Plug & Test® Technology

Models PTA / PTAF

PLUG & TEST® ADAPTERS

User's Guide

MARK-10®

Thank you…

Thank you for purchasing a Mark-10 Plug & Test® Adapter, used to connect common strain gage-based force sensors and torque sensors to Mark-10 indicators and Series F test frames.

With proper usage, we are confident that you will get many years of great service with this product. Mark-10 products are ruggedly built for many years of service in laboratory and industrial environments.

This User's Guide provides setup, safety, and operation instructions. For additional information or answers to your questions, please do not hesitate to contact us. Our technical support and engineering teams are eager to assist you.

Before use, each person who is to use this product should be fully trained in appropriate operation and safety procedures.

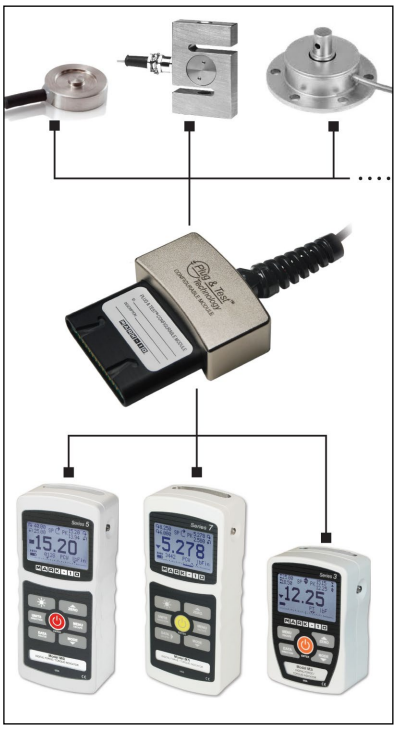


TABLE OF CONTENTS

1 OVERVIEW

1.1 List of included items

Qty.	Item
1	Model PTA or PTAF Plug & Test® adapter
1	Strain relief
1	Quick start guide

1.2 General Overview

Model PTA adapter interfaces a user-supplied force sensor or torque sensor to Models M3I, M5I, and M7I indicators.

Model PTAF adapter interfaces a user-supplied force sensor to Models M5I and M7I indicators, and Series F test frames.

Both adapters may be programmed to the appropriate load capacity with a software utility through USB or RS-232 connection to a Mark-10 indicator. Through Plug & Test® technology, all configuration and calibration information are saved within the adapter, allowing for interchangeability between multiple sensors, including standard Mark-10 sensors.

1.3 Compatible Equipment

The PTA and PTAF adapters are compatible with sensors meeting the following specifications:

- Type: Full bridge
- Resistance: 300 – 1000 ohms
- Sensitivity: 1 – 3 mV/V full scale
- Indicator requirements:
  - PTA: Model M3I, M5I, or M7I indicator with firmware version 1.0.9 or later
  - PTAF: Model M5I or M7I indicator with firmware version 2.2.8 or later

The PTA adapter **cannot be configured** using firmware versions prior to 1.0.9. It **can be used** with prior indicator versions, however, the adapter **cannot be calibrated** for single-direction load cells, such as load button and thru hole type load cells.

2 MECHANICAL SETUP

2.1 Wire Connection Overview

Sensors meeting the above specifications are supplied with a cable with four leads, for the following functions:

EXCITATION +
EXCITATION –
SIGNAL +
SIGNAL –

These leads are typically color coded. Refer to the manufacturer's data sheet for details.

Note: Ensure that the signal leads have been installed into the appropriate terminal blocks. Some sensor manufacturers consider SIGNAL + to be a compression value, while others consider it to be a tension value. If these leads are installed incorrectly, the indicator will display the opposite tension/compression indicator, and calibration cannot take place. In such a case, the indicator may display a message that the load is too high or too low, even if the applied load is correct. Switching the leads may fix the issue. Lead assignments should be verified with the manufacturer.

The adapters contain a circuit board with a screw terminal block to allow for the connection of these leads.

