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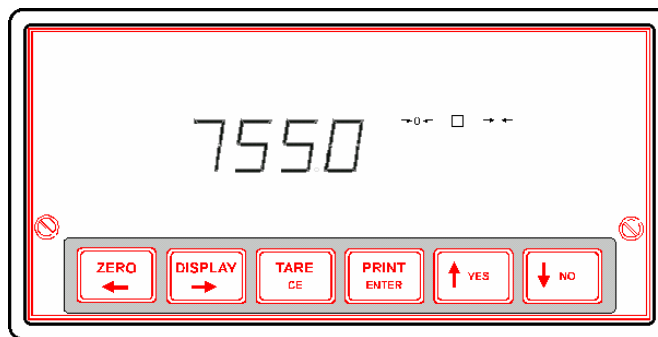
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Section 1.1

INTRODUCTION



This flexible, yet powerful, series of digital strain gage transducer indicators were developed from a family of precision pressure calibrators. It is the ideal solution for meeting the measurement and display requirements of industrial applications.

The standard product may be made even more powerful through the selection of options to detect preset alarm points, sense speed, calculate work (HP), and provide a digitally derived analog signal to communicate with other devices.

Section 1.2

FEATURES

Input

Accuracy	≤ .02% FS @ 2mV/V Input
Excitation Supply	10 VDC @200 mA
Signal Input Range	0.5 to 3.4 mV/V
Signal Sensitivity	0.15 μ V/graduation
Conversions/Second	20
Analog Filtering	Active 2 Hz or wide band
Digital Filtering	Selectable 1-99

Power Supply Requirements

AC Supply Voltage	120 VAC/60 Hz
-------------------	---------------

Display

Resolution	Selectable by 1, 2, 5, 10, 20, 50, or 100 counts
Range	± 50,000
Decimal Point	Selectable Position
Force Display	6 Digit (7 Segment, .55" LED)

Analog Output

16 bit	(D/A) Scaled & Linearized
Voltage	0 to ±5 VDC
Impedance	≤ 600 Ω
Resolution	10 VDC/50,000 Counts (Std)

User Configurable Linearization

User defined linearization function as a 10 point piece-wise linear approximation. Set up to 10 values corresponding to 10 readings

Dual Limits

Number of Bands:	Two
Trip Point Range:	0 to ± 100% Full Scale
Output: <u>Relay</u> :	Form C Contact Closure
Max Current	

AC(resistive load) 120 VAC: 1A

AC(resistive load) 220 VAC: 1/2 A

DC(resistive load) : 1/2 A

Logic: One Logic output for each trip point.

Logic "0" when trip point energized:

Configuration: Can be set for "ACCEPT" band or trip pts.
Trip point resolution and hysteresis digitally configurable.

RPM/Horsepower

Horsepower is calculated from RPM and torque values measured.

RPM

Input Frequency Range:	2Hz to 50KHz
Input Symmetry:	80/20% Max Duty Cycle
Input Amplitude:	1 V P-P min to 70V P-P max
Accuracy:	0.1%
Gear Tooth Range:	2-999 Selectable
Response Time:	50ms > 50Hz
Display Units:	Selectable RPM, rad/sec

Horsepower

Resolution:	.001 to 50 HP
Units:	Selectable HP, ftlb/sec, BT/min, and Watts
Accuracy:	Function of RPM and Torque (.01% and .02%)

Section 1.3

MODEL 7550 PHYSICAL CHARACTERISTICS

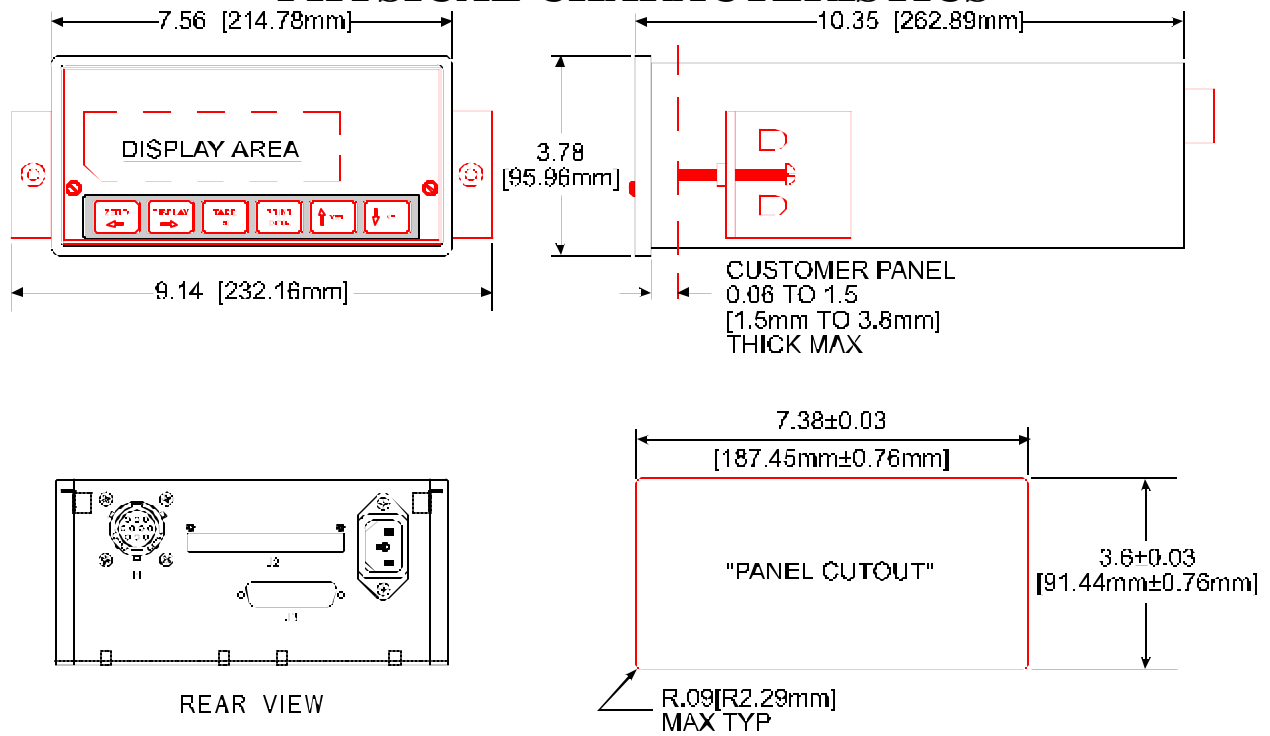


Figure 1-1, Dimensions and Perspectives

Section 1.4

LIMITED WARRANTY

(Liability for Repair and Replacement Only)

The Company's products are warranted to be free from defects in material and workmanship for one year from date of shipment from the factory. The Company's obligation is limited to repairing, or at their option, replacing products and components which, on verification, prove to be defective, at the factory in Troy, Michigan. The Company shall not be liable for installation charges, for expenses of Buyer for repairs or replacements, for damage from delay or loss of use, or other indirect or consequential damages of any kind. The Company extends this warranty only upon proper use of the product in the application for which it was intended and does not cover products which have been modified without the Company's approval or which have been subjected to unusual physical or electrical stress, or upon which the original identification marks have been removed or altered. Transportation charges for material shipped to the factory for warranty repair are to be paid by the shipper. The Company will return items repaired or replaced under warranty prepaid. No item shall be returned for repair without prior authorization from the Company.

Whenever the design of the equipment to be furnished or the system in which it is to be incorporated originate with the buyer, manufacturer's warranty is limited specifically to matters relating to furnishing of equipment free from defects in material and workmanship and assumes no responsibility for implied warranties of fitness for purpose or use.

Section 2.1

INSTALLATION AND WIRING

Unpacking And Inspection

When received, carefully remove the instrument from its shipping container. A visual inspection of the instrument's external surfaces should be performed immediately after unpacking. If obvious damage has incurred during transit, the shipping agency should be notified as soon as possible. Instructions as to how to proceed after assessment of the damage will then be determined.

If the instrument shows no signs of damage, check to be sure all the required equipment and accessories have been received.

Repacking

If at any time, the Model 7550 must be returned for repair, recalibration or modification, please be sure that it is properly cushioned and packed and that a description of the work to be performed is included. If at all feasible, the original carton should be retained for just this purpose.

Rear Panel Configuration

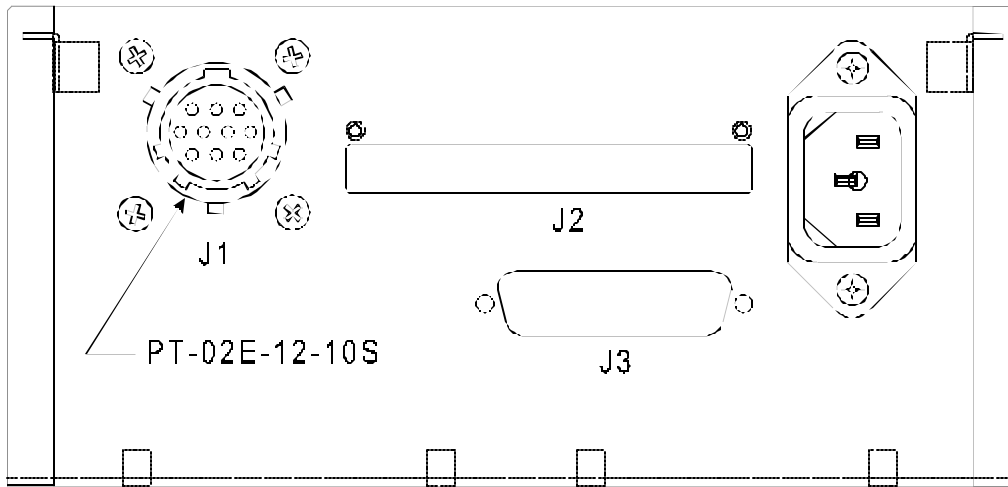
The rear panel of the Model 7550, contains the AC power cord input receptacle, receptacle J1 (PT-02E-12-10S), the unit's identification plate and if required, the optional connectors, J2 (screw terminal connector), and J3 (25 pin "D" connector) for Serial I/O communication interface.

Connector J3 Output

Table 2-1, J3 Connector

PIN	FUNCTION
1	RELAY 1 NORMALLY CLOSED
2	RELAY 1 NORMALLY OPEN
3	RELAY 1 COMMON (ISOLATED FROM ALL OTHER COMPONENTS)
4	NOT USED
5	RELAY 2 NORMALLY CLOSED
6	RELAY 2 NORMALLY OPEN
7	RELAY 2 COMMON (ISOLATED FROM ALL OTHER COMPONENTS)
8	NOT USED
9	SPEED SENSOR / INPUT FROM SENSOR
10	SPEED SENSOR COMMON (COMMON WITH J3 PIN 7 – RS232 DB25)
11	POWER SUPPLY FOR SPEED SENSOR (12 VDC)
12	NOT USED
13	4-20 MA OUTPUT* (VOLTAGE OUTPUT IS DEFAULT)
14	COMMON FOR VOLTAGE/MILLI-AMP OUTPUT (ISOLATED FROM ALL OTHER COMMONS)
15	VOLTAGE OUTPUT -5 TO +5 (DEFAULT) OR 0-10 VDC
16	NOT USED

Note: Voltage output is the default configuration. If 4-20 mA output is desired, a recalibration of the A/D is necessary. Consult section 7.3 entitled "ANALOG SETUP PARAMETERS."



REAR VIEW

Figure 2-1, Rear View

Section 2.2

HARDWARE CONFIGURATION & WIRING

The CPU board in the Model 7550 series has been designed for easy access to wiring and configuration of all available inputs and outputs. In addition to easy access, the wire and configuration mapping provide clear labeling of all input and output signals and the associated configurations of their device drivers.

