DILLON®

Quick-Check

Tension Meter

User Instructions

Table of Contents

1   General information and warnings

1.1   About this manual

This manual is divided into chapters by the chapter number and the large text at the top of a page. Subsections are labeled as shown by the 1 and 1.1 headings shown above. The names of the chapter and the next subsection level appear at the top of alternating pages of the manual to remind you of where you are in the manual. The manual name and page numbers appear at the bottom of the pages.

1.1.1   Text conventions

Key names are shown in **bold** and reflect the case of the key being described. This applies to hard keys and onscreen or soft keys.

Displayed messages appear in ***bold italic*** type and reflect the case of the displayed message.

1.1.2   Special messages

Examples of special messages you will see in this manual are defined below. The signal words have specific meanings to alert you to additional information or the relative level of hazard.

> ***CAUTION!***
> ***This is a Caution symbol.***
> ***Cautions give information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.***

> *NOTE: This is a Note symbol. Notes give additional and important information, hints and tips that help you to use your product.*

1.1.3 Safe handling of equipment with batteries

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

ATTENTION: Il y a danger d'explosion s'il y a remplacement incorrect de la batterie, remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

1.2 Routine maintenance

IMPORTANT: This equipment must be routinely checked for proper operation and calibration.
Application and usage will determine the frequency of calibration required for safe operation.

1.3 Cleaning the machine

Table 1.1 Cleaning DOs and DON'Ts

DO	DO NOT
Wipe down the outside of standard products with a clean cloth, moistened with water and a small amount of mild detergent	Attempt to clean the inside of the machine
	Use harsh abrasives, solvents, scouring cleaners or alkaline cleaning solutions
Spray the cloth when using a proprietary cleaning fluid	Spray any liquid directly on to the display windows

1.4 Training

Do not attempt to operate or complete any procedure on a machine unless you have received the appropriate training or read the instruction books.

To avoid the risk of RSI (Repetitive Strain Injury), place the machine on a surface which is ergonomically satisfactory to the user. Take frequent breaks during prolonged usage.

1.5 Sharp objects

Do not use sharp objects such as screwdrivers or long fingernails to operate the keys.

1.6   FCC and EMC declarations of compliance

United States

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

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

European Countries

WARNING: This is a Class A product. In a domestic environment, this product may cause radio interference in which the user may be required to take adequate measures.

2   Introduction

This manual covers the setup and operation of the Quick-Check Clamp Line Tensiometer from Dillon. The Quick-Check is a simple, accurate strand dynamometer. It is can be clamped onto a cable, accurately determine the wire tension and be removed in seconds.

The Quick-Check can handle multiple wire diameters, it can display live tension, dual live/peak tension, average tension captured from several tests, dual tension/ temperature display and a check-tensioning graphical display.

With its battery-powered electronic interface, setup and operation is made simple with on-screen prompts.

This manual covers the following:

- Unpacking
- Setup
- Operation
- Maintenance
- Troubleshooting

2.1   Unpacking

When you receive your Quick-Check, unpack it and inspect the container and the instrument for any damage. Report any problems to the shipping company immediately and save the packing materials.

Insert 2 AA batteries into the battery compartment, shown in Figure 2.1. Your Quick-Check probably comes from the factory with the proper sheave size installed and calibrated for your application. If not, follow the setup directions later in section 3.0 Configuration Mode and 4.0 Changing Sheaves.