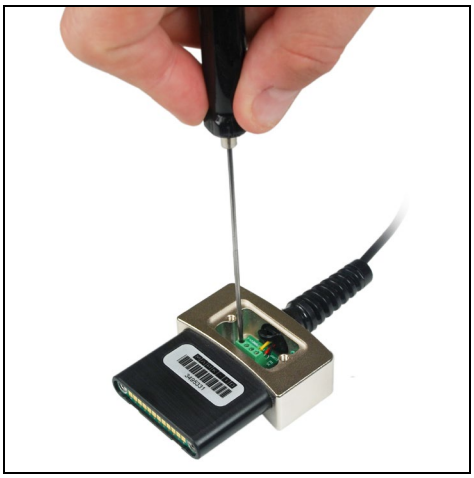
2.2 Wire Connection - Model PTA

Access the circuit board inside the adapter by loosening two screws and removing the cover, as shown below:

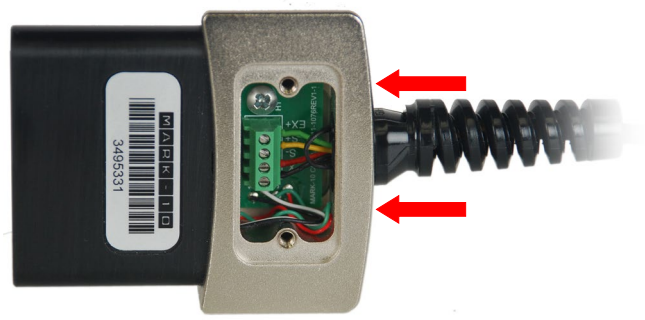
The screw terminal block will be visible, along with labels referencing the functions listed above:

1. Feed the four leads through the supplied strain relief (pictured above) and into the body of the adapter.

2. Using a flat screwdriver, loosen the four screws in the terminal block until the sensor leads can be inserted into the appropriate receptacles. After inserting the leads, tighten the screws, as shown below:



3. Install the strain relief by pressing it into the receptacle in the adapter housing, as shown below:



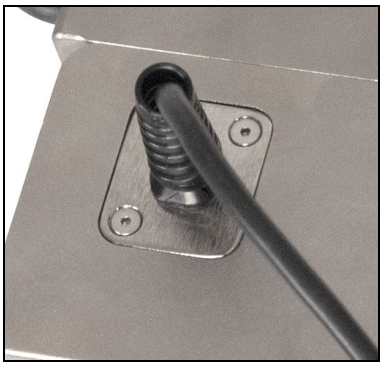
4. Reinstall the cover.

2.3 Wire Connection - Model PTAF

1. Remove the circuit board by loosening two screws, and remove the side cover by loosening two screws, as shown below:

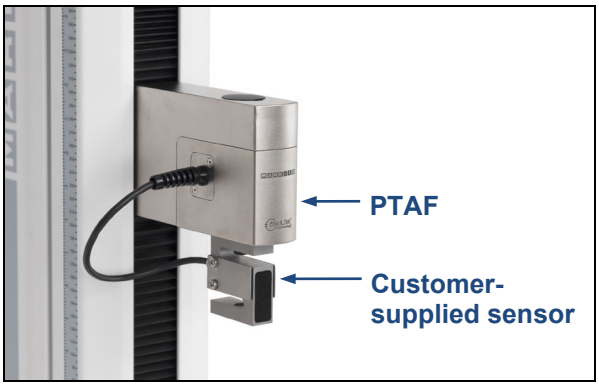
2. Feed the sensor leads through the strain relief and side cover over. Then, using a flat screwdriver, loosen the four screws in the terminal block until the sensor leads can be inserted into the appropriate receptacles. After inserting the leads, tighten the screws, as shown below:

3. Reinstall the circuit board and side cover, then press the strain relief into the side cover, as shown below:



2.4 Mounting Model PTAF to Models F105, F305, F505, and F505H Test Frames

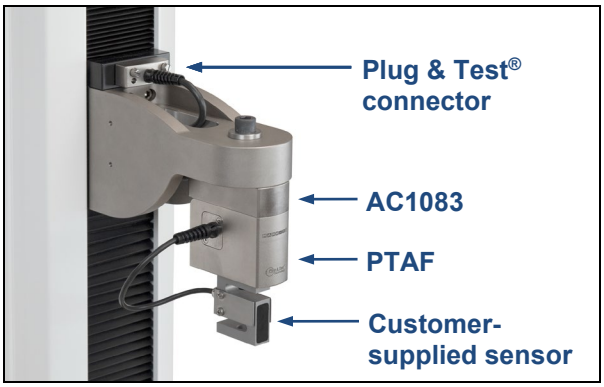
Fasten a user-supplied screw through the crosshead of the test frame, through the PTAF adapter, and into the sensor, as shown in the following example:



