

DRI-Digital Remote Indicator with Remote Load Cell/Torque Sensor

Instruction Manual



Congratulations on your purchase of a Shimpo DRI (Digital Remote Indicator). We trust you will enjoy many years of professional results from your DRI when used in conjunction with a Shimpo Remote Load Cell or Remote Torque Sensor for force and/or torque measurement applications.

Please read the entire instruction manual thoroughly before initial set-up and operation; the information contained herein will aid you in operating your Shimpo DRI safely and with excellent results.

If you have any questions regarding our product(s), call your local Shimpo representative or contact Shimpo directly for assistance.

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Inspection/Standard Accessories

If any damage is apparent, do not unpack the DRI. Notify the shipping carrier immediately for damage claim instructions. Refer to the nameplate to confirm model number ordered and record serial number for future reference.

Items included with the DRI are:

- AC adapter
- (4) AA batteries
- DRI output connector
- Overload protection cable
- Plastic carrying case

Features and Benefits

The DRI offers many features and benefits, including:

- Enables easy set-up when changing applications and reduces investment in gauges and/or torque sensors by accepting multiple interchangeable load cells/torque sensors
- Large memory capacity (100 samples plus statistics) enables portable data collection for multi-location usage
- High sampling rate (1000 hz) allows peak force and torque points to be easily captured
- Handheld and test stand mountable - allows flexibility in multiple test set-ups, applications and fixturing
- High and low set points permit measurement of breakaway torque in applications such as child safety cap testing
- External tare and hold control allows hands-free zeroing using a keyboard or foot switch

Important Safety Instructions



Always wear eye protection when testing materials.



Never use a remote sensor that appears to be damaged in conjunction with the DRI.



Confirm that the DRI is turned OFF when connecting or disconnecting a remote sensor; failure to do so may damage the DRI.



Attachments must be properly installed to the remote sensors (hand-tighten only! Use only the Jacob's Chuck - provided with torque sensor - to tighten the torque sensors. Do not use wrenches or other tools!).



Never exceed remote sensor capacity; if "OVR 1234" appears on the display, STOP the test immediately to avoid permanent sensor damage.



Never apply a force or load at an angle to the remote sensor.



When installing the DRI on a test stand, confirm that the indicator unit is thoroughly secured.



When not in use over an extended period of time, remove batteries to avoid battery terminal corrosion.



Only use the provided AC adapter; usage of any other adapter may damage circuitry.



Check the batteries periodically for corrosion when using the unit under AC power; this will avoid damage and ensure memory backup (refer to "Low Battery Indication" section).



Do not use or store unit in extreme temperatures; normal operating temperature is 32-113°F (0-45°C).



Do not use or store unit in oily, dusty, or excessively wet areas.



Do not use any chemicals to clean the case; use a wet, soapy cloth.

Set-Up

Power

Every DRI unit is shipped from the factory without the batteries (provided) installed. To install the batteries:

1. Remove the battery plate located at the bottom of the handle using a coin or appropriate screwdriver.
2. Install the (4) AA batteries, observing the proper polarity.
3. Reinsert the battery plate cover, making sure the lip engages properly before tightening.

NOTE: If AC adapter operation is preferred, refer to the “Display & Keypad” section of this manual for AC outlet location.

Connection/Disconnection of DRI to Load Cells (LC) or Torque Sensors (TS)

CAUTION: Always confirm that the DRI’s power is turned OFF when connecting or disconnecting an LC or TS.

Instructions to connect a remote sensor (LC or TS) are as follows:

1. Remove the plastic cover from the DRI’s remote sensor port.
2. Align the arrows from the remote sensor’s plug with the arrows on the port of the DRI.
3. Push the plug straight onto the port until a “click” is heard.
4. Press the DRI’s ON button; the LCD will briefly display all indicators (see “Display & Keypad” section).
5. The DRI will briefly display what type of remote sensor is connected (“SEN” will be flashing on the small display). The abbreviations on the main display are as follows. Please call Shimpo for information on additional sensors.

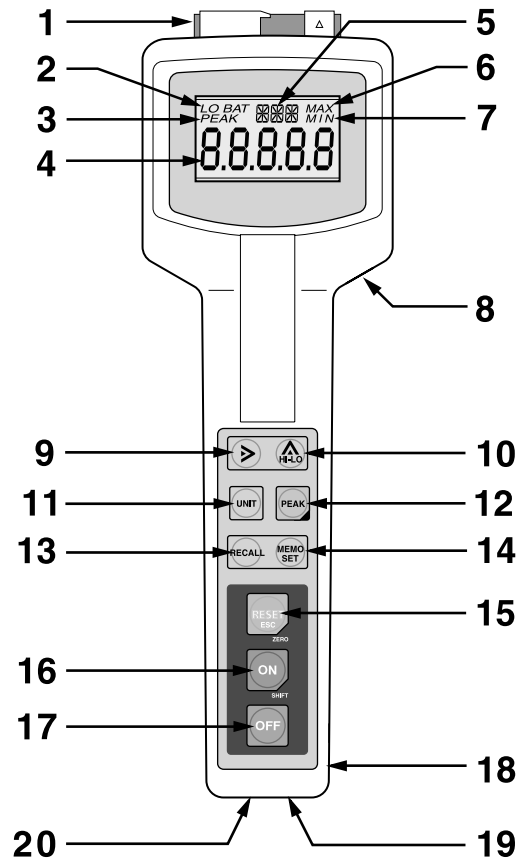
Load Cells (LC)	
PART NUMBER	MAIN DISPLAY
LC-50S	50L
LC-100S	100L
LC-200S	200L
LC-500S	500L

Torque Sensors (TS)	
PART NUMBER	MAIN DISPLAY
TS-3SD/TS-3J	t50o
TS-10SD/TS-10J	t10L
TS-20SD/TS-20J	t20L
TS-50SD/TS-50J	t50L
TS-100SD/TS-100J	t100L

Instructions to disconnect a remote sensor (LC or TS) are as follows:

1. Press the DRI’s OFF button.
2. Press and hold the gray release button located towards the top of the remote sensor’s plug.
3. Pull the plug (not the cord) straight off the DRI’s port.
4. Connect another remote sensor (see instructions above) or replace the protective plastic cover on the exposed port of the DRI.