The Quick-Check is shown in Figure 2.1 with the different parts labeled.
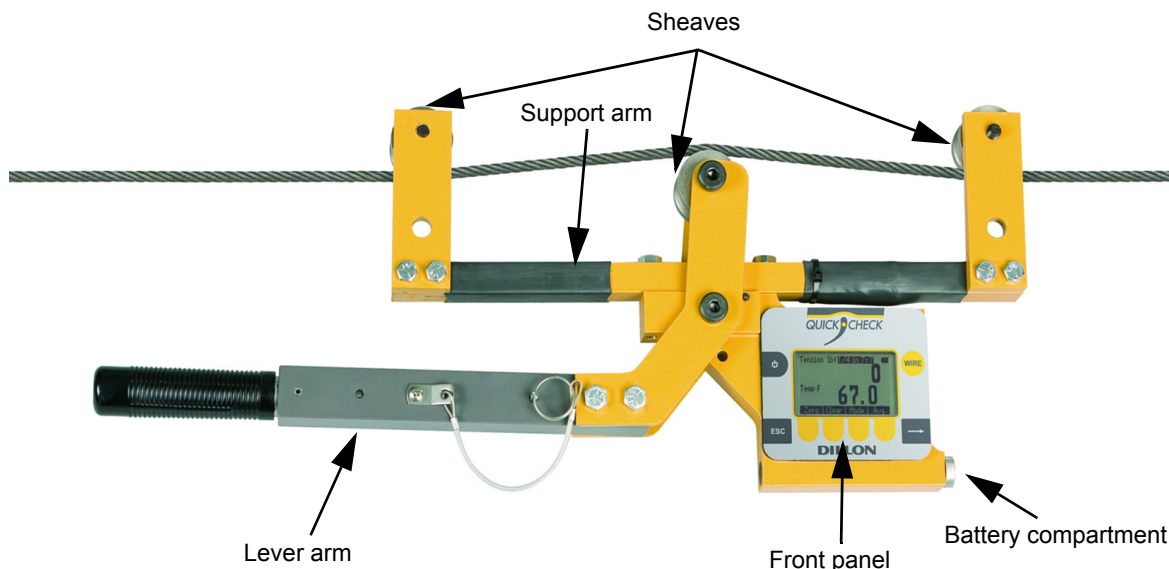
Figure 2.1 Quick-Check parts

2.2 Front Panel and Keys

The front panel of the Quick-Check is shown in Figure 2.2.
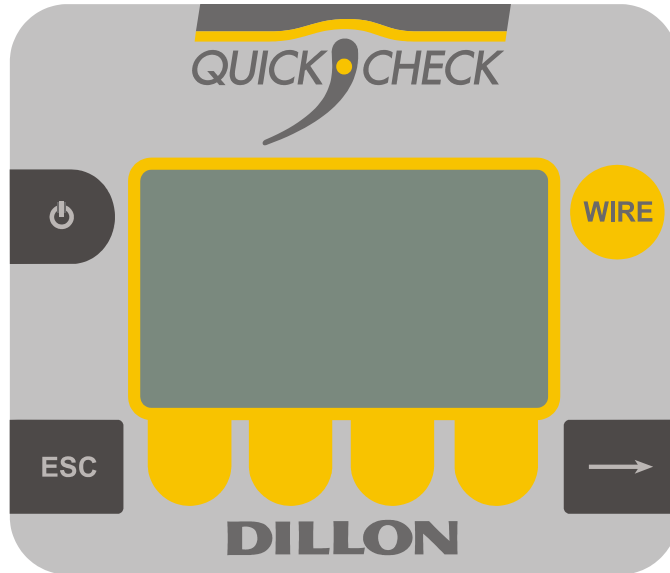
Figure 2.2 Quick-Check front panel

Following are descriptions of the keys and their functions:

ON/OFF key. Press this key to power up and turn off the Quick-Check.

ESC key. Press this key to escape an area of the menu or to clear the field when in data entry mode.

WIRE key. Press this key to change the wire diameter you are testing with the Quick-Check. Choose from the listed selection and when the desired size is highlighted, press the ENTER softkey. Up to 15 sizes available.

Soft key. Softkey function changes as needed for different tasks. The soft key labels appear above the keys themselves. You will use these for operation and configuration.

Arrow key. Press this key to reveal more softkeys in a group of softkeys.

2.3   Important Features

Quick to use

Attaches and removes from tensioned line in seconds.

Quick-tensioning readout for ultra fast line tensioning.

Direct tension readings

No more complicated lookup charts! Save time and improve accuracy.

Portable & rugged

Designed for outdoor use.

Accurate

Employs Weigh Bar$^®$ technology used for precise weighing.

Multiple wire size storage

Stores up to 15 different calibrations.

