/M/5 | J120/SW/0/M/5/0.8/S | 8.5 |
| M4 | J120/TA/0/M/4 | J120/SI/0/M/4 | J120/TW/0/M/4 | J120/SW/0/M/4/0.7/S | 6.8 |
| M3 | J120/TA/0/M/3 | J120/SI/0/M/3 | J120/TW/0/M/3 | J120/SW/0/M/3/0.5/S | 5.1 |
| 1/2" | J120/TA/0/I/1.2 | J120/SI/0/I/1.2 | J120/TW/0/I/1.2 | J120/SW/0/I/1.2/13/S | 21.6 |
| 3/8" | J120/TA/0/I/3.8 | J120/SI/0/I/3.8 | J120/TW/0/I/3.8 | J120/SW/0/I/3.8/16/S | 16.2 |
| 5/16" | J120/TA/0/I/5.16 | J120/SI/0/I/5.16 | J120/TW/0/I/5.16 | J120/SW/0/I/5.16/18/S | 13.5 |
| 1/4" | J120/TA/0/I/1.4 | J120/SI/0/I/1.4 | J120/TW/0/I/1.4 | J120/SW/0/I/1.4/20/S | 10.8 |
| #10 | J120/TA/0/I/#10 | J120/SI/0/I/#10 | J120/TW/0/I/#10 | J120/SW/0/I/#10/24/S | 8.2 |
| #8 | J120/TA/0/I/#8 | J120/SI/0/I/#8 | J120/TW/0/I/#8 | J120/SW/0/I/#8/32/S | 7.1 |
| #4 | J120/TA/0/I/#4 | J120/SI/0/I/#4 | J120/TW/0/I/#4 | J120/SW/0/I/#4/40/S | 4.8 |

## Variable eccentricity

The J120T is designed with variable and exchangeable eccentricity from ±0.05mm to ±1.00mm. Changing the eccentricity is accomplished by replacing the existing eccentric bush with another bush of different eccentricity. To change eccentricity, please follow these steps:

1. Remove the front cover and front cover spacer (items 4 and 5) by unscrewing and removing seven M5 fasteners (item 45)
2. Remove the eccentric bush sleeve (item 62) by unscrewing and removing the M4 screw (item 54)
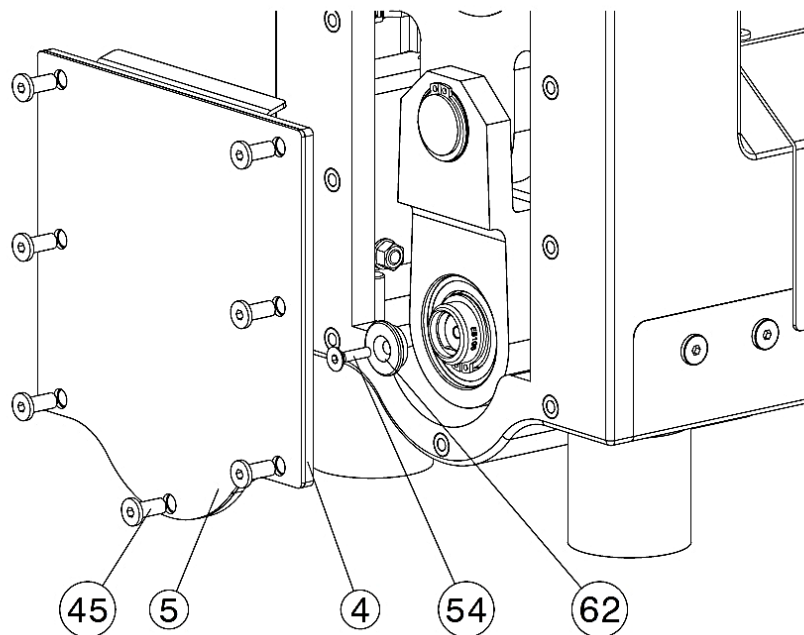
3. Tighten the eccentric bush puller (item 63) into the eccentric bush (item 26)
4. Tighten the star knob M8 (item 64) into the eccentric bush puller (item 63) and the eccentric bush will gradually move outwards from the connecting rod bearing and axle.
5. Insert another eccentricity bush (item 26) on the axle and reassemble parts in the reverse order of disassembly
6. Tighten the M4 screw (Item 54) to lock the bush securely in place
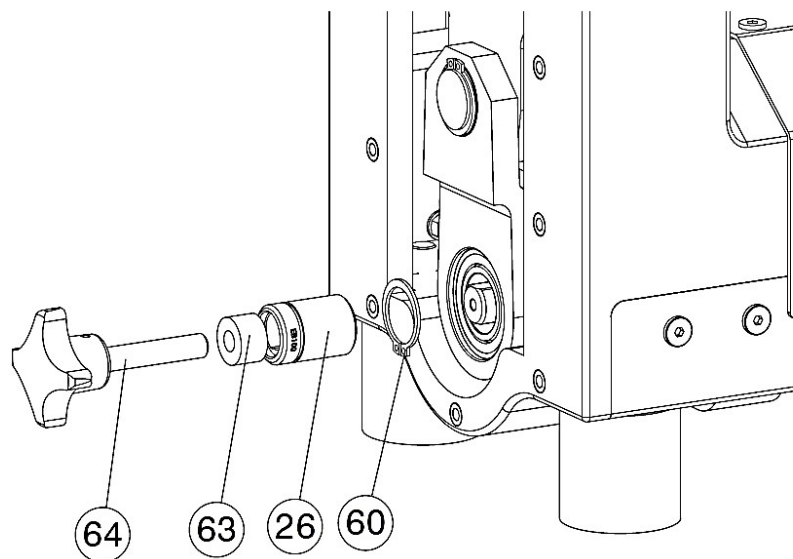
| | Vibrationmaster recommends lubricating the eccentric bushes on the inner surface before inserting the eccentric bush on the axle as this will make the eccentric bush easy removable after use. |
|---|---|

In the event the axle rotates while trying to remove an eccentric bush and the bush appears to be stuck on the axle, please follow these steps to safely remove the eccentric bush from the axle:

1. Place the J120T on the side
2. Locate the hole below the machine, shown with an arrow on the image below, and remove the white plastic protecting cap
3. Tighten the eccentric bush puller (item 63) into the eccentric bush (item 26)
4. Tighten the star knob M8 (item 64) into the eccentric bush puller (item 63) until the axle begin to rotate
5. Insert a small tool into the hole below the machine and then rotate the axle clock wise using the star knob until the tool "falls into a recess"
6. Keep the tool in place in the hole –this will restrict the drive train and axle from rotating
7. Tighten the star knob M8 (item 64) into the eccentric bush puller (item 63) and the eccentric bush will gradually move outwards from the connecting rod bearing and axle.
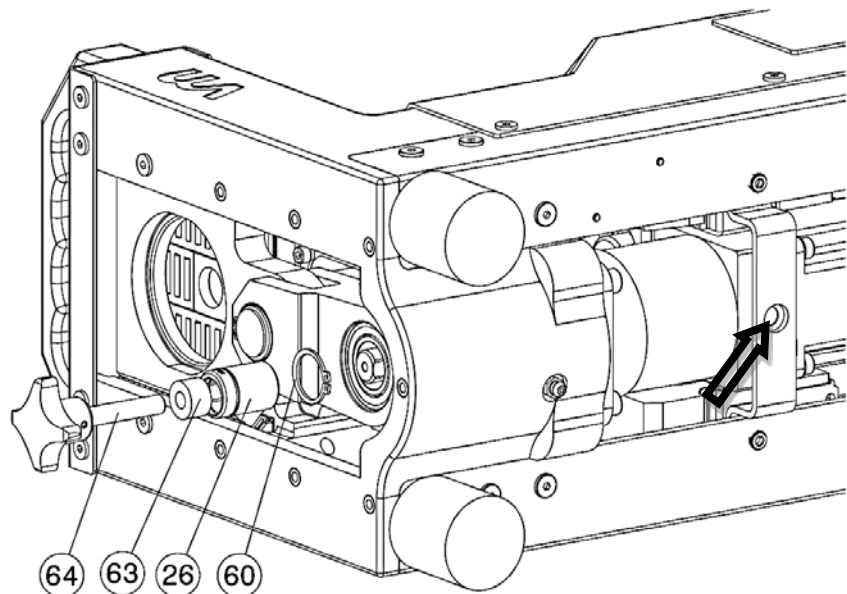
## Mechanical System Description

## Glider plate adjustment

It is possible to adjust the glider plate (item 11) sideways to ensure it remains correctly centred in relation to the fastener being tested. The adjustment is completed using the wedge key adjustment system.

To adjust the glider plate to the right hand side (as seen from the font side of the J120T) please follow these steps:

1. Untighten the M5 screw (item 44) on the right hand side
2. Tighten the M5 grub screw (item 43) on the right hand side
3. Untighten the M5 grub screw (item 43) on the left hand side
4. Tighten the M5 screw (item 44) on the left hand side until the desired adjustment is achieved
5. Ensure the glider plate is moving freely but firmly
6. Ensure both M5 screws (item 44) and both grub screws (item 43) are safely tightened.

To adjust the glider plate to the left hand side (as seen from the font side of the J120T) please follow these steps:

7. Untighten the M5 screw (item 44) on the left hand side
8. Tighten the M5 grub screw (item 43) on the left hand side
9. Untighten the M5 grub screw (item 43) on the right hand side
10. Tighten the M5 screw (item 44) on the right hand side until the desired adjustment is achieved
11. Ensure the glider plate is moving freely but firmly
12. Ensure both M5 screws (item 44) and both grub screws (item 43) are safely tightened.

