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INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

Torquímetro Celda Externa 40 lbf-in

IM-HTGS

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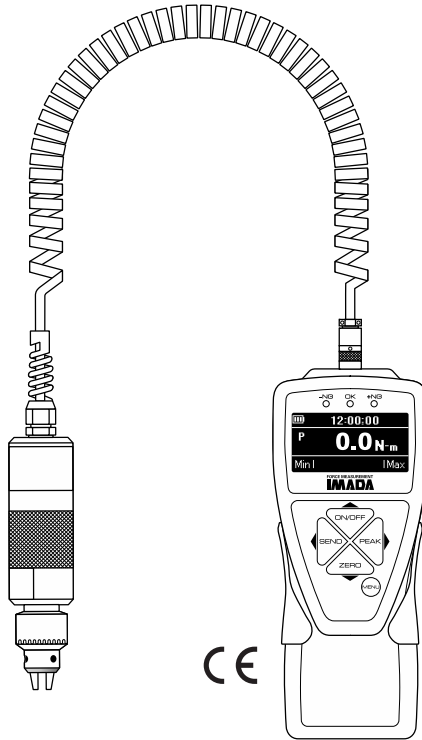
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INNOVATIONS IN FORCE MEASUREMENT

IMADA®

Digital Torque Gauges

with Electro Luminescent (EL) Display
Multi-Language Menus and
Force Logger Data Acquisition Software



Imada HTGS Standard Model

INSTRUCTION MANUAL

V339644

11/18

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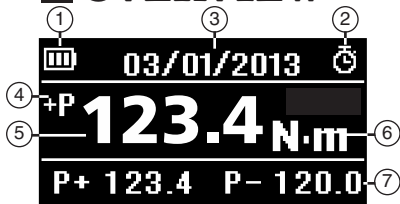
1 INTRODUCTION

Imada HTGS Series high performance, digital torque gauges include all the standard features: selectable real time and peak measuring modes, selectable measuring units, lbf-in, ozf-in, kgf-cm, N-cm, N-m, high/low setpoints with color-coded LED indicators for Go/No Go testing, 1,000 data memory, USB, RS-232 and Digimatic output. Additionally, HTGS gauges incorporate user-friendly, multi-language program menus and highly visible EL (electro luminescent) displays. Force Logger data acquisition software is included and downloads gauge memory, sets all gauge functions and captures continuous data up to 10 data/sec.

2 PRECAUTIONS

1. **WARNING!!** Test samples and fixtures can break or shatter, wear eye and body protection to avoid injury.
2. **WARNING!!** REGARDLESS of whether the unit is ON or OFF, **DO NOT** exceed the capacity of the gauge or the load cell will be damaged. Avoid shock load. At 110% of the rated capacity, the overload LED indicator flashes to warn.
3. Make sure this gauge and all peripherals are powered down before attaching any cables.
4. **DO NOT** disassemble the gauge. Disassembly voids warranty.

3 OVERVIEW



See page 33 to switch between Multi and Single display.

MULTI DISPLAY

Upper Section

- ① Battery status indicator
- ② Auto zero icon: appears when Auto Zero is set.
- ③ Select data: Date, Time, Stored memory data, Measurements over high setpoint (see pages 32-33).

Middle Section

- ④ Peak indicator
- ⑤ Torque value
- ⑥ Units

Lower Section

- ⑦ Select data: Peak value, Torque level, Memory number/value, High/low setpoints (see pages 32-33).



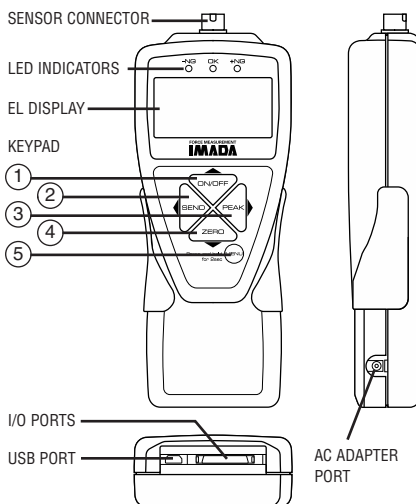
SINGLE DISPLAY

- ① Battery status indicator
- ② Auto zero icon: appears when Auto Zero is set.
- ③ Peak indicator
- ④ Torque value
- ⑤ Peak hold: Appears when external hold signal is active or SEND is pressed.
- ⑥ Units

LED INDICATORS: When high/low setpoints are set, LED indicates below (-NG), within (OK), or above setpoint value (+NG)

KEYPAD

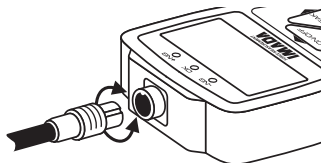
- ① **ON/OFF:** Press to turn ON, hold more than one second to turn OFF
 - ② **SEND:** Press to send data to internal gauge memory, press and hold for data hold
 - ③ **PEAK:** Press to toggle Peak and Real Time
 - ④ **ZERO:** Resets the display, tares attachments
 - ⑤ **MENU:** Press to select data on Multi Display. see pages 32-33)
- Program Menu:** with gauge ON, press and hold two seconds to enter Program Menu.
- Setup Menu:** with gauge OFF, press and hold, then press ON/OFF to enter Setup Menu.



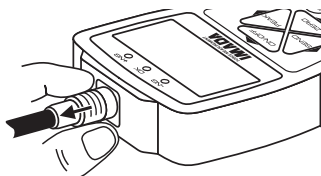
4 PREPARATION

1. Connecting the Sensor

1. To connect the remote sensor to the display unit, rotate the connector to match the groove with the key, then push it in until positive connection is made.
2. To disconnect, hold the ribbed cover of the connector and pull out.





ROTATE CONNECTOR TO MATCH THE GROOVE WITH THE KEY AND PUSH IN.



HOLD RIBBED COVER AND PULL OUT. DO NOT TWIST OR PULL CABLE!

DO NOT TWIST OR PULL THE CABLE!


2. Charging the Ni-MH Battery

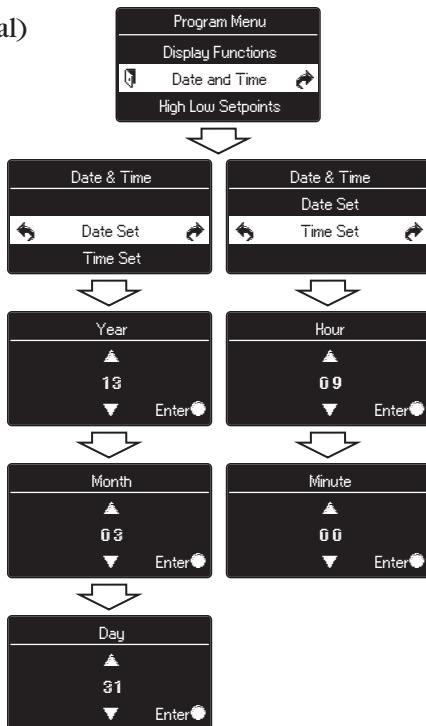
Power shuts off after 10 minutes of non-use. Recharge the battery when the icon shows a single bar . A full charge takes about two hours. When fully charged the  icon appears and charging stops. Auto shut off is bypassed when used with the AC adapter/charger. The battery also charges when connected to a computer USB port.

