



# User Manual

## Wireless Bridle Cable Tension Meter

Model: Gripper CTR-BCWL-30



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## 1. Introduction

This document describes SPRAGUE Instrument's Wireless Cable Tensiometer (Gripper CTR-BCWL-30) and provides specifications and user instructions.

## 2. Overview

The CTR-BCWL-30 tensiometer is a wireless strain measuring instrument. It uses Bluetooth technology for communication between the sensor and display unit. The sensor unit measures tension in cable which gets displayed on the display unit.

It consists of 2 Parts

- Display unit
- Sensor unit

## 3. Contents in the Box

- Display Unit
- Sensor unit
- Batteries for Display and Sensor unit
- 5V Adapter
- User Manual

## 4. Descriptions

### 4.1 Display Unit

1. Temperature indication
2. Tension Reading
3. Power ON/OFF Button
4. Cable Size/Up Navigation Button
5. Tension Unit Selection/ Left Navigation
6. Settings/Down Navigation Button
7. Charging Port
8. Charge Indication
9. Zero Set/Right Navigation Button
10. OK Button
11. Display Backlight ON/OFF Button
12. Tension Unit
13. Sensor Signal Strength
14. Cable Size Selected
15. Temperature unit



### 4.2 Sensor Unit



Sensor Top View

1. Power Button
2. Connectivity Indication
3. Charge Indication



Sensor Bottom View

## 5. Product Specifications

Property	Details
Scale Range	10 to 30 Pounds
Scale Resolution	2 Pound
Scale Tolerance	+/- 3% of Full scale
Unit of Measurement	Metric – Kg, °C lbs – lb , °F
Number of Calibrations	15
Supported Cables Sizes	1/16, 3/32, 1/8 inches
Ambient Temperature	Selectable units of measurement °C and °F
Operating Temp Range	14 to 100 °F (-10 to 40 °C)
Storage Temperature	-4 to 122 °F (-20 to 50 °C)
Operating Modes	Measurement / Calibration / Firmware Update
Humidity	5 to 95 %
Communication	BLE 4.2 (Between Display Unit & Sensor Unit)
Wireless Range	10 meters
<b>Display Unit</b>	
Display	160 x 128 Dot Matrix LCD
	Back light ON/OFF option
Charging	5V DC / Charge status Indicator
	1500mAH – Li Po Rechargeable Battery
	~10000 Reading in single charge with back light OFF
	~3000 Reading in single charge with back light ON
Sleep mode	Activated after 5 Mins of inactivity
Dimensions	164x80x29mm
Weight	160gm(approx.)
Housing	ABS Plastic
<b>Sensor Unit</b>	
Charging Voltage	5VDC / Charge Status Indicator
Power	300mAH – Li Po Rechargeable Battery
	~2500 Reading in Single Charge
	Sleep mode after 5 mins idle time
Dimensions	64x28x39mm
Weight	118gm(approx.)
Housing	6061 Aluminum

## 6. Operations

### 6.1 Display units Buttons

Buttons	Naming	Functions
	Power ON/OFF Switch	<ul style="list-style-type: none"> <li>• Press to turn ON</li> <li>• Hold 3 Secs to turn OFF</li> </ul>
	Tension Unit Selection/Left Navigation Switch	<ul style="list-style-type: none"> <li>• Toggle lbs/Metric units for Tension and Temperature</li> <li>• Back Button / Navigate Left direction</li> </ul>
	Display Backlight ON/OFF Switch	<ul style="list-style-type: none"> <li>• Turn display backlight ON/OFF</li> </ul>
	Zero/Right Navigation Switch	<ul style="list-style-type: none"> <li>• Set Zero load offset</li> <li>• Navigate Right direction</li> </ul>
	Cable Size/Up Navigation Switch	<ul style="list-style-type: none"> <li>• Select Cable Size (supported sizes 1/16, 3/32, 1/8 inches)</li> <li>• Navigate Upward direction</li> </ul>
	Settings/Down Navigation Switch	<ul style="list-style-type: none"> <li>• Go to Settings</li> <li>• Navigate downward direction</li> </ul>
	OK Switch	<ul style="list-style-type: none"> <li>• Confirmation for user action/settings</li> </ul>

## 6.2 Battery Charging (Display & Sensor Units)

Both Meter and Sensor unit use a rechargeable battery which can be charged through 5V@1A adapter.