3 Operation

Typical operation of the Quick-Check is covered below, followed by explanations of the various display modes, how to change wire size, how to change the unit of measure, etc.

3.1 Typical Operation

To perform a typical tension measurement, see the note below and follow these steps:

Take readings at three different places along the cable, moving the tension meter at least four inches for each reading. Take the average of the readings. The built-in average function is ideal for this task.

The handle quick release pin should be used when the Quick-Check is attached to a cable that will be de-tensioned and re-tensioned. The pin prevents the handle from opening once the tension falls to a small level. The pin should also be used if the Quick-Check will be installed for a prolonged period.

1. Turn the unit on by pressing the **ON/OFF** key…

    The display shows *DILLON* briefly, then, in this example, the screen shows the following:
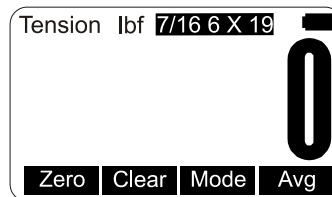
    Figure 3.1 Sample display

*Press the **WIRE** key to list the stored calibrations.*

2. This example shows the wire is a 7/16", 6X19 stranded cable and the unit of measure is lbf. Place the Quick-Check so the two outside sheaves hang on the wire. Insure that the wire rope is riding in the groove of all three sheaves. See Figure 3.2. Press the **Zero** softkey to zero the display.

    0 should be displayed.

3. Raise the lever arm until it locks in the upright position to apply tension to the wire. Read the line tension on the display.

4.   Release the lever arm and you are ready to perform another measurement.

Figure 3.2 Quick-Check attached to cable

3.2   Measurement Practices

For best measurement, install the Quick-Check at least 2 feet (0.6 m) from terminations, clamps or other hardware. Do not install over the top of wire wrappings.

Take readings at three different places along the cable, moving the tension meter at least four inches for each reading. Take the average of the readings. The built-in average function is ideal for this task.

⚠️   *WARNING: Do not apply tension greater than rated capacity of the instrument or overload damage to the sensor may result. Do not use the Quick-Check with cable larger than indicated on the sheaves. Overload and damage to the instrument may result. Do not mix sheave sizes. This will result in inaccurate measurement and possible overload.*

Do not use the Quick-Check to measure tension for wires if both of the following are true:

1.   No wire calibrations are stored of the same diameter as the wire you are looking to measure, and

2.   You do not have sheaves of the same diameter.

If both of these conditions exist, contact your Dillon distributor.

Contact your Dillon distributor to improve accuracy for a specific wire type by calibrating to it.

Insure that the wire rope is riding in the groove of all three sheaves.

Insure sheaves installed agree with sheaves noted in the Wire calibration. **Exception:** Sheaves match the wire diameter of the cable to be measured and alternate calibration is selected as per section 5.2.

The Quick-Check has an internal temperature sensor inside the electronics cavity. Dramatic temperature changes (such as moving from a warm vehicle to cooler outdoors) requires time for the sensor to reach the same temperature. Direct sunlight will heat the electronics cavity and cause higher readings than actual ambient temperature. In these cases, use a separate thermometer to determine temperature. Be certain to enter this temperature into the Quick-Check if using the quick-tensioning mode with the temperature dependent acceptance window.

For best tension accuracy, use the exact temperature of the wire. This may be widely different from the ambient temperature if the cable has been sitting in direct sunlight.

3.3   Softkey Functions

Now that you've seen a simple operation, we'll explain the softkey functions. Figure 3.3 shows the softkeys available during normal operation.
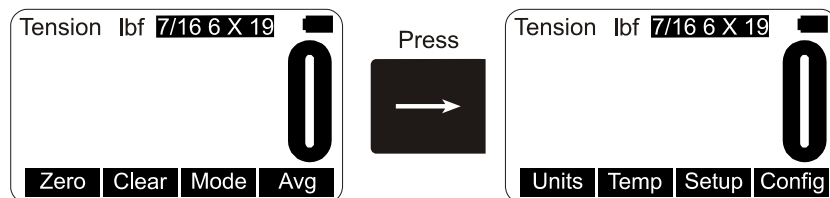

Figure 3.3 Normal mode softkeys

3.3.1   Top level softkeys

Zero   Press this softkey to zero the force display. You would usually press this at the beginning of a series of tension tests but would not need to do it for every test unless there is some zero drift.