1. Push **ON/OFF** to turn off power.
2. Only use IMADA AC adapter/charger (ADW6010) with the proper 115VAC or 230VAC plug adapter. Plug into the correct AC output. Turn ON the gauge. The display flashes until the battery is charged.


5 COMMON PROGRAMMING TASKS

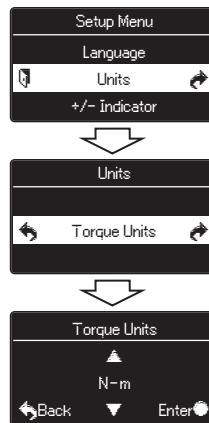
1. Date and Time (optional)

1. Press **ON/OFF** to turn on the gauge.
2. Press and hold the **MENU** key two seconds to enter the Program Menu.
3. Press the up or down arrows on the keypad to highlight Date and Time, then press the right arrow key.
3. Press the right arrow key to select Date Set.
4. Press the up/down arrows to select the year and press **MENU** to save. Repeat this step for month and day.
5. Press the up/down arrow keys to select Time Set, then press the right arrow key.
6. Press the up/down arrows to select the hour and press **MENU** to save and repeat this step for minute.
7. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.




2. Selecting Units

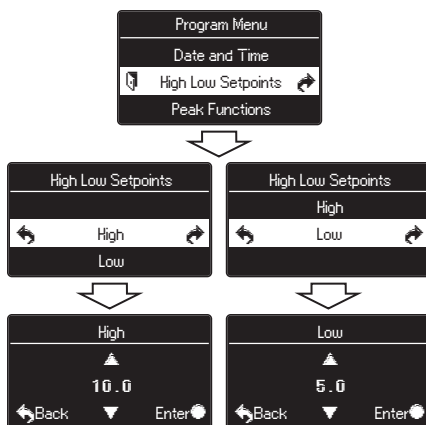
1. Turn OFF the gauge. Press and hold the **MENU** key then press **ON/OFF** to enter the Setup Menu.
2. Press the up/down arrows on the keypad to highlight Units, then press the right arrow key.
3. Press the right arrow key to select Torque Units.
4. Press the up/down arrows to select the desired units and press **MENU** to save.
5. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



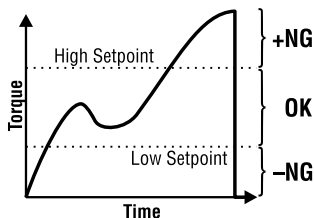
3. Programming Setpoints (optional)

Program High and Low setpoints for easy Go/No Go testing.

1. Press **ON/OFF** to turn on the gauge.
2. Press and hold the **MENU** key two seconds to enter the Program Menu.
3. Press the up or down arrows on the keypad to highlight High Low Setpoints, then press the right arrow key.
4. When High appears press the right arrow key to set the High setpoint.
5. Press the up or down keys to change the high setpoint and press **MENU** to save and return to the High Low Setpoints.
6. Press the down arrow to highlight Low and then press the right arrow key.
7. Press the up/down arrow keys to change the low setpoint and press **MENU** to save.
8. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



For example, if High and Low setpoints have been programmed and 5 lbf-in is set as Low and 10 lbf-in as High, the ORANGE LED lights for measurements less than 5 lbf-in (-NG). GREEN lights between 5-10 lbf-in (OK) and RED lights over 10 lbf-in (+NG). Setpoint output is available through the Communications port (see page 14).



6 OPERATION

1. Programming

Select unit and set the high/low setpoints if required, using the steps on pages 6-8.

2. Measurement Mode

Real Time Measurement

Press **ON/OFF** to turn on the gauge. The gauge automatically enters real time mode and displays transient torque values.

Peak Measurement

Press **ON/OFF** to turn on the gauge. Press **PEAK** to capture peak measurements. In Multi display mode 'P' is displayed and in Single display mode 'Peak' is displayed. Peak torque values do not change until a higher value is measured. Press **PEAK** again to return to real time.

'Or Peak' is the factory default and captures either clockwise peak or tension measured during a test.

'And Peak' captures both clockwise peak and counterclockwise peak (See page 34 for programming instructions).

When 'And Peak' is programmed press **PEAK** and '+P' is displayed. Press **PEAK** again and '-P' is displayed.

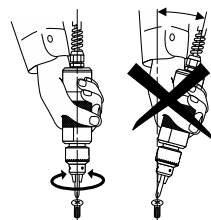
'+P' displays the clockwise peak captured during a test; press **PEAK** to display the counterclockwise peak.

'-P' displays the counterclockwise peak captured during a test; press **PEAK** to display the clockwise peak.

3. Tare and Zero

'All Reset' is the factory default that tares and zeroes the display. Press **ZERO** before clamping the sample in position to zero the display and tare any preload. After clamping do not tare.

If you need to zero without tare see page 41 'Peak Only'.




When measuring, hold the torque sensor inline not at an angle.

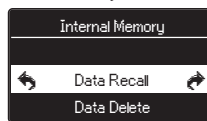
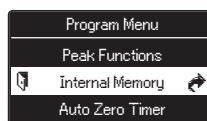
7 STORING AND COLLECTING DATA

During measurement in either Peak or Real Time mode, press **SEND** to store data. Up to 1,000 torque values may be stored in memory.

Connect the gauge and a PC with the included USB cable. Press **SEND** and data is simultaneously stored in memory and transmitted to the PC. Use included Force Logger (see page 20) or optional SW-1X or other software to collect and display torque data.


1. Recalling Stored Data

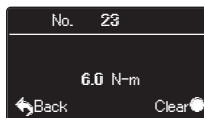
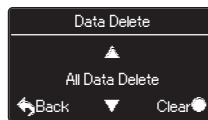
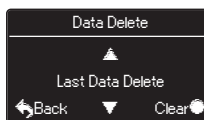
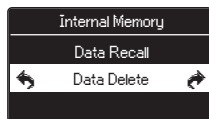
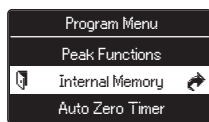
1. Press **ON/OFF** to turn on the gauge.
2. Press and hold the **MENU** key two seconds to enter the Program Menu.
3. Press the up or down arrow keys to highlight Internal Memory, then press the right arrow key.
4. Highlight Data Recall and press the right arrow key.
5. Press the up or down arrow keys to view stored data. If no data is stored '-' is displayed.
6. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.




2. Clearing Stored Data

Last Data Delete

1. Press **ON/OFF** to turn on the gauge.
2. Press and hold the **MENU** key two seconds to enter the Program Menu.
3. Press the up/down arrow keys to highlight Internal Memory, then press the right arrow key.
4. Highlight Data Delete and press the right arrow key.
5. Press the up/down arrow keys and select Last Data Delete.
6. The last data appears, press the **MENU** key to delete it. If no data is stored '–' is displayed.
7. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



All Data Delete

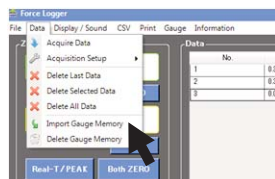
1. Follow steps 1-4 above and select All Data Delete from the Data Delete menu.
2. Press the **MENU** key to clear and a confirmation screen appears. Press the **MENU** key again to clear all the data.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

3. Downloading Data from Memory

Choose between the following download methods.