2.5 Mounting Model PTAF to Models F755, F755S, F1505, and F1505S Test Frames

To mount Model PTAF and a sensor to these test frames, Model AC1083 is also required.

Fasten a user-supplied screw through the crosshead of the test frame, through the AC1083 adapter, through the PTAF adapter, and into the sensor. Then route the AC1083 cable through the opening in the crosshead and connect the Plug & Test® connector to the receptacle on the crosshead. Reference the image below:



3 SOFTWARE INSTALLATION

The adapters are configured by a PC running the included software utility, *Plug & Test Adapter Configuration*. Communication is achieved through a Mark-10 indicator and a USB or RS-232 connection.

The software and USB drivers may be downloaded from:
www.mark-10.com/resources/software-drivers

3.1 PC requirements

- Windows 7 or later operating system
- Screen resolution of 1024 x 768 or greater
- RS-232C serial port or USB port. If USB communication is required, be sure to install the appropriate USB driver.

3.2 Installation instructions

After downloading the file from the above link, unzip/extract the folder, then run the file "setup.exe". Follow the prompts on the screen to install the software.

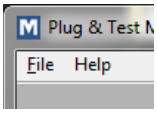
3.3 Running the software

When the installation is complete, the program can be found in:
Programs > Mark-10 Software > Plug & Test Adapter Configuration.

4 USING THE SOFTWARE

When software installation has been completed, plug the adapter into the indicator, and connect a USB or RS-232 cable between the indicator and the PC.

4.1 General Menus



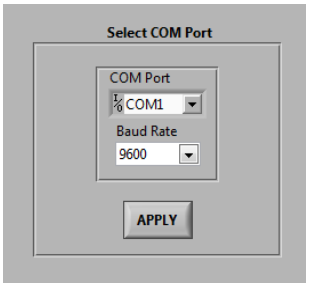
File
Close – Click to exit the program.

Help
User's Guide – Click to open the user's guide PDF document (this document).

Mark-10 Website – Click to go to the Mark-10 website.

About
Click to display general software information, including the version number.