## 6.3 Charge Status Led Indications (Display & Sensor Units)

Charge Status are indicated using dual color Led indications. For this Green and Blue colored LEDs are used. The status of charge can be described using the following table.

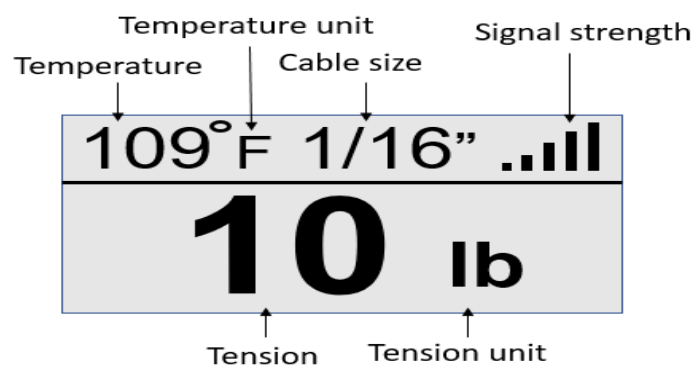
State	LED
Charge in Progress	Blue LED
Charge Complete	Green LED

## 6.4 Meter Reading

For start system operation, Power ON/OFF button need to be single pressed. On the meter unit, a display will pop up with a welcome screen for a few seconds. The LCD backlight will be ON by default. If required, it can be turned OFF by pressing Backlight ON/OFF button.



After that, it displays the following if the Sensor is switched ON; temperature, cable size, Sensor Signal Strength and tension based on data received from sensor.



## 6.5 Sensor Unit Power ON

- To start system operation, the Power ON/OFF button needs to be pressed one-time.
- The green led will turn on and it will start transmitting tension data.
- It will remain ON until it is turned off.

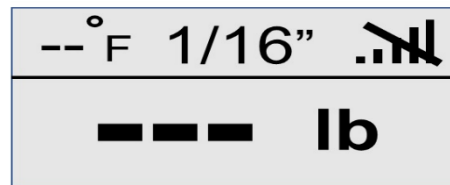
## 6.6 Cable Size Selection Procedure

- Desired cable size can be selected by a single press on Cable Size Selection button.
- It will change from one cable size to the other on subsequent Cable size key press as shown.
- The supported cable diameter sizes are 1/16, 3/32, 1/8 inches.
- Each cable size calibration needs to be done independently.



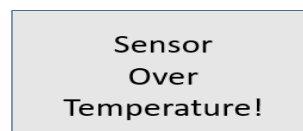
## 6.7 Sensor Out of Range

- In case sensor is placed out of range or if it is turned OFF, it will display following

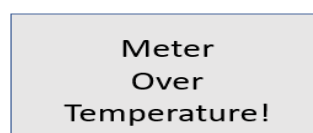


## 6.8 Over Temperature Shutdown

- In case sensor unit temperature reaches 53 °Celsius/ 127 °Fahrenheit, the Display/Meter board displays over temperature message with a warning buzzer. Any button pressed in Display/Meter board can stop the buzzer sound only.



- When it reaches beyond 55 °C/ 131 °F, then the sensor unit will go into shutdown.
- Once the sensor board is removed from an over temperature condition or turned off, the sensor board only makes Display/meter board to work normally otherwise it displays above message.
- In case the Display/Meter unit temperature reaches 63 °Celsius/ 145 °Fahrenheit, the Display/Meter board displays over temperature message with warning buzzer. Any button pressed in on the Display/Meter board can stop buzzer sound only.



- When it reaches beyond 65 °C/ 149 °F then the Display/meter unit will go into shutdown.
- Once Display/meter board is removed from over temperature area or turned off the meter board.

- Both Display/meter board and Sensor board attain over temperature or Display/meter board gets over temperature and sensor board get disconnected then below message is displayed in the screen.