Image deleted in the online version. For the complete Operating Manual, please contact Vibrationmaster.

# 4. Test and demonstration Setup

## Overview

Firstly, before using the J120T to provide a test or demonstration, complete the set-up process as described earlier in this manual. Then, check the thread of the bolt and nut to be tested or demonstrated by spinning the nut on to the bolt a few times and ensuring that the nut moves freely on the bolt. If there is any tightness, snagging or jamming, then replace the sample bolt and/or nut.

Make sure that the contact parts of the J120T are clean and free from dirt or any foreign bodies.

| | |
|---|---|
| ⚠️ | **It is important to properly lubricate the bolt and nut. Failure to do so will result in un-reliable and non-reproducible results and increase wear and tear on the J120T.** |

| | |
|---|---|
| ⚠️ | **Do not attach or detach the load washer from the sensor cable while the J120T is powered on, as this will permanently damage the measuring load amplifier.** |

| | |
|---|---|
| ❓ | **Vibrationmaster recommends using a lubricant with a viscosity of ISO 100 (SAE 30) as described in the DIN 25201-B standard.**<br><br>**Vibrationmaster has found that in order to have reproducible demonstration results it is important to keep all the test parameters the same. Lubricating the bolt and nut properly is a very important factor in obtaining these reproducible demonstration results.** |

## Setup – installing standard fastener adaptors

Insert the top adaptor (A) onto the glider plate with the accompanying test washer (B). The straight edge on the test washer should line up with the straight edge on the top adaptor (A).

M12

Straight edge
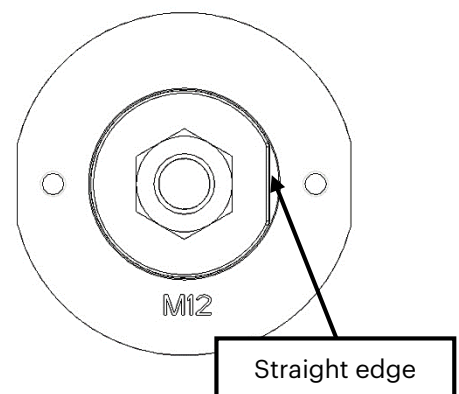
## Test and demonstration Setup

Insert the sleeve (C) from the rear of machine onto the load cell cover plate. The load cell cover plate prevents the sleeve from rotating during demonstrations. When correctly mounted, the sleeve will be level with the load cell cover plate.
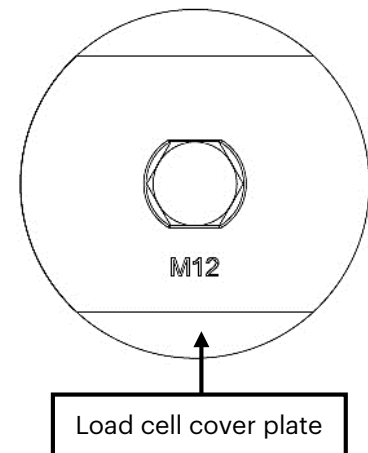
Insert the bolt through the sleeve (C).

M12

Load cell cover plate

On the top adaptor side (A) screw on by hand the lubricated lock nut or securing element to be tested or demonstrated and gently tighten it finger tight.

> **Do not tighten the nut with any tools until the Vibrationmaster Test software program is fully operational, all test parameters has been set and the preload value can be read on the screen.**

After correctly mounting the bolt and nut for testing or demonstration, ensure the PC tablet is wirelessly connected to the J120T. Once connected, the user can start the Vibrationmaster Test software and follow the demonstration procedure as described in the Software section (Section 6) of this manual.

## Installing the optional torque sensor

The J120T can be delivered with an optional torque sensor which will turn the J120T into a torque tension test unit capable of analysing the relationship between applied torque and achieved preload of bolted joints.

With the software's ability to calculate the total coefficient of friction ($\mu$tot) and K (Nut Factor) in real-time, the operator receives immediate feedback on the effect of lubrication, coatings and materials in the bolted joint.

To attach the torque sensor, please follow these steps:

1. Turn off the J120T
2. Attach one end of the sensor cable to the torque sensor and the other end of the cable to the J120T's female socket
3. The torque sensor can be used as shown on the image below for tightening tools with 1/2" socket
4. Turn on the J120T and open the browser window on the tablet PC. The operating system will auto discover the torque sensor.
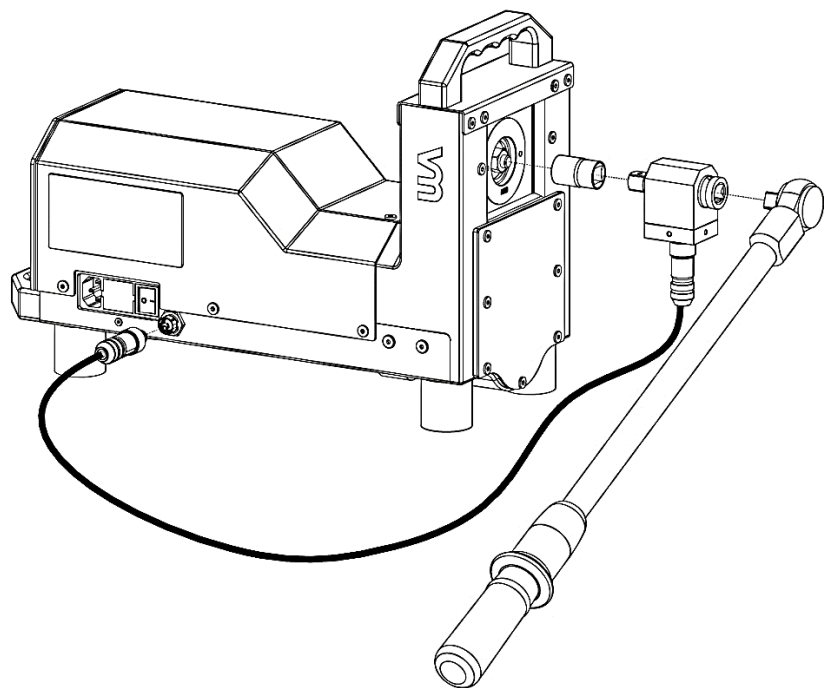
## 5. Maintenance of the J120T

### Overview

To ensure the continued safe and reliable operation of the J120T, some maintenance operations need to be carried out on a periodic basis.

**Before every use:**

- Clean any dirt or foreign bodies from the machine and fixture surface but do not remove the lubrication from the contact surfaces

- Make sure that the mains cable is not damaged

- Lubricate the flat cage bearings (item 22) with suitable bearing grease

- Check the load cell cable for any damage (handle the load cell with care during mounting and dismounting)

- Check all bolted connections on the machine for any cracks, looseness, etc.
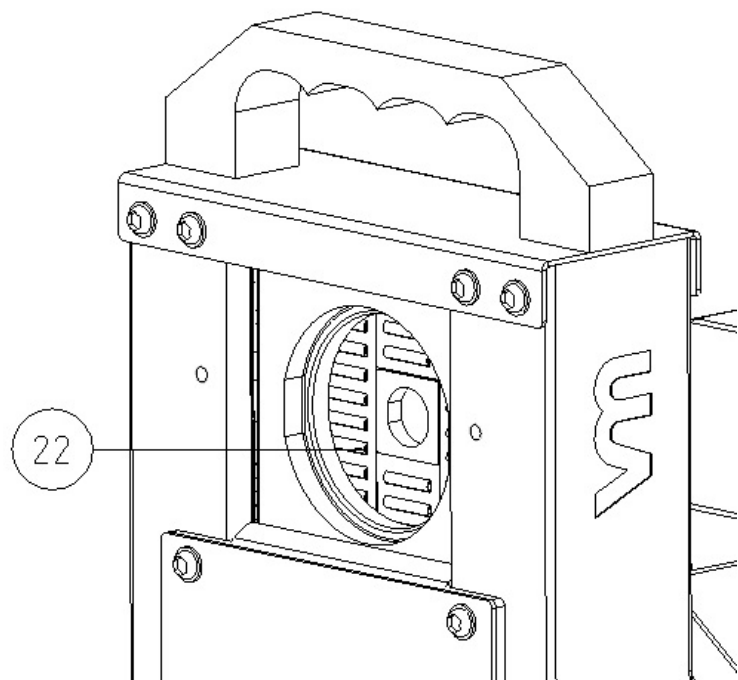


**When required:**

- Use a soft damp cloth and a mild detergent to clean the anodised surfaces

- Check and tighten all the cover screws

- Check for wear on the rubber feet and replace if they are damaged or excessively worn.

Annual service:

- Make sure all screws and bolts are tightened. If necessary tighten or change the screws/nuts

- Check for wear on all moving parts. If any parts seem to be worn or defective it is important to replace these with original spare parts – contact Vibrationmaster to order spares or to seek further advice

- Check all bearings

- Calibrate the load cell and amplifier to ensure continued measuring accuracy

- Check the electrical wiring and ensure all wires are connected properly

- Check the motor for excessive power consumption.

## Corrective maintenance

If experiencing problems when trying to use the J120T, it may be necessary to carry out tests and perform corrective maintenance.

Motor does not start during test:

- Check the power switch is ON

- Check the mains cable is connected

- Check the test bolt preload values. Reduce the preload if it is higher than the specifications and then restart the test

- Check if any foreign body has become trapped in the guide ways or drive mechanism

- Check if there is damage to the bearings on the axle. Replace the bearings if required or contact Vibrationmaster support for advice.