4.2 COM Port Settings

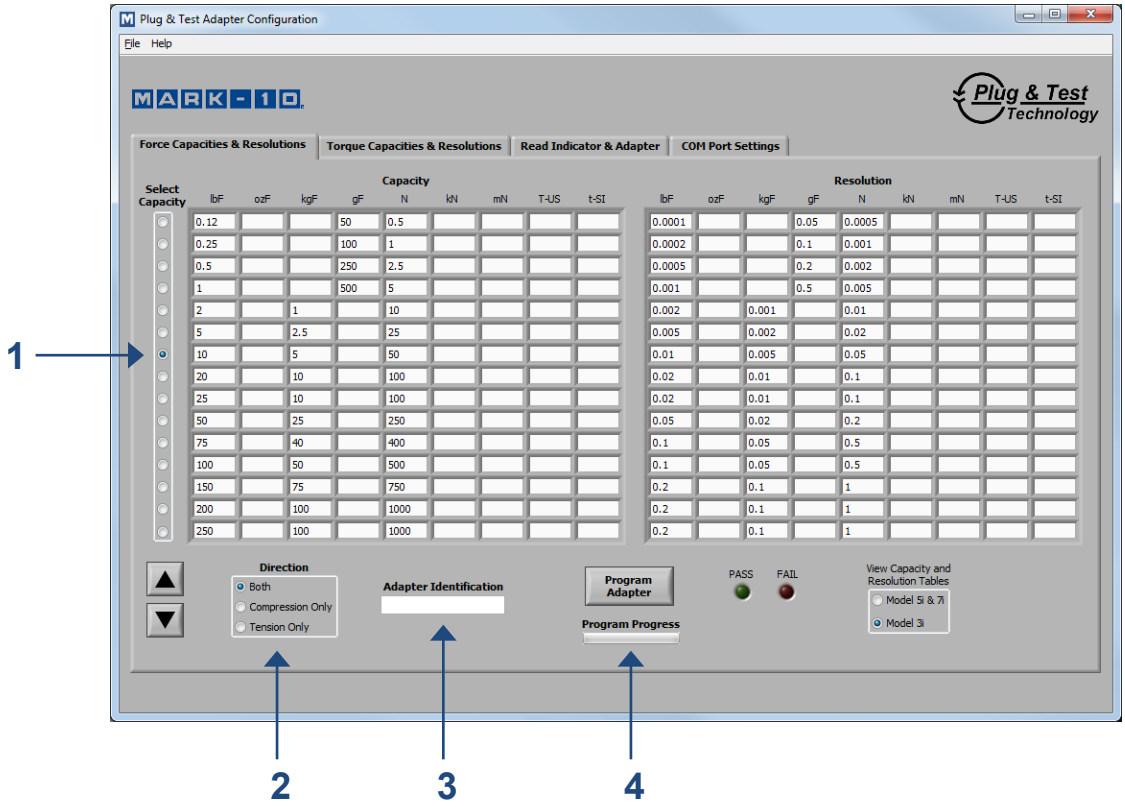


Use this screen to configure the PC's COM port to which the indicator is connected.

COM Port
Select the appropriate COM port from the dropdown list. Clicking **Refresh** updates the list with all installed ports. The COM port associated with the indicator can be identified under the *Ports* sub-section of *Device Manager* in *Windows*.

Baud Rate
Select the baud rate of the serial port. The default setting is 9600 baud. Be sure to configure the baud rate to match that of the indicator.

4.3 Force / Torque Capacities & Resolutions



Use the **Force Capacities & Resolutions** and **Torque Capacities & Resolutions** screens to program the capacity appropriate for the sensor. The number of available units of measurement and displayed resolution depend on the indicator being used. Refer to Section 5 for detailed information.

Refer to the following procedure:

1. Select the appropriate capacity. Use the ▲ and ▼ arrows to scroll through additional capacities. The Capacity table shows the available units of measurement and their corresponding capacities. The Resolution table displays the increment size for each of the available units.

   Select the **Model 5i & 7i** or **Model 3i** radio button in the lower right corner of the screen to display the units and resolutions available for each indicator. Do not use a Model M3I indicator to configure a sensor via the PTAF adapter.

2. The software may be used to configure a bi-directional sensor, such as an S-beam, or single direction sensor, such as a load button. Select the appropriate direction.