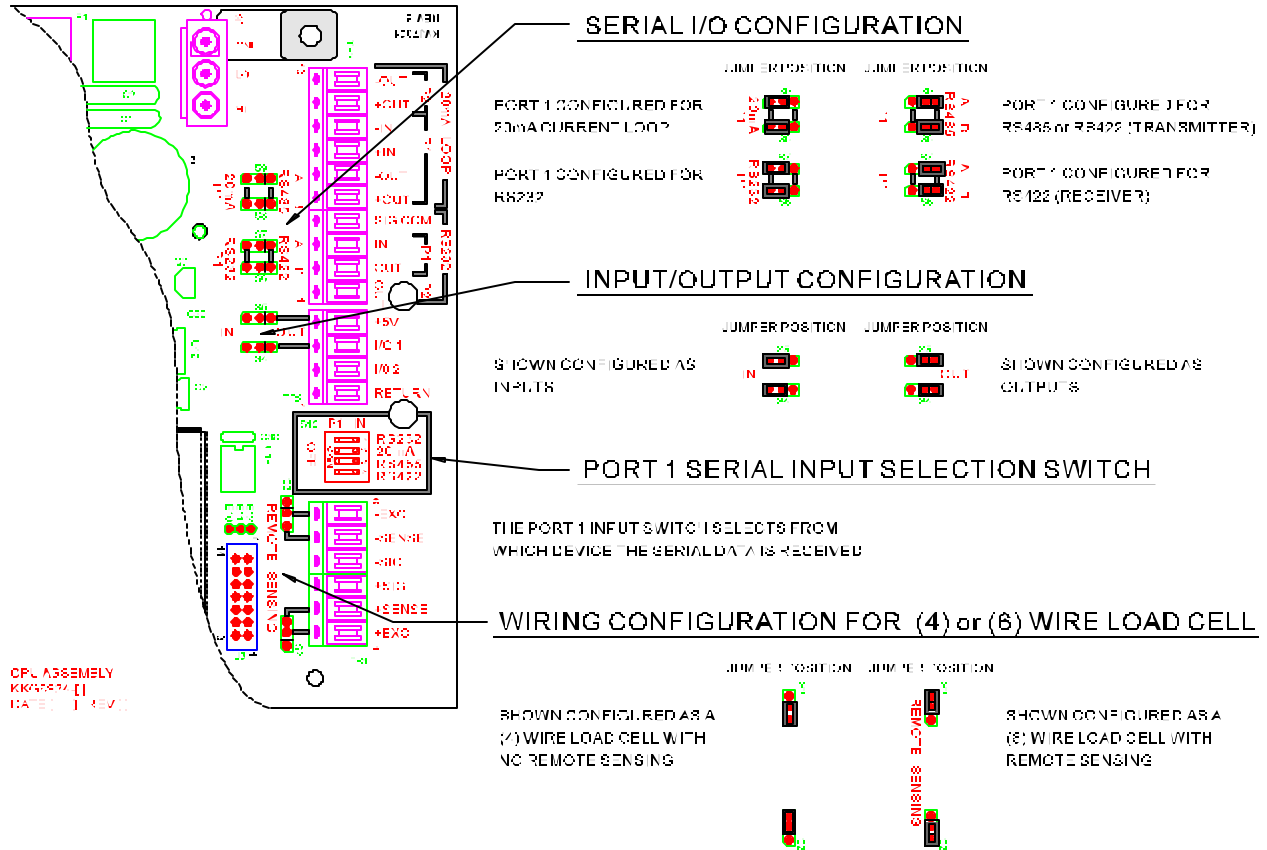


Figure 2-2, CPU Board

4 WIRE SYSTEM

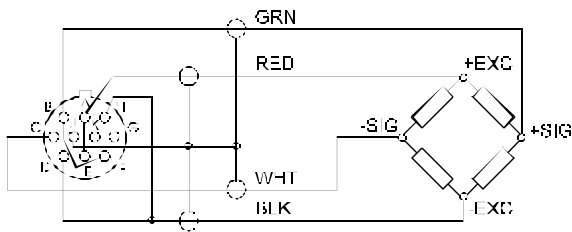


Figure 2-3, 4 Wire System

6 WIRE SYSTEM

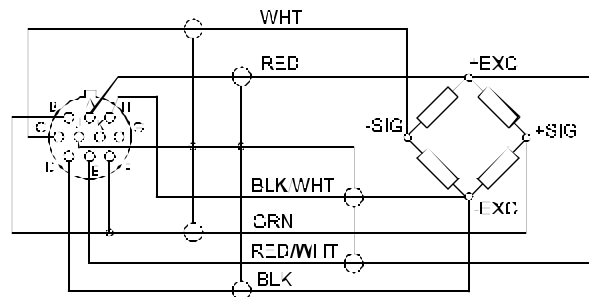


Figure 2-4, 6 Wire System

Section 3.1

FRONT PANEL LAYOUT

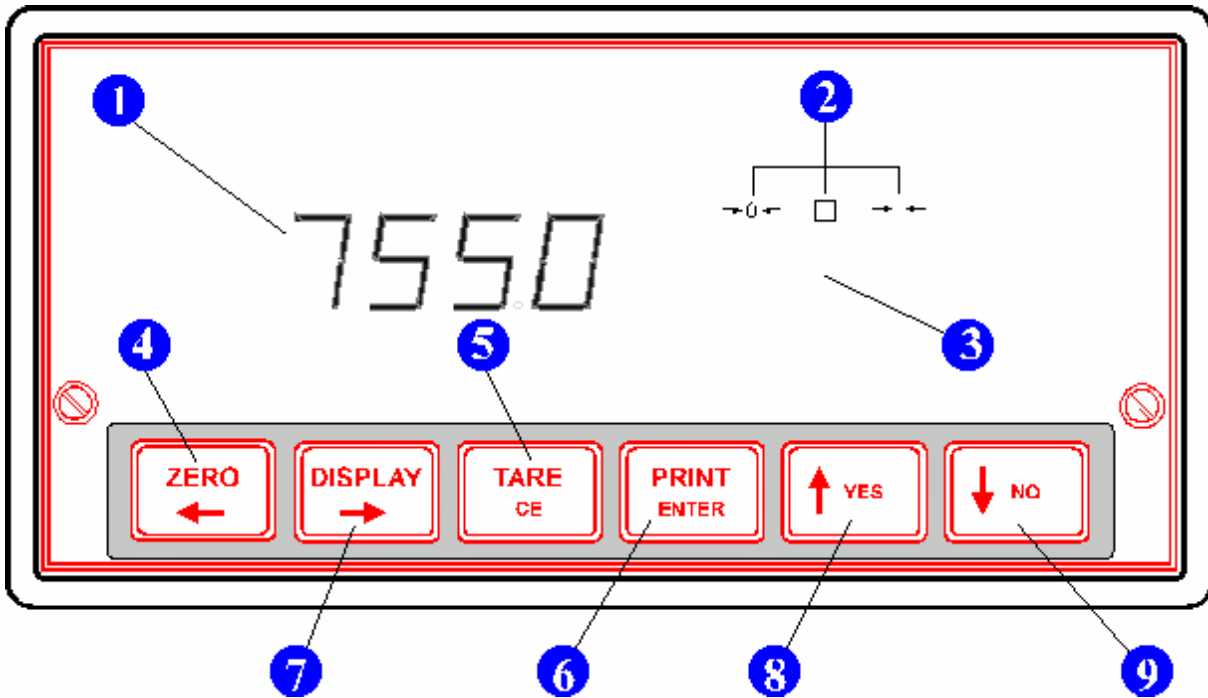



Figure 3-1, Front Panel


- 1 Six Digit LED display of measured force.
- 2 Three Annunciators. One of the LED's is used for indicating whether the unit is operating at center of zero ($\rightarrow 0 \leftarrow$) or in motion (). The LED marked $\rightarrow \leftarrow$ indicates that the unit is in the delta P display mode (Tare/Offset applied).
- 3 Eight Character LED display for indicating the conversion units that measured force data is currently being displayed in. This display also scrolls prompting messages if corrective action is required or a problem occurred in performing an operation.

Example: If attempting to perform a push to ZERO while force data is in motion, the display would scroll the following message.


Unit is in MOTION.

- 4  function key. This key allows the indicator to be zeroed if it is within the limits defined by the ZERO configuration.


5

TARE  function key. The AUTO TARE (Auto.tr) feature is enabled in the CONFIGURATION mode under the ZERO SET selection. When AUTO TARE is enabled, pressing the TARE key will automatically tare out the value of the current force display reading and shift the display to the ΔF mode. A fixed TARE can also be selected, be enabled, and entered in the CONFIGURATION mode under the ZERO SET selection.

6



PRINT  key. Issues a demand serial print out of the display data from the indicator.

7

DISPLAY  key. In the normal operating mode this key is used to select and view all active displays that were enabled in the configuration mode (i.e., force data, MIN/MAX data, Freeze mode data, and delta F display mode data).

8







and 9

UP  and **DOWN**  arrow keys step through and display the data in the conversion units that were selected in the configuration mode.


Section 3.2

FRONT PANEL FUNCTIONS


Entering a FIXED TARE:

1. Press the **TARE**  key.
2. Press the **DOWN or UP**  ,  arrow key to increment or decrement the value of the least significant digit. The selected digit to be changed will be flashing.
3. Use the **HORIZONTAL**  ,  arrow keys to move to the next desired digit position.
4. Repeat step 2.
5. When the Fixed Tare value is ready to be entered, press the **ENTER**  key to accept the value and return the indicator to the NET mode display.

Recalling TARE and GROSS data:

1. In the NET operating mode GROSS weight (RCL GR) and the current stored TARE value (RCL TR) may be recalled by pressing the **DISPLAY**  key.
2. After displaying the RECALLED GROSS or RECALLED TARE data for approximately 3 seconds the display will automatically return to the normal operating NET mode display.

Returning to GROSS mode from NET mode:

1. To return the display from NET mode to GROSS mode remove the live load.
2. Perform a ZERO by pressing the **ZERO**  key. The scale is re-zeroed and the stored TARE value is zeroed out.

Section 3.3

PEAK/ TRACK HOLD (MIN/MAX) FEATURE

General:

The Min and Max mode is designed to capture and store the highest and the lowest torque readings in the unipolar or bipolar modes . These values may be recalled at any time in the normal operating mode by repeatedly pressing the **DISPLAY** key until the desired value is displayed. When either the MIN or the MAX value is selected the alphanumeric display will flash between the mode (MIN or MAX) and its units.


Note - The MAX and MIN torque data is automatically converted to any of the active conversion units by stepping through the conversion units using the **UP** or **DOWN** arrow keys.

The MAX and MIN data is stored in non-volatile memory and therefore will not be lost when power is removed from the meter.

Both the MINIMUM and MAXIMUM mode are independent of each other and are enabled (turned **ON**) in the CONFIGURATION mode. These are off by default and **MUST** be turned on to see any of the following displays.

Displaying The Min And Max Values:



To display the MIN or MAX value.



1. Press the  key until the desired reading is shown on the display.

NOTE: When either the MIN or MAX value is on the LED display the alphanumeric display will flash between MIN or MAX and the current engineering units.

Converting Units With Min and Max Values:



To convert the engineering units of the MIN or MAX value.

1. Press the  or  arrow key until the desired engineering unit is displayed on the alphanumeric display.

NOTE: Once the engineering base units are changed by a conversion with the  or  arrow keys they will remain at that base for all display modes (i.e. MIN / MAX) until another base is set through a conversion.



Resetting Min and Max Values:

To reset the stored MIN or MAX value:

1. Select the MIN or MAX display to be reset using the  key.
2. Press the  key. The appropriate scrolling message will appear on the alphanumeric display.

RESET MAX? YES OR NO

RESET MIN? YES OR NO

3. At the display prompt shown above, press the  key to reset the value or press the  key to abort resetting the value.

Note: MIN and MAX data work with the standard torque, not ΔT (delta Torque) data.

Examples:

If the MIN and MAX are enabled, the following example values will be stored for the recorded readings:

1. Readings: 20, 50, 100, 300 and 500
MAX: 500 MIN: 20
2. Readings: -100, -50, 0, 20 and 50
MAX: 50 MIN: -100
3. Readings: -500,-200, -50, -20 and -10
MAX: -10 MIN: -500

Section 4.1

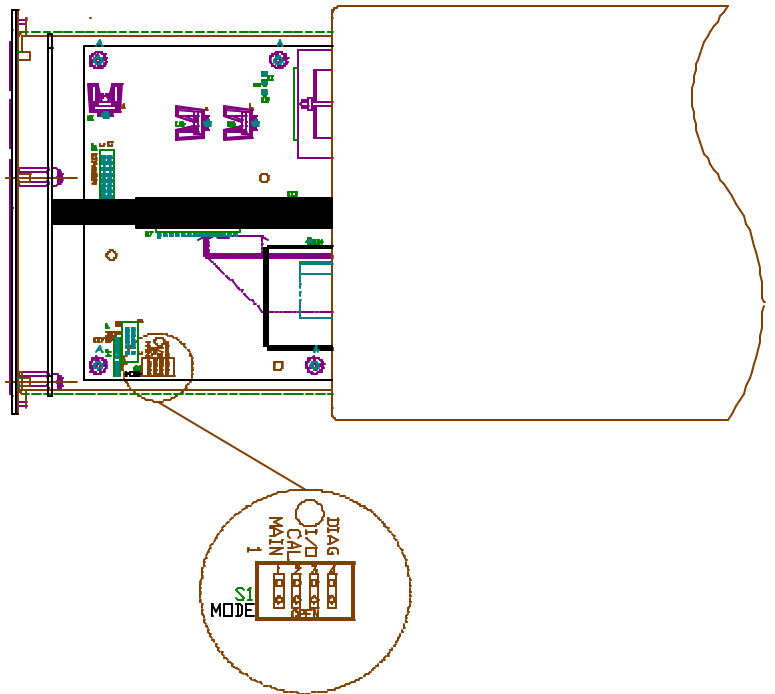
SET-UP MENUS

General:

This indicator has been designed to perform configuration and calibration both quickly and effortlessly. With the flip of a mode selection switch an indicator can be set up to operate within minutes. In the configuration modes the 7550 provides prompting messages to assist the operator in setup thereby reducing the tedious task of searching through instruction manuals.