Clear   Press this softkey and you are prompted to clear the Peak reading or the Average. Make your choice by pressing the appropriate softkey and that value is cleared from memory.

Mode   Press the **Mode** key to scroll through the five display modes. These are explained below:

Live Tension Mode: The display shows the live tension.

Dual Peak Mode: The display shows the live tension on the top display and the peak force achieved on the bottom display. To clear the peak, remove any force on the Quick-Check, press the **Clear** softkey and follow the prompts.

Average Capture Mode: This mode shows the live tension in the top display and the average of all captured readings on the bottom display. To capture a reading and add it to the average, press the **Avg** softkey when a force is applied to the Quick-Check. Follow the prompts to add (or not) the reading to the average.

Temperature Mode: This mode shows the live tension in the top display and the current temperature in the bottom display. Also shown is whether the reading is in Fahrenheit or Centigrade and if the temp is one that was **Entrd** (entered) manually.

You can enter the temperature in one of two ways; let the Quick-Check determine the ambient temperature automatically or key in a temperature manually. Instructions for entering the temperature are under the **Temp** softkey description on page 15.

Check-tensioning Mode: Check-tensioning mode permits quick & easy graphical view of the applied tension versus the desired tension. This mode works well when you are repeatedly tensioning to the same tension range. This mode displays a bar graph representation of the tension being applied. See Figure 3.4. The black bar represents the range of the wire, from zero to ultimate wire rating. The wide white band is the tolerance window based on upper and lower thresholds you can enter. The live force is represented by the arrow and the white line on the black bar. When the force gets within ±5% of the acceptance window, a close-up of the acceptance window is displayed. See bottom example in Figure 3.4.

The Quick-Check has automatic tension targeting with temperature. Points may be entered from a linear Tension-Temperature supplied table for a wire cable. If entered, the check-tensioning window will automatically float according to the active temperature (manual or automatic). Use the bottom and top entries from the table.

Display when tension is below the dotted, target box.
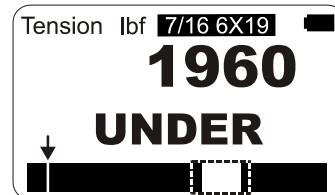
Display when tension falls within the dotted, target box.
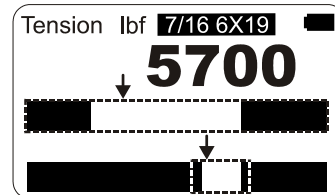
Figure 3.4 Check-tension display

To exit the check-tension mode, press any softkey to display the softkey labels, then press the **Mode** softkey to scroll to the next mode. The next mode is the first mode that was described, live tension mode.

Avg   Press the **Avg** softkey to add a displayed tension to the average of other entered readings. Follow the onscreen prompts.

*Press the **Right Arrow** key to move to the next set of softkeys.*

Units   Press this key to set the Quick-Check for displaying:

● Force in lbf, kgf or N
● Size of wire in inches or millimeters
● Temperature in Fahrenheit or Centigrade

Temp Press this softkey to choose the source of the temperature reading, the Quick-Check itself (*Meter*), outside input (*Input*) or *None*. If you choose Input, you are prompted to enter the temperature. When finished, press the **Enter** softkey to accept this value.

Next you are prompted to choose Fahrenheit or Centigrade as the temperature unit. When your choice is highlighted, press the **Enter** softkey.

An annunciator shows when temperature has been manually entered. See example below:

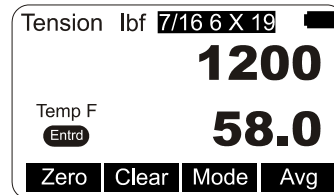Tension lbf 7/16 6 X 19
1200

Temp F
Entrd **58.0**
Zero | Clear | Mode | Avg

Temperature Display Mode

Auto-off can preserve battery life.