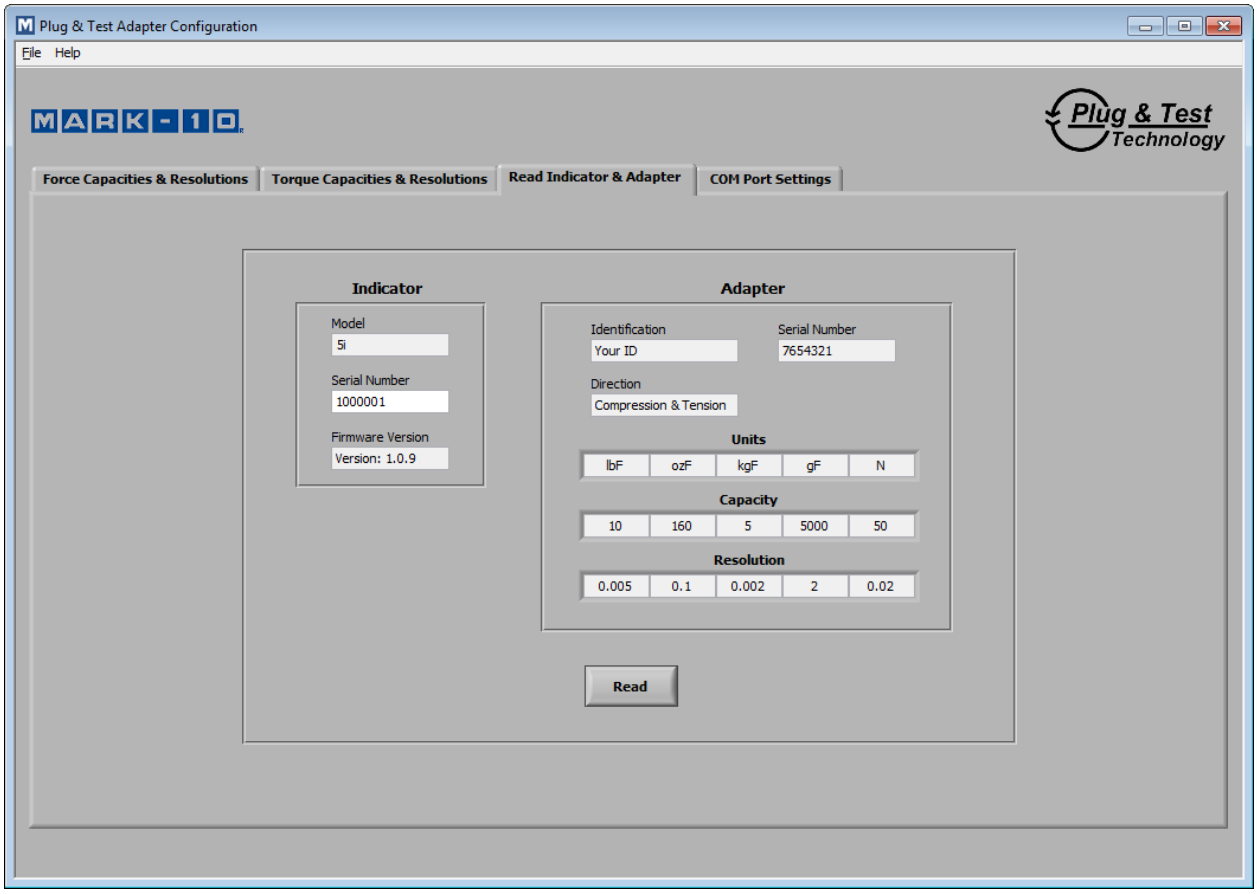
3. Optionally enter an identification number for the sensor. This number will be displayed in the indicator's power-up sequence and **Information** screen.

   Note: The identification number may not begin with the letter sequence "MR".

4. Click **Program Adapter**. A progress bar is supplied below this button, for visual convenience. **Do not** disconnect the communication cable until this process is complete, denoted by the **PASS** or **FAIL** indicator.

   Note: This software does not allow the user overwrite the configuration of a standard Mark-10 force or torque sensor.

4.4 Read Indicator & Adapter



Use this screen to view information about the sensor and indicator. Click **Read** to view the indicator model number, serial number, and firmware version. The sensor's identification number, serial number, direction(s), capacities, and resolutions are also visible.

Note: The adapter's serial number is programmed at the factory and cannot be modified.