Mode Selections Switch (S1):

- MAIN** - Allows access to the configuration and calibration modes.
- CAL** - Accesses the calibration mode directly.
- I/O** - Allows direct access to the set up of the Serial I/O Ports (Ports 1&2), Analog output, Discrete inputs/outputs.
- DIAG** - Accesses a diagnostic mode for trouble-shooting and evaluation.



SWITCH (S1)				
SW. POSITION				FUNCTION
1	2	3	4	
O	O	O	O	NORMAL OPERATE MODE
C	O	O	O	MAIN SET UP MODE
O	C	O	O	CALIBRATION MODE
O	O	C	O	I/O SET UP MODE
O	O	O	C	DIAGNOSTIC MODE

O = OPEN
C = CLOSED

Figure 4-1, Dipswitches

Figure 4-2, Setup Modes

The Main Menu Overview

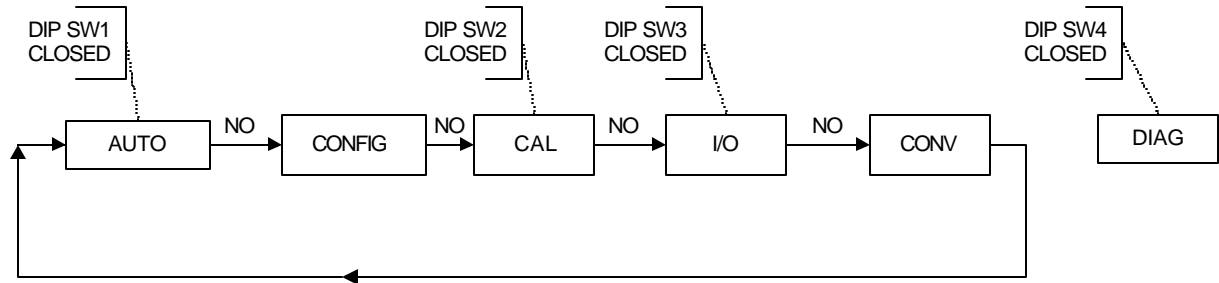


Figure 4-3, Main Menu Chart



THIS KEY selects the next menu entry.



THIS KEY selects the entry (such as AUTO, CONFIG, etc) shown on the Alpha-Numeric Display.

No other front panel keys are active at this time.

DIP SW1 allows movement to menus AUTO, CONFIG, CAL, I/O and CONV.

DIP SW2 is a shortcut to the CAL menu and allows input in the CAL menu only.

DIP SW3 is a shortcut to the I/O menu and allows input in the I/O menu only.

DIP SW4 is the only way to enter the DIAG routine.

Section 4.2

MODEL 7550 SERIES AUTO SETUP

Auto Setup Mode Selection

The AUTO setup feature automatically loads pre-determined profiles into the memory of the instrument. It does not calibrate the instrument. This feature can save you time IF you are using a full 10 point linearization.

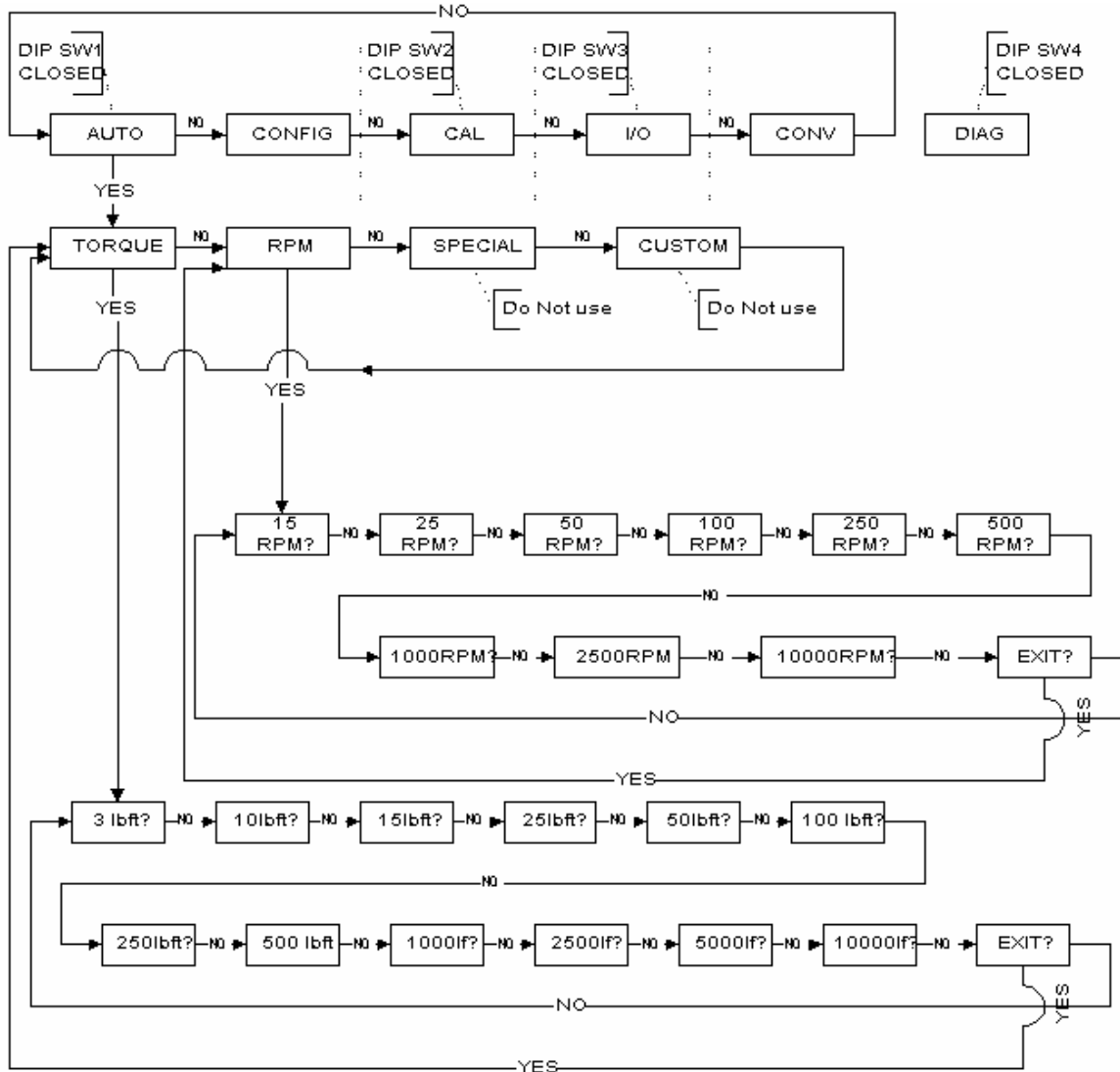






Figure 4-4, Automenu

Entering Automode

1. To get into the Automode, you first need to enter the configuration mode. You can do this by closing DIP switch 1.
2. Press to step down through the menu steps or to go to the previous menu step until the display says "AUTO?". Then select to enter the Automode.

3. Within Automode,  the **NO** selects the next menu entry.  the **YES** selects the entry (such as AUTO, CONFIG, etc) shown on the Alpha-Numeric Display.
4. Press  or  to change the current configuration of the selected parameter.
5. The CONFIGURATION mode may be exited at anytime by pressing the 'CE' key. If the CE key is pressed the prompt shown below will scroll continuously until the **YES** or **NO** key is pressed. Be sure to open switch 1 to get back to normal operating mode.

Default Tables: Torque 1 Of 2:

Table 4-1, Torque

PARAMETER	# 1 3 lbft	# 2 10 lbft	# 3 15 lbft	# 4 25 lbft	# 5 50 lbft	# 6 100 lbft	# 7 250 lbft	# 8 500 lbft
<u>CAL</u>								
CAPACITY	3	10	15	25	50	100	250	500
CT-BY	0.0005	0.001	0.002	0.002	0.005	0.01	0.02	0.05
UNITS (CAL)	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft
CAL +SPAN 1	0.3	1	1.5	2.5	5	10	25	50
CAL +SPAN 2	0.6	2	3.0	5.0	10	20	50	100
CAL +SPAN 3	0.9	3	4.5	7.5	15	30	75	150
CAL +SPAN 4	1.2	4	6.0	10.0	20	40	100	200
CAL +SPAN 5	1.5	5	7.5	12.5	25	50	125	250
CAL +SPAN 6	1.8	6	9.0	15.0	30	60	150	300
CAL +SPAN 7	2.1	7	10.5	17.5	35	70	175	350
CAL +SPAN 8	2.4	8	12.0	20.0	40	80	200	400
CAL +SPAN 9	2.7	9	13.5	22.5	45	90	225	450
CAL+ SPAN 10	3.0	10	15.0	25.0	50	100	250	500
+HYSTERESIS	1.5	5	7.5	12.5	25	50	125	250
CAL -SPAN 1	-0.3	-1	-1.5	-2.5	-5	-10	-25	-50
CAL -SPAN 2	-0.6	-2	-3.0	-5.0	-10	-20	-50	-100
CAL -SPAN 3	-0.9	-3	-4.5	-7.5	-15	-30	-75	-150
CAL -SPAN 4	-1.2	-4	-6.0	-10.0	-20	-40	-100	-200
CAL -SPAN 5	-1.5	-5	-7.5	-12.5	-25	-50	-125	-250
CAL -SPAN 6	-1.8	-6	-9.0	-15.0	-30	-60	-150	-300
CAL -SPAN 7	-2.1	-7	-10.5	-17.5	-35	-70	-175	-350
CAL -SPAN 8	-2.4	-8	-12.0	-20.0	-40	-80	-200	-400
CAL -SPAN 9	-2.7	-9	-13.5	-22.5	-45	-90	-225	-450
CAL -SPAN 10	-3.0	-10	-15.0	-25.0	-50	-100	-250	-500
-HYSTERESIS	-1.5	-5	-7.5	-12.5	-25	-50	-125	-250

PARAMETER	# 1 3 lbf	# 2 10 lbf	# 3 15 lbf	# 4 25 lbf	# 5 50 lbf	# 6 100 lbf	# 7 250 lbf	# 8 500 lbf
PARAMETER	# 1 3 lbf	# 2 10 lbf	# 3 15 lbf	# 4 25 lbf	# 5 50 lbf	# 6 100 lbf	# 7 250 lbf	# 8 500 lbf
<u>CONFIG</u>								
FILTR	5	5	5	5	5	5	5	5
DSP /SEC	3	3	3	3	3	3	3	3
ZERO %	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ZERO+/-%	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL
AZM +/-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MOTION	1	1	1	1	1	1	1	1
ZERO SET	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MIN	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MAX	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FREEZE	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
<u>RPM/HP</u>								
HP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
rP dSP	ON	ON	ON	ON	ON	ON	ON	ON
SP rES	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1
FILtEr	5	5	5	5	5	5	5	5
tEEth	60	60	60	60	60	60	60	60
dSP UP	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec
HP rES	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1
<u>SERIAL</u>								
PORT 1	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX
P1 SET	DU1	DU1	DU1	DU1	DU1	DU1	DU1	DU1
PORT 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
<u>I/O</u>								
HOURL	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR
DATE FORM	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY
DATE (mo)	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER
t (DLS)	STANDAR	STANDAR	STANDARD	STANDAR	STANDAR	STANDAR	STANDARD	STANDARD
PARALLEL	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

PARAMETER	# 1 3 lbft	# 2 10 lbft	# 3 15 lbft	# 4 25 lbft	# 5 50 lbft	# 6 100 lbft	# 7 250 lbft	# 8 500 lbft
ANALOG	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ANA-ZERO	0.0000	0.000	0.000	0.000	0.000	0.00	0.00	0.00
ANA-FS	3.0000	10.000	15.000	25.000	50.000	100.00	250.00	500.00
ANA-Z TRIM	0	0	0	0	0	0	0	0
ANA-S TRIM	0	0	0	0	0	0	0	0
TRIP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE
TRIP	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS
DISPLAY	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TRIP 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP 1	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND
TRIPL.H	0	0	0	0	0	0	0	0
TRIPL.L	0	0	0	0	0	0	0	0
HYST1.H	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST1.H	0	0	0	0	0	0	0	0
HYST1.L	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST1.L	0	0	0	0	0	0	0	0
TRIP 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP2	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND
TRIP2.H	0	0	0	0	0	0	0	0
TRIP2.L	0	0	0	0	0	0	0	0
HYST2.H	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST2.H	0	0	0	0	0	0	0	0
HYST2.L	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST2.L	0	0	0	0	0	0	0	0
INPUT 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
INPUT 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
<u>CONV</u>								
lb ft	ON	ON	ON	ON	ON	ON	ON	ON
lb in	ON	ON	ON	ON	ON	ON	ON	ON
oz in	ON	ON	ON	ON	ON	ON	ON	ON
Nm	ON	ON	ON	ON	ON	ON	ON	ON