Setup Press the **Setup** softkey and you will see these choices; *Off*, *PtFmt*, *Misc*, *About*, and *Test*. These are described below:

Off Press this softkey to enable or disable the auto-shutdown function. If you choose *Yes*, you are asked to set a period of time in minutes. Next, press the **Enter** softkey to accept this value. You are then asked to set the shutdown type; Fixed, No Load, or No Change. These are described below;

Fixed - The unit will shutdown after the set number of minutes no matter what happens.

No Load - The unit will shutdown after the set number of minutes only if there is no load on the unit. This prevents shutdown in the middle of a test.

No Change - The unit will shutdown if there has been no keypad activity or change in tension after the set number of minutes.

PtFmt Not currently used.

Misc Press this softkey to set the following:

Flash - Enables or disables the momentary blinking of the display to acknowledge a key press.

Zero - Enables the use of the **Zero** softkey to clear a peak tension value.

Contr - Press this key to adjust the contrast of the LCD display. Press the **Up** soft key to lighten the contrast. Press the *Down* softkey to darken the contrast.

There is a keypad shortcut for increasing and decreasing contrast. While in normal display mode press the **Arrow** key and the 2nd softkey simultaneously to increase contrast. Press the **Arrow** key and first softkey simultaneously to decrease contrast.

Blite - Not currently used.

About Press this softkey to see the following information:

Device - Press this softkey to show a list of information about the Quick-Check; serial number, capacity rating, hardware and software revision levels. Press any key to return to the previous softkey set.

Calib - Press this softkey to show Calibration Points and the calibration information for the current wire size. Follow the on-screen prompts.

O. Load - Press this softkey to show an audit count of the number of times the unit has been overloaded beyond 125% of capacity. Press any key to return to the previous softkey set.

Zero - Press this softkey to show the deadload analysis of the Quick-Check. Press any key to return to the previous softkey set.

Ntwrk - Not used in the Quick-Check.

Test Press this softkey and the following softkeys appear:

Batt - Press this softkey to test the battery level.

A-D - Press this softkey to display the A to D counts.

Disp. - Press this softkey to perform a test of the display pixels.

Keys - Press this softkey to test the keypad.

Comm - Not used in the Quick-Check.

Ntwrk - Not used in the Quick-Check.

Config   This is a password protected menu. See *Configuration Mode on page 17*.

Press the **ESC** key to return to the normal operating mode. If you made changes to the configuration of the unit, you are prompted to save them or abort the changes. Do so and the unit returns to normal operation mode.
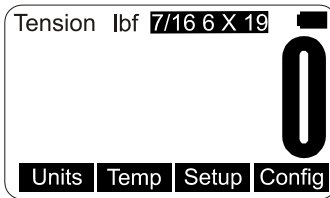
4 Configuration Mode

4.1 Accessing the Configuration Mode

You need to access the Configuration mode to perform certain tasks. Access to some of these tasks may be restricted by a supervisor password.

To access Configuration mode:

1. From normal operating mode, press the **Right Arrow** softkey…

   A new softkey set, shown below, appears:

   ```
   Tension  lbf  7/16 6 X 19     ▬

                    0

   Units | Temp | Setup | Config
   ```

2. Press the **Config** softkey…

   The following is displayed:

   ```
   Password: 0_

   Num↑ Num↓ Adv→ Enter
   ```
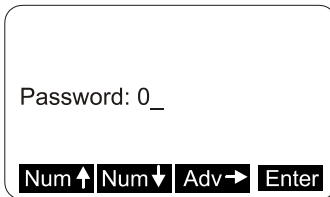
*The **Num** keys increment and decrement the displayed numbers. The **Adv** key moves the cursor to the next digit position.*

Default Configuration password is 0. If a new password is lost or forgotten, contact your Dillon distributor.

3. Use the **Num** and **Adv** keys to enter the Config password. Default is 0. After the number is displayed, press the **Enter** key…

   The following is displayed:

   ```
   Config

   Wire | Setup | Reso | Comm
   ```

4. The unit is now in the Configuration mode. To see the rest of the softkeys available in this mode, press the Right Arrow key. All the Config softkeys are shown below.