1. USB Data Download from Memory

- 1) Connect the gauge and computer receiving data with the USB cable.
- 2) Turn on the gauge and Force Logger.
- 3) Under the Data menu, select Import Gauge Memory. The gauge memory will fill the Data Table which can be saved as a CSV file.



2. RS-232C Data Download from Memory

Connect the gauge and device receiving data with a CB-208 cable. All functions can be duplicated remotely by using the RS-232C interface. Commands must be sent in uppercase ASCII character format followed by a carriage return [CR].

RS-232C Signal: 8 data, 1 stop, no parity. Baud Rate: 19,200 bps

Refer to the tables on pages 16-19 for ASCII commands.

3. Mitutoyo Digimatic Signal

Connect the CB-308 cable to the communications port and the device receiving the data. Set up parameters as instructed from the Mitutoyo processor manual.

4. ±2 VDC Analog Signal

Connect the CB-108 analog cable and communications port receiving the voltage signal. Voltage comes through the D/A converter and resets to zero when a tare function is performed.

Specifications

Voltage	±2V
Update	2,000 times/sec
Zero offset	20mV maximum
Span error	±1%
Load Impedance	1KΩ or higher

5. External Power ON/OFF (Same as ON/OFF key function)

Connecting #24 (EX_Power) and #30 (GND) of the communications port turns ON the gauge and connecting #24 (EX_Power) and #30 (GND) while #29 (Shift) and #30 (GND) are connected turns OFF the gauge.

6. **External Zero** (Same as **ZERO** key function)
Connecting #25 (EX_ZERO) and #30 (GND) of the communications port resets the torque display. (Tare, peak reset, or peak reset only are dependent on the Zero/Tare Reset settings, see page 39).

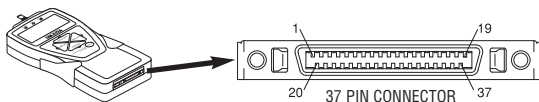
7. **External Send** (same as the **SEND** key function)
Connecting #26 (EX_SEND) and #30 (GND) of the communications port stores up to 1,000 data into gauge memory.

8. **External Peak** (same as **PEAK** key function)
Connecting #27 (EX_PEAK) and #30 (GND) of the communications port turns on peak mode.



Use contact closure only and **DO NOT** apply voltage to #24 through #30 port pins.

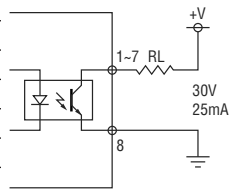
8 OUTPUT



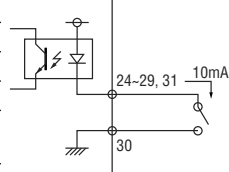
1. Communications Port

PIN#	Signal	Description
1	-NG	-NG Output Signal (Note 1)
2	OK	OK Output Signal (Note 1)
3	+NG	+NG Output Signal (Note 1)
4		
5		
6	OVL	Over Load Output (Note 1)
7	READY	Output while Measuring (Note 1)
8	OUT_GND	Signal ground for Pins 1 to 7
9	ANALOG OUT 2	Direct Analog Output (Optional)
10	ANALOG GND 2	
11	ANALOG OUT 1	
12	ANALOG GND 1	D/A convertor Analog output
13	TXD	Serial Output (RS232C)
14	RXD	
15	RS_GND	
16	NC	Do not use (Factory use only)
17	NC	
18	NC	
19	REQ	Digimatic Output
20	RDY	
21	CLK	
22	DATA	
23	GND	
24	EX_Power	Power On / Power Off with shift input (Note 2)
25	EX_ZERO	Zero torque with shift input (Note 2)
26	EX_SEND/HOLD	Same function as SEND switch (Note 2)
27	EX_PEAK	Same function as PEAK switch (Note 2)
28	Rec	Data record control (Note 2)
29	Shift	Shift input (Change EX_Power and EX_ZERO input function) (Note 2)
30	IN_GND	Signal ground for Pins 24 to 29
31	MARK	MARK Input
32		Do not use
33		
34		
35		
36	+5V	Power supply +5V 200mA max
37	GND	

OUTPUT CONNECTION



INPUT CONNECTION



Note 1: Pins 1 to 7 are NPN open collector output (30VDC and 25mA maximum)

Note 2: Pins 24 to 29 are inputs for non-voltage contact or NPN open collector.



2. Data Output Formats

Data Output Format	[Q][±ffff][±dddddd][P][L][C][S][X][CR]
Memory Data Output Format	m[±ffff][±dddddd][P][L][C][S][YY][MM][DD][hh][mm][ss][CR]

Q	Type of Data	f: Continuous data output (2000 data/sec)
		l: Continuous data output (10 data/sec)
		a: Continuous +peak data
		h: Continuous –peak data
		r: Real time data
		p: +Peak
		n: –Peak
		1: 1st Peak
		2: 2nd Peak
±ffff	Torque Data	w/decimal point
±dddddd	Displacement Data	+0000000 (placeholder)
P	Selected Unit #	0 - 5
L	Displacement Unit	0 (placeholder)
C	High/Low Setpoints	H: +NG
		O: OK
		L: –NG
S	2nd/3rd Setpoints	E: Overload
X	Signal Line Conditions (Rec Signal and Mark Signal)	0 (placeholder)
		0: No input
		1: No Rec input and Mark input
		2: Rec input and No Mark input
		3: Rec input and Mark input
4: Rec + Shift input and No Mark input		
5: Rec + Shift input and Mark input		
YY	Date/Time Stamp	Year
MM		Month
DD		Date
hh		Hour
mm		Minute
ss		Second

4. Command Table (RS232C & USB communication)

CATEGORY	COMMAND	DESCRIPTION	RESPONSE	NOTES
Data Output	XAR[CR]	Real Time Data Output Request	See Data Output Format	
	XFP[CR]	+Peak and -Peak Data Output Request		
	XFF[CR]	1st Peak and 2nd Peak Data Output Request		
	XAg[CR]	Continuous Data Output Request (10 data/sec)		
	XAG[CR]	Continuous Data Output Request (2000 data/sec)		
	XAS[CR]	Stop Continuous Data Output		R[CR]
Setpoints	XCW[±UUUU][±LLLL][CR]	Set High/Low Setpoints	R[CR]	±UUUU: High Setpoint
				±LLLL: Low Setpoint (w/o decimal point)
	XCR[CR]	High/Low Setpoint Output Request	R[CR]	XCRH[CR] Display > High Set
				XCRO[CR] High ≥ Display ≥ Low
XCRL[CR] Display < Low Setpoint				
			XCRE[CR] Overload	
Mode	XDS0[CR]	Switch Mode	R[CR]	Real Time Display
	XDS1[CR]			Peak Display
	XDS2[CR]			+Peak Display
	XDS3[CR]			-Peak Display
Unit	XFU0[CR]	Switch Unit	R[CR]	Unit0
	XFU1[CR]			Unit1
	XFU2[CR]			Unit2
	XFU[3-5][CR]			Unit3 - 5 (Option)
	XFC[CR]	List of Measuring Unit Output Request	XFC[00][11][22][33][44][55][CR]	00 - 55: Unit Code for Unit 0 - 5 (See Unit Code Table)
Peak	XFT[bbbb][CR]	Set 1st and 2nd Peak Sensitivity	R[CR]	bbbb: Peak Sense Drop Digits (w/o decimal point)
	XFG0[CR]	Peak Switch Function Select	R[CR]	Real Time, +Peak, -Peak (Functions cycle)
	XFG1[CR]			Real Time, Peak (Functions toggle)
Reset	XFY[CR]	Reset Peak	R[CR]	
	XFZ[CR]	Tare		
	XAZ[CR]	Reset All (Peak and Tare)		
Memory	XMM[CR]	Save Data in Memory	R[CR]	
	XMR[CR]	Download All Memory Data Request		See Memory Data Output Format
	XMC[CR]	Clear All Memory	R[CR]	
	XME[CR]	Clear Last Memory	R[CR]	
Counter	XCN[CR]	+NG Counter data output request	XCN[nnnn][CR]	nnnn: Number of +NG
	XCC[CR]	Clear +NG Counter	R[CR]	
Power	XQT[CR]	Turn off Power	R[CR]	
Other		Invalid command	E[CR]	