Bolt preload values not seen on tablet screen:

- Check the strength of the wireless connection between the J120T and the tablet PC. If required, move the tablet PC closer to the J120T to get a stronger wireless signal

- Check the tablet PC is turned ON and operating correctly

- Check for faulty or damaged cable connections and wiring from the load cell to the load amplifier ensuring the load cell connection cable is undamaged

- Check the load cell mounting on the fixture – the load cell contact surface should always be parallel to the adaptor sleeve surface.

## Maintenance of the J120T



| Adaptor sleeve |
| Load cell |
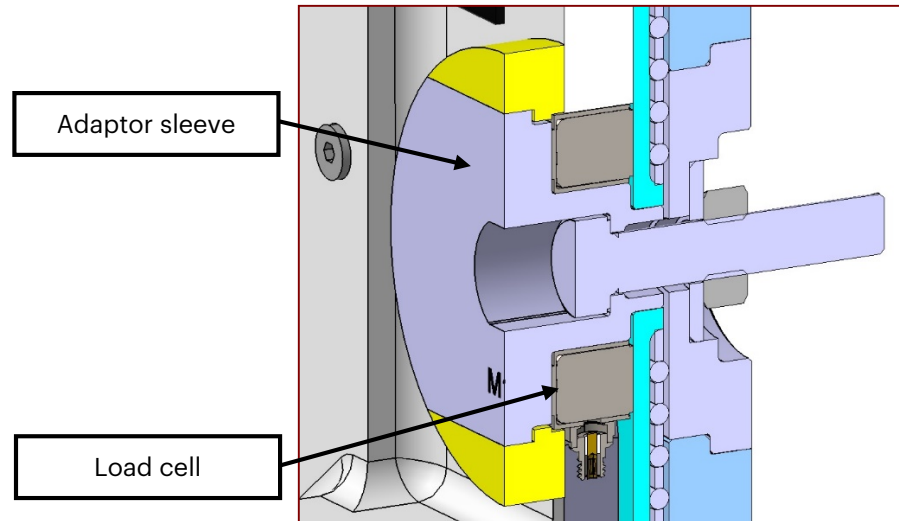
**No electrical supply:**

- Check that the J120T is plugged in and turned ON (both at the mains socket and on the J120T on/off switch)

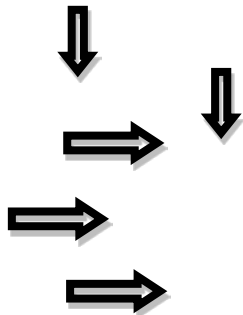- Check the two fuses in the power input connector and replace if needed.

## Lubrication

The guide bearings and load support bearings require periodic lubrication to function properly and reduce heat generation. It is recommended that a suitable grade of grease is used for lubrication – Vibrationmaster recommends the use of all-purpose industrial bearing grease such as SKF LGMT 2/0.2.

There are several lubrication points on the J120T, as follows:

**Lubrication procedure for the test fixture:**

1. Turn off the J120T and disconnect the mains cable.

2. Remove the top adaptor, sleeve and load cell from the fixture

3. Remove the top handle assembly (item 2) by unscrewing and removing the eight M5 fasteners (item 45)

Image deleted in the online version. For the complete Operating Manual, please contact Vibrationmaster.

4. Lift up the handle assembly carefully taking care of the wiring and the LED lights mounted inside the handle assembly

5. Remove the M-guide top end plates (items 15) by unscrewing and removing the four M4 screws (item 49)

6. Remove the front cover along with front cover spacer (item 4 and 5) by unscrewing and removing the seven M5 fasteners (item 45)

7. Remove the circlip (item 60)

8. Remove the main cover (item 3) by unscrewing and removing the eight M5 fastener (item 46)

9. Push back and remove pin (item 35) and lift glider plate (item 11) upwards

10. Remove the four flat roller cage bearings and two angled roller bearings and clean them with grease detergent. Replace the bearings if wear is evident

11. After careful cleaning, apply grease on all six  bearings and insert them in the bearing cages

12. Wipe away any excess grease before final assembly

13. Reassemble the parts in the reverse order to disassembly

14. Reconnect the electrical supply

15. Turn on the J120T and check for correct operation.


## Lubrication procedure for the drive mechanism

1. Turn off the J120T and disconnect the mains cable

2. Remove the top adaptor, sleeve and load cell from the fixture

3. Remove the top handle assembly (item 2) by unscrewing and removing the eight M5 fasteners (item 45)

4. Lift up the handle assembly carefully taking care of the wiring and the LED lights mounted inside the handle assembly

5. Remove the M-guide top end plates (items 15) by unscrewing and removing the four M4 screws (item 49)

6. Remove the front cover along with front cover spacer (item 4 and 5) by unscrewing and removing the seven M5 fasteners (item 45)

7. Remove the circlip (item 60)

8. Remove the main cover (item 3) by unscrewing and removing the eight M5 fasteners (item 46)

9. Push back and remove pin (item 35) and lift glider plate (item 11) upwards

10. Remove circlip and eccentric bush (item 26 and 60) from the connecting rod (item 12) and bearing (item 25)

11. Remove the connecting rod (item 12) and retaining ring (item 60) from the axle (item 38)

12. Remove the power supply unit and relays (items 31 and 39) from DIN rail

13. Remove the stiffener and cooling fan (items 34 and 30) by unscrewing and removing two M6 fastener (item 56) and two M6 washers (item 58)

Image deleted in the online version. For the complete Operating Manual, please contact Vibrationmaster.

14. Detach the drive motor mains power cable and 24VDC power lines

15. Remove the main drive motor (item 27) by unscrewing the four M5 screws (item 50) and four M5 washers (item 57)

16. Remove the gearbox, gearbox adaptor and axle (items 28, 29 and 38) in one assembly by unscrewing and removing four M6 screws (item 52) and four M6 washers (item 58)

17. Clean the accessible parts of the bearings with a soft cloth

18. If required, remove the two outer bearing circlips and pull out the two bearings. Then clean the bearings using a grease detergent. Replace the bearings if wear is evident

19. After careful cleaning, install the bearings and bearing circlips

20. Install the gearbox, gearbox adaptor and axle (items 28, 29 and 38) in one assembly by tightening four M6 screws (item 52)

21. Use a grease gun to apply grease through the grease nipple (item 9) until the grease can be seen protruding from the front bearing

22. Wipe away any excess grease

23. Reassemble the parts in the reverse order to disassembly

24. Reconnect the electrical supply

25. Turn on the J120T and check for correct operation.

Bearings

9
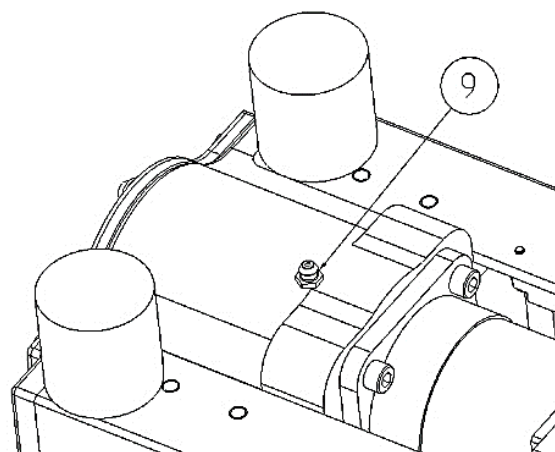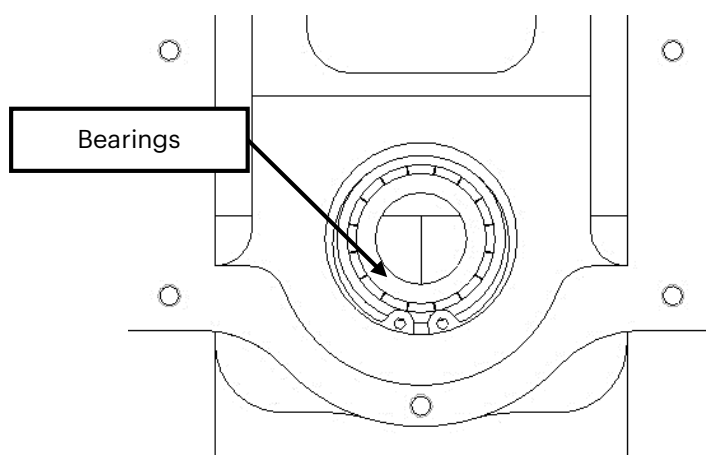
# 6. Software

## Overview

The Vibrationmaster Test Software is designed as a user interface for testing and demonstrating the self-loosening curves of fasteners as well as analysing the torque and tension relationship for a bolted joint on any Wi-Fi enabled device with a browser installed. It requires the following basic system configuration:

| | |
|---|---|
| **Operating system:** | Operating system independent (iOS, Android, Mac OS X, Linux and Windows are supported, see the Software Requirements section below) |
| **Hardware:** | Any Wi-Fi capable device with a screen capable of displaying at least 768px in width |
| **Software requirements:** | The software requires a recent Web Browser. On platforms other than iOS, Google Chrome version 35 and higher is recommended. On iOS devices, Safari is recommended |
| **Software limitations:** | Microsoft Internet Explorer prior to 8 is not supported. Export and Import functionality is not supported and thus disabled in Internet Explorer 9. Internet Explorer in versions 10 and 11 is fully supported. |

The J120T is operated via a PC tablet included with the delivery or your preferred Wi-Fi capable device.

The device and the J120T are connected through a Wi-Fi connection provided by the J120T.

The Vibrationmaster Test Software is designed to simplify a complex test procedure. The program can perform vibration tests, as well as display and combine several vibration test results.