Display & Keypad



1. Remote Sensor Port
2. Low Battery Indicator
3. Peak Indicator (**NOTE:** Refer to “Changing the Measuring Mode” section for explanation)
4. Main Display
5. Small Display
6. Maximum Reading Indicator
7. Minimum Reading Indicator
8. AC Adapter Port
9. > Button
10. HI-LO Button
11. Unit Button
12. Peak Button (**NOTE:** Refer to “Changing the Measuring Mode” section for explanation)
13. Recall Button
14. Memo Set Button
15. Reset Button
16. On Button
17. Off Button
18. Overload Output Port
19. Data Output Port
20. Battery Compartment

Factory Settings

Each time the power is turned OFF and ON there are some parameters that the DRI will default to. Consult the section on “Parameter Settings” to customize these default settings. The following chart reflects the default settings as programmed by the factory:

PARAMETER	DEFAULT FACTORY SETTING
Display Update	0.125 seconds
Measuring Mode	True Peak
Auto Power Off	3 Minutes
Measurement Unit	English (Lb, Lb-l or oz-l)
Output	RS232 Baud Rate - 4800 Data Length - 8 bits Stop Pulse - 2 bits Data End Code - CrLF Software Flow Control - off
External Trigger	Tare
Memory Mode	Single
Analog Output Mode	On
Filter	Off

Operation

How to Tare and Zero the Display

After installing an attachment, it will be necessary to tare the DRI:

1. Press the RESET button while holding down the ON button to tare the display.
2. Press the RESET button by itself when the peak indicator is showing to zero the display. Repeat step 1 if the display does not return to zero.

NOTE: The DRI can tare up to 50% of the remote sensor’s rated capacity.

Changing the Measuring Mode: True Peak Mode/Standard Mode

CAUTION: Depending on which of these two measuring modes is selected, the PEAK button performs two different functions! The DRI will always display an average force when PEAK is not showing on the display. The average measurement is based upon the display update rate chosen (see “Changing Display Update Time” section). When in the True Peak mode, pressing the PEAK button will allow the display to scroll from average to peak “+” (compression or clockwise torque) to peak “-” (tension or counterclockwise torque). When in the Standard mode, pressing the PEAK button will allow the display to scroll from average to maximum display reading “+” to maximum display reading “-”. **Despite showing PEAK on the display, these are not true peak readings; they are the highest average displayed readings since the DRI was last “tared”.**

Instructions to change the Measuring Mode are as follows:

1. Press the PEAK button while holding down the ON button. The small display will exhibit “dSP”.
3. Press the PEAK button; the small display will read “PfS” and the main display will show “on” (True Peak) or “oFF” (Standard).
3. Press the > button to toggle between “on” and “oFF”.
4. Press MEMO SET button to store the measuring mode and exit.

NOTE: By keeping the true peak mode “ON”, the DRI will always display the peak samples and not a maximum average.

Operation (continued)

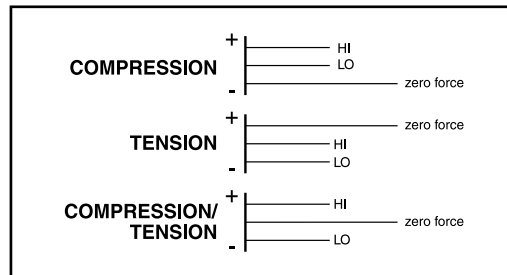
Changing Units of Measure

By pressing the UNIT button, the DRI will scroll between English, Metric, and Newton units; once the DRI is turned OFF the unit will default to the factory setting. Instructions to change the default unit of measure setting are as follows:

1. Press the PEAK button while holding down the ON button; the small display will indicate “dSP”.
2. Press the PEAK button three times; the main display will indicate “init” and the small display will reflect the current default setting.
3. Each time the UNIT button is pressed, the small display will scroll between English, Metric, and Newton units.
4. Press the MEMO SET button to store the default unit setting and exit.

Setting High and Low Limits

It is possible to program high and low limits for applications requiring tolerances. Use the diagram below as a guide for setting the limits.



Instructions to set the high and low limits are as follows:

1. Press the HI-LO button; “ Δ HI” will be flashing on the small display and whatever limit is already programmed will be displayed.
2. Press the > button; the entire display will be flashing.
3. Press the HI-LO button to toggle between “+” (compression or clockwise torque) and “-” (tension or counter-clockwise torque).
4. Press the > button to scroll across each digit position.
5. Press the HI-LO button to select the numerical value of each digit position.
6. Once the high limit has been programmed, press the MEMO SET button; “ ∇ LO” will be flashing on the small display and whatever limit is already programmed will appear on the main display.
7. To program the low limit, repeat steps 2-5.
8. Once the low limit has been programmed, press the MEMO SET button to store the set points and exit from this function.

The unit of measure will be displayed when the measurement is within the set points. Small “arrows” (Δ or ∇) will appear on the small display when the measurement is above or below the set points.

The unit of measure will never be displayed if the low limit is set higher than the high limit. This is because it is impossible for the measurement to fall between the setpoints.

Set points can be referenced by pressing the HI-LO button: the first time the button is pressed the display will show the high limit, the second time will show the low limit, and the third time will exit.

To cancel the high and low limits, both settings must be set to zero.

NOTE: A comparator output is available for “go – no go” testing (refer to “Comparator Output” section).

Changing Display Update Time

The display update time works with the sampling rate (1000 hz) to provide an average reading. All samples taken within the selected update time are averaged (based on 1000 samples/sec) and displayed.