Meter Battery Low  
Recharge Battery!  
Sensor Battery Low  
Recharge Battery!

## 6.9 Tension/Temperature Unit selection

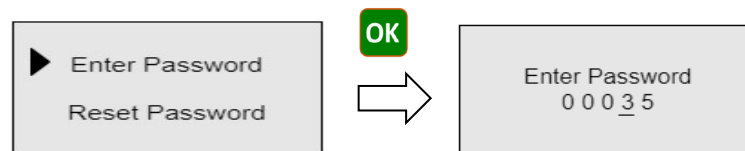
- Meter supports lbs unit (lb. for tension and degree Fahrenheit for temperature) and metric unit (degree Celsius for temperature measurement).
- Pressing it will change from deg Fahrenheit to Celsius or Celsius to Fahrenheit when pressed.

## 6.10 Zero load Setting

- Zero load can be set using Zero button. Once set to zero, tension value read will get set to 0lb.

## 6.11 Password Protection

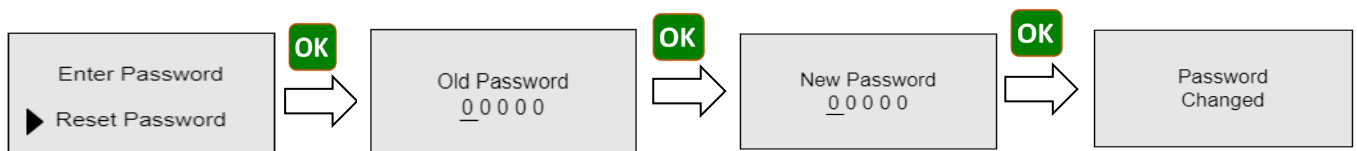
- Sensor Id and Calibration settings are protected by password; Once the user enters a valid password then only user can be allowed to change the Sensor Id and Calibration.
- Selected digit will be underlined (cursor symbol).



- Use Zero key for navigation: Use cable size key and setting key to change numbers and then press OK button to enter.
- For every wrong password, an invalid password message is returned and the correct password must be entered.

Invalid  
Password!

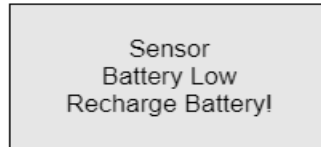
- If a user needs to change password, then use Reset password option to set a new password.
- If User forgot' s password, then he can use Master key (77724) in the place of old password to set new password.



## 6.12 Low Battery Indication

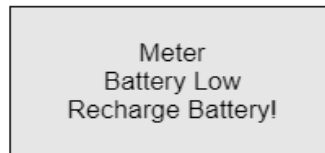
- Low battery indication messages are displayed on the Display/Meter board.
- When battery percentage reaches 20% or below, the low battery indication message will appear on the Display/Meter board for every 5% battery power decreases.

Sensor board low battery indication:



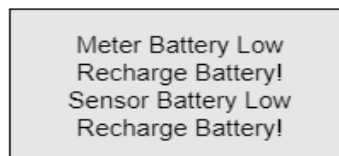
Sensor  
Battery Low  
Recharge Battery!

Display/Meter board low battery indication:



Meter  
Battery Low  
Recharge Battery!

Both board battery became low at same time:



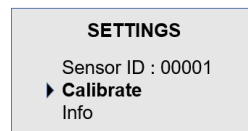
Meter Battery Low  
Recharge Battery!  
Sensor Battery Low  
Recharge Battery!

## 6.13 Settings

### 6.13.1 Calibration Procedure

The meter needs to be calibrated for each cable size and different weights before they can be used. The following procedures describes the process of calibration

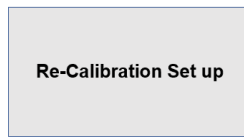
- Go to the Settings menu- Press Settings buttons
- Display shows settings options as below. Use Up/Down button to select 'Calibrate'. It will get highlighted in Bold with arrow pointing to it.