5 CAPACITIES & RESOLUTIONS

5.1 Force Capacities & Resolutions – Models M7I and M5I indicators and IntelliMESUR® software

Capacity									Resolution								
lbF	ozF	kgF	gF	N	kN	mN	T-US*	t-SI*	lbF	ozF	kgF	gF	N	kN	mN	T-US*	t-SI*
0.12	2	-	50	0.5	-	500	-	-	0.00005	0.001	-	0.02	0.0002	-	0.2	-	-
0.25	4	-	100	1	-	1000	-	-	0.0001	0.002	-	0.05	0.0005	-	0.5	-	-
0.5	8	-	250	2.5	-	2500	-	-	0.0002	0.005	-	0.1	0.001	-	1	-	-
1	16	-	500	5	-	5000	-	-	0.0005	0.01	-	0.2	0.002	-	2	-	-
2	32	1	1000	10	-	-	-	-	0.001	0.02	0.0005	0.5	0.005	-	-	-	-
5	80	2.5	2500	25	-	-	-	-	0.002	0.05	0.001	1	0.01	-	-	-	-
10	160	5	5000	50	-	-	-	-	0.005	0.1	0.002	2	0.02	-	-	-	-
20	320	10	10000	100	-	-	-	-	0.01	0.2	0.005	5	0.05	-	-	-	-
25	400	10	10000	100	-	-	-	-	0.01	0.2	0.005	5	0.05	-	-	-	-
50	800	25	25000	250	-	-	-	-	0.02	0.5	0.01	10	0.1	-	-	-	-
75	1200	40	40000	400	-	-	-	-	0.05	0.5	0.02	20	0.2	-	-	-	-
100	1600	50	50000	500	-	-	-	-	0.05	1	0.02	20	0.2	-	-	-	-
150	2400	75	75000	750	-	-	-	-	0.1	2	0.05	50	0.5	-	-	-	-
200	3200	100	100000	1000	-	-	-	-	0.1	2	0.05	50	0.5	-	-	-	-
250	4000	100	-	1000	1	-	-	-	0.1	2	0.05	-	0.5	0.0005	-	-	-
300	4800	150	-	1500	1.5	-	-	-	0.2	5	0.1	-	1	0.001	-	-	-
500	8000	250	-	2500	2.5	-	-	-	0.2	5	0.1	-	1	0.001	-	-	-
750	12000	400	-	4000	4	-	-	-	0.5	10	0.2	-	2	0.002	-	-	-
1000	16000	500	-	5000	5	-	-	-	0.5	10	0.2	-	2	0.002	-	-	-
1500	24000	750	-	7500	7.5	-	-	-	1	20	0.5	-	5	0.005	-	-	-
2000	-	1000	-	-	10	-	1	1	1	-	0.5	-	-	0.005	-	0.0005	0.0005
2500	-	1000	-	-	10	-	1	1	1	-	0.5	-	-	0.005	-	0.0005	0.0005
3000	-	1500	-	-	15	-	1.5	1.5	2	-	1	-	-	0.01	-	0.001	0.001
5000	-	2500	-	-	25	-	2.5	2.5	2	-	1	-	-	0.01	-	0.001	0.001
7500	-	4000	-	-	40	-	4	4	5	-	2	-	-	0.02	-	0.002	0.002
10000	-	5000	-	-	50	-	5	5	5	-	2	-	-	0.02	-	0.002	0.002
15000	-	7500	-	-	75	-	7.5	7.5	10	-	5	-	-	0.05	-	0.005	0.005
20000	-	10000	-	-	100	-	10	10	10	-	5	-	-	0.05	-	0.005	0.005
25000	-	10000	-	-	100	-	10	10	10	-	5	-	-	0.05	-	0.005	0.005
30000	-	15000	-	-	150	-	15	15	20	-	10	-	-	0.1	-	0.01	0.01
50000	-	25000	-	-	250	-	25	25	20	-	10	-	-	0.1	-	0.01	0.01
75000	-	40000	-	-	400	-	40	40	50	-	20	-	-	0.2	-	0.02	0.02
100000	-	50000	-	-	500	-	50	50	50	-	20	-	-	0.2	-	0.02	0.02
150000	-	75000	-	-	750	-	75	75	100	-	50	-	-	0.5	-	0.05	0.05
200000	-	100000	-	-	1000	-	100	100	100	-	50	-	-	0.5	-	0.05	0.05
250000	-	100000	-	-	1000	-	100	100	100	-	50	-	-	0.5	-	0.05	0.05
300000	-	150000	-	-	1500	-	150	150	200	-	100	-	-	1	-	0.1	0.1
500000	-	250000	-	-	2500	-	250	250	200	-	100	-	-	1	-	0.1	0.1
750000	-	400000	-	-	4000	-	400	400	500	-	200	-	-	2	-	0.2	0.2