PARAMETER	# 1 3 lbf	# 2 10 lbf	# 3 15 lbf	# 4 25 lbf	# 5 50 lbf	# 6 100 lbf	# 7 250 lbf	# 8 500 lbf
Kgm	ON	ON	ON	ON	ON	ON	ON	ON
Kpm	ON	ON	ON	ON	ON	ON	ON	ON
Lb	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Kg	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Newton	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Dram	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Gram	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R.P.M.	ON	ON	ON	ON	ON	ON	ON	ON
rad/sec	ON	ON	ON	ON	ON	ON	ON	ON
deg/sec	ON	ON	ON	ON	ON	ON	ON	ON
revs/sec	ON	ON	ON	ON	ON	ON	ON	ON
HP	ON	ON	ON	ON	ON	ON	ON	ON
ftlb/sec	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Btu/min	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Watts	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
CONV. SP 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Default Tables: Torque 2 Of 2:

Table 4-2, Torque

PARAMETER	# 1 1000 lbft	# 2 2500 lbft	# 3 5000 lbft	# 4 10000 lbft	# 5 15000 lbft	# 6 20000 lbft	# 7 100 lbft	# 8 100 lbft
<u>CAL</u>								
CAPACITY	1000	2500	5000	10000	15000	20000	100	100
CT-BY	0.1	0.2	0.5	1	1	2	0.01	0.01
UNITS (CAL)	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft	lb ft
CAL +SPAN 1	100	250	500	1000	10	10	10	10
CAL +SPAN 2	200	500	1000	2000	20	20	20	20
CAL +SPAN 3	300	750	1500	3000	30	30	30	30
CAL +SPAN 4	400	1000	2000	4000	40	40	40	40
CAL +SPAN 5	500	1250	2500	5000	50	50	50	50
CAL +SPAN 6	600	1500	3000	6000	60	60	60	60
CAL +SPAN 7	700	1750	3500	7000	70	70	70	70
CAL +SPAN 8	800	2000	4000	8000	80	80	80	80
CAL +SPAN 9	900	2250	4500	9000	90	90	90	90
CAL+ SPAN 10	1000	2500	5000	10000	100	100	100	100
+HYSTERESIS	500	1250	2500	5000	50	50	50	50
CAL -SPAN 1	-100	-250	-500	-1000	-10	-10	-10	-10
CAL -SPAN 2	-200	-500	-1000	-2000	-20	-20	-20	-20
CAL -SPAN 3	-300	-750	-1500	-3000	-30	-30	-30	-30
CAL -SPAN 4	-400	-1000	-2000	-4000	-40	-40	-40	-40
CAL -SPAN 5	-500	-1250	-2500	-5000	-50	-50	-50	-50
CAL -SPAN 6	-600	-1500	-3000	-6000	-60	-60	-60	-60
CAL -SPAN 7	-700	-1750	-3500	-7000	-70	-70	-70	-70
CAL -SPAN 8	-800	-2000	-4000	-8000	-80	-80	-80	-80
CAL -SPAN 9	-900	-2250	-4500	-9000	-90	-90	-90	-90
CAL -SPAN 10	-1000	-2500	-5000	-10000	-100	-100	-100	-100
-HYSTERESIS	-500	-1250	-2500	-5000	-50	-50	-50	-50
<u>CONFIG</u>								
FILTR	5	5	5	5	5	5	5	5
DSP /SEC	3	3	3	3	3	3	3	3
ZERO %	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ZERO+/-%	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL

PARAMETER	# 1 1000 lbft	# 2 2500 lbft	# 3 5000 lbft	# 4 10000 lbft	# 5 15000 lbft	# 6 20000 lbft	# 7 100 lbft	# 8 100 lbft
AZM +/-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MOTION	1	1	1	1	1	1	1	1
ZERO SET	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MIN	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MAX	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FREEZE	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
<u>RPM/HP</u>								
HP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
rP dSP	ON	ON	ON	ON	ON	ON	ON	ON
SP rES	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1
FILtEr	5	5	5	5	5	5	5	5
tEEth	60	60	60	60	60	60	60	60
dSP UP	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec	2/sec
HP rES	x 1	x 1	x 1	x 1	x 1	x 1	x 1	x 1
<u>SERIAL</u>								
PORT 1	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX	DUPLEX
PI SET	DU1	DU1	DU1	DU1	DU1	DU1	DU1	DU1
PORT 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
I/O								
HOUR	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR	12 HR
DATE FORM	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY	MM/DD/YY
DATE (mo)	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER
t (DLS)	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
PARALLEL	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ANALOG	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ANA-ZERO	0.0	0.0	0.0	0	0	0	0.00	0.00
ANA-FS	1000.0	2500.0	5000.0	10000	15000	20000	100.00	100.00
ANA-Z TRIM	0	0	0	0	0	0	0	0

PARAMETER	# 1 1000 lbft	# 2 2500 lbft	# 3 5000 lbft	# 4 10000 lbft	# 5 15000 lbft	# 6 20000 lbft	# 7 100 lbft	# 8 100 lbft
ANA-S TRIM	0	0	0	0	0	0	0	0
TRIP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE	TORQUE
TRIP	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS	TRIP PTS
DISPLAY	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TRIP 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP 1	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND
TRIPL.H	0	0	0	0	0	0	0	0
TRIPL.L	0	0	0	0	0	0	0	0
HYST1.H	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST1.H	0	0	0	0	0	0	0	0
HYST1.L	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST1.L	0	0	0	0	0	0	0	0
TRIP 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TRIP2	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND	IN BAND
TRIP2.H	0	0	0	0	0	0	0	0
TRIP2.L	0	0	0	0	0	0	0	0
HYST2.H	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST2.H	0	0	0	0	0	0	0	0
HYST2.L	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND	DESCEND
HYST2.L	0	0	0	0	0	0	0	0
PARAMETER	# 1 3 lbft	# 2 10 lbft	# 3 15 lbft	# 4 25 lbft	# 5 50 lbft	# 6 100 lbft	# 7 250 lbft	# 8 500 lbft
INPUT 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
INPUT 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
<u>CONV</u>								
lb ft	ON	ON	ON	ON	ON	ON	ON	ON
lb in	ON	ON	ON	ON	ON	ON	ON	ON
oz in	ON	ON	ON	ON	ON	ON	ON	ON

PARAMETER	# 1 1000 lbft	# 2 2500 lbft	# 3 5000 lbft	# 4 10000 lbft	# 5 15000 lbft	# 6 20000 lbft	# 7 100 lbft	# 8 100 lbft
Nm	ON	ON	ON	ON	ON	ON	ON	ON
kgm	ON	ON	ON	ON	ON	ON	ON	ON
kpm	ON	ON	ON	ON	ON	ON	ON	ON
lb	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
kg	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Newton	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
dram	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
gram	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R.P.M.	ON	ON	ON	ON	ON	ON	ON	ON
rad/sec	ON	ON	ON	ON	ON	ON	ON	ON
deg/sec	ON	ON	ON	ON	ON	ON	ON	ON
revs/sec	ON	ON	ON	ON	ON	ON	ON	ON
HP	ON	ON	ON	ON	ON	ON	ON	ON
ftlb/sec	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Btu/min	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Watts	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
CONV. SP 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Section 4.3

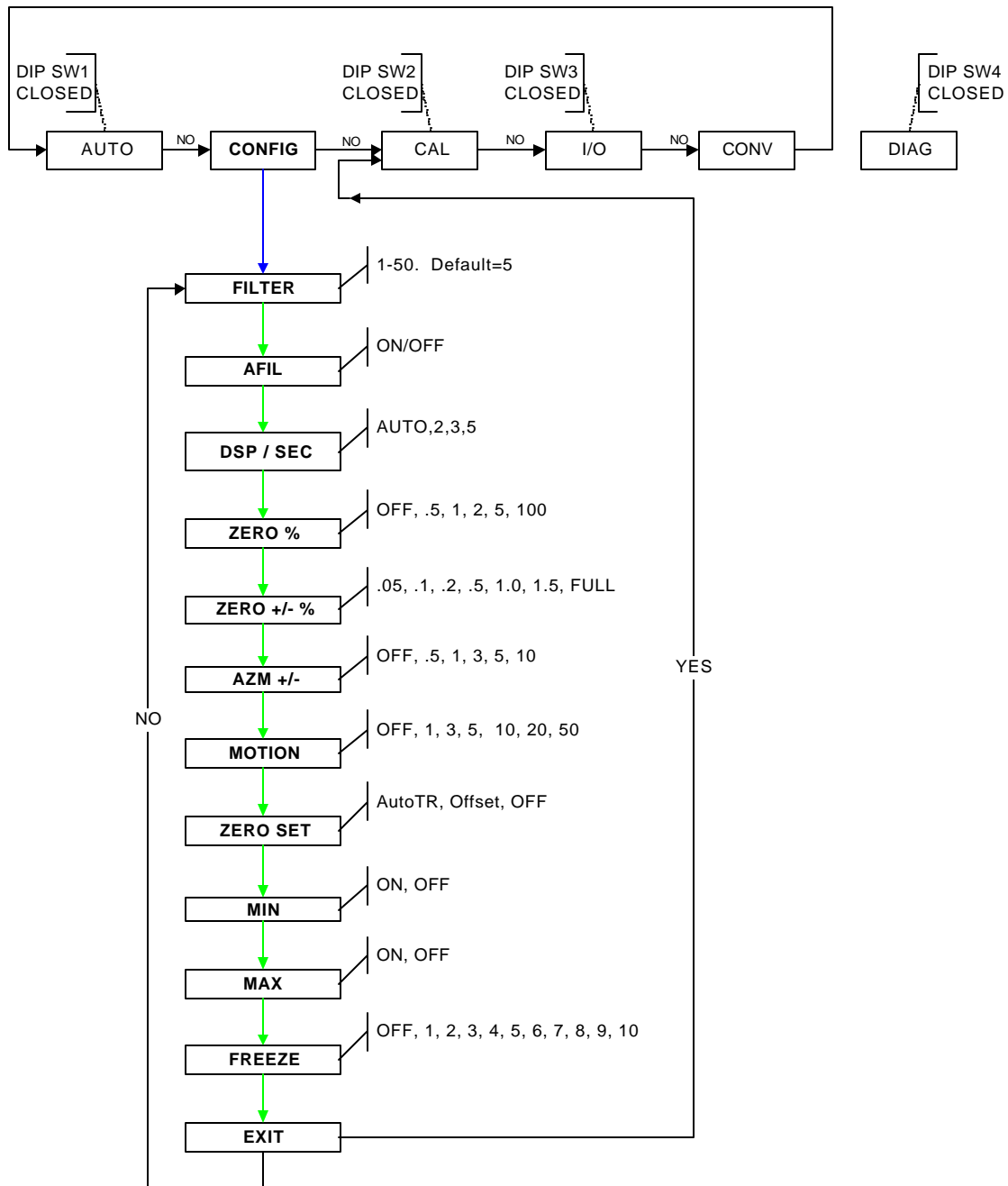
CONFIGURATION MODE

The configuration mode is where many of the features of the meter can be accessed or enabled, such as the filter and the min and max. To enter the configuration mode, close DIP switch 1.





Configuration Flowchart:

The following chart gives an overview of the configuration options

Figure 4-5, Configuration Chart



Configuration Mode: Quick Instructions

1. Press  to step down through the menu steps or  to go to the previous menu step.
2. Press  or  to change the current configuration of the selected parameter.
3. The CONFIGURATION mode may be exited at anytime by pressing the 'CE' key. If the CE key is pressed the prompt shown below will scroll continuously until the YES or NO key is pressed.