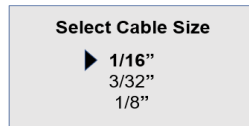
**SETTINGS**  
Sensor ID : 00001  
▶ **Calibrate**  
Info

- Press OK (Confirmation) button to enter Calibration process. It will ask for password to enter calibration.
- The password is a 5-digit numerical number. Whenever the correct password is provided, recalibration will occur.
- Up and down navigation buttons are used to enter a password. The password value for each digit will increment on the up button press and decrement on the down button press.
- To select the next digit, press the right navigation button. The user needs to enter 5 digits password in total one by one.

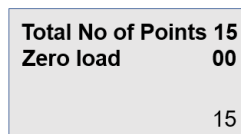
- Once the password is entered correctly, it displays the following for 2sec



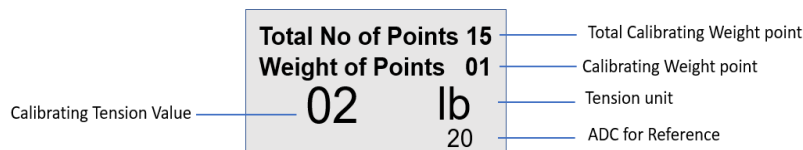
- Select desired cable size. Use Up/Down buttons to navigate to desired cable size



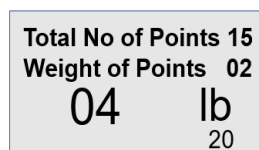
- Then it will display the following.



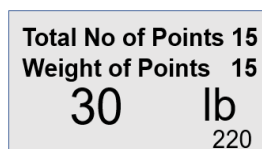
- Press the OK button to start the calibration process for weight 2lb. It shows below (naming conventions marked for clarification)



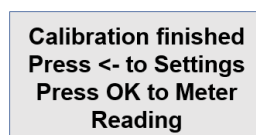
- Add 2lb load. When ADC reference value is stable, press OK. This will confirm 10lb load is calibrated. Weight point will change to 2 which corresponds 4lb. Add Weight 4lb for calibration



- When ADC value gets stable, press OK button. This will complete calibration for weight 4lb. Weight point will change to 3. Add weight for 6lb and press Ok button.
- Continue procedures i.e. add weight and press OK button till weight of point 15 (for 30lb)



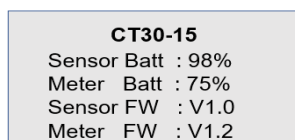
- When calibration is done for 30lb, Press OK to check measurement or left navigation button for going back to setting menu.



- When the Ok button is pressed, the calibration procedure is completed.
- For calibrating other cable sizes, the above procedures need to be followed i.e. starting calibration from 2lb and ending at 30lb.

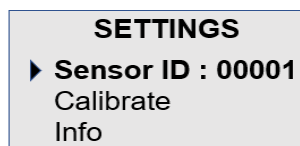
### 6.13.2 Device Info

For getting device info, press Settings button->Navigate downward to select 'Info' and press OK. It displays Cable Tension meter (CT) model number, meter, and Sensor Board Firmware version as well as the Battery Voltage.

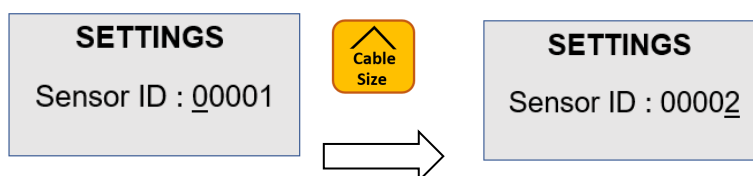


### 6.13.3 Setting Sensor ID

- Sensor ID can be set by pressing the Setting button. Use the Up/Down navigation key to select the Sensor ID option (it will get highlighted and the arrow will point to it). Now Press OK to enter Sensor ID settings



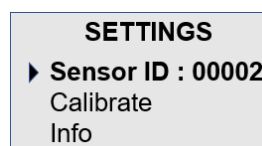
- Use the Left/Right Navigation key to point to the digit to be set. The selected digit will be underlined.
- Use Up/Down key to set the desired value for the digit selected.



- Finally Press OK and the respective Id will set with below acknowledgement pop-up message.



- Set id will be displayed as shown (sensor ID set to 00002).



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