* T-US = US ton
t-SI = metric ton

5.2 Force Capacities & Resolutions – Model M3I indicator

Capacity					Resolution				
lbF	kgF	gF	N	kN	lbF	kgF	gF	N	kN
0.12	-	50	0.5	-	0.0001	-	0.05	0.0005	-
0.25	-	100	1	-	0.0002	-	0.1	0.001	-
0.5	-	250	2.5	-	0.0005	-	0.2	0.002	-
1	-	500	5	-	0.001	-	0.5	0.005	-
2	1	-	10	-	0.002	0.001	-	0.01	-
5	2.5	-	25	-	0.005	0.002	-	0.02	-
10	5	-	50	-	0.01	0.005	-	0.05	-
20	10	-	100	-	0.02	0.01	-	0.1	-
25	10	-	100	-	0.02	0.01	-	0.1	-
50	25	-	250	-	0.05	0.02	-	0.2	-
75	40	-	400	-	0.1	0.05	-	0.5	-
100	50	-	500	-	0.1	0.05	-	0.5	-
150	75	-	750	-	0.2	0.1	-	1	-
200	100	-	1000	-	0.2	0.2	-	2	-
250	100	-	1000	-	0.2	0.2	-	2	-
300	150	-	1500	-	0.5	0.2	-	2	-
500	250	-	2500	-	0.5	0.2	-	2	-
750	400	-	4000	-	1	0.5	-	5	-
1000	500	-	5000	-	1	0.5	-	5	-
1500	750	-	7500	-	2	1	-	10	-
2000	1000	-	10000	-	2	1	-	10	-
2500	1000	-	10000	-	2	1	-	10	-
3000	1500	-	15000	-	5	2	-	20	-
5000	2500	-	25000	-	5	2	-	20	-
7500	4000	-	40000	-	10	5	-	50	-
10000	5000	-	50000	-	10	5	-	50	-
15000	7500	-	75000	-	20	10	-	100	-
20000	10000	-	100000	-	20	10	-	100	-
25000	10000	-	100000	-	20	10	-	100	-
30000	15000	-	150000	-	50	20	-	200	-
50000	25000	-	250000	-	50	20	-	200	-
75000	40000	-	400000	-	100	50	-	500	-
100000	50000	-	500000	-	100	50	-	500	-
150000	75000	-	750000	-	200	100	-	1000	-
200000	100000	-	-	1000	200	100	-	-	1
250000	100000	-	-	1000	200	100	-	-	1
300000	150000	-	-	1500	500	200	-	-	2
500000	250000	-	-	2500	500	200	-	-	2
750000	400000	-	-	4000	1000	500	-	-	5

5.3 Torque Capacities & Resolutions – Models M7I and M5I indicators

Capacity								Resolution							
lbFin	ozFin	lbFft	Ncm	Nm	Nmm	kgFmm	kgFm	lbFin	ozFin	lbFft	Ncm	Nm	Nmm	kgFmm	gFcm
-	10	-	7	-	70	7	700	-	0.005	-	0.005	-	0.05	0.005	0.5
-	20	-	14	-	140	14	1400	-	0.01	-	0.01	-	0.1	0.01	1
-	50	-	35	-	350	35	3500	-	0.02	-	0.02	-	0.2	0.02	2
-	100	-	70	-	700	70	7000	-	0.05	-	0.05	-	0.5	0.05	5
-	1000	-	700	-	7000	700	70000	-	0.5	-	0.5	-	5	0.5	50
12	192	1	135	1.35	-	-	-	0.005	0.1	0.0005	0.1	0.001	-	-	-
20	320	1.5	220	2.2	-	-	-	0.01	0.2	0.001	0.1	0.001	-	-	-
25	400	2	290	2.9	-	-	-	0.02	0.2	0.002	0.2	0.002	-	-	-
50	800	4	570	5.7	-	-	-	0.02	0.5	0.002	0.5	0.005	-	-	-
100	1600	8	1150	11.5	-	-	-	0.05	1	0.005	0.5	0.005	-	-	-
150	-	12.5	1700	17	-	1700	-	0.1	-	0.01	1	0.01	-	1	-
200	-	16	2200	22	-	2200	-	0.1	-	0.01	1	0.01	-	1	-
250	-	20	2800	28	-	2800	-	0.2	-	0.02	2	0.02	-	2	-
400	-	32	4500	45	-	4500	-	0.2	-	0.02	2	0.02	-	2	-
500	-	40	5800	57	-	5800	-	0.2	-	0.02	2	0.02	-	2	-
600	-	50	6900	69	-	6900	-	0.5	-	0.05	5	0.05	-	5	-
1000	-	80	11500	115	-	11500	-	0.5	-	0.05	5	0.05	-	5	-
1500	-	125	17000	170	-	17000	-	1	-	0.1	10	0.1	-	10	-
2000	-	150	22000	220	-	22000	-	1	-	0.1	10	0.1	-	10	-
2500	-	200	29000	290	-	29000	-	1	-	0.1	20	0.2	-	20	-
5000	-	400	57000	570	-	58000	-	2	-	0.2	20	0.2	-	50	-
6000	-	500	69000	690	-	69000	-	5	-	0.5	50	0.5	-	50	-
10000	-	800	115000	1150	-	-	-	5	-	0.5	50	0.5	-	-	-
15000	-	1250	170000	1700	-	-	-	10	-	1	100	1	-	-	-
20000	-	2000	220000	2200	-	-	-	10	-	1	100	1	-	-	-
50000	-	4000	570000	5700	-	-	-	20	-	2	200	2	-	-	-
100000	-	8000	-	11500	-	-	-	50	-	5	-	5	-	-	-
150000	-	12500	-	17000	-	-	-	100	-	10	-	10	-	-	-
200000	-	15000	-	22000	-	-	-	100	-	10	-	10	-	-	-
500000	-	40000	-	57000	-	-	-	200	-	20	-	20	-	-	-