If the optional torque sensor is attached, the software is further able to show the torque and tension relationship graph and calculate µtot and K (Nut factor).

## Software

### About the software

The Vibrationmaster Test Software has been specifically designed to be used in connection with the J120T and to work cross-platform. In order to achieve compatibility across platforms, the J120T has been developed using client-server architecture where a web-server inside the J120T's VARControl MINI control system delivers the software as Firmware to any device that meets the above mentioned requirements. This also means that no software installation is required on the user's device.

### Launching the software and connecting to the J120T

The J120T is equipped with an 80.211n capable wireless chip, enabling connection to any Wi-Fi capable device. In order to connect to the J120T and access its web based graphical user interface, turn on the J120T and allow approximately 60 seconds for the operating system to boot.

Once ready, the J120T will spawn a WPA-protected Wi-Fi network named VMJ120T.xxxx where the xxxx is equal to the unit's serial number. The unique password allowing connection to the J120T has been predefined before delivery by Vibrationmaster and cannot be changed. The password can be found on the unit's calibration certificate.

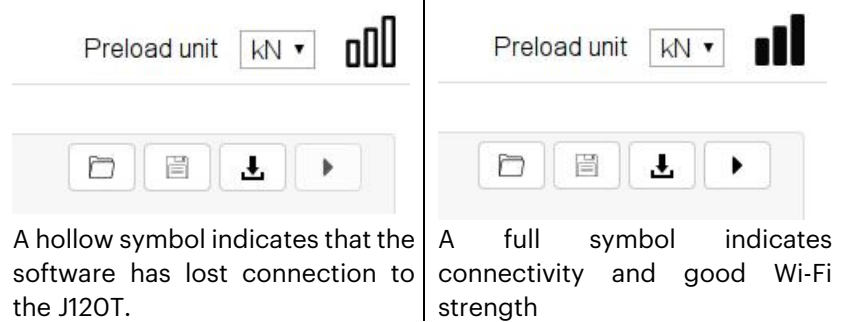| | |
|---|---|
| ![?] | **The unique password to connect to the J120T's operating system can be found on the document Wireless password and calibration certificate enclosed with the delivery.**<br><br>**The password cannot be changed by the operator.**<br><br>**Forgot the Wi-Fi password or lost the calibration certificate? No problem, please contact Vibrationmaster immediately by telephone (+352 24 55 90 68) or email (support@vibrationmaster.com).** |

Connect to the VMJ120T network, then open a web browser to the location: http://j120T.vm or by writing the IP address: http://10.0.0.1

The application will load in the browser window and in the process, query the J120T device about its functions and capabilities, such as the optional torque sensor.

| | |
|---|---|
| ![!] | **When using the J120T, try to minimize radio interference from other devices using radio in frequencies close to the 2.4 GHz and 5 GHz bands.** |

A signal symbol in the upper right corner of the Vibrationmaster Software indicates whether connectivity to the J120T device is achieved.

A hollow symbol indicates that the software has lost connection to the J120T.

A full symbol indicates connectivity and good Wi-Fi strength

A full symbol means that connectivity is established, while a hollow symbol means that the user interface is currently unable to communicate with the J120T and is in offline-mode. Passing the mouse over the symbol, or tapping it on mobile devices, will display a detailed status notification.

While in offline-mode, the software will periodically try to reconnect to the J120T.

While in offline-mode, the software still allows some operations, such as import and export of data stored locally in the device or defining and removing program steps.

## Using the J120T software on smaller screens

On screens with a resolution lower than 1200 pixels wide, the Vibrationmaster Test Software will automatically adapt its layout. The responsive design ensures a good user experience with the interface, regardless of the device's screen resolution and portrait or landscape orientation.

## User Screens

The software has two main user screens accessible through tabs at the upper edge of the browser window:
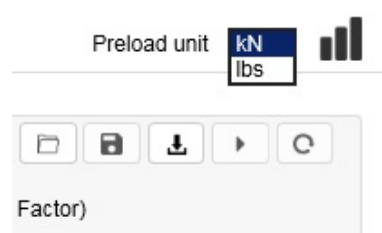
- Vibration test
- Torque test
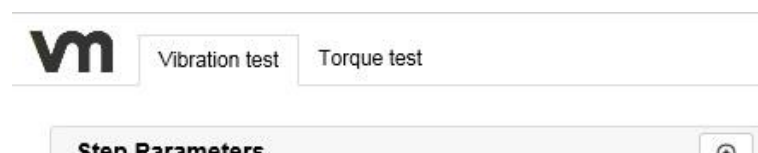


The user can shift between the screens at any time by clicking on the tab.

## Configuration option

The J120T's software has one configuration option for the preload values unit.

A drop-down list in the upper right section of the screen lets the operator select either kilo-Newton (kN) or pound (lbs) as denominator for the preload value. Changing between kN and lbs can be done at any time, unless the user interface is blocked by a modal dialogue. All values on the screen will be recalculated and graphs will be redrawn in real-time.
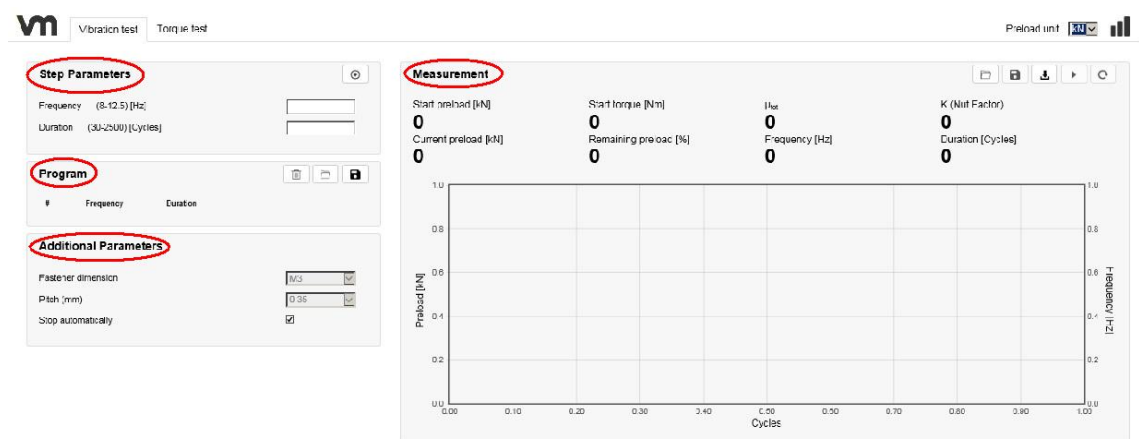
## Vibration test tab

From the vibration test screen the user can create a vibration test program, execute vibration tests or display previously recorded vibration test data in a graphical format.

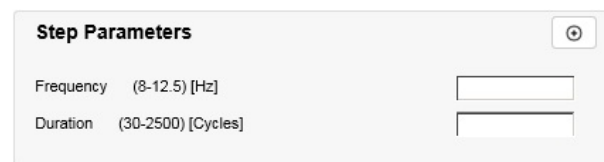The vibration test screen has 4 main sections:

- Step Parameters

- Program

- Additional Parameters

- Measurement.



### Step Parameters section

A vibration test program can consist of one or more individually configurable steps which are defined in the step parameters section.

The step parameters section allows the user to set frequency and duration for each individual step and then add that step to the overall program.



In order to set the values and add a step to a program, the operator should input the value directly in the field using the keypad or increase/decrease the values using the mouse, then Press the ADD button or simply hit RETURN on the keypad.

The values entered will be validated and, provided they are within the acceptable ranges, added to the program section.

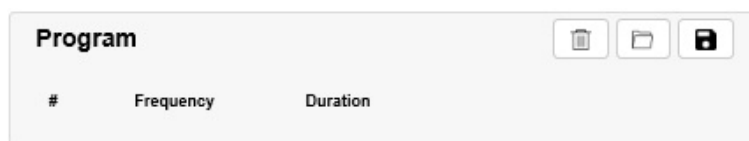| Field | Description | Units | Comments |
|---|---|---|---|
| **Frequency** | Input the required test frequency in this field | Hz | The valid range is from 8Hz to 12.5 Hz |
| **Duration** | Input the test duration in this field | Cycles | The valid range is from 30 to 2500 cycles |
| ⊕ | Add step | This button adds the current step to the program list in the program section | Instead of pressing this button, the user can also hit the RETURN key in either the Frequency or Duration fields. |

### Program section

The individual steps configured will be added to the program section in list form.

From this list, the user can remove individual steps by pressing the red trashcan icon next to the step.
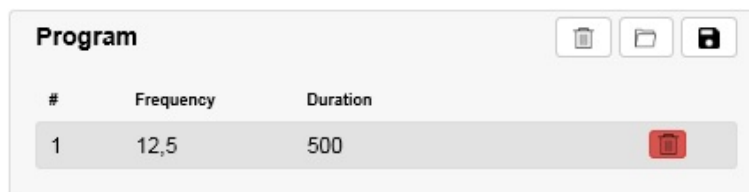
The program list pane also allows the user to empty the entire program by pressing the trashcan icon at the top right, load a predefined program from the device's local storage or save the current program to the device's local storage.

The maximum total number of cycles for one program is 2500 cycles in one or more steps.



*Program section without steps*



*Program section with one step added. The test or demonstration can now begin*

*Program section with three individual steps to form one program; First the J120T will run 500 cycles at 12.5Hz, then 200 cycles at 8Hz and finally 300 cycles at 11Hz.*

| Button | Function | Description | Comments |
|---|---|---|---|
|  | Delete step / Delete all steps | Press the red trashcan button next to an individual step to delete that step only, or the button at the top right to delete all steps | |
|  | Load saved program | Load a previously saved program from the device's local storage | |
|  | Save current program | Save the current program to disk as a .csv file | |

**Additional Parameters Section**

The additional parameters section allows the user to set parameters globally applied to their program.