5. Data Output Formats

Data Output Format	[Q][±ffff][±dddddd][P][L][C][S][X][CR]
Memory Data Output Format	m[±ffff][±dddddd][P][L][C][S][YY][MM][DD][hh][mm][ss][CR]

6. Torque Unit Codes

TORQUE UNIT CODES																		
CODE	00	01	02	03	04	05	07	08	10	11	12	13	14	16	17	22	23	
UNIT	None	mN	N	kN	g	kg	gf	kgf	ozf	lbf	klbf	N-cm	N-m	kgf-cm	kgf-m	ozf-in	lbf-in	

8. Backward Compatible Command Table

(RS232C & USB communication)

CATEGORY	COMMAND	DESCRIPTION	RESPONSE	NOTES
Data Output	D[CR]	Data Output Request	[±FFFFF][U][M][C][CR]	FFFFF: Torque Data w/ Decimal Point U: Unit, K (Kgf-cm), N (N-m) or O (Lbf-in) M: Mode, T (Real time), P (Peak) H (Hold), M (Memory) C: Setpoints, H (High), O (OK) L (Low), E (Overload)
	V[CR]	+/- Peak Data Request	P+[AAAAA][U][CR] P-[BBBBB][U][CR]	AAAAA: +Peak Data w/ Decimal Point BBBBB: -Peak Data w/ Decimal Point
	g[CR]	Continuous Data Output Request	R[CR]	Same data format as D command response
			[±FFFFF][U][M][C][CR]	
			[±FFFFF][U][M][C][CR]	
Y[CR]	Stop Continuous Data Output	R[CR]		
Memory	Z[CR]	Zero Reset (Tare and Peak Reset)	R[CR]	
	M[CR]	Save Data in Memory	R[CR]	
	B[CR]	Clear Last Memory	R[CR]	
	C[CR]	Clear All Memory	R[CR]	
	I[CR]	Download All Memory Data Request	[±FFFFF][U][M][C][CR]	Same data format as D command response
			[±FFFFF][U][M][C][CR]	
.				
END[CR]				
Unit	N[CR]	Switch Unit to N-m	R[CR]	
	K[CR]	Switch Unit to Kgf-cm	R[CR]	
	O[CR]	Switch Unit to Lbf-in(ozf-in)	R[CR]	
Mode	T[CR]	Switch to Real time mode	R[CR]	
	P[CR]	Switch to Peak Mode	R[CR]	
Setpoints	E[HHHH][LLLL][CR]	Set High/Low Setpoints	R[CR]	HHHH: High Setpoint w/o decimal LLLL: Low Setpoint w/o decimal

9 FORCE LOGGER

The Force Logger USB software utility captures and logs all torque values sent to the computer. All gauge settings can be entered from the software. Force Logger exports data in CSV format.

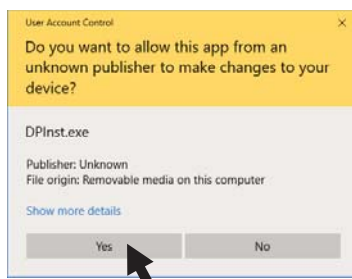
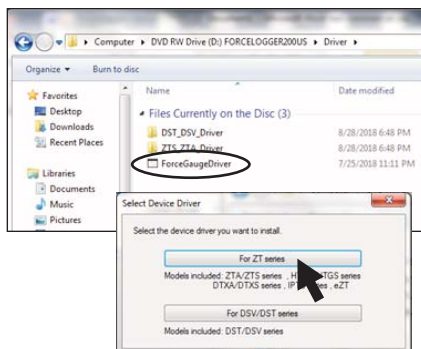
Minimum System Requirements:

- Microsoft Windows 7/8/8.1/10
- Microsoft .NET Framework 4.6
- CPU: 1GHz or higher
- Memory: 1GB
- Hard disk: 2GB (Data storage)

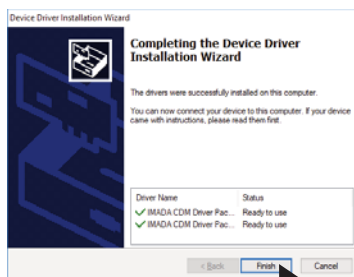
INSTALLATION

1. USB Driver Installation for Windows 10

1. Insert the Force Logger CD-ROM and click the Windows Icon.
2. In the search bar, next to the Windows Icon, type “file manager” and press enter to open the File Manager.
3. Navigate to the “Driver” folder on the CD-ROM.
4. Double click on “Force Gauge Driver” and select the ZT series drivers to install.
5. Windows may ask for confirmation to install the driver, click Yes.

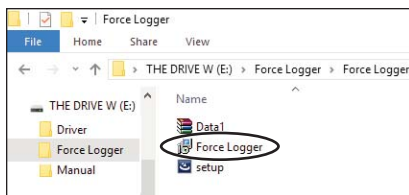


6. Choose “Finish” when installation is complete.

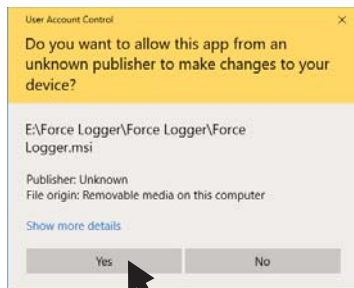


2. Force Logger Installation

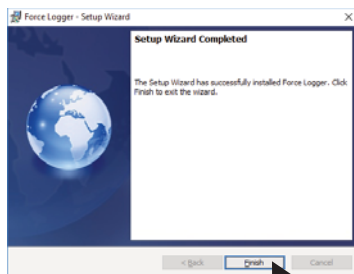
1. With the CD-ROM in the drive click the Windows Icon.
2. In the search bar, next to the Windows Icon, type “file manager” and press enter to open the File Manager.
3. Navigate to the “Force Logger” folder on the CD-ROM.
4. Double click on “Force Logger” to install.