Config			
Wire	Setup	Reso	Comm

→

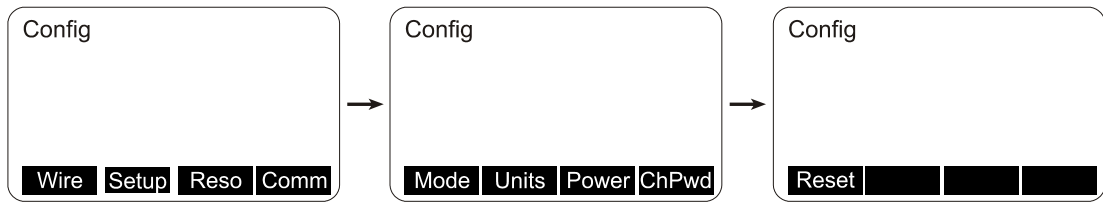| Config			
Mode	Units	Power	ChPwd

→

Config			
Reset			

The softkeys in the Configuration mode are **Wire**, **Setup**, **Reso**, **Comm**, **Mode**, **Units**, **Power**, **ChPwd**, and **Reset**. These are described below:

Wire   Press this softkey and the wire selection screen is displayed. Choose an existing wire to change its defining characteristics.

You have the choice of changing the *Range*, which is used to set the check-tensioning function, or the *Rating*, which is the maximum rating of the cable.

Range - Use this item to set the parameters for the check tensioning display. Follow the prompts to set the following:

Lower tension limit - This is the lowest acceptable force

Upper tension limit - This is the highest acceptable force

Units - Unit of measure used in defining the tension limit

Rating - Press this softkey and you are prompted to set the ultimate rating for the cable being used and the unit of measure for that rating.

Setup   Press the **Setup** softkey to view the Setup softkeys. This is the same as the **Setup** softkey described in*Top level softkeys *.

Reso   Press the **Reso** softkey and you are prompted to enter a display, or count-by, resolution. Choose from *Low*, *Medium* or *High*.

Low resolution provides the best stability and makes the display easiest to read. High resolution provides the finest graduations, but sees greater drift from wire creep and non-repeatability. If the reading is decreasing over time or differing between measurements on the same line, lowering the resolution will reduce these effects.

Comm   Communication output not supported at this time in the Quick-Check

Mode   Press this softkey to set the display mode on power up. Choices are *Last**, *Temp*, *Check*, *Avg*, *Peak*, and *Force*. Use the **Sel** keys to display your choice and press **Enter** to accept it.

Units   Press this softkey to set the following:

Unit of measure on power up - Choices are *Last**, *C2*, *C1*, *N*, *kgf*, and *lbf*. Use the **Sel** keys to display your choice and press **Enter** to accept it. C2 and C1 are custom units. If you choose to have custom units, you are prompted to enter the number of pounds in each custom unit. The Quick-Check will then automatically calculate correct display for the applied force.

Enable lbf - Enable or disable the pound-force unit of measure.

Enable kgf - Enable or disable the kilogram-force unit of measure.

Enable N - Enable or disable the N unit of measure.

Enable CUST1 - Enable or disable the Cust1 unit of measure.

Enable CUST2 - Enable or disable the Cust2 unit of measure.

Enable C - Enable or disable Centigrade temperature.

Enable F - Enable or disable Fahrenheit temperature.

Custom units of measure are handy when working with multi-part lines.

Off　Press this softkey to enable or disable the auto-shutdown. If you enable this function you are prompted to set a period of time in minutes. Next, press the **Enter** softkey to accept this value. You are then asked to set the shutdown type; *Fixed*, *No Load*, or *No Change*. These are described below;

Fixed - The unit will shutdown after the set number of minutes no matter what happens.

No Load - The unit will shutdown after the set number of minutes only if there is no load on the unit. This prevents shutdown in the middle of line tensioning.

No Change - The unit will shutdown if there has been no keypad activity or change in tension after the set number of minutes.

ChPwd　Press this key and you are prompted to enter a new password to access the configuration menus. Use the softkeys to scroll in a new password and press the Enter softkey to accept it.