Please note that the "Fastener dimension", "Pitch" and "Threads per Inch" fields will only be active when the presence of a torque sensor was discovered during the system start up and browser window loading.

Without the optional torque sensor detected, the additional parameter section allows the user to check or uncheck the "Stop automatically" checkbox.

The "Stop automatically" checkbox serves to determine when the software will stop receiving data and displaying values from the J120T's preload sensor.

When checked, measurement of preload data will automatically stop once the defined program's total number of cycles has been completed or when the operator manually stops the test by clicking the STOP button.

At that point in time, the graph will cease to evolve and the STOP button will automatically turn back into a START button to signal that the test run has been completed.

When unchecked, the software will keep receiving data from the preload sensor until the STOP button is manually pressed. This means that after the total number of cycles have been completed the preload sensor will still be active and measure changes in preload.

This functionality is particular useful when demonstrating the change (rise and fall) of preload value as the fastener is manually loosened by the operator after a completed vibration test.

Often used in connection with demonstrating the working principle of wedge washers, this functionality can also be used to show any other fastener product with similar characteristics.
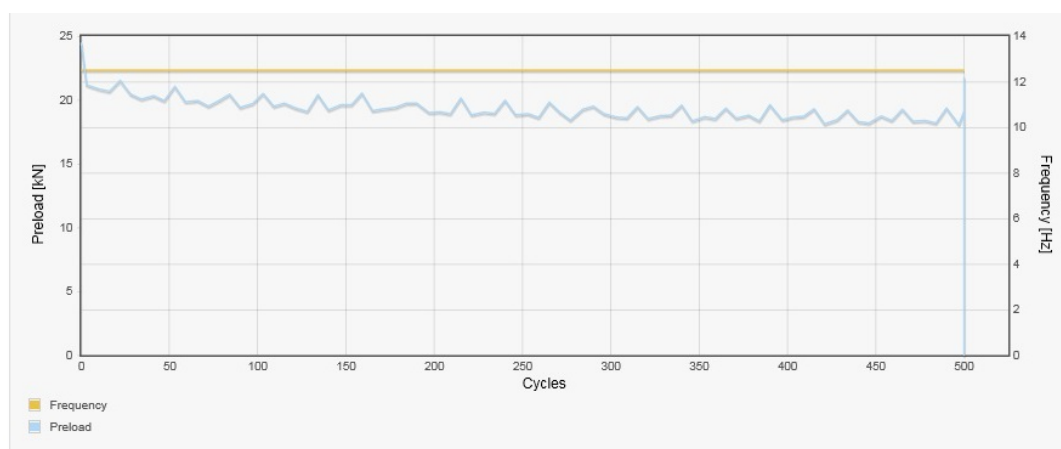


*On the image above a completed vibration test of 500 cycles can be seen where, after the fastener was being manually un-tightened, there was a rise in the preload value from approximately 10kN to 12kN. This serves to demonstrate the working principle of wedge washers.*

With the optional torque sensor attached, the additional parameter section allows the user to select the fastener dimension and pitch value.

When using the optional torque sensor during the tightening process of a fastener before undergoing a vibration test or demonstration, the software will automatically calculate the total coefficient of friction (μtot) and K (Nut Factor) and display those values real-time in the measurement section.
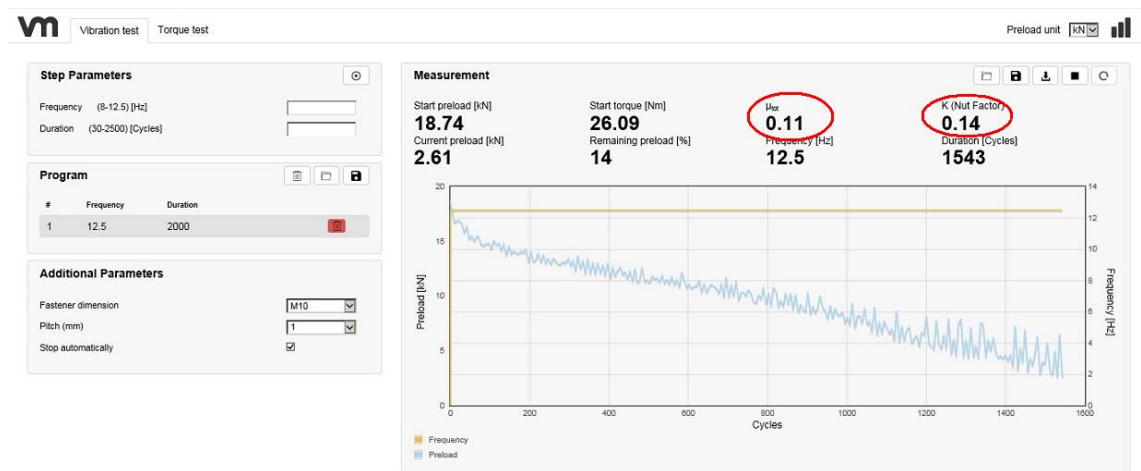


Please refer to the torque test section of this manual for further explanation of how to set the fastener dimension and pitch value.

## Launching a vibration test

Once at least one step has been added to the program, the user will notice that the START button at the top right of the measurement area has been enabled and can now be pressed.



When pressing the START button, the software will remind the user to first loosen the fastener, which will have to be confirmed by clicking "OK"

Prepare for test

Please check to ensure the fastener is untightened before starting the test.

OK     Cancel
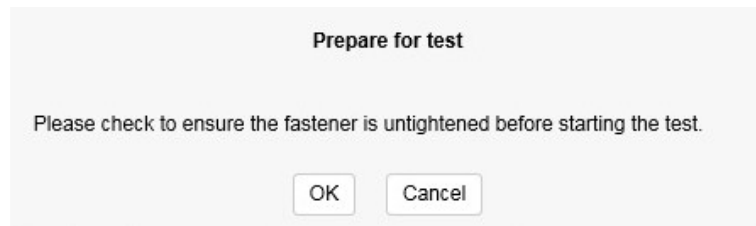
⚠️ **Not loosening the fastener prior to launching a new test will result in false measurement values and may damage the J120T**

Once the fastener has been completely loosened, the user should hit "OK" in order to start the procedure to tighten the fastener to the desired preload or a given torque if the optional torque sensor is attached. The applied torque and achieved preload will be displayed in real-time.

Please tighten the fastener to the desired value

Clamp force
30.40 kN

Torque
46.72 Nm

Ok     Cancel
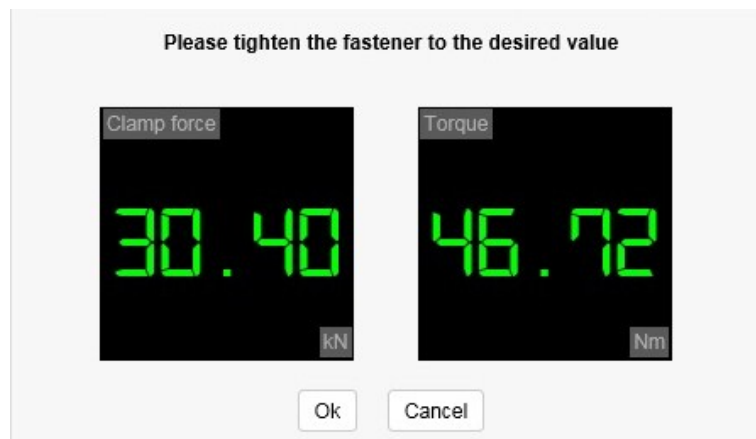
If the optional torque sensor has not been installed, the torque value panel will be greyed out.

Please tighten the fastener to the desired value

Clamp force
27.14 kN

Torque
-- Nm

Ok     Cancel
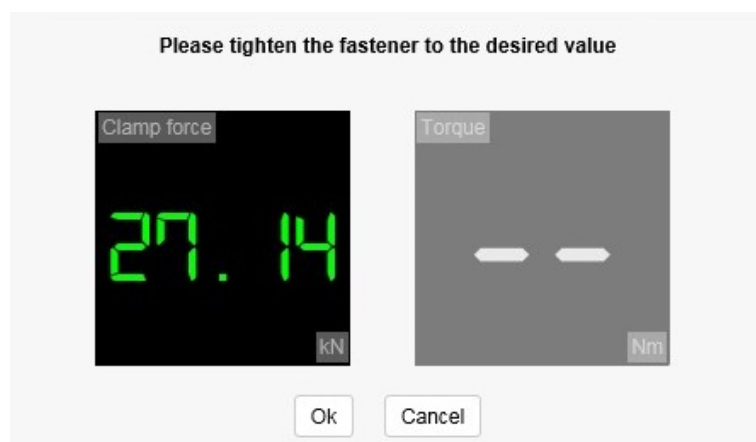
Once the fastener has been tightened to the desired value, press "OK" in order to start the actual vibration test.

| ⚠️ | **Please show caution. The test will begin once "OK" has been pressed.** |
|---|---|

As the vibration test proceeds, test data will be recorded and shown in real-time in the measurement section.