5. Windows may ask for confirmation to install the software, click Yes.



6. Choose “Finish” when installation is complete.
7. Eject the CD-ROM.



FORCE LOGGER OPERATION

1. Preparation

1. Connect the HTGS gauge and computer with the USB cable.
2. Turn ON the gauge.
3. In the search bar, next to the Windows icon, type “Force Logger” and press enter to start Force Logger.

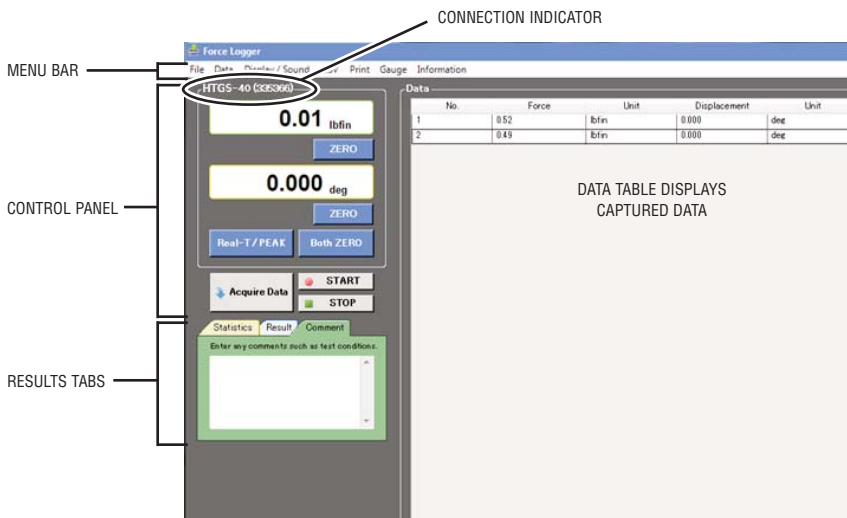
If the Connection Indicator does not register the gauge, check:

USB cable

USB driver installation

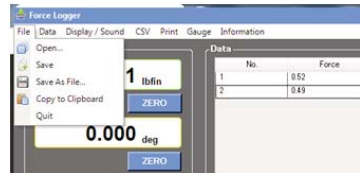
Microsoft .NET Framework 4.6 installation.

If Force-Recorder (optional) is running, it should be closed.

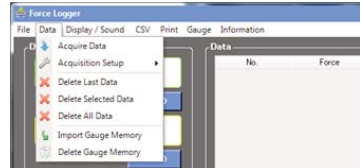


2. Menus

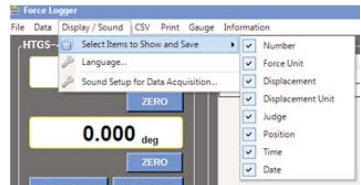
File Menu Open, Save, Save as File, Copy to Clipboard, Quit



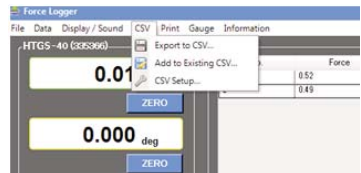
Data Menu Acquire Data, Acquisition Setup, Delete Last Data, Delete Selected Data, Delete All Data, Import Gauge Memory and Delete Gauge Memory.



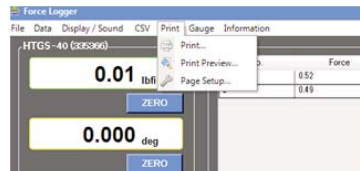
Display Menu Select items to show and save, Language



CSV Menu Export to CSV, Add to Existing CSV, CSV Setup



Print Menu Print, Print Preview, Page Setup

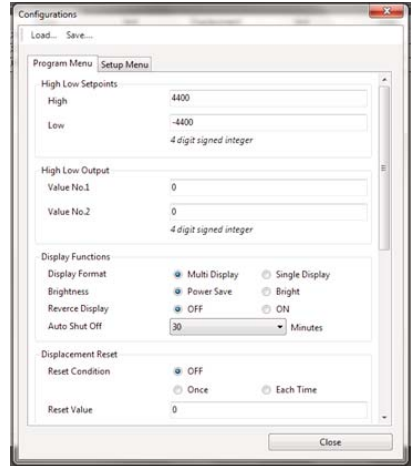


2. Menus (cont'd)

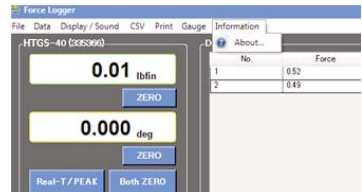
Gauge Setup View and edit all gauge functions in the Program and Setup menus.



Menus change depending upon the gauge connected.

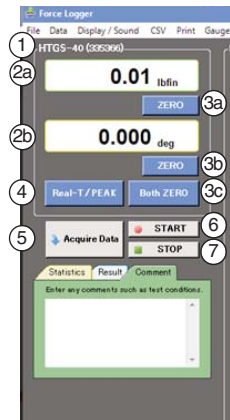


Information Displays current version number



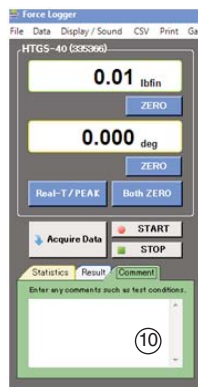
3. Control Panel

- ① **Connection Indicator** Registers gauge when connected.
- ②a **Torque Value** Current torque value
- ②b **Angle Value** Current angle if available.
- ③a **Zero** Zero the gauge or tare the weight of an attachment
- ③b **Zero** Zero angle (if available)
- ③c **Zero** Zero both torque and angle
- ④ **Real T/Peak** Set real time or peak mode
- ⑤ **Acquire Data** Captures display value
- ⑥ **Start** Starts continuous data capture
- ⑦ **Stop** Halts continuous data capture



4. Results Tabs

- ⑧ **Statistics Tab** Displays statistics of acquired data
- ⑨ **Result Tabs** Show value and judgement
- ⑩ **Comments Tab** Allows user input



5. Capturing Data

Capturing Individual Data

Click the Acquire Data button ⑤ in the control panel to capture the current display value.

OR press the **SEND** button on the gauge.

Capturing Continuous Data

Click the START button ⑥ in the control panel to capture continuous data and display it in the data table. Click the STOP button ⑦ in the control panel to halt data acquisition.

To set the data acquisition rate see page 27.

6. Saving Data

The Data Table can be saved in native .flps format.

1. Check items to save in the Display/Select Items to Show and Save on the menu bar.

2. Click on File/Save or File/Save As File in the menu bar to save the current Data Table in native .flps format.

OR

3. Click on File/Copy to Clipboard in the menu bar to copy the Data Table to the clipboard in text format. The copied data can be pasted into Microsoft Word and Excel.