Default password is 0. If a new password is lost or forgotten, contact your Dillon distributor.

Reset　Press this key and you are asked if you wish to reset the system. Press the **Yes** softkey only if you want to reset the unit to factory default configuration. Press the **No** softkey to abort this and return to the previous screen.

5 Changing Sheaves
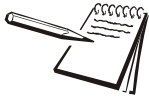
Do not use the Quick-Check with cable larger than indicated on the sheaves. Overload and damage to the instrument may result.

Do not mix sheave sizes. This will result in inaccurate measurement and possible overload.

As you use the Quick-Check on different diameter cables you must change to the correct sheave size. To change sheaves, remove the hex head screws pointed out in Figure 5.1 below. Replace the sheaves with the correct letter sheave and reinsert the screws and tighten.

Insure sheaves installed agree with sheaves noted in the Wire calibration.

Exception: Sheaves match the wire diameter of the cable to be measured and alternate calibration is selected as per the section *Calibration to Specific Wire Type on page 21*.

Insure that the wire rope is riding in the groove of all three sheaves.
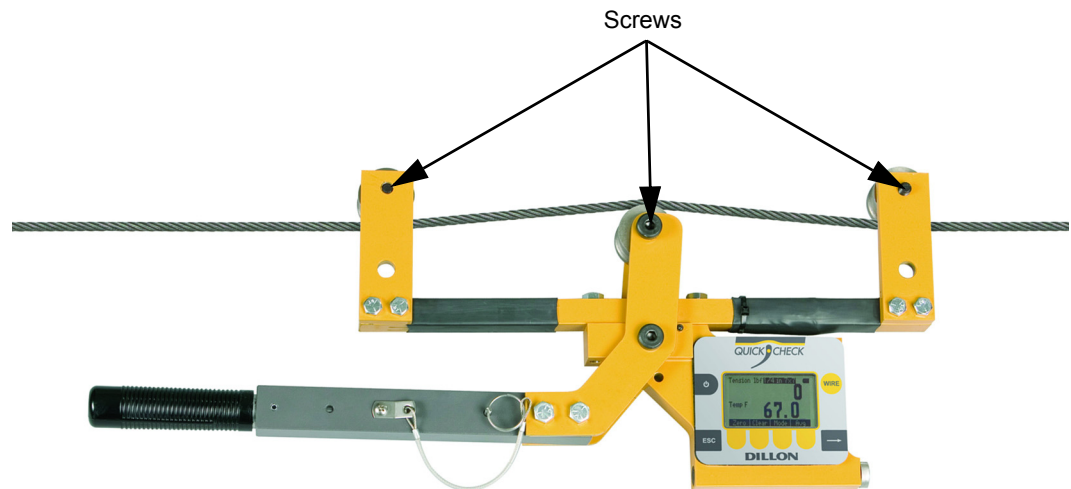

Figure 5.1 Changing sheaves

6 Achieving Best Accuracy

6.1 Accuracy

The Quick-Check is an instrument designed to give accuracy that typically exceeds normal requirements for wire tensioning. You should have an understanding of what factors affect tension measurement accuracy.

6.2 Calibration to Specific Wire Type

While it is best to have the instrument calibrated to the specific wire size(s) and type(s) used, the Quick-check can often work adequately in other situations. If the best tension accuracy is required, Dillon recommends that a calibration be performed for that specific wire size and type.

Contact your Dillon distributor for any additional calibrations you may need.

Do not use the Quick-Check to measure tension for wires if either of the following are true:

1. No wire calibrations are stored of the same diameter as the wire you are looking to measure, and

2. You do not have sheaves of the same diameter.

If either of these conditions exist, contact your Dillon distributor.

Contact your Dillon distributor to improve accuracy for a specific wire type by calibrating to it.

6.3 Loading Error

A tensiometer works by deflecting the cable, which makes the cable path longer than when a tensiometer is not installed. When the tensiometer is removed, the wire tension decreases as the cable length is restored. This effect is known as loading error. The Quick-Check design elongates the cable by a mere 0.08 inch (2 mm), making loading errors extremely small.