Overview of Configuration Menu

Table 4-3, Configuration Options

Alpha Display	Name of Feature	Example of Numeric Display	Description	Possible Entries
FILTR 1	FILTER	12	This function controls the amount of digital filtering. Default=5	1 to 10 by 1, 10 to 20 by 2, 20 to 50 by 5 (conversions/sec)
AFIL	FILTER TOGGLE	YES	This feature turns the above described filter on or off.	ON/OFF
DSP/SEC	DISPLAY UPDATE	Auto	This controls the update of the display of the Numeric LEDs.	Auto, 2, 3, 5 (in updates per sec.)
ZERO%	Total allowed Zero Range for full scale	OFF	The allowable range (in percentage of absolute full scale) for zeroing.	OFF, .5, 1, 2, 5, 100 (% of full scale)
ZERO ±%	Incremental allowable Zero	.05	The allowable range (in percentage of the displayed value) for zeroing.	.05, .1, .2, .5, 1.0, 1.5, full (% of displayed)
AZM	Auto Zero Mode	OFF	The ability of the meter to perform an automatic zero.	OFF, .5, 1, 3, 5, 10 (units in GRADS)
MOTION	Motion Movement	OFF	The tare, zero button, print, and auto zero will not function if the meter senses motion.	OFF, 1, 3, 5, 10, 20, 50 (units in GRADS)
ZERO SET	Zero Set	OFF	The ability to automatically TARE the measured value.	AutoTR, Offset, OFF
MIN?	Minimum	ON	The minimum value since the last reset.	ON, OFF
MAX?	Maximum	ON	The maximum value since the last reset.	ON, OFF
FREEZE	Freeze	OFF	The ability to freeze the value on the display for the amount of time specified.	OFF, 1,2, 3, 4, 5, 6, 7, 8, 9, 10 (in seconds)

Detailed Description of Configuration Menu Items

Filter	FILTR 1	1 to 10 by 1, 10 to 20 by 2, 20 to 50 by 5
---------------	---------	--

This function sets the length of the register that controls the moving average which is a first in first out (FIFO) type of filtering scheme. For example: Since there are 20 conversions per second, a filter value of 5 will average .25 seconds of data; and every .05 seconds the oldest value scrolls off the register. The higher the filter number, the more registers used, thereby smoothing the displayed value more.

Filter Toggle	AFIL	ON/OFF
----------------------	------	--------

This feature turns the above described filter on or off.

Display Update	DSP/SEC	Auto, 2, 3, 5
-----------------------	---------	---------------

This feature controls the update of the display of the Numeric LEDs.

Allowed Zero Range for full scale	ZERO%	OFF, .5, 1, 2, 5, 100
--	-------	-----------------------

The allowable range (in percentage of **absolute full scale**) that the user can zero the display. This value refers to the absolute value. For instance, if you set the value to 1% and the next day observed that value had shifted to 0.75, if the zero key is pressed the value on the display will zero out. The next day you observe that the value on the display is 0.5. The meter will not zero out because the system has exceeded the maximum allowable zero shift.

Zero Range for full displayed value	ZERO +/-%	.05 , .1 , .2 , .5 , 1.0 , 1.5 , full
--	-----------	---------------------------------------

The allowable range (in percentage of the **displayed** value) the user can zero the display. This limits the incremental zero shift allowed and prevents erroneous zero values from being entered. The FULL selection effectively renders this feature off.

Auto Zero Mode	AZM	OFF, .5 , 1 , 3 , 5 , 10
-----------------------	-----	--------------------------

The ability for the meter to perform an automatic zero based on the motion register. If the meter is not in motion and within the specified graduation, the meter will auto-zero.

NOTE FOR TORQUE APPLICATIONS: It is recommended that this feature is fully understood before it is used as slight error due to mechanical out-of round situations may result.

Motion Movement	MOTION	OFF, 1 , 3 , 5, 10 , 20, 50
------------------------	--------	-----------------------------

The tare, zero button, print, and auto zero will not function if the meter senses motion. When the meter is in motion, a small symbol will illuminate. See the front panel drawing for the location of the symbol.

Zero Set	ZERO SET	AutoTR, Offset, OFF
-----------------	----------	---------------------

The ability to automatically TARE the measured value.

Minimum	MIN?	ON, OFF
----------------	------	---------

The minimum value since the last reset.

Maximum	MAX?	ON, OFF
----------------	------	---------

The maximum value since the last reset.

Freeze	FREEZE	OFF, 1,2, 3, 4, 5, 6, 7, 8, 9, 10
---------------	--------	-----------------------------------

The ability to freeze the value on the display for the amount of time specified.
(in seconds).

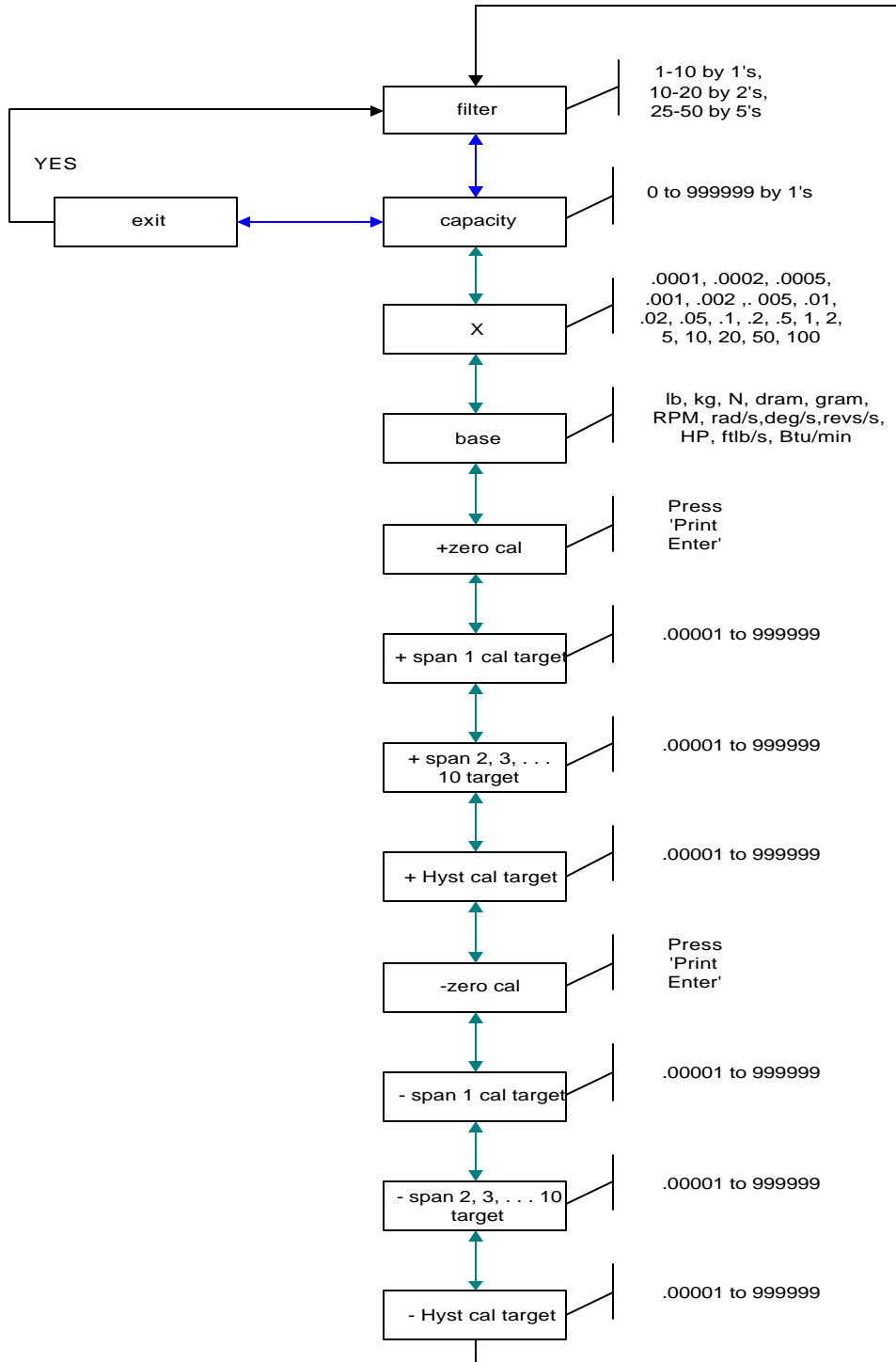
Section 4.4

CALIBRATION PROCEDURE





Calibration Overview

The following chart gives an overview of the calibration procedure:

Figure 4-6, Calibration Chart



Calibration Setup Mode Selection: Quick Instructions

1. Press  to step down through the menu steps or  to go to the previous menu step.
2. Press  or  to change the current configuration of the selected parameter.
3. The CONFIGURATION mode may be exited at anytime by pressing the 'CE' key. If the CE key is pressed the prompt shown below will scroll continuously until the YES or NO key is pressed.

Open instrument case and close switch 2 on dip switch S1 to start the calibration setup. The following diagram illustrates this procedure.

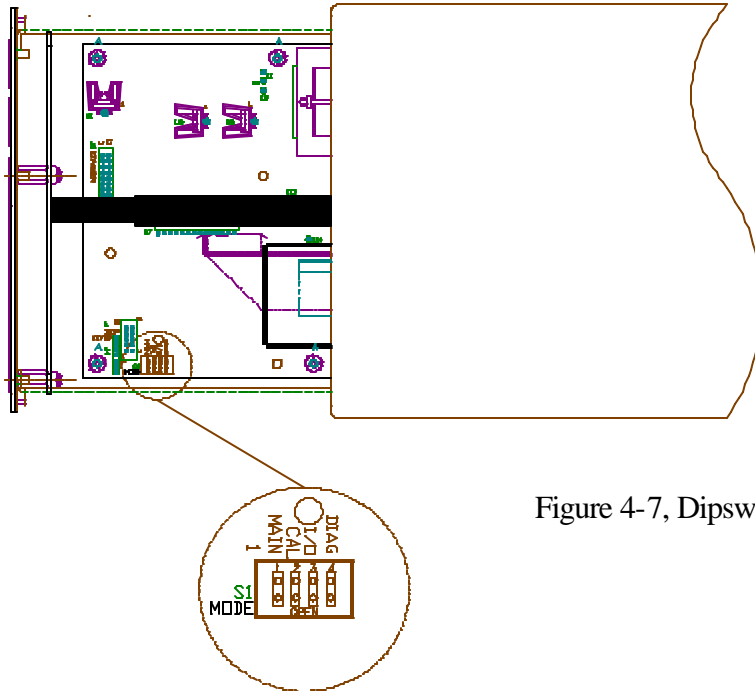


Figure 4-7, Dipswitches

Description of Menu Items



Table 4-4, Calibration Options

Name of Feature	Example of Numeric Display	Alpha Display	Description	Possible Entries
FILTER	12	FILTR 1	This function sets the length of the register that controls the moving average. For example: Since there is 20 conversions per second, a filter value of 5 will average .25 seconds of data.	1 to 10 by 1, 10 to 20 by 2, 20 to 50 by 5
CAPACITY	1000	CAPACITY	Enter full scale capacity of sensor	≤50,000
Count By	1000	X 5	decimal place or multiplier settings Example: 5000 lb. capacity sensor, using a .1 “count by” setting would give you a 50,000 resolution read out, but a 5000 lb. capacity sensor, using a .05 “count by” would result in a 100,000 resolution which is outside the instruments allowable range	.0001, .0002, .0005, .001, .002, .005, .01, .02, .05, .1, .2, .5, 1, 2, 5, 10, 20, 50, 100

Base Value	Base	Lb ft	Engineering unit selection	lb ft, lb in, oz in, Nm, kgm, lb, kg, Newton, dram, gram, R.P.M, rad/sec, deg/sec, revs/sec, HP, ftlb/sec, Btu/min
Positive Zero Cal	0	+ZeroCal	No load zero setting (+ CW Torque or Tension Load) Pressing ENTER zeroes out the sensor	N/A
Positive Span Cal	0	+SPAN 1 CAL TARGET =	First Linearization load point or positive shunt cal value (Enter deadweight load)	User defined values
.				
Positive Span Cal	0	+SPAN 10 CAL TARGET =	Tenth linearization load point	User defined values
Positive Hysteresis cal	0	+HYST. CAL TARGET =	Enter worst case + hysteresis	User entered
Negative Zero Cal	0	-ZeroCal	No load zero setting (- CCW Torque or Compression Load) Pressing ENTER zeroes out the sensor	N/A
Negative Span Cal	0	-SPAN 1 CAL TARGET =	First Linearization load point or negative shunt cal value (Enter deadweight load)	User defined values
.				
Negative Span Cal	0	-SPAN 10 CAL TARGET =	Tenth linearization load point	User defined values
Negative Hysteresis cal	0	-HYST. CAL TARGET =	Enter worst case -hysteresis	User entered







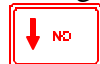





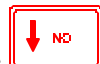

Detailed Instructions:

Note: If at any time during setup you press the wrong button or get lost, reset dip switch **S1** or power down and restart from **Step 1**.


- Loosen the two screws on the front panel of the instrument.
- Slide the instrument chassis out to allow access to main Printed Circuit Board (PCB).
- On dip switch **S1** (mode), located in the front right corner of the PCB, close switch 2 to enter the **CAL** mode. *See Figure 4-8.*
- Note:** the following steps are performed using the front panel controls. The dip switches will not be used again until the end to return you to the run mode.
- The first prompt you will see is **filter x**, where x is the current filter value. Use  or  to change the value.