To change display update time:

1. Press the PEAK button while holding down the ON button. The small display will exhibit “dSP” and the main display will reflect the current setting.
2. Each time the > button is pressed, the main display will scroll through “0.125”, “0.25”, “0.5”, “1.0” and “2.0” (these correspond with the amount of time in seconds that the display will update).
3. Press the MEMO SET button to store the desired display update time and exit.

Operation (continued)

Changing Memory Modes

The DRI operates in three distinct memory modes:

- *Single (on-demand memory)*
- *Continuous*
- *Standard* (**NOTE**: Main display reflects “nonE” in this mode)

To change the memory mode:

1. Press the PEAK button while holding down the ON button; the small display will reflect “dSP”.
2. Press the PEAK button six times; “Log” will appear on the small display and the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will scroll through “SinG”, “Cont” and “nonE”.
4. Press the MEMO SET button to store the desired memory mode and exit.

NOTE: Data stored in memory can be output to an external device (see “Communication with External Devices” section).

Single and Continuous Memory Modes

The three functions performed when using either the Single or Continuous mode are:

- *Storing data*
- *Recalling data*
- *Deleting data*

Storing Data (Single Memory Mode)

After selecting the “SinG” mode it is possible to send one data reading into memory each time the MEMO SET button is pressed; the small display will briefly change to an “M”. The “M” indicates that the data reading displayed has been stored in memory. Up to one hundred data readings can be stored. “FULL” will appear on the main display if memory is full.

Storing Data (Continuous Memory Mode)

After selecting the “Cont” mode it is possible to enter data readings continuously into memory by pressing the MEMO SET button once. The small display will reflect a flashing “M” and data readings will be stored in memory as quickly as the display update rate chosen (reference “Changing Display Update Time” section). Data readings will continually be entered into memory until the MEMO SET button is pressed a second time or 100 samples have already been entered (“FULL” will appear briefly on the main display).

Recalling Data (Single and Continuous Memory Mode)

To recall data in the memory press the RECALL button; the last data reading entered and corresponding memory position will be flashing opposite each other on the main display. Each subsequent push of the RECALL button will scroll through the data readings in the opposite order as they were entered. Press the RESET button to exit from memory recall.

NOTE: No data readings have been entered if “nonE” shows on the main display after pressing the RECALL button.

Deleting Data (Single and Continuous Memory Mode)

While recalling data (see above) it is possible to delete one data reading at a time or delete the entire memory.

To cancel one reading at a time:

Press the RECALL button to scroll through the data in memory until the undesired reading is appears on the display. Push the > button to delete that data reading. All higher memory positions will decrement one to fill the deleted position. If the reading being deleted is the last one in memory, then the memory position will decrement one as there is no higher memory position to take its place.

To delete the entire memory:

After recalling the memory using the RECALL button, press the RESET button while holding down the ON button; “CLr” will briefly appear on the main display. This indicates that all data readings have been deleted and will automatically exit from memory recall.

Operation (continued)

Standard Memory Mode

After selecting the “nonE” mode it is possible to store the maximum “+”, maximum “-”, minimum “+”, minimum “-”, and last reading during a sampling period. After pressing the MEMO SET button, a flashing “M” will appear on the small display; push the MEMO SET button again to end the sampling period.

Each time the RECALL button is pressed the DRI will scroll through the readings mentioned above. It is not necessary to clear the memory before performing the next test as they will be cancelled when the MEMO SET button is pressed.

Recalling Statistics

While recalling data from memory in either the Single or Continuous Mode it is possible to also recall statistics. To recall statistics:

1. Press the RECALL button. The last data reading entered and memory position will be flashing opposite each other on the main display.
2. Press the PEAK button. The maximum reading will appear on the main display.
3. Each subsequent push of the Peak button will scroll to minimum, peak “+”, peak “-”, average, standard deviation and return to maximum.
4. Press the RESET button to exit.

NOTE: Peak “+” and peak “-” will not be displayed if the data was stored in the Single Memory Mode.

Setting of Filter

Subtle vibrations are common in many testing environments. The DRI incorporates a filtering feature that “smoothes” the force curve by eliminating extraneous measurements caused by these outside influences. Depending on how severely these impact the sampling, a large or small filter is available. Set a filter as follows:

1. Press the PEAK button while holding down the ON button. The small display will show “dSP”.
2. Press the PEAK button eight times. The small display will indicate “Adf” and the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will scroll through “0” (no filter), “1” (small filter) and “2” (large filter).
4. Press the MEMO SET button to store the selection and exit.

NOTE: To determine which filter (if necessary) is needed, first attempt to test without a filter, then proceed to filter 1 and possibly to filter 2.

Communication with External Devices

When operated with the proper cable, the DRI offers a variety of output and input abilities for bi-directional communication with external devices such as computers and data loggers.

Output Selection

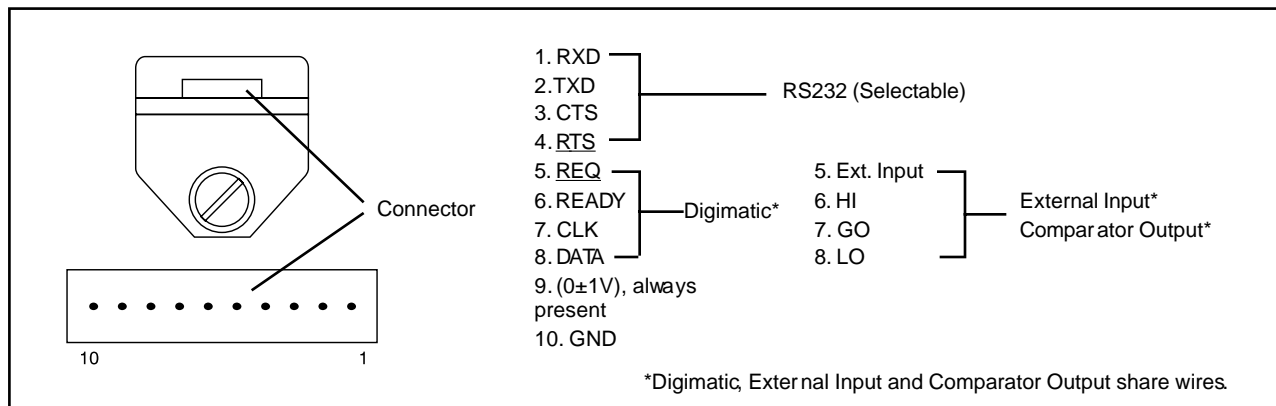
There are three output selections:

- *RS232*
- *Digimatic*
- *None*

Although there are only three output options, there are actually four outputs available; consult the chart below to determine the proper selection for the cabling and output desired:

DESIRED OUTPUT	CABLE PART #	MAIN DISPLAY
RS232	DFS-RS232	232
Digimatic	DFS-Digimatic	dG
Comparator	DFS-Comparator	232 or nonE
Analog	DFS-Analog	232, dG, or nonE

The following chart indicates the pin outs of the DRI connector:



Instructions to select the type of output are as follows:

1. Press the PEAK button while holding down the ON button. The small display will indicate “dSP”.
2. Press the PEAK button four times. The small display will indicate “OUT” and the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will scroll through “nonE”, “dG”, “232”. **NOTE:** If “RS232” is selected, please review the following section to set these specific output characteristics.
4. Press the MEMO SET button to store the selection and exit.

Communication With External Devices (continued)

RS232

Depending upon the type of data collection device that is being used with the DRI, it may be necessary to adjust the factory settings mentioned at the beginning of this manual. To adjust the RS232 output characteristics:

1. Select the RS232 output (following the above instructions) but do NOT press the MEMO SET button.
2. To set the baud rate, press the HI-LO button. The small display will indicate "bPS" and the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will scroll through "9600", "4800", "2400" and "1200".
4. To set the data length, press the HI-LO button; "dAT" will appear on the small display while the main display will indicate the current setting.
5. Each time the > button is pressed the main display will toggle between "8" and "7".
6. To set the stop pulse, press the HI-LO button. The small display will indicate "STP" and the main display will reflect the current setting.
7. Each time the > button is pressed, the main display will toggle between "1" and "2".
8. To set the parity, press the HI-LO button; "PRT" will appear on the small display and the main display will reflect the current setting.
9. Each time the > button is pressed, the main display will scroll through "nonE", "Eun" (even), "odd" (odd).
10. To set the data end code, press the HI-LO button; the small display will indicate "dEL" and the main display will reflect the current setting.
11. Each time the > button is pressed, the main display will toggle between "Cr" and "CrLF".
12. To set the software flow control, press the HI-LO button. The small display will indicate "fLO" and the main display will reflect the current setting.
13. Each time the > button is pressed, the main display will toggle between "on" and "oFF".
14. After selecting the software flow control, press the MEMO SET button to store the RS232 characteristics and exit.

Output Data Format

The following chart demonstrates the format of the data as it is output through RS232:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
CR	S	T	A	T	I	S	T	I	C	S		CR	LF
LF				S		g	f		1	0	0	CR	LF
U	N	I	T									CR	LF
D	A	T	A					1	0	0	0	CR	LF
M	A	X			—							CR	LF
M	I	N								1	0	CR	LF
P	K	C									0	CR	LF
P	K	T						1	1	0	0	CR	LF
A	V	G							9	1	2	CR	LF
D	E	V							8	.	2	CR	LF
H	L	M	T					1	0	0	0	CR	LF
L	L	M	T						9	0	0	CR	LF
CR	LF												
	D	A	T	A					9	1	5	CR	LF
		1											
		2		L					8	9	5	CR	LF
	9	9		H				1	0	0	5	CR	LF
1	0	0							9	9	0	CR	LF
	*	*		E	N	D		*	*				

Memory Data Output

Data may be output from memory by first pressing the RECALL button and then pressing the MEMO SET button. The main display will briefly indicate "oUt" to confirm that the data has been sent. The following chart indicates the order of the data output depending upon which memory mode was used:

ON-DEMAND	CONTINUOUS	STANDARD
STATISTICS	STATISTICS	Units
Units	Units	Max
DATA	DATA	Max
MAX	MAX	MIN
MIN	MIN	MIN
AVG.	PKC	LAST
DEV	PKT	**END**
HLMT	AVG	
LLMT	DEV	
	HLMT	
	LLMT	
DATA		
1 XXX		
2 XXXX	DATA	
3 XXXX	1 XXXX	
	2 XXXX	

Communication With External Devices (continued)

External Control Commands

The chart below lists the ASCII Capital Characters and their functions for controlling the DRI from a computer or other external device:

COMMAND	FUNCTION	DATA
UNTG	Change units to g or kg	
UNTN	Change units to N	
UNTL	Change units to lb or oz	
DSPN	Change mode to average	
DSPT	Change mode to peak tension	
DSPC	Change mode to peak compression	
PKCL	Peak clear reset	
MEMS	Display value stored in memory	
MEMC	Last data in memory clear	
MEMD	Memory data output	
MEMZ	Clear all data in memory	
MEMN	Memory location recall	
CPST	Upper and lower limit set	
Z	Tare	
UPD	Display update	1,2,3,4,5
APF	Auto – power – off	0,3
EXS	External input setting	Z,H,N
HLD	Hold trigger mode	E,L,O,C
LOG	Memory mode setting	S,C,N
PKF	Peak fast mode	0,1
DAF	Analog output setting	0,1
ADF	Filter setting	0,1,2
D	Output display data	
DATN	Output average mode data	
DATT	Output tension peak data	
DATC	Output compression peak data	
LIST	Gauge's present state	
AB	Stop continuous data output	
BB	Continuous data output request	
BC	Model name confirmation request	
BD	Units confirmation request	

External Control Command Descriptions

ASCII capital characters

- UNTG, UNTN, UNTL - Change UNITS to Kg, N, lb

UNTG CR... Kg(g)

UNTN CR... N

UNTL CR... lb (oz)

- DSPN, DSPT, DSPC - Change to average, peak tension, peak compression mode

DSPN CR... Change to average mode

DSPT CR... Change to peak tension mode

DSPC CR... Change to peak compression

- PKCL _____ Peak Clear

PKCL CR.... Peak reset. Same as reset from the gauge. If edge trigger is selected for HOLD, the PC can release the HOLD using this particular command.