During the test run, the START button will turn into a STOP button that can be pressed at any moment in time to cancel the current test run.
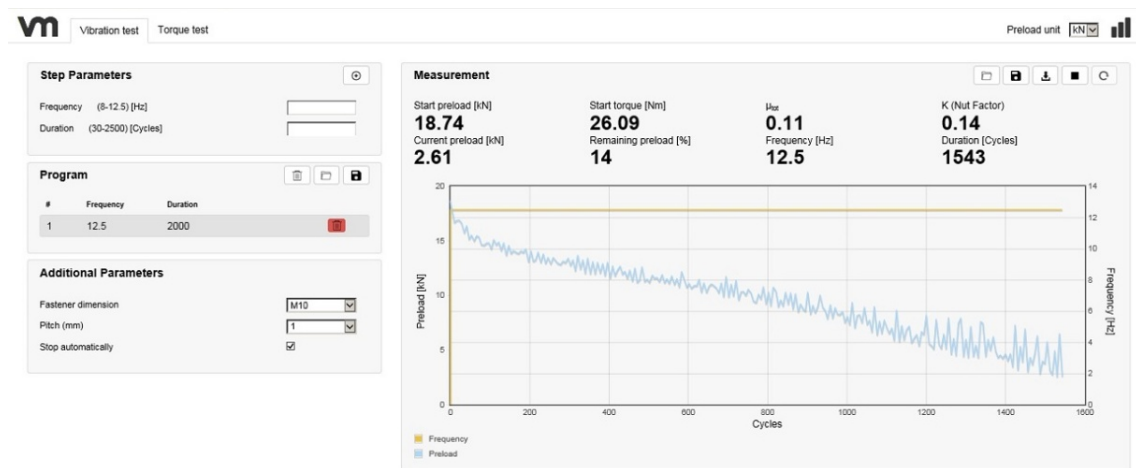




## Using the rerun function

Once a program has ended or has been manually stopped by the user, the same program can be rerun without resetting the sensors to zero.

This means that the test can be rerun using the same program and at the same level of preload as where the previous test stopped. This also means that the user should not manually tighten or loosen the fastener in this situation.

In order to do this, press the RERUN button at the top right edge of the measurement screen.



The rerun function may be used an unlimited number of times.

| ⚠️ | Please show caution. Running a test or demonstration will significantly stress the fastener and may cause the fastener to fail by breaking. |
| | Fastener testing involves inherent hazards from high forces, rapid motions and stored energy. The user must make themself aware of all the operations and components that may cause potential hazards. |

## Torque test tab

In order to be able to perform torque tests on the J120T, or generally to retrieve torque values from its sensor, it is necessary to have the torque sensor installed. The J120T's software will auto-discover the torque sensor when first loading the application from the J120's web-server. Unless the torque sensor has been discovered, the fastener dimension drop-down list as well as the START button will remain disabled.

From the torque test screen, it is possible to conduct torque and tension tests to analyse the relationship between applied torque and achieved preload.

The torque test screen has 2 main sections:

- Parameters

- Measurement.
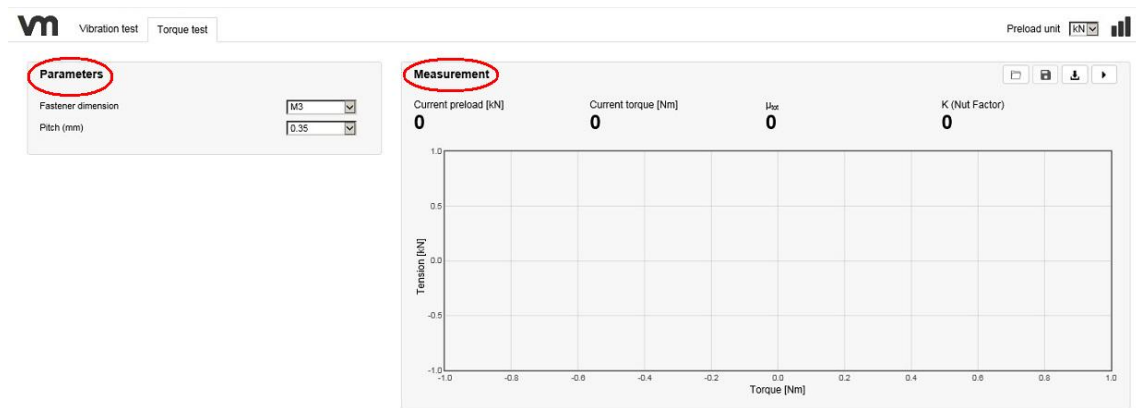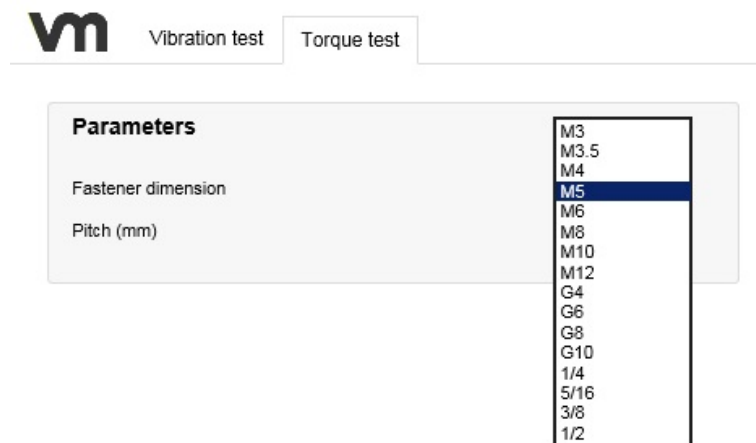


| | When using a device with a screen resolution lower than 1200px in width, the measurement section will be placed below the parameters section. |
|---|---|

### Parameters section

The parameters section offers the following available parameters:

| Field | Description | Units | Comments |
|---|---|---|---|
| Fastener dimension | Select which fastener dimension is being tested | ISO metric or UTS Inch | The valid range is ISO metric M3 to M12 and UTS G4 to 1/2 in |
| Pitch Threads per Inch | Depending on the selected fastener, the Pitch field will have one or more available values to choose from | Pitch or threads per inch | When selecting imperial fastener dimensions from the Fastener dimension drop-down, the label of the Pitch selector will change to Threads per Inch |

Image below shows the drop down list for selecting the fastener size.



The image below shows the drop down list for standard programmed available pitches when an M10 fastener has been selected.



The image below shows the drop down list for standard programmed available Threads per Inch when a G8 sized fastener has been selected.

**Measurement section**

The measurement section displays the following data and allows the following actions:

| Field | Description | Units | Comments |
|---|---|---|---|
| **Current preload** | Displays the current preload value reported by the J120T's preload sensor | kN or lbs | |
| **Current torque** | Displays the current torque reported by the J120T's torque sensor | Nm | |
| **µtot** | Calculates the total coefficient of friction | | Real-time calculation |
| **K (Nut Factor)** | Calculates the nut factor | | Real-time calculation |
|  | Open | Allows the user to import and open saved tests | The operation mode and available actions are described in the common functionality section of this manual |
|  | Save | Allows the user to rename and save test data, as well as export that data to a .csv file | The operation mode and available actions are described in the common functionality section of this manual |
|  | Download | Allows the user to download the test results as a bitmap (.png) graphic. | Use this function to create an image of the measurement graph |
|  | Start | Starts the test | The START button will turn into a STOP button once pressed. |

| | Stop | Stops the test and data recording | The STOP button will turn into a START button once pressed |
|---|---|---|---|

## Launching a torque test

In order to conduct a torque test, please select the fastener dimension and pitch values in the parameters section.

Once the values are selected, press the START button to start the test.

The software will remind the user to first loosen the fastener, which will have to be confirmed by clicking "OK":

**Prepare for test**

Please check to ensure the fastener is untightened before starting the test.
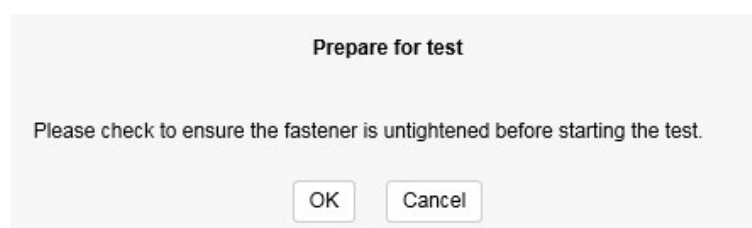
OK     Cancel

Pressing "Cancel" on this screen will abort the test and bring the user back to the main torque test screen, where it will be possible to change the test parameters.

Once the user has clicked "OK", the recording of torque measurement data will begin.

The user can now go ahead and manually tighten the fastener.

As the fastener is tightened, the real-time applied torque and achieved preload will be seen in the measurement section and the chart will be drawn as test data is generated.

Simultaneously the software will calculate in real-time the µtot and K (Nut Factor).

The image below shows a real time image of the screen receiving torque and tension measurement data from the sensors during a tightening sequence.
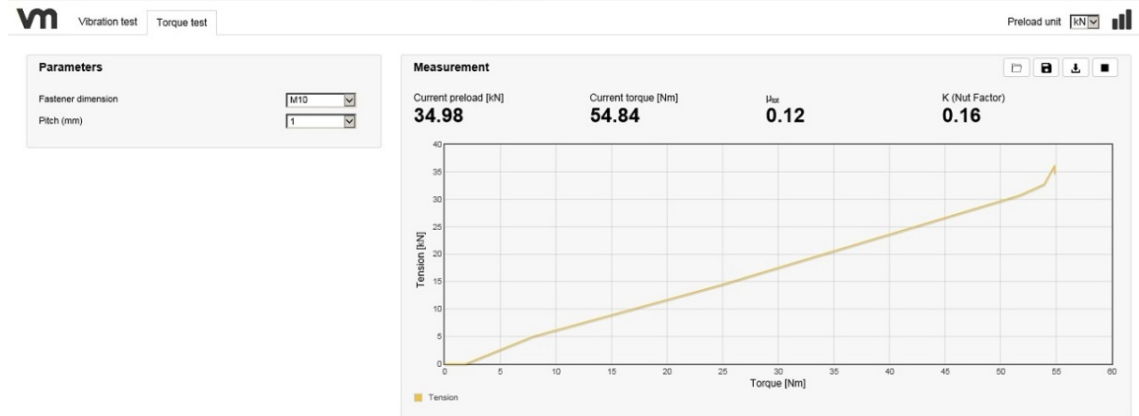
While the torque test is running, the START button in the Measurement's upper right corner will turn into a STOP button.