Example of saved data:

MAXIMUM	2.37	@	No.6	} Saves maximum and minimum results followed by @ and the data number.		
MINIMUM	0.72	@	No.9			
AVERAGE	1.65	} Saves the average value, number of data, number of NG results				
DATA QUANTITY	9					
NUMBER OF NG	5					
1	0.93	lbf in	NG	10:50:22 AM	12/21/2017	} Saves the data displayed in the data table.
2	1.14	lbf in	NG	10:50:22 AM	12/21/2017	
3	1.47	lbf in	NG	10:50:23 AM	12/21/2017	
4	1.85	lbf in	OK	10:50:23 AM	12/21/2017	

7. Exporting Data

1. Click on CSV/Export to CSV in the menu bar. Click the SAVE button to select folder and filename. The Data Table is saved in CSV format and can be imported into Microsoft Excel and Word.

* Data may not appear correctly in Microsoft Excel depending on the Excel settings.

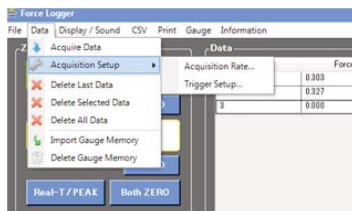
2. Adding to existing CSV file

Click File/Add to Existing CSV File in the menu bar and navigate to a CSV file. The Data Table will be added to the right of the existing data.

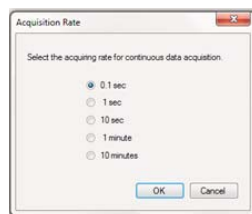
* New data cannot be added to an open file. Close the file in which the data is to be added.

8. Acquisition Rate/Trigger Setup

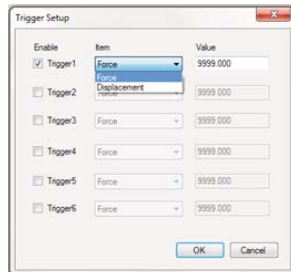
Click on Data/Acquisition Rate in the menu bar.



Select the desired acquisition rate from the pop up window and click OK to exit.

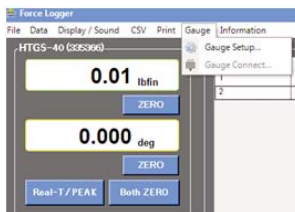


Click on Data/Trigger Setup in the menu bar. Enable triggers for torque (force) or angle (displacement, if available) and set a value. Click on OK to exit.



9. Gauge Settings

Click on Gauge Setup in the menu bar.

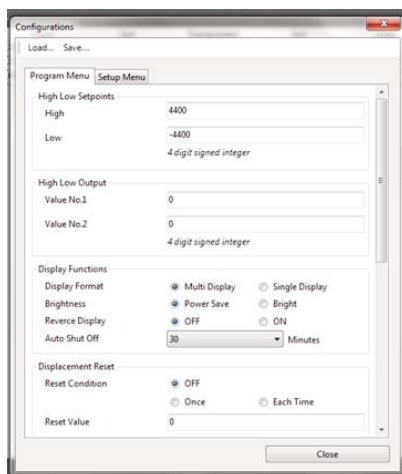


All the gauge functions in the Program and Setup menus can be changed on the popup window tabs.

Settings can be saved and reloaded. Setup files are saved in .xml format.

Click Close to update the settings on HTGS gauge.

Note: Menu content depends upon the gauge connected.



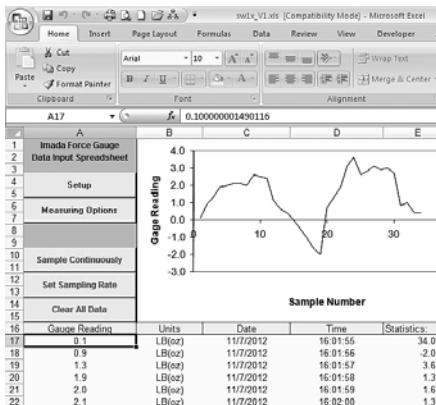
10. Closing the Program

Save or delete the Data Table before closing. Click the X box at the top right of the window or select File/Quit.

10 OPTIONAL DATA ACQUISITION

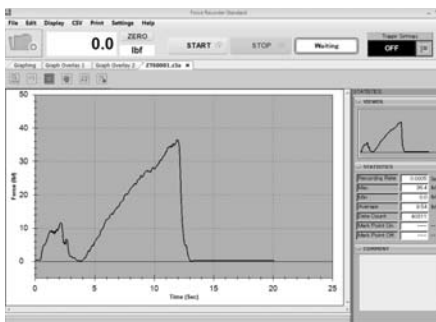
SW-1X Data Acquisition Software

Capture and analyze torque data from torque gauges with an RS-232 port. A running log of all the data is displayed along with a chart. Calculate max/min, average, and standard deviation.



ZT-R Force Recorder Software

Record and process the 2,000 data per second from HTGS torque gauges and generate a graph with statistics. Zoom in to examine the torque value at individual data points. Select part of the graph to detect the first peak or generate statistics for that time interval. Compare and align multiple graphs. Save graphs or export data to CSV format.



Cables

- CB-108** 10' Analog cable
- CB-208** 10' RS-232C cable, 9 pin female
- CB-308** 10' Digimatic Cable



10 SPECIFICATIONS

HTGS Series

Accuracy	± 0.5% F.S. ± 1 LSD
Selectable Units	ozf-in, lbf-in, kgf-cm, N-cm, N-m
Overload Capacity	200% of F.S. Overload indicator flashes beyond 110% of F.S.
Setpoints	Programmable high/low setpoints with color-coded LED indicators and output signal
Setpoint Output	-NG, OK, +NG, 2nd & 3rd setpoints 1st & 2nd Peaks Overload
Outputs	USB, RS-232C, Digimatic and ± 2 VDC analog output
Memory	Non-volatile, recall up to 1000 data
Auto Zero Reset	1.0 to 60 seconds (selectable)
Sensitivity	Max, High, Medium, Low (selectable)
Auto Power Off	5, 10, minutes or OFF (selectable)
Display Update	10/second
Data Processing Speed	Actual 2,000 data/second through the USB port
Power	Rechargeable Ni-MH battery pack or Imada ADW6010 adapter
Battery Indicator	Indicates three charge states high, medium and low
Battery Life	approx. 8 hours (recharge time approx. 10 hours)
Operating Temp.	32° to 100°F (0° to 40°C) 20-80% relative humidity