5.4 Torque Capacities & Resolutions – Model M3I indicator

Capacity						Resolution					
lbFin	ozFin	Ncm	Nm	kgFmm	kgFm	lbFin	ozFin	Ncm	Nm	kgFmm	kgFm
-	10	7	-	7	-	-	0.01	0.01	-	0.01	-
-	20	14	-	14	-	-	0.02	0.02	-	0.02	-
-	50	35	-	35	-	-	0.05	0.05	-	0.05	-
-	100	70	-	70	-	-	0.1	0.1	-	0.1	-
-	1000	700	-	700	-	-	1	1	-	1	-
12	192	135	-	-	-	0.01	0.2	0.1	-	-	-
20	320	220	-	-	-	0.02	0.5	0.2	-	-	-
25	400	290	-	-	-	0.02	0.5	0.2	-	-	-
50	800	570	-	-	-	0.05	1	0.5	-	-	-
100	1600	1150	-	-	-	0.1	2	1	-	-	-
150	-	1700	-	1700	-	0.2	-	2	-	2	-
200	-	2200	-	2200	-	0.2	-	2	-	2	-
400	-	4500	-	4500	-	0.5	-	5	-	5	-
500	-	5800	-	5800	-	0.5	-	5	-	5	-
600	-	6900	-	6900	-	1	-	10	-	10	-
1000	-	11500	-	11500	-	1	-	10	-	10	-
1500	-	17000	-	17000	-	2	-	20	-	20	-
2000	-	22000	-	22000	-	2	-	20	-	20	-
2500	-	29000	-	29000	-	2	-	20	-	20	-
5000	-	57000	-	58000	-	5	-	50	-	100	-
6000	-	69000	-	69000	-	5	-	50	-	100	-
10000	-	115000	-	-	115	10	-	100	-	-	0.1
15000	-	170000	-	-	170	20	-	200	-	-	0.2
20000	-	220000	-	-	220	20	-	200	-	-	0.2
50000	-	570000	-	-	580	50	-	500	-	-	1
100000	-	-	11500	-	1150	100	-	-	10	-	1
150000	-	-	17000	-	1700	200	-	-	20	-	2
200000	-	-	22000	-	2200	200	-	-	20	-	2
500000	-	-	57000	-	5800	400	-	-	50	-	10

Mark-10 Corporation has been an innovator in the force and torque measurement fields since 1979. We strive to achieve 100% customer satisfaction through excellence in product design, manufacturing and customer support. In addition to our standard line of products we can provide modifications and custom designs for OEM applications. Our engineering team is eager to satisfy any special requirements. Please contact us for further information or suggestions for improvement.

MARK-10

Force and torque measurement engineered better

Mark-10 Corporation
11 Dixon Avenue
Copiague, NY 11726 USA
1-888-MARK-TEN
Tel: 631-842-9200
Fax: 631-842-9201
www.mark-10.com
info@mark-10.com

32-1164
REV 0322