The test can be stopped at any time by pressing the STOP button.

Pressing the STOP button will stop retrieving and displaying test results. Once pressed, the STOP button will turn back into a START button.

| | To ensure highest accuracy of the measurement data, the J120T's software system will automatically reset the sensors prior to starting a new torque test or demonstration. |
|---|---|

| | For opening, saving, importing and exporting test data please refer the shared functionality section of this manual. |
|---|---|

It is also possible to test and record data during the untightening sequence of, for example, a wedge washer where the preload shortly rises before falling to zero. The image below shows how this is done in practice.

Simply perform the loosening sequence after the tightening procedure without pressing the STOP button. After loosening is complete, press the STOP button to stop the data recording.

## Software



Comparing different torque tension profiles of bolted joints is also possible as shown below. Please refer to the shared functionality section for an explanation of how to import file(s).
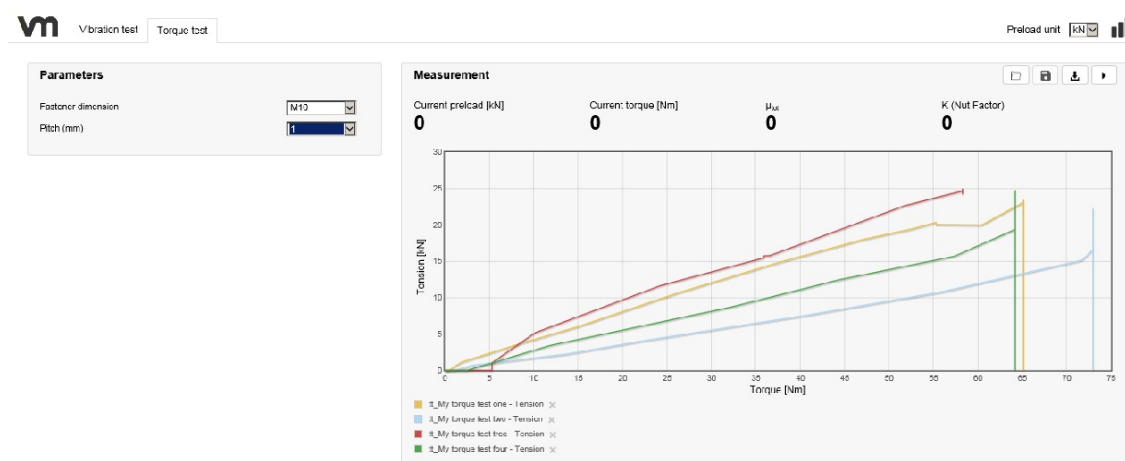


## Shared functionality

This section of the manual explains the functionality that is shared and common to both the vibration and torque test screens.

### Opening, saving, importing and exporting test data

Test data is kept in the device's temporary memory after having performed a test.

Test data is however not automatically saved to local storage.

In order to save the test data for later reference, use the save functionality by pressing the SAVE button.

A modal dialogue box will appear that allows the user to rename test data by something meaningful to them.

By default, the test run will be named by the type of test that was run (TT_*.* for torque test and VT_*.* for vibration test), the current date and the time a test was conducted.

Change the name or just hit ENTER and the data will be saved for later use.
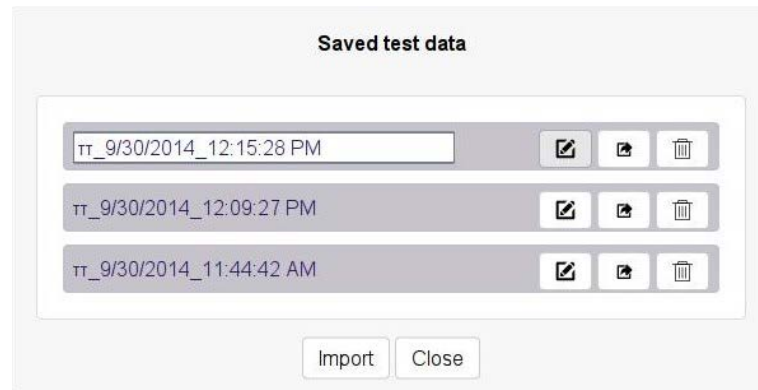


| | The functionality to save and load test data to and from local storage is not available on iOS platforms. |
|---|---|

Available actions are:

| Field | Function | Description | Comments |
|---|---|---|---|
| **Filename** | Load | Clicking a filename will load that test data into the current graph | When loading test data, the legend at the lower left area of the measurement section will indicate the names and colours of loaded test data |
|  | Edit name | Clicking this button allows the user to edit the name of a saved test | Once a name has been given to the latest test data, pressing RETURN on the keyboard or clicking anywhere on the window will accept this name |
|  | Export | Test data may be exported as a csv file to the device's storage | . |
|  | Delete | Discard a saved test run by clicking the delete button | |
| **Import** | Import | The import functionality allows the user | Pressing the import button will open the browser's file dialogue. |

| | | to import previously exported test data | Choose a file previously exported from the application |
|---|---|---|---|
| **Close** | Close | Press the close button in order to close the file saving/loading dialogue | |

| | |
|---|---|
| (icon) | **If trying to import an incompatible file, the application will display a message:** <br> **"The file you were trying to import has the wrong format."** |

**Loading a reference graph into the measurement graph**

When loading saved test data by clicking on its filename, the accompanying graph will be superimposed on the current graph.

The graph legend in the measurement pane's lower left area will show the loaded test data with its filename and allows the user to remove single graphs lines that are no longer needed by pressing the cross symbol behind its legend.
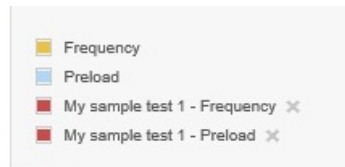


This functionality is useful if conducting vibration testing or torque testing while showing a reference graph on the screen.

This allows the import of a reference graph before starting a new test run and compares the graphs as the current test runs measurements come in.

Please note that, contrary to a current test data graph, imported graphs will have the same colour for both frequency and preload. Each imported test data set will have its own unique colour making it possible to import several saved tests.

An imported test data set will remain on the graph until manually removed by clicking on the cross in the legend.

The image below shows a reference graph named My sample test 1 loaded onto the screen before conducting a new vibration test.

## Software
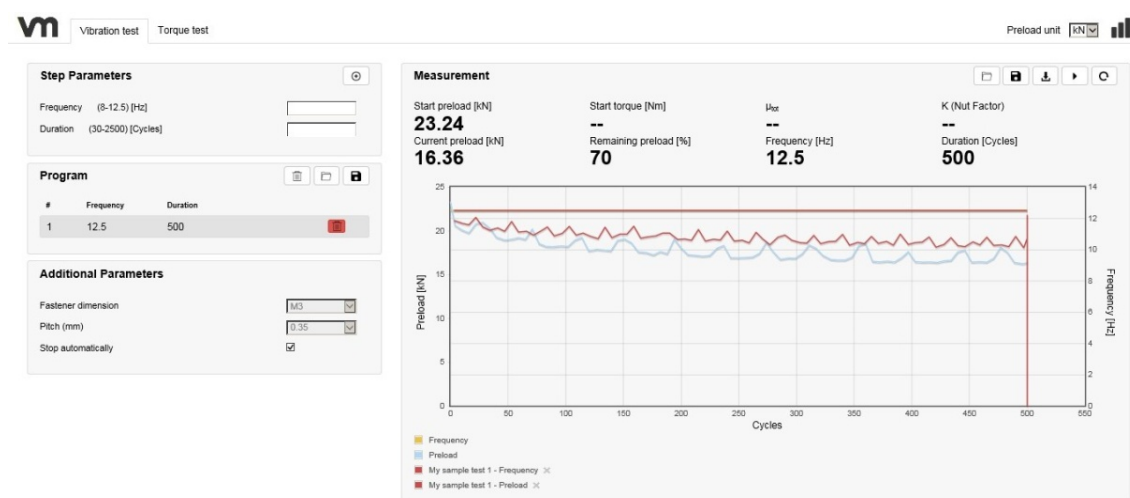
### Taking a snapshot of a graph

The graph generated by a test run can also be exported as a bitmap (.png) file. In order to save all the graphs currently displayed on the measurement pane as a bitmap, press the DOWNLOAD button at the top right of the measurement pane. A file named "chart.png" will be downloaded to the device's storage. Depending on the operating system, browser and settings a file dialogue will ask for a name and location or will simply save the file to a predetermined location.

## Appendix A: EU Declaration of Conformity

### EU Declaration of Conformity for Machinery

Manufacturer:

Vibrationmaster Technology Centre s.à r.l.

9, avenue des Hauts-Fourneaux

4362 Esch-sur-Alzette

Luxembourg

Phone: +352 24 55 90 68

Email: info@vibrationmaster.com

Web: www.vibrationmaster.com

Hereby declares that the product:

Type: J-Series

Name: J120T Junker Test bench

Serial number: J120T.1.xxxx

Is in conformity with all relevant requirements of the Machinery Directive (Directive 2006/42/EC).