Note 1 : This is the digital filter and it determines how sensitive the unit is to changes in the input. You should use **filter 5** as the filter setting, if you are not concerned with response time of display. The larger the filter the slower the unit will respond to input changes.


Note 2 : In order for this filter value to work, **AFIL** must first be turned on. See section 4.3 for a description of how to go through the **config** menu and turn on this option.



6. Next use the  to scroll to the next step.
7. The numeric display is now indicating its current full-scale value contained in the instrument. To enter your sensor's capacity go to step 8.
8. Use the  or  keys to choose the digit you want to change. The active digit will now be flashing on the display.
9. Use the  or  keys to change the value of the flashing digit.
10. After you have the correct capacity value on the display press the  key to save the value. **'Enter'** will be displayed on the screen for about 1 second and the display will return with the new capacity value on the display with all solid digits. If you made a mistake and want to change the value, go back to step 8.
11. Next press the  key to advance to the next step.
12. You will now see the full scale capacity in the numeric display, a flashing **x** and some value in the alpha numeric display. This is the instrument's resolution or "count by" value. Press the  or  keys to change its value.
13. Next press the  key to advance to the next step.
14. The display will now show **"base"** and the current engineering units. (Such as lb-ft)
15. Press the  or  keys to change the value to the **"base"** you would like to use. **Note:** This step does not perform any conversions. It only selects the engineering unit to be used.
16. Next press the  key to advance to the next step.
17. The display will now show **+ZeroCal**. With no load applied to the cell press  to set the zero value. The display will show **"— ZERO CAL"** for about 2 seconds, then **CAL OK**, and then automatically advance to the next step.
18. The display will now show **CAL** for about 2 seconds and then the active weight. The display will also display a scrolling message that states **+ SPAN 1 CAL TARGET =** and the current value for the set point.

At this point, apply the first weight or load. Enter the value of the weight or load, following steps 8 and 9.

(For shunt calibration set up you must first install the shunt resistor at **TB5**. See *Figure 4-9*. When prompted to apply the **+SPAN 1 CAL TARGET =** enter your sensor's + shunt cal value. This should be provided in the documentation for your sensor. Follow steps 8 and 9 to enter the value. After the shunt cal value is entered you must depress and hold the momentary switch **S13** from center to "+CAL" position. While holding in "+CAL" position press the  key to have the shunt value accepted. Be sure to hold the switch long enough to get the confirmation message. You may then release the momentary switch **S13**. The display will now briefly show **SPAN CAL**, then **SPAN OK**, and then scroll **+SPAN 2 CAL TARGET=**. Now skip to step 20.)

19. Next press the  key. The display will now briefly show **SPAN CAL**, then **SPAN OK**, and then scroll **+SPAN 2 CAL TARGET=**.
20. Press the  key until **-ZeroCal** is displayed. With no load applied to the cell press  to set the zero value. The display will show "**— ZERO CAL**" for about 2 seconds and then automatically advance to the next step.
21. The display will now show **CAL** for about 2 seconds and then the active weight. The display will also display a scrolling message that states **-SPAN 1 CAL TARGET =** and the current value for the set point.
At this point, apply the first weight or load. Enter the value of the weight or load, following steps 8 and 9.

(For shunt calibration set up you must first install the shunt resistor at **TB5**. See *Figure 4-9*. When prompted to apply the **-SPAN 1 CAL TARGET =** enter your sensor's - shunt cal value. This should be provided in the documentation for your sensor. Follow steps 8 and 9 to accomplish this. Depress and hold the momentary switch **S13** from center to "-CAL" position once the shunt cal value is entered. While holding in "-CAL" position press the  key to have the shunt value accepted. Be sure to hold the switch long enough to get the confirmation. The display will now briefly show **SPAN CAL**, then **SPAN OK**, and then scroll **+SPAN 2 CAL TARGET =**.)

22. Next press the  key. The display will now briefly show **SPAN CAL**, then **SPAN OK**, and then scroll **-SPAN 2 CAL TARGET=**.
23. Press the  key three times or until the **filter x** setting is displayed.
24. You can now return to the run mode by opening switch 2 on dip switch **S1**.

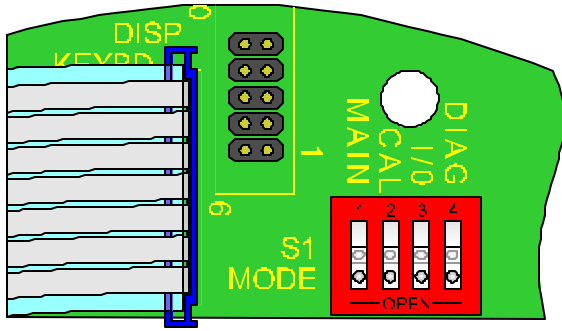


Figure 4-8, Dipswitches

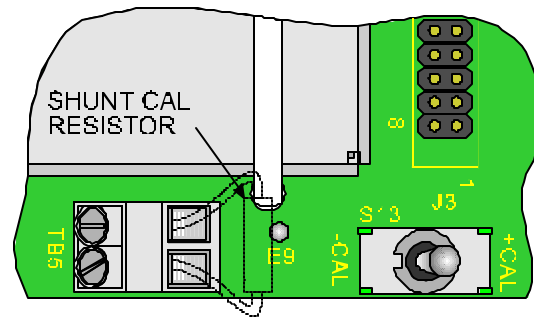


Figure 4-9, Shunt Cal

CONGRATULATIONS !


You Have Now Successfully Installed and Calibrated Your New Model 7550 Instrument.

This completes the calibration setup mode. Open switch 2 on dip switch S1 to return to the normal operating mode.

Linearization

The ideal calibration curve for a meter is a straight line, as shown below. However, in reality the best we can do is get near this linear fit. By using the linearity feature, you can create a data set of known values. After this base curve is set up, the next data points can be interpolated from a line segment of the data.

The 7550 instrument linearization feature is enabled for up to 10 calibration points (SPAN 1 – 10 CAL TARGET) which are sequentially entered. If using Shunt Calibration setup, only the first span point is utilized. For the linearization feature, you must perform point by point linearization through deadweight loading each span point. If a calibration is performed with less than ten (10) points, the curve will be extrapolated to full capacity based upon the slope correction between the last two (2) entered SPAN CAL points. In the example below, if only four (4) span calibration points were entered (SPAN 1 to SPAN 4), the slope correction from SPAN 4 to full capacity would be defined by the computed slope between SPAN 3 & SPAN 4. During a calibration, if fewer than ten (10) SPAN CAL points are

desired, simply step past the remaining calibration points using the  key. The following curve shows the fundamental idea behind linearization.

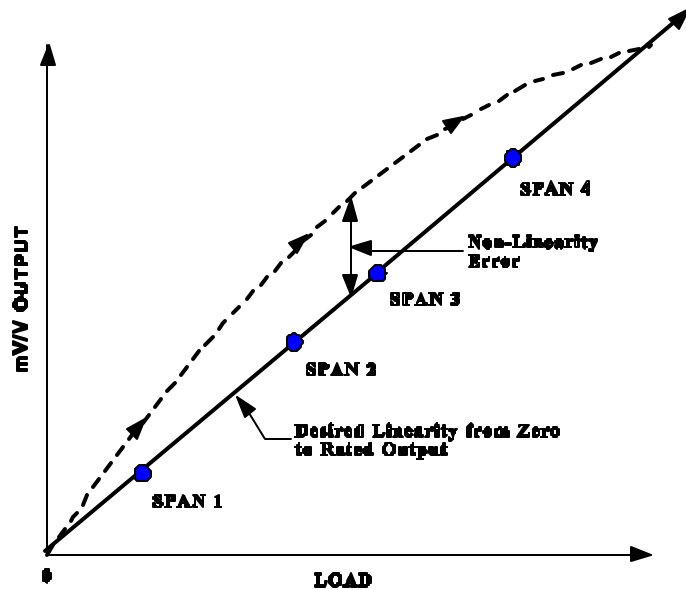




















Figure 4-10, Span Points


Linearity Instructions

1. The linearity feature is integrated right into the calibration procedure. Most of the steps are identical. Essentially, the calibration is just a linearization using one data point. Complete steps 1 through 17 of Section 4.3, entitled **Detailed Instructions**. Be sure to have the correct capacity for the device.
2. It will display “+ SPAN 1 CAL TARGET =” and the current value for the set point. Now is the time to add the first weight or load and then enter the amount.
3. Use the  or  keys to choose the digit you want to change. The active digit will now be flashing on the display.
4. Use the  or  keys to change the value of the flashing digit.
5. After you have the correct capacity value on the display press the  key to save the value. ‘Enter’ will be displayed on the screen for about 1 second and the display will return with the new capacity value on the display with all solid digits. If you made a mistake and want to change the value, go back to step 3.
6. Next press the  key to advance to the next span or data point. Repeat steps 2 through 5 for up to 10 total spans or data points.
7. When you have entered your last span or data point, press the  key two times or until “- Zerocal” is displayed.
8. With no load applied to the cell press  to set the zero value. The display will show “— — ZERO CAL” for about 2 seconds and then automatically advance to the next step.


9. The display will now show **CAL** for about 2 seconds and then the active weight. The display will also display a scrolling message that states **-SPAN 1 CAL TARGET =** and the current value for the set point
10. Now is the time to add the first weight or load and then enter the amount.
11. Use the  or  keys to choose the digit you want to change. The active digit will now be flashing on the display.
12. Use the  or  keys to change the value of the flashing digit.
13. After you have the correct capacity value on the display press the  key to save the value. **“Enter”** will be displayed on the screen for about 1 second and the display will return with the new capacity value on the display with all solid digits. If you made a mistake and want to change the value, go back to step 8.
14. Next press the  key to advance to the next span or data point. Repeat steps 10 through 13 for up to 10 total spans or data points. There will be a negative span value for each positive span you entered, whether you need that many points or not.
15. Use the  key to bypass unnecessary data points or spans.
16. Press the  key three times or until the **filter x** setting is displayed.
17. You can now return to the run mode by opening switch 2 on dip switch **S1**.

Resetting Span Calibration Points:

To reset the span calibration points **step** to the desired SPAN CAL point using the  key and then press the  key. **“Reset linearity cal point?”** scrolls on the screen until a key is pressed. If you select **yes**, the correction factor of the selected SPAN CAL point and all others beyond will be reset to unity.

Important ! - If all ten (10) SPAN CAL points are not used in the calibration, the last span calibration point to appear is **not** an entered correction point. It only indicates the next span calibration that can be entered. It is essentially ‘skipped over’ when you press the **NO**  key to advance.

Overwriting Span Calibration Points:

Any SPAN CAL point can be overwritten with a new value provided that it remains within the range bounded by the span calibration points above and below the span point to be overwritten. The illustration below shows SPAN 2 CAL point being redefined within the boundaries set by SPAN 1 and SPAN 3. To overwrite a span calibration point, **step** to the desired point using the  key and then modify and enter the new value as described in the linearity instructions below.

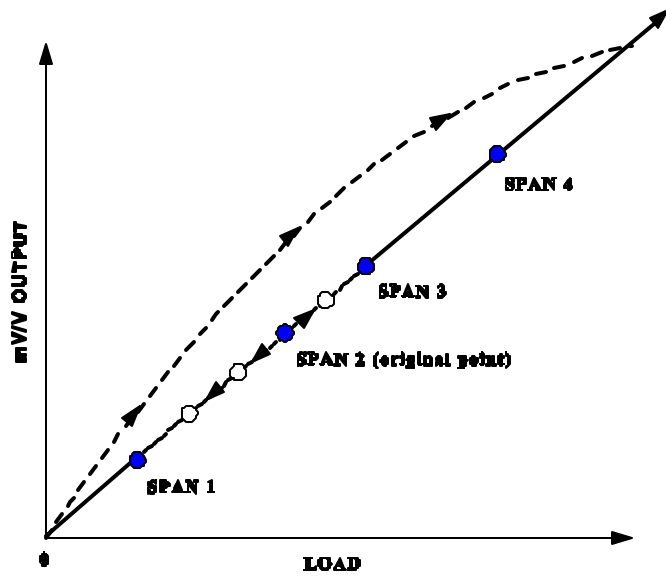


Figure 4-11, Overwriting Span Points

Section 4.5

I/O CONFIGURATION MODE

I/O Menu Overview

The following chart shows the menu items for the I/O category:

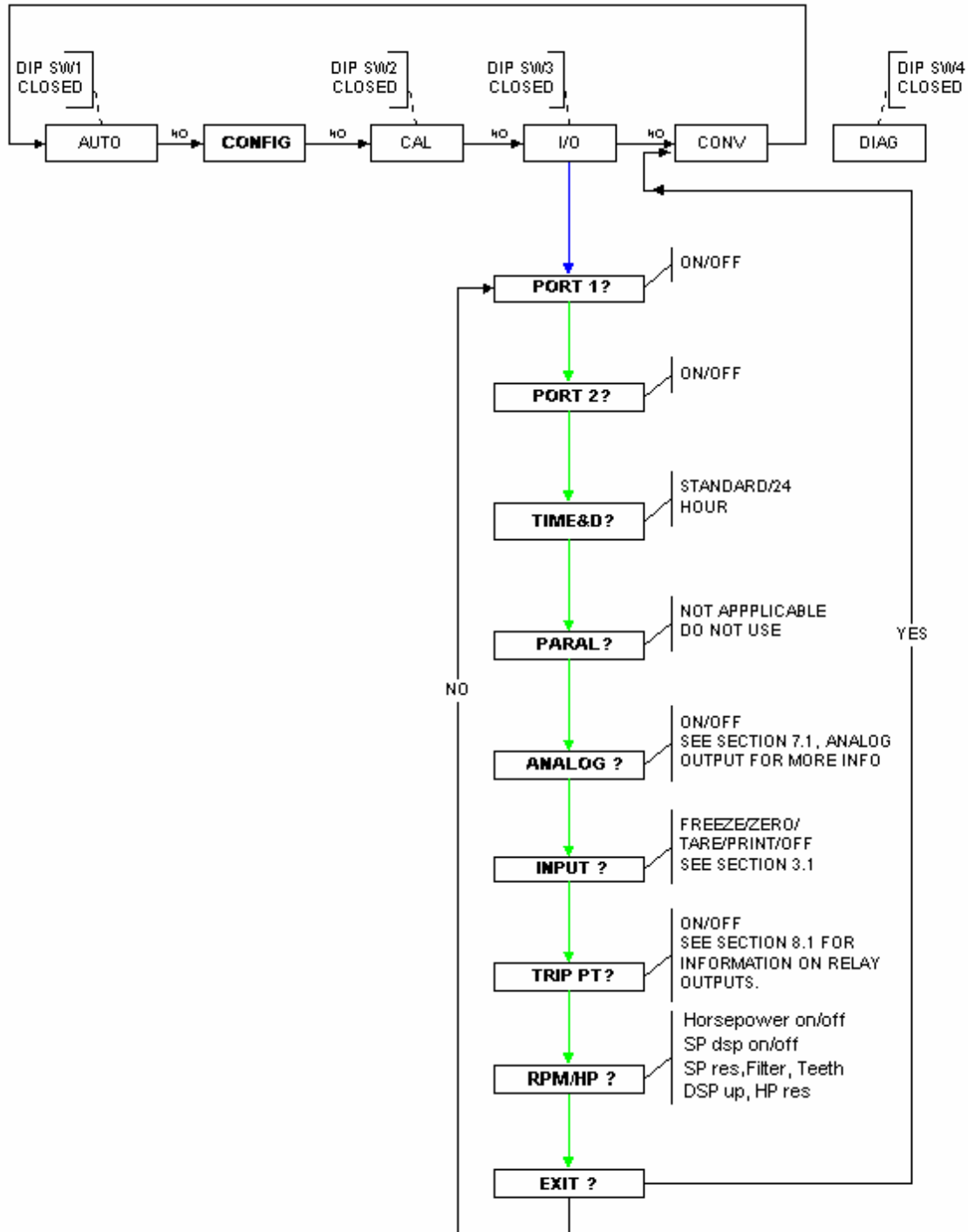






Figure 4-12, I/O Chart

Entering I/O Mode

1. To get into the I/O Mode, close switch 3.
2. Use the **NO** key  and the **YES** key  to select an item from the menu.
3. Press  or  to change the current configuration of the selected parameter.
4. The I/O mode may be exited at anytime by pressing the 'CE' key. If the CE key is pressed the prompt shown below will scroll continuously until the **YES** or **NO** key is pressed. Also open switch 3 to get back to normal operating mode.

Menu Items:

The following is a general description of the different menu items seen in the I/O mode:

Table 4-5, I/O Menu

Alpha Display	Name of Feature	Example of Numeric Display	Description	Possible Entries
PORT 1	Port 1	PORT 1: DUPLEX	The 25 pin port on the back of the meter can be configured with the options listed to the right. It can output information to a desktop computer, laptop, palmtop, or other machine with a serial interface.	Port 1: Duplex/Printer/Off/ Simplex, Set P1: Auto SI?, Baud: 19200/9600/4800/ 2400/1200/600, Parity: none/mark/odd/even, Port 1: Modify/Standard/Custom, Delay 1: Auto/1-5 per sec, t-d 1: Off/Below/Above/On Line, Data 1: Display/G-T-N, EOL 1: CR-LF/CR, SOT 1: STX/SOH/None, EOT 1: None/LF/FF/ETX/EOT
PORT 2	Port 2	PORT 2: OFF	The mode of the second port.	Port 2: Off, Simplex, Printer
TIME&D	Time and Date	T STANDARD	Standard date and time menus. These items are self-explanatory.	Time: Standard/DLS Time: 24 Hour/12 Hour Time: Enter current time Date: MM-DD-YY, DD-MM-YY Date: Enter current date Date: Number/Letter
PARAL	Parallel	N/A	N/A	N/A
ANALOG	Analog Output	ANLG OFF	If your equipment works better with the range versatility of analog voltage, the meter can be set accordingly.	Analog: On/Off, Analog: \pm Unipol/Bipolar, Analog: HP/Torque/R.P.M./Delta T, Zero: number entry FS: number entry, Zero Adj: number entry SP Adj: number entry
INPUT	Input	INPUT 1 OFF	Standard features such as FREEZE can be assigned to an additional component, such as a switch, when connected to the inputs.	Input 1: Off/Freeze/Print/Tare/Zero, Input 2: Off/Freeze/Print/Tare/Zero

TRIP POINT	Trip Point	TRIP OFF	The Trip Option provides replay contact closures as well as a visual indication whenever a recorded data is in or out of a preset band as set by the configuration	Trip: On/Off, Trip: Torque/HP, Trip: Trip Points/Accept, Display: Modify/View/None, Trip 1: On/Off, Trip 2: On/Off
RPM/HP	Revolutions Per Minute/ Horsepower	HP ON	The work (Horsepower) / Speed (RPM) Option is a measurement of speed and the calculation of horsepower in the meter's CPU on the processed speed and torque data.	HP: On/Off SP DSP: On/Off SP Res x: .01/.02/.05/.1/.2/.5/1/2/5 Filter: 1/2/5/10/15/20/25/30, Teeth: 0-999, DSP UP: 1/2/5/10/20 per sec HP Res x: .001/.002/.005/.01/.02/.05/.1/.2/.5/1/2/5/10/20/50

Note 1: The Parallel option is not used.

Note 2: The Ports are covered in section 6.1, Serial Data Overview, and not in this section of the manual.



Note 3: The Analog Output is covered at length in section 7.1, not in this part of the manual.



Note 4: The Trip Point and information on relay outputs are covered in section 8.1, not in this part of the manual.

Note 5: There is a detailed description of the RPM/Horsepower feature in section 9.1, therefore it is not covered in this part of the manual.

Time and Date:

1. The Time and data options are self-explanatory. To see the available options, refer to the table above.

2. In order to navigate through the menus, use the **NO** key  and the **YES** key  to select an item from the menu.

3. Press  or  to change the current configuration of the selected parameter.

4. The I/O mode may be exited at anytime by pressing the 'CE' key. If the CE key is pressed the prompt shown below will scroll continuously until the **YES** or **NO** key is pressed. Also, open switch 3 to get back to normal operating mode.



Input

The input is an extra way to get to access some of the features by wiring an additional component to the input connections. An example would be to connect a switch to activate the freeze mode or to tare the meter.

Section 4.6









CONVERSIONS

The Torque Indicator can be configured for its various units for front panel selection or base units in torque, speed (RPM) or work (horsepower). When selecting the various units for torque and speed, the indicator will automatically maintain full scale resolution (sensitivity) by adjusting the unit resolution (by .01, 2, 50, etc)

In order for you to be able to flip through the units using the  or  in normal operating mode, each unit must first be turned on. If no unit selection is enabled the default unit will be 'lb ft' for torque, 'R.P.M.' for speed and 'HP' for work.

Most of the conversions can be turned on in the **Conv** menu. However, to get the RPM conversions, you must first enable the HP/RPM in the **I/O** menu.

Instructions for Enabling the HP/RPM Conversions

1. In order to turn these on, you must enter the configuration menu. To enter the configuration mode, close DIP switch 1, as explained in section 4.1.
2. Press the  key to step down through the menu items until you reach **I/O**.
3. Press the  key to select **I/O**.
4. Press the  key until **RPM/HP** comes up.
5. Press the  key to select **RPM/HP**.
6. Press the  or  key to select turn HP on.
7. You may now access **all** of the possible conversions.
8. Exit now by pressing  and then the yes  key.

Overview of the Conversion Menus

The following flow chart shows the conversion menu items as seen with the HORSEPOWER OPTION TURNED ON.

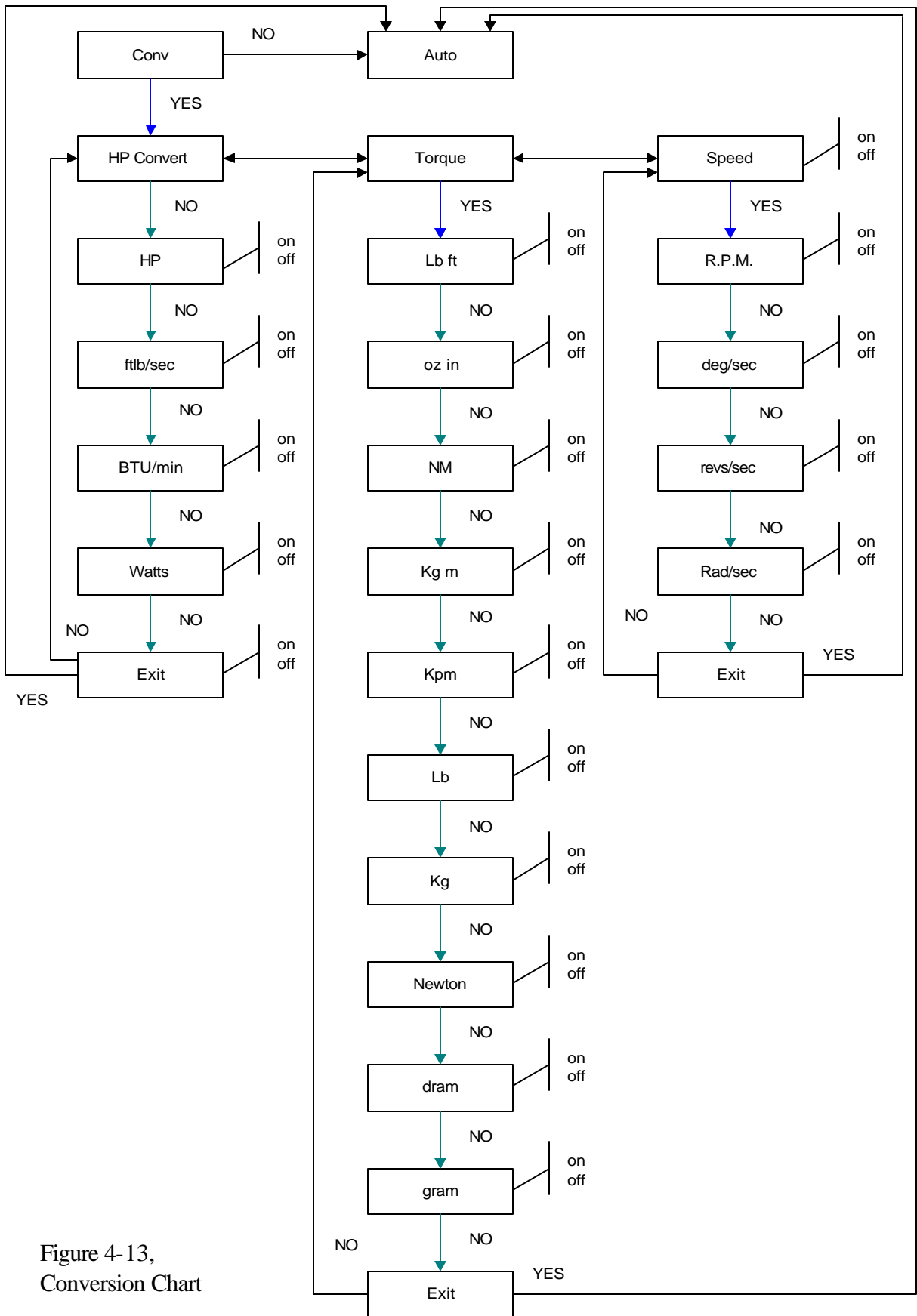











Figure 4-13,
Conversion Chart

Instructions for Enabling the Conversions

1. In order to turn these on, you must enter the configuration menu. To enter the configuration mode, close DIP switch 1, as explained in section 4.1.
2. Press  to step down through the menu items until you reach **Conv**.
3. Press the  key to select **Conv**.
4. The default category is **torque**, but you may also select from **HP** or **speed** by using the  or  keys to select the appropriate entry and pressing the  key to confirm the selection.