- MEMS, MEMC, MEMD, MEMZ, MEMN (five control memory commands)

MEMS CR.... with this command if gauge is set in the ON-DEMAND (single) mode, it sends back to the computer the word SING. If gauge is set in the continuous or standard mode then when this command is sent and the gauge's memory starts, it sends back to PC the word STA. If memory stops, the word STP is sent back to the PC.

MEMC CR.... Last DATA in memory to clear

MEMD CRMemory DATA recall

MEMZ CR ... Clear all DATA in memory

MEMN CRMemory location recall

- CPST _____ Comparator Setting

CPST 0 0000 0 0000 CR
SIGN UPPER LIMIT SIGN LOWER LIMIT

Example: CPST 1234-0123 CR
SPACE need 4-digit # (fill with zeros)

- Z _____ TARE

Z CR To TARE. Works the same way as if it were done thru the gauge i.e SHIFT + ZERO.

- UPD _____ Display Update Time

UPD CR = 1: 0.125 sec.

2: 0.25 sec.

3: 0.5 sec.

4: 1 sec.

5: 2 sec.

Communication With External Devices (continued)

Digimatic

Digimatic output is used for Mitutoyo data collectors and printers (refer to RS232 memory data output instructions).

Analog

Analog output is very linear and can have a high response time (1mS). This voltage is directly related to the unit of measurement.

Specifications:

Voltage: -1VDC~0~+1VDC

Load Impedance: 2K or higher

Response Time:

1mS - with analog output mode "on"

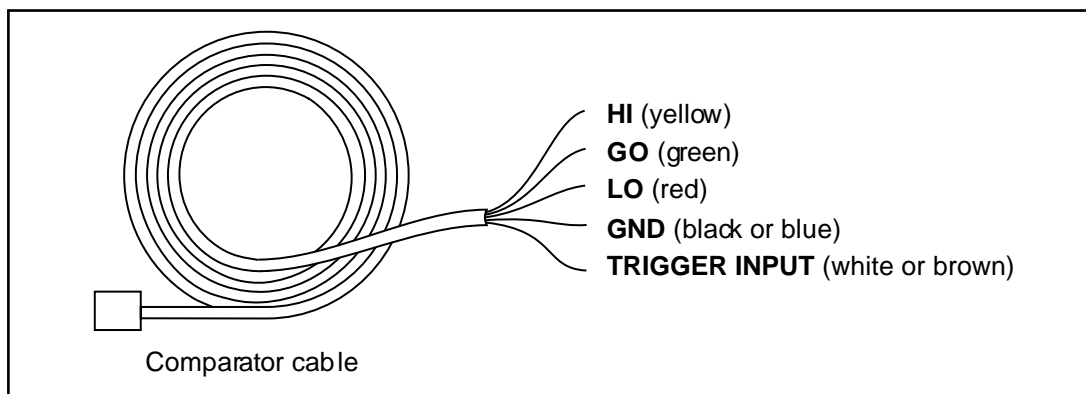
display update time - with analog output mode "oFF"

To change analog output mode:

1. Press the PEAK button while holding down the ON button; "dSP" will appear on the small display.
2. Press the PEAK button seven times. The small display will indicate "dAf" and the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will toggle between "on" and "oFF".
4. Press the MEMO SET button to store analog output mode and exit.

Comparator

Once high and low limits have been set (refer to "Setting High and Low Limits" section), the comparator output may be used to turn on a light or sound an alarm for "go - no go" testing.



HI point is defined as: $HI < Data$ (display)

OK or GO is defined as: $LO \leq Data \leq HI$

LO point is defined as: $LO > Data$

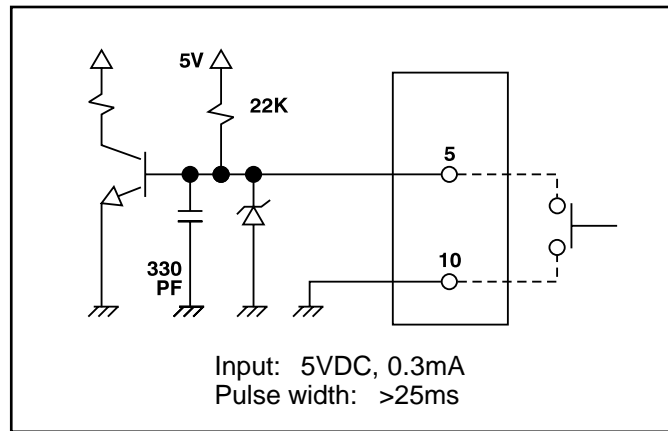
NOTE: The comparator cable is also used for external control input (see following section).

Communication With External Devices (continued)

External Control Input

NOTE: To activate the comparator cable, either “RS232” or “nonE” needs to be selected under outputs.