HTGS Ranges (Resolution) Accuracy: ±0.5% F.S. ±1 LSD

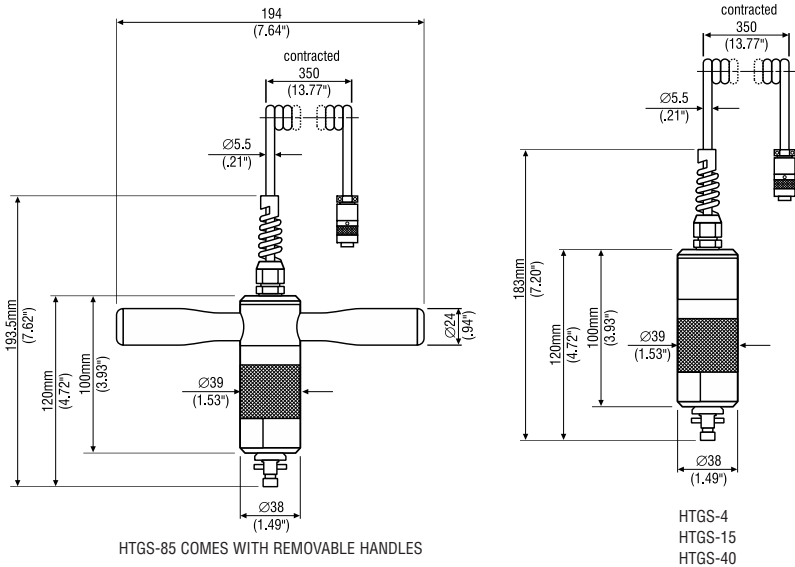
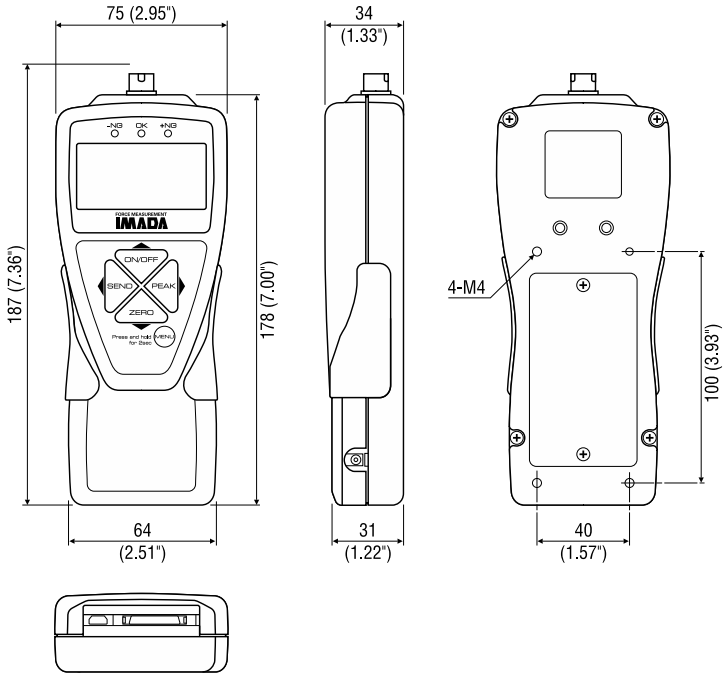
Model	Capacity (Resolution)		N-cm
	ozf-in/lbf-in	kgf-cm	
HTGS-4	70.00 (0.01 ozf-in)	5.000 (0.001 kgf-cm)	50.00 (0.01 N-cm)
HTGS-15	15.00 (0.01 lbf-in)	20.00 (0.01 kgf-cm)	200.0 (0.1 N-cm)
HTGS-40	40.00 (0.01 lbf-in)	50.00 (0.01 kgf-cm)	500.0 (0.1 N-cm)
HTGS-85	85.0 (0.1 lbf-in)	100.0 (0.1 kgf-cm)	1000 (1 N-cm)

Specifications subject to change without notice.

Repair/Calibration

Go to www.imada.com and click on Repair/Calibration to get an RGA number or call 800-373-9989 and send your gauge to Imada, Inc. Suite 707, 3100 Dundee Rd., Northbrook, IL 60062 USA

11 DIMENSIONS

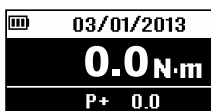


HTGS-85 COMES WITH REMOVABLE HANDLES

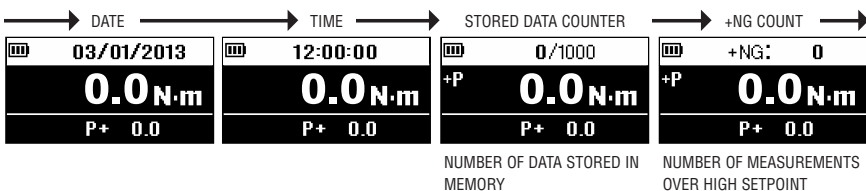
Using Multi Display

Multi Display (factory default) divides the screen into three sections: upper, middle and lower. Selectable data can be displayed in the upper and lower sections. See the next page for Single Display.

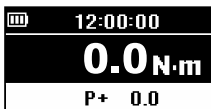
Upper Section



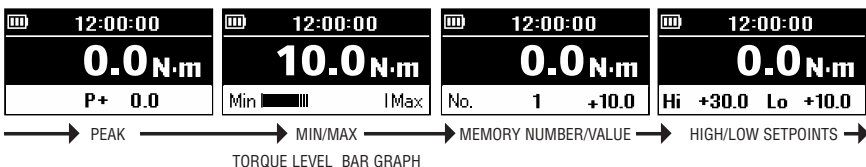
Turn on the gauge, then press (do not hold) the **MENU** key to highlight the upper section. Press the left (**SEND**) or right (**PEAK**) arrow keys to cycle date, time, stored data counter, or +NG count. Press the **MENU** key to select the data and highlight the lower section. See page 6 to change date and time.



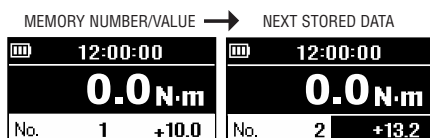
Lower Section



After highlighting the upper section, press the **MENU** key and the lower section is highlighted. Press the left (**SEND**) or right (**PEAK**) arrow keys to cycle peak, min/max, stored memory number and value, or high/low setpoints. Press the **MENU** key to select.



When memory number/value are highlighted, press (do not hold) the **MENU** key and the data location number becomes highlighted. Press the up (**ON/OFF**) or down (**ZERO**) arrow keys to view other locations and values if more than one are stored. If no data is stored ‘-’ appears. Press the **MENU** key to highlight high/low setpoints.



Press (do not hold) **MENU** until high/low setpoints are highlighted. Press **MENU** again and high setpoint becomes highlighted. Press the up (**ON/OFF**) or down (**ZERO**) arrow keys to change the value. Press **MENU** again to highlight the low setpoint and the up or down arrow keys to change the value. Press the **MENU** key to exit. Multi display highlighting must be off for proper gauge operation.



Selecting Single Display

Displays torque value, unit, and peak indicator.




1. Press **ON/OFF** to turn ON the gauge.
2. Press and hold the **MENU** key two seconds to enter the Program Menu.
3. Press the up (**ON/OFF**) or down (**ZERO**) arrow keys to highlight Display Functions then press the right arrow key to select.
4. Press the up or down arrow keys to highlight Display Format then press the right arrow key (**PEAK**), to select.
4. Press the up or down arrow keys to select Single Display and press the **MENU** key to input your selection.
5. Press the left arrow key until the door icon appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when ‘Exit Menu’ appears, press **MENU** to exit.

1 High Low Setpoints

High/Low setpoints enable Go/No Go tests. Orange LED lights for values under the low setpoint (-NG), green lights for values within low and high (OK), and red lights for values over high (+NG). See page 8.



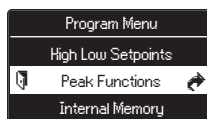
1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. High/Low Setpoints, is highlighted, press the right arrow key to select.
2. High is highlighted; press the right arrow key to select.
3. Press the up/down arrow keys to change the High value and press **MENU** to input your selection.
4. Press the down arrow key to highlight Low, then press the right arrow key to select.
5. Press the up/down arrow keys to change the Low value and press **MENU** to input your selection.
6. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.