NOTE: If the HP is not turned on, you will not even see these categories. If you do not need the HP options, skip to step 13. If you need the HP options and are not getting them to appear, please see the section above entitled **Instructions for Enabling the HP/RPM Conversions**.

5. Press  or  to step through and select the desired conversions. (**NOTE 1 & 2**)
6. To turn a conversion **on** or **off**, use the  or  keys. (**NOTE 3**)
7. The CONVERSION mode may be exited at any time by pressing the 'CE' key. If the CE key is pressed a confirmation message will scroll continuously until the **YES** or **NO** key is pressed.

NOTE 1 - Although all conversions can be selected, due to round off and resolution changes in order to convert the data, some conversions can over run the six (6) digit display. Care should be taken in selecting reasonable conversions of the display data.

NOTE 2 - The Conversions selected are all derived from the BASE units that the indicator was calibrated in.

NOTE 3 - If all Conversions are turned **off** then the CONV on/off selection under the **CONFIG ?** menu is automatically turned **off** and the **CONV. ?** menu will not appear on the display.

The following units may be seen in the Conversion menu. Note that you will only see up to 'gram' if the HP/RPM option is not turned on.

Table 4-6, Conversions

As seen on	Description
lb ft	Pound feet
lb in	Pound feet
oz in	Ounce inches
Nm	Newton meter

Kgm	Kilograms to meter
Kpm	Kilopounds to meter
Lb	Pounds
Kg	Kilograms
Newton	Newtons
Dram	Dram
Gram	Grams
RPM	Revolutions/Minute
Rad/sec	radians/second
Deg/sec	degrees/second
Revs/sec	Revolutions/sec
HP	Horsepower
Ft-lb/sec	Foot pounds per second
Btu/min	British Thermal Units

Section 4.6

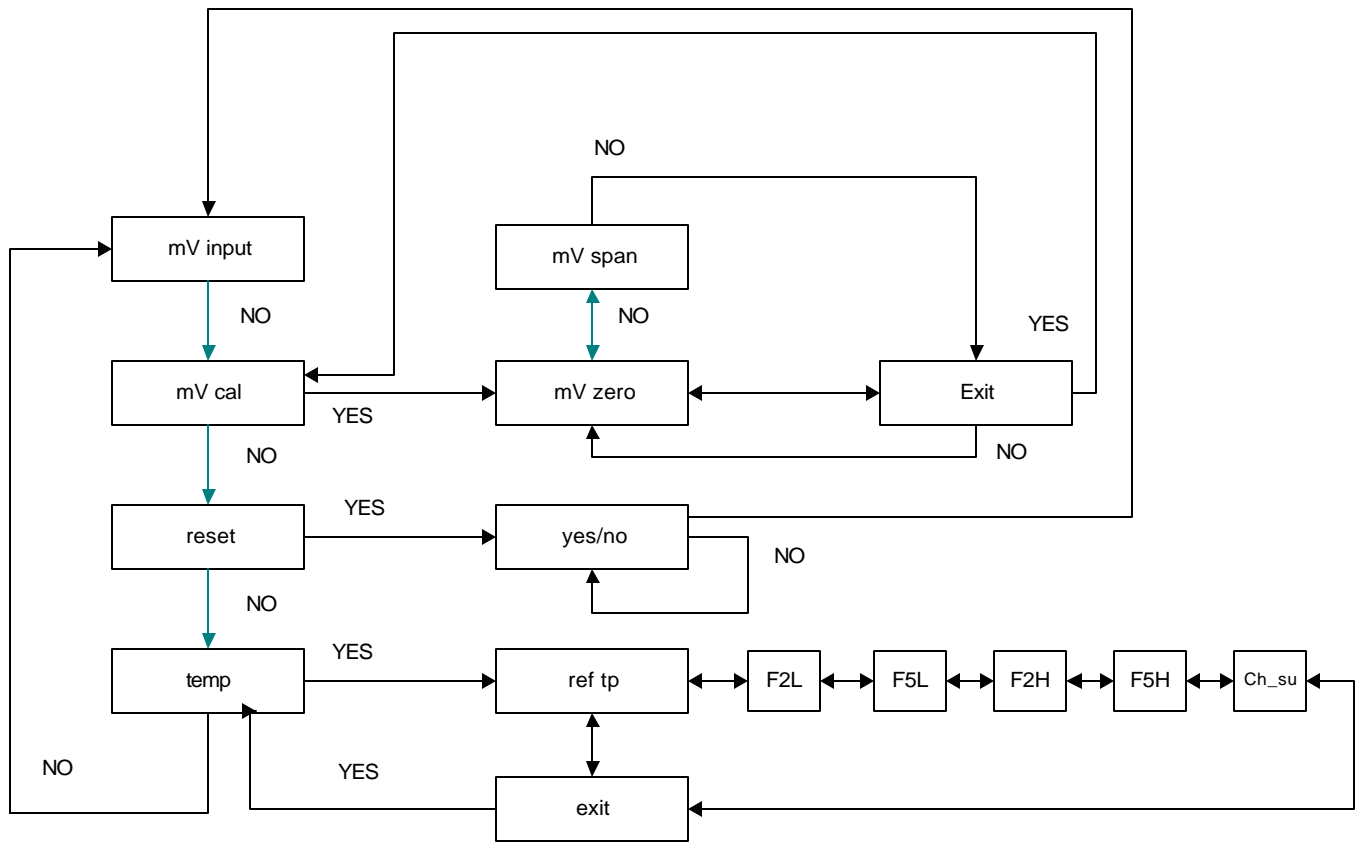
DIAGNOSTIC MODE

How to Enter Diagnostic Mode

To enter the diagnostic mode, close DIP switch 4. This procedure is explained in section 4.1 of this manual. Unlike many of the other features described in section 4, this is the only way to enter the diagnostic mode.

Overview of the Diagnostic Mode

Figure 4-14, Diagnostic Chart



Resetting the RAM






CAUTION: This procedure will set the meter back to factory defaults. The meter will have to be re-calibrated, the conversions will need to be turned back on, and any other changes will need to be completed again.



CAUTION: If you have set the meter up to communicate with a serial device, like a computer port, the serial settings on the meter will have to be reconfigured. You will temporarily lose communication until your customized settings are restored.

Note: If you only need to reset or change the linear calibration points, refer to section 4.3 of the manual. This can be done **without** losing all other settings!

1. Close DIP switch 4 to enter the diagnostic mode.
2. Press  to step down through the menu items until you reach - - - - **RESET**
3. Press the  key to select - - - - **RESET**
4. A message will appear on the screen with the question: “**Reset RAM? Yes or No?**” press the  key to accept the clearing of the RAM.
5. **RST RAM** will appear for about 2 seconds and it will then go back to **mV input**
6. The RAM has now been reset. You can return to normal operating mode by opening switch 4. However, since the calibration is now lost, you may wish to go through the calibration procedure before going back to the normal operating mode.

The following chart shows the default settings for the most of the important options.

Table 4-7, Default Values

Category	Option	Default Setting
Config	Afil	Off
Config	Dsp/sec	Auto
Config	Zero %	Off
Config	Zero + / - %	Full
Config	Azm	Off
Config	Motion	Off
Config	Zero set	Off
Config	Min	Off
Config	Max	Off
Config	Freeze	Off
I/O RPM/HP	HP	Off
I/O RPM/HP	SP dsp	Off
I/O RPM/HP	SP res x	0.01
I/O RPM/HP	Filter	1
I/O RPM/HP	Teeth	0
I/O RPM/HP	Dsp up	1/sec
I/O RPM/HP	HP res x	0.001
Conv	All of the conversion factors	Off

Section 5.1

DIGITAL IN

Introduction:

The 7550 meter has two channels for digital input and output. Digital input and output can be accomplished by setting jumpers S4 and S5 and connecting a few leads.

The following is a diagram of the basic hardware for the Digital input and output:

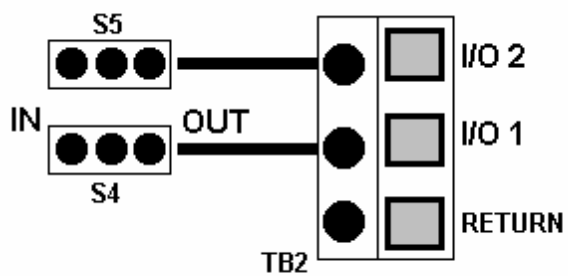


Figure 5-1, Digital In

Section 5.2

FREEZE MODE AND DIGITAL INPUT:

One example of digital input for this meter is freeze mode. This mode, often used for testing pressure switches, is an edge triggered input signal that will “freeze” the last display update for the number of seconds (1 to 10 seconds) selected in the CONFIGURATION mode. The **FREEZE** mode is enabled in the “**CONFIG ?**” menu under Freeze time selections. Instructions for enabling freeze mode are included later in this section.

Either opening or closing of a switch contact between an active input (I/O 1 or I/O 2) and **RETURN** will “freeze” the display for the selected amount of time (in seconds), as shown above. However, while the display is in the freeze condition it will not respond to another contact transition.

The following is a diagram of the meter set for digital input. Note that the jumper positions would be the same for any other application of digital input. The two leads of the hardware must also connect to the I/O positions, but the device attached would not have to be a switch.

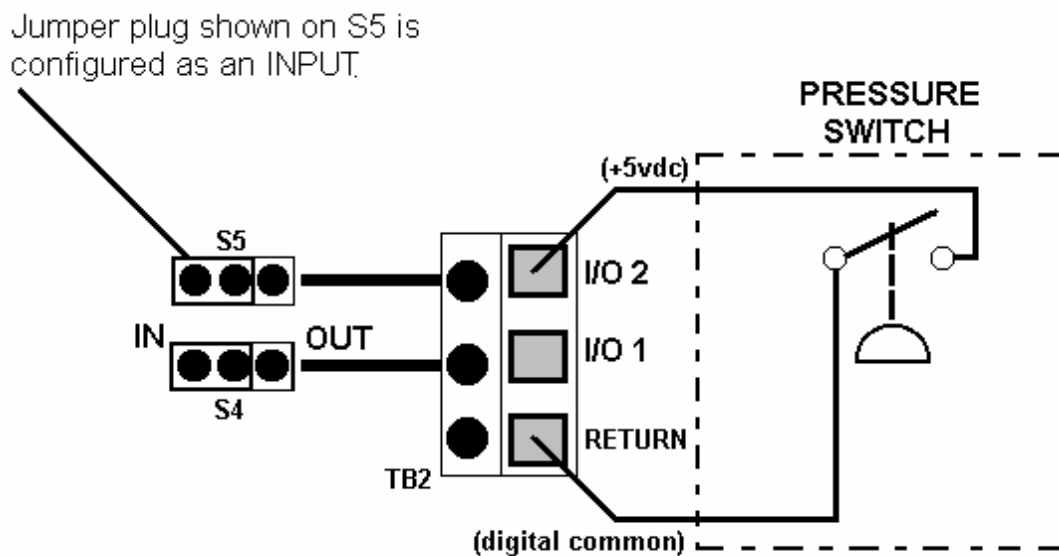


Figure 5-2, Freeze Mode

Freeze Mode Specifications:

The Freeze input will “freeze” the display for approximately five seconds on the rise and fall time of the input (edge not level triggered) and is “non-retriggerable.”

Input pulse > 100 ms required to guarantee detection.

The freeze will “freeze” the 6 digit numeric and LED bar displays in whatever mode it is in (i.e. Normal, “net”, Max, or Min mode).




Alphanumeric display will prompt “**FREEZE.**”




During the “Freeze” the Front Panel Keys are inactive.

Inputs are a +5vdc logic level. Sinking current \approx 0.5mA.

Enabling Freeze Mode:

1. To enable freeze mode, you first need to enter the configuration mode. You can do this by closing DIP switch 1.

2. Press  to step down through the menu steps or  to go to the previous menu step until the display says “**CONFIG?**”. Then select  to enter the configuration mode.

3. Press  to step down through the menu steps or  to go to the previous menu step until the display says “**FREEZE?**”. Then select  to enter the configuration mode.

4. Press  or  to turn Freeze mode off or to set it to 1-10 seconds.

5. The CONFIGURATION mode may be exited at any time by pressing the 'CE' key. If the CE key is pressed, a confirmation prompt will scroll continuously until the **YES** or **NO** key is pressed. Be sure to open switch 1 to get back to normal operating mode.

Section 5.3

DIGITAL OUTPUT:

This meter can also be set up for digital output to take advantage of various TTL devices. The following is a diagram of the correct jumper position for digital output. Note that your device must still connect to the I/O positions on the board.

Jumper plug shown on S5 is configured as an OUTPUT.