Using external control input makes it possible to remotely tare or hold the display. The following diagram indicates the pin outs of the DRI:



To select external input:

1. Press the PEAK button while holding down the ON button. The small display will indicate “dSP”.
2. Press the PEAK button five times; “ET” will appear on the small display while the main display will reflect the current setting.
3. Each time the > button is pressed, the main display will scroll through “tArE”, “HoLd”, “nonE”.
4. A) If “nonE” or “tArE” is desired, push the MEMO SET button to store the selection and exit.
B) If the “HoLd” feature is desired, push the HI-LO button to set additional characteristics; the small display will indicate “EL” and the main display will reflect the current setting.
5. Each time the > button is pressed, the main display will toggle between “EdG”(edge trigger) and “LEu”(level trigger).
6. Push the HI-LO button after selecting the type of trigger; the small display will indicate “OPC” and the main display will reflect the current setting.
7. Each time the > button is pressed, the main display will toggle between “oPn”(open) and “CLS” (closed).
8. Push the MEMO SET button to store the type of trigger and exit.

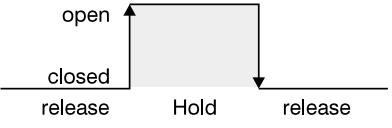

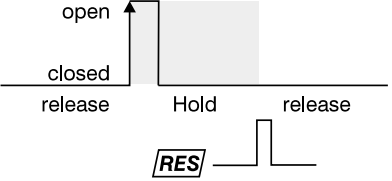
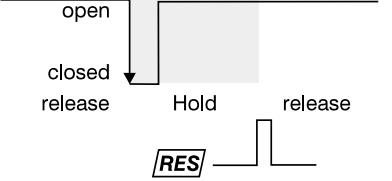
Communication With External Devices (continued)

External Tare

To tare, short pins 5 and 10 for at least 25mS.

External Hold

Choose edge or level trigger and also OPEN or CLOSED condition.

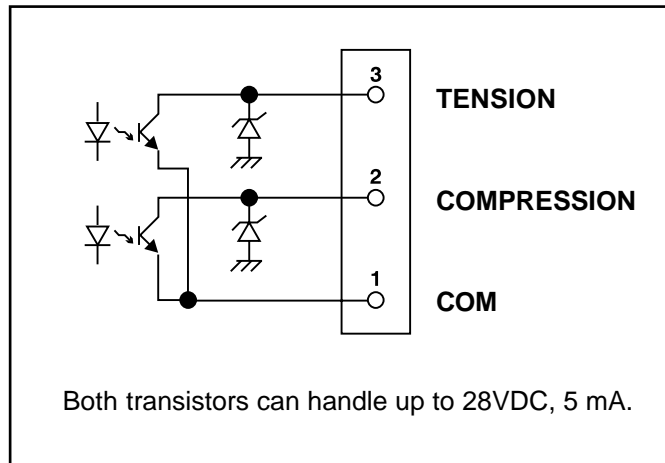
<p>Level trigger: OPEN Display holds present value when switch opens.</p>	
<p>Level trigger: CLOSED Display holds present value when switch closes.</p>	
<p>Edge trigger: OPEN Display holds present value after switch opens until it is reset.</p>	
<p>Edge trigger: CLOSED Display holds present value after switch closes until it is reset.</p>	

HOLD cannot be released from an external source in the edge trigger mode. To release it press RESET. Level mode can be released externally.

Communication With External Devices (continued)

Overload Output

The DRI possesses an overload output feature (DFS-CTRLCABLE) to protect the load cell or torque sensor. When the load exceeds 150% of its capacity, an open collector transistor turns ON (there are two OC NPN transistors, one for tension and one for compression). The output of these transistors can be used as an alarm or to stop a process, thus protecting the remote sensor or the sample under test. See “Display and Keypad” section for the location of the overload output port.

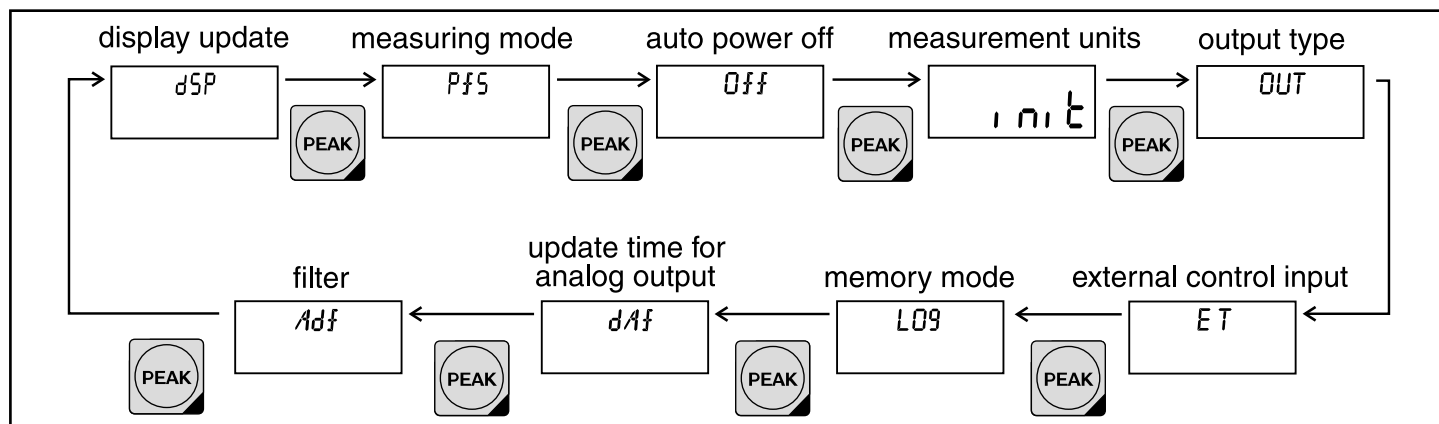


NOTE: This output is always active, therefore no parameter selection is necessary.

Parameter Settings

The DRI will default to certain parameters when power is turned OFF and ON. To access the parameter settings:

1. Press the PEAK button while holding down the ON button; the small display will indicate “dSP”.
2. Each time the PEAK button is pressed, the DRI will scroll through each of the parameters.