2 Peak Functions

[and][or] Peak Factory Default='Or'

'Or Peak' captures clockwise OR counterclockwise peak.


'And Peak' captures both clockwise AND counterclockwise peaks. See page 9 for instructions.



1. Turn ON the gauge. Press and hold **MENU** two seconds to enter the Program Menu. Press down arrow key, to highlight Peak Functions then press the right arrow key, to select.
2. [and][or] Peak is highlighted; press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

Auto Peak Memory Factory Default='OFF'


Sends peak value to memory when **ZERO** is pressed.

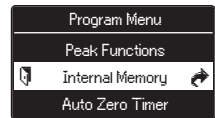
1. Turn ON the gauge. Press and hold **MENU** two seconds to enter the Program Menu. Press down arrow key, to highlight Peak Functions then press the right arrow key, to select.
2. Press the up/down arrow keys to highlight Auto Peak Memory, then press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

3 Internal Memory

Data Recall

Display up to 1,000 data from non-volatile memory.


1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. Press the down arrow key, to highlight Internal Memory then press the right arrow key to select.
2. Data Recall is highlighted; press the right arrow key to select.
3. Press the up/down arrow keys to view stored data.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.




Data Delete

Clear the last data or all data stored in memory.

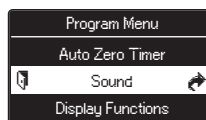
1. Follow Data Recall step 1.
2. Press the up/down arrow keys to highlight Data Delete, then press the right arrow key to select.
- 3a. **Last Data Delete** is displayed; press **MENU** to clear the last data.
- 3b. **All Data Delete** press the up/down arrow keys to display All Data Delete; press **MENU** to clear all data.
4. Follow Data Recall step 4 to exit the menu.

4 Auto Zero Timer Factory Default='OFF'
 Automatically clears peak value.  appears when set.
 Select: 1~60 seconds or OFF




1. Turn ON the gauge. Press and hold **MENU** two seconds to enter the Program Menu. Press down arrow key, to highlight Auto Zero Timer, then press the right arrow key to select.
2. Press the up/down arrow keys to change the value and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

5 Sound
Keypad Beep Factory Default='ON'




Beep confirms keys are pressed. Select: ON or OFF

1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. Press the down arrow key, to highlight Sound, then press the right arrow key, to select.
2. Keypad Beep is highlighted; press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

High/Low Alarm

Beeps when high setpoint is exceeded. Select: ON or OFF

1. Follow Keypad Beep step 1, above.
2. Press the up/down arrow keys to highlight High/Low Alarm and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

6 Display Functions

Display Format

Single Display displays torque value, unit, peak and battery indicators.


Multi Display divides the screen into three sections.

Top section displays date, time, data storage, or +NG count.

Middle section displays unit and value.

Lower section displays peak, min/max, stored data, or high/low set-points. See pages 32-33, Using Multi Display.


Select: Single or Multi

1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. Press the down arrow key, to highlight Display Functions, then press the right arrow key to select.
2. Press the up/down arrow keys to highlight Display Format and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



Brightness

Select bright or power save.


1. Follow Display Format step 1 , above.
2. Press the up/down arrow keys to highlight Brightness and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

6 Display Functions (continued)

Reverse Display

Invert the screen so it can be read when the gauge is mounted to a test stand.

Select: Normal or Reverse.


1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. Press the down arrow key, to highlight Display Format, then press the right arrow key, to select.
2. Press the up/down arrow keys to highlight Reverse Display and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

If the display has been reversed the left/right and up/down keys are transposed.

Auto Shut Off Factory Default='10 Min'

The interval of non-use before auto shut off.

Select: 5, 10, 30, 60 minutes or OFF


1. Follow Reverse Display step 1, above.
2. Press the up/down arrow keys to highlight Auto Shut Off and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



7 Date and Time




Date Set

1. Turn ON the gauge, then press and hold **MENU** two seconds to enter the Program Menu. Press the down arrow key, to highlight Date and Time, then press the right arrow key to select.
2. Press the up/down arrow keys to highlight Date Set and press the right arrow key to select.
3. Press the up/down arrow keys to select year and press **MENU** to input your selection.
4. Press the up/down arrow keys to select month and press **MENU** to input your selection.
5. Press the up/down arrow keys to select day and press **MENU** to input your selection.
6. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

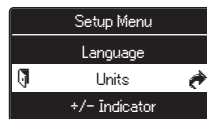
Time Set


Set time in military format.

1. Follow Date Set step 1, above..
2. Press the up/down arrow keys to highlight Time Set and press the right arrow key to select.
3. Press the up/down arrow keys to select hour and press **MENU** to input your selection.
4. Press the up/down arrow keys to select minute and press **MENU** to input your selection.
5. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

1 Units

Select: ozf-in, lbf-in, kgf-cm, N-cm, N-m

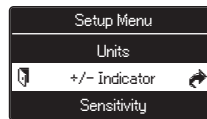



1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Units is highlighted, press the right arrow key to select.
2. Press the up or down arrow keys to highlight Torque Units and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

2 +/- Indicator

Normal: clockwise (+) counterclockwise (-)

Reverse: clockwise (-) counterclockwise (+)




1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key, to highlight +/- Indicator, then press the right arrow key to select.
2. Press the up/down arrow keys to select +/- Torque and press the right arrow key to select.
3. Press the up/down arrow keys to select and press **MENU** to input your selection.
4. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

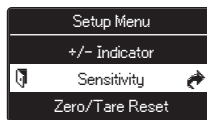
3 Sensitivity

Some applications may yield more consistent results with less sensitivity.

Select: Max, High, Medium, Low

Factory Default='Max' (best for destructive tests)

1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Sensitivity, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.




4 Zero/Tare Reset

Select: All Reset or Peak Only

All Reset: zeroes and tares all values

Peak Only: zeroes the peak value without tare (see note below)

Factory Default='All Reset'

1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Zero Tare Reset, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



Note:

All Reset: Press **ZERO** to tare any preload and zero the display.


Peak Only: Press **ZERO** to zero the display without tare.

Press and hold **ZERO** for two seconds to zero the weight of a pre-load or attachment.

5 Send Functions

Store current value(s) in memory when **SEND** is pressed.


Select: Display Value, + Peak, - Peak, +/- Peak

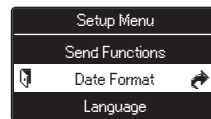
1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Send Functions, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



6 Date Format

Select: YYYY/MM/DD, MM/DD/YYYY, DD/MM/YYYY


1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Date Format, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.



7 Language

Select: English, Chinese, Korean, German, French, Italian, Spanish, Japanese



1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Language, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.


8 Setting LOCK (optional)

Prevents gauge settings from being changed.

Select: ON or OFF

Factory Default='OFF'



1. Press and hold **MENU**, then press **ON/OFF** to turn ON the gauge and enter the Setup Menu. Press the down arrow key to highlight Setting LOCK, then press the right arrow key to select.
2. Press the up/down arrow keys to select and press **MENU** to input your selection.
3. Press the left arrow key until the door icon  appears, then press and hold **MENU** two seconds to exit. Or press the left arrow key and when 'Exit Menu' appears, press **MENU** to exit.

twilight

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