The following harmonised standards have been applied:       $C \, \epsilon$

Esch-sur-Alzette

October 1, 2014

Morten Schiff

CEO

## Appendix B: Product Specifications

### J120T Junker Test Bench Demonstrator – Product Specifications

| | |
|---|---|
| **Test Bench Type** | Portable |
| **Amplitude/Displacement** | ±1 mm changeable; bespoke displacements available |
| **Frequency** | Adjustable from 8 to 12.5 Hz |
| **Bolt Sizes** | M3 to M12 ISO Metric |
| | #4  to 1/2 in UTS |
| **Preload Capacity** | 40 kN (9,000 lbf) |
| **Load Cell** | Calibrated quartz load washer |
| **DIN 65151** | Compliant |
| **DIN 25201-B** | Compliant |
| **Control System** | IoT platform independent tablet PC |
| **Software** | Vibrationmaster Test Software proprietary browser based software |
| **Voltage** | 100 V / 230 V, 50-60 Hz automatic voltage sensing switch |
| **Machine Approval** | CE |
| **Dimensions** | H 306 x W 186 x D 434mm |
| | (H 12.0 x W 7.3 x D 17.1 inches) |
| **Weight** | 17.0 kg (37.5 lb) |
| **Finish** | Glass ball blasted or vibratory ground anodized high strength, low weight aluminium chassis and carrying handles with a protective cover fabricated from carbon fibre. |
| **Grounding** | No grounding required – unit has been designed for portability |
| **Servicing Schedule** | Regular lubrication of the linear motion guide Bearing changes every 500 hours |

## Appendix C: Spare Parts

### External Items:
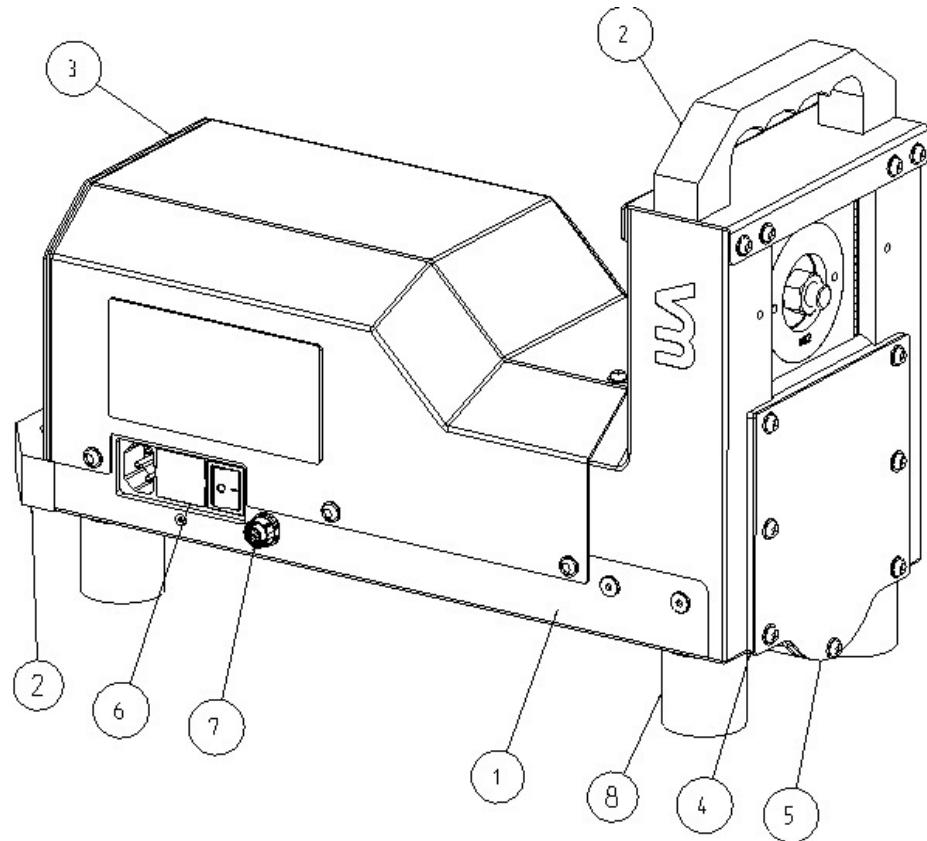


### External Items - Parts List:

| Item | Description | Quantity |
|------|-------------|----------|
| 1 | J120T Frame | 1 |
| 2 | Handle | 2 |
| 3 | Main cover | 1 |
| 4 | Front cover spacer plate | 1 |
| 5 | Front cover | 1 |
| 6 | Power input switch | 1 |
| 7 | Torque sensor female connector | 1 |
| 8 | Feet | 4 |
| 9 | Grease nipple (Not shown) | 1 |
| 10 | Torque sensor male connector (Not shown) | 1 |

## Appendix C: Spare Parts

## Internal Items:

<span style="color:red">Image deleted in the online version. For the complete Operating Manual, please contact Vibrationmaster.</span>

## Internal Items - Parts List:

| Item | Description | Quantity |
|------|-------------|----------|
| 11 | Glider Plate | 1 |
| 12 | Connecting Rod | 1 |
| 13 | Wedge key - LH | 1 |
| 14 | Wedge key - RH | 1 |
| 15 | End piece M guide top | 2 |
| 16 | M Guide | 2 |
| 17 | End piece M guide bottom ( Not shown) | 2 |
| 18 | Angular cage bearing | 2 |
| 19 | End piece | 2 |
| 20 | End piece bottom (Not shown) | 2 |
| 21 | Bearing plate | 1 |
| 22 | Flat cage bearing L89 | 2 |
| 23 | Flat cage bearing L29 | 2 |
| 24 | Bush | 2 |
| 25 | Needle roller bearing | 1 |
| 26 | Eccentric bush | 1 |
| 62 | Sleeve – eccentric bush (Not shown) | 1 |

**Internal Items (continued):**

<span style="color:red">Image deleted in the online version. For the complete Operating Manual, please contact Vibrationmaster.</span>

**Internal Items - Parts List (continued):**

| Item | Description | Quantity |
|------|-------------|----------|
| 27 | Drive motor | 1 |
| 28 | Gear box | 1 |
| 29 | Adaptor gearbox | 1 |
| 30 | Cooling fan | 1 |
| 31 | Power supply | 1 |
| 32 | Charge amplifier | 1 |
| 33 | Motor power lines (not shown) | 1 |
| 34 | Stiffener | 1 |
| 35 | Pin | 1 |
| 36 | Bearing | 1 |
| 37 | Bearing | 1 |
| 38 | Axle | 1 |
| 39 | Relay | 2 |
| 40 | Control system | 1 |
| 65 | DC power terminal block | 2 |

## Appendix C: Spare Parts

### Hardware Items - Parts List:

| Item | Description | Quantity |
|------|-------------|----------|
| 41 | Din rail L= 35mm | 2 |
| 42 | Din rail L= 45mm | 1 |
| 43 | Grub screw | 2 |
| 44 | Socket button head screw M5x16 | 2 |
| 45 | Socket button head screw M5x12 | 15 |
| 46 | Socket button head screw M5x8 | 8 |
| 47 | Socket button head screw M8x16 | 4 |
| 48 | Socket button head screw M3x16 | 2 |
| 49 | Socket cap screw M4x8 | 12 |
| 50 | Socket cap screw M5x20 | 4 |
| 51 | Socket cap screw M4x12 | 1 |
| 52 | Socket cap screw M5x35 | 4 |
| 53 | Socket cap screw M6x20 | 4 |
| 54 | Socket flat head M4x16 | 1 |
| 55 | Socket flat head M3x12 | 2 |
| 56 | Hex head bolt M6x16 | 2 |
| 57 | Plain washer M5 | 11 |
| 58 | Plain washer M6 | 8 |
| 59 | Hex nut M3 | 2 |
| 60 | Retaining ring shaft 20x1.2 | 3 |
| 61 | Retaining ring bore 42x1.75 | 4 |

### Tool Items - Parts List:

| Item | Description | Quantity |
|------|-------------|----------|
| 63 | eccentric bush puller | 1 |
| 64 | Star knob M8x40 | 1 |

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The User expressly acknowledges and agrees that the use of the Software is solely at the User's risk.

### 7. Limitation of liability

To the maximum extent permitted by applicable law, in no event shall Vibrationmaster Technology Center s. á r. l or its suppliers be liable for any special, incidental, indirect or consequential damages whatsoever, including but not limited to damages for loss of profits or confidential or other information, for business interruption, for personal injury, except from personal injury suffered as a consequence of product liability, for loss of privacy, for failure to meet any duty, for gross negligence, and for any other pecuniary or other loss whatsoever arising out of or in any way related to the use of or inability to use the Vibrationmaster Test Software, the provision of or failure to provide support services or otherwise under or in connection with any provisions of this Licence Agreement, even in the event of tort, strict liability, breach of contract or breach of warranty of Vibrationmaster Technology Center s. á r. l or any supplier, and even if Vibrationmaster Technology Center s. á r. l or any supplier has been advised of the possibility of such damages.

Notwithstanding any damages that the User might incur for any reason whatsoever, including, without limitation, all damages referred to above and all direct or general damages, the entire liability of Vibrationmaster and any of its suppliers under any provision of this Licence Agreement and the User's exclusive remedy for all of the foregoing shall be limited to the greater of the amount actually paid by the user for the Vibrationmaster Test Software. The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails its essential purpose.

### 8. Governing Law and Venue

Any dispute arising out of or in connection with this Licence Agreement shall be settled by Luxembourgish courts in accordance with Luxembourgish law.