3. Press the RESET button to exit.

See the chart below for the location of descriptions of the options within each parameter.

DESCRIPTION	DISPLAY	OPTIONS
Display Update Time (see page 6)	dSP	(in seconds) 0.125, 0.25, 0.5, 1, 2
Measuring Mode (see page 5)	Pff	on, oFF
Auto Power Off (see page 18)	Off	nonE, 3
Measurement Units (see page 5)	unit	English, Metric, or Newton Load Cells: Lb(oz), Kg(g), N Torque: Lbl(oZI), KgC(gC), NCM
Output Type (see page 9-13)	OUT	nonE, dG, 232C
External Control Input (see page 14-15)	ET	nonE, tArE, HoLd
Memory Mode (see page 7)	LOG	nonE, SinG, Cont
Update time for Analog Output (see page 13)	dAf	on(1ms), oFF(display update time)
Filter (see page 8)	Adf	0, 1, 2

Low Battery Indication

The batteries should be changed when “LO BAT” appears on the display.

NOTE: Parameters and data in memory can be saved if the AC adapter is plugged in and the DRI is left ON before removing the batteries.

Auto Power Off

The DRI incorporates a selectable auto power off feature to protect the life of the batteries. If no buttons are pressed or the display has not changed for a period of three minutes, the DRI will automatically shut off. This feature is inactive if the DRI is being used with the AC adapter or if it is in calibration mode. To engage or disengage the auto power off feature:

1. Press the PEAK button while holding down the ON button; the small display will indicate “dSP”.
2. Press the PEAK button two times. The small display will indicate “Off” and the main display will reflect the current setting.
3. Each time the > button is pressed the main display will toggle between “3” and “nonE”.
4. Press the MEMO SET button to store the auto power off selection and exit.

Calibration

Any remote sensor (LC or TS) can be calibrated in the field. The load cells are very easy to calibrate with metric weights, but the torque sensors require a “calibration wheel” (please call Shimpo for torque calibration instructions).

Required items for load cell calibration:

- *Appropriate calibration weight (see following table)*
- *Proper attachment for applying the weight to the load cell (either tension or compression)*
- *Secure mounting stand that will not introduce vibration*

Instructions to calibrate a remote load cell are as follows:

1. Mount the load cell to the stand.
2. Secure the attachment to the load cell.
3. Make sure the power on the DRI is turned OFF.
4. Plug in the remote load cell to the DRI
5. While holding down the MEMO SET button, press the ON button and hold until the main display shows “CAL”. The small display will reflect the two-digit code that corresponds with the load cell (see following calibration table). If the DRI did not recognize the sensor, the small display will reflect “XXX”.
6. Press the MEMO SET button. The capacity of the load cell will appear on the main display; please move on to step 7. If the remote sensor was not identified, the display will default to the eight ounce load cell. Use the > button to select the proper code for the remote sensor (see the following table).
7. Press the MEMO SET button. The small display will show “PLS”. Pressing the > button will toggle the small display “MNS” and “PLS”. If calibrating under a compression load choose “PLS”. If calibrating under a tension load choose “MNS”.

NOTE: Only one direction calibration is necessary.

8. Press the MEMO SET button. The minimum indicator will appear and the main display will reflect a hexadecimal number that has no relevance to the user.
9. Confirm that there is no load (except for the attachment) since the DRI is ready for zero point calibration. Press the MEMO SET button. The small display will exhibit “SCN” and the minimum indicator will blink for about 12 seconds until the maximum indicator appears.
10. Gently place the proper calibration weight (see the following table) on the load cell and confirm that it is steady. Press the MEMO SET button to begin full scale calibration. The maximum indicator will flash for about 18 seconds until the small display shows “ENd”.
11. “ERR” will appear on the display if the calibration failed. Turn the power off and repeat the entire procedure.
12. After “ENd” appears, press the OFF button to end the calibration process.

Calibration (continued)

MODEL	SELECT NUMBER	DISPLAY	CALIBRATION WEIGHT
LC-50S	06	50L	25kg
LC-100S	07	100L	50kg
LC-200S	08	200L	100kg
LC-500S	10	500L	250kg
TS-3SD, TS-3J	18	t50o	
TS-10SD, TS-10J	19	t10L	
TS-20SD, TS-20J	20	t20L	
TS-50SD, TS-50J	21	t50L	
TS-100SD, TS-100J	22	t100L	

Please call Shimpo for information on additional sensors.

Troubleshooting

The following are general checkpoints; please call your local Shimpo representative or contact Shimpo Instruments directly for further assistance.

The DRI does not turn on:

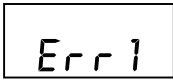
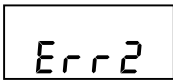
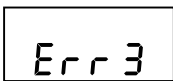
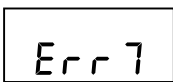
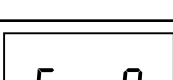
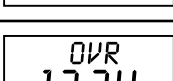
- *Check all electrical components (power source ... battery or power cord)*

The DRI does not recognize a sensor:

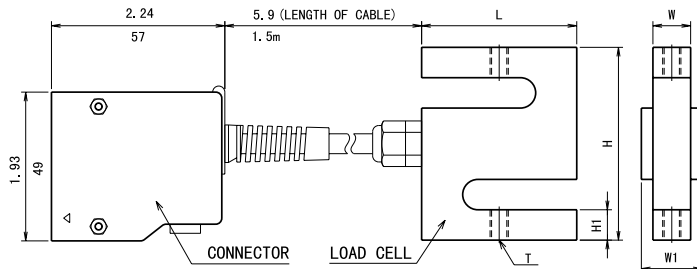
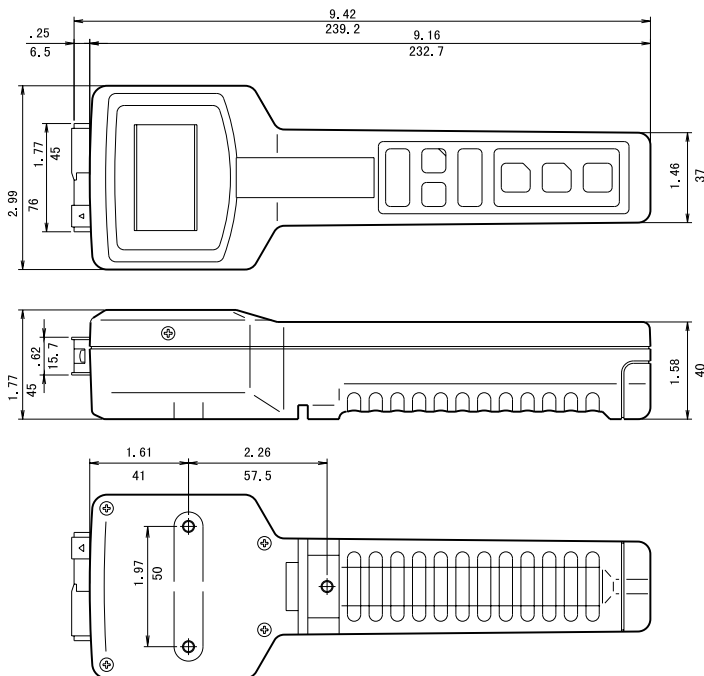
- *Check connection between the DRI and the remote sensor*
- *Refer to calibration instructions for a sensor that cannot be recognized*

Error Codes are displayed:

- *If any error codes appear on the display, turn power OFF and then ON*
- *If error code remains, see table below:*

DISPLAY	CONDITION	ACTION
	EE PROM reading error	Press RESET; unit will default to factory settings
	Memory data error	Press RESET to clear memory
	Calibration error	Press RESET and repeat calibration procedure
	Memory unit error; occurs if the measurement unit (lb, Kg, N) is changed while entering data into memory	Change measurement units or clear memory
	Sensor error; occurs if the remote sensor is changed during data entry to memory	Change sensor or clear memory
	Overload condition –possible load cell damage	Remove excessive load; if the display does not return to normal operation, send unit in for repair

Dimensions and Specifications



CAPACITY	H	H1	L	T	W	W1
50lb (25kgf)	2.5	.39	2.0	M6	.49	.79
100lb (50kgf)	63.5	10	51		12.4	20
200lb (100kgf)	3.0	.50	2.0	M10	.75	1.06
500lb (250kgf)	76.1	12.7	51		19	27

in
mm

SPECIFICATIONS

MODEL	DRI
Sensor	Interchangeable w/Shimpo force & torque sensors
Display	5 digit 0.47"(12 mm) high with various indicators including low battery indication and minus sign
Measuring Mode	Average, peak compression(CW), peak tension(CCW) (selectable)
Display Update	125 msec, 250 msec, 500 msec, 1 sec, 2 sec (selectable)
Sampling Rate	1000 sample/sec
Outputs	1.RS232C 2.Digimatic:(works with Mitutoyo's printer model DP-1HS) 3.Analog:(±1 VDC 1000 times/sec update)
Comparator Output (Set Point)	Three open collector NPN transistors for HI, GO and LO (28 VDC, 7 mA max.)
Overload Output	Two open collector NPN transistors one for tension and one for compression (28 VDC, 5 mA max.)
Tare & Hold Control	Relay contact (tare or hold selectable)
Memory	Hold 100 samples plus statistics (MAX, MIN, AVG, and Standard Deviation)
Power	4-AA alkaline batteries. Last approx. 20 hrs. in continuous operation or AC adapter for continuous use (6 or 9 VDC, 200 mA)
Auto Power Shut-Off	Selectable (3 minutes if there is no activity)
Operating Temperature Range	32 to 113°F (0 to 45°C)
Dimensions	3" W × 1.77" H × 9.42" L (76 mm × 45 mm × 239.2 mm)
Standard Accessories	AC adapter, (4) AA batteries, DRI output connector, Overload protection cable (DFS-CTRLCABLE), Plastic carrying case

Warranty

LIMITED EXPRESS WARRANTY: Shimpo Instruments warrants, to the original purchaser of new products only, that this product shall be free from defects in workmanship and materials under normal use and proper maintenance for one year from the date of original purchase. This warranty shall not be effective if the product has been subject to overload, misuse, negligence, or accident, or if the product has been repaired or altered outside of Shimpo Instruments's authorized control in any respect which in Shimpo Instruments's judgment, adversely affects its condition or operation.

DISCLAIMER OF ALL OTHER WARRANTIES: The foregoing warranty constitutes the SOLE AND EXCLUSIVE WARRANTY, and Shimpo Instruments hereby disclaims all other warranties, expressed, statutory or implied, applicable to the product, including, but not limited to all implied warranties of merchantability and fitness.

LIMITATION OF REMEDY: Under this warranty, Shimpo Instruments' SOLE OBLIGATION SHALL BE TO REPAIR OR REPLACE the defective product or part, at Shimpo Instruments' option. Shimpo Instruments reserves the right to satisfy warranty obligation in full by reimbursing Buyer for all payments made to Shimpo Instruments, whereupon, title shall pass to Shimpo Instruments upon acceptance of return goods. To obtain warranty service, Purchaser must obtain Shimpo Instruments's authorization before returning the product, properly repackaged, freight pre-paid to Shimpo Instruments.

INDEMNIFICATION & LIMITATION OF DAMAGES: Buyer agrees to indemnify and hold Shimpo Instruments harmless from and against all claims and damages imposed upon or incurred arising, directly or indirectly, from Buyer's failure to perform or satisfy any of the terms described herein. In no event shall Shimpo Instruments be liable for injuries of any nature involving the product, including incidental or consequential damages to person or property, any economic loss or loss of use.

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