6.4 Non-repeatability

The Quick-Check's sheave with bearing design provides the best mechanical performance. It is also superior at detecting tension that is being added or removed.

6.5 Non-linearity

Most three-point tension meters employ only linear characterization and have large errors at the midpoints (up to 15%). The Quick check uses multi-point segmenting to correct for non-linearity, reducing it to less than 0.2%.

6.6 Wire Characteristics

Creep Every material including steel exhibits creep under load. It will neck down over time, quite quickly over the first few seconds and much slower as time progresses. A wire cable also sees creep from the wire spacing and wind. This effect is seen as a display that drifts lower after it has been clamped in line.

Variations Material that varies in diameter or shape will have different output at the same tension

Strands The best cable assembly is one that is perfectly round, as it will not change contact geometry with the wire twist. The closer the wire cable cross section appears to be round, the better the measurement performance will be.

7   Troubleshooting

Problem	Possible Cause	Solution
Powers on momentarily and turns off	Low battery	Replace with high quality alkaline batteries
Does not power on	Low battery	Replace with high quality alkaline batteries
	Batteries installed backwards or no spring contact	Insure that positive terminals of both batteries (nub) face inward – towards the black cap. Check that spring is attached to the battery cap.
	Software reset	Remove battery cap & reinstall after one minute. Attempt to turn power on again.
	Display contrast too light	Hold the Right Arrow key down while pressing the F2 key several times to increase the display contrast. If nothing occurs, release both keys. Press the power button and try again.
Display is completely dark	Display contrast too dark	Hold the Arrow key down while pressing the F1 key several times to decrease the display contrast.
Display drifts downward once installed	Wire material is creeping and internal friction between wires is relieved.	This is normal behavior of wire. Lower display resolution to mask this effect.
Temperature not accurate	Instrument changed temperature environments	Allow instrument to remain in environment until temp stabilizes or enter temp manually
	Instrument exposed to sun	Enter temp manually

8   Specifications

Power

2 AA, common alkaline batteries. Operational battery life over 40 hours at room temperature. Battery life is reduced at lower temperatures.

Display

Dot graphic LCD display

Operational keys

Power, Wire, Escape/Clear (Esc), Next (   ) and four softkeys with changing function and label, depending on the specific menu in use

Operational annunciators

Unit of measure, battery level

Temperature detection

Temperature accuracy approximately ±2° F (±1°C)

Display resolution

2,000 lbf/ 10 kN/ 1000 kgf Quick-Check instrument:

	Displayed resolution setting		
	Low	**Med**	**High**
lbf (pound-force)	10 lbf	5 lbf	2 lbf
kgf (kilogram-force)	5 kgf	2 kgf	1 kgf
N (Newton)	50 N	20 N	10 N
Custom units	between 101 & 200 divisions	between 201 & 500 divisions	between 501 & 1000 divisions

10,000 lbf/ 45 kN/ 4500 kgf Quick-Check instrument:

	Displayed resolution setting		
	Low	**Med**	**High**
lbf (pound-force)	50 lbf	20 lbf	10 lbf
kgf (kilogram-force)	20 kgf	10 kgf	5 kgf
N (Newton)	200 N	100 N	50 N
Custom units	between 101 & 200 divisions	between 201 & 500 divisions	between 501 & 1000 divisions

For ease of use, the display always counts by a multiple of 1, 2 or 5.

Available options

Varied wire sizes

Operating environment

Suitable for outdoor use

Dimensions

10″ x 23″ x 3″ (25 cm x 59 cm x 8 cm) approximately

Weight

11 lb (5 kg) approximately

AUTHORIZED DISTRIBUTORS

Ask the experts. Dillon distributors offer complete service capabilities from application assistance to sales and product support. Their experienced representatives are the most knowledgeable experts that you will find in the force measurement industry. We recommend that you consult these capable specialists for all of your measuring needs.

DILLON®

**Overload Protection and
Overhead Weighing Equipment**

Fairmont, Minnesota U.S.A.

Toll-Free: (800) 368-2031
Phone: (507) 238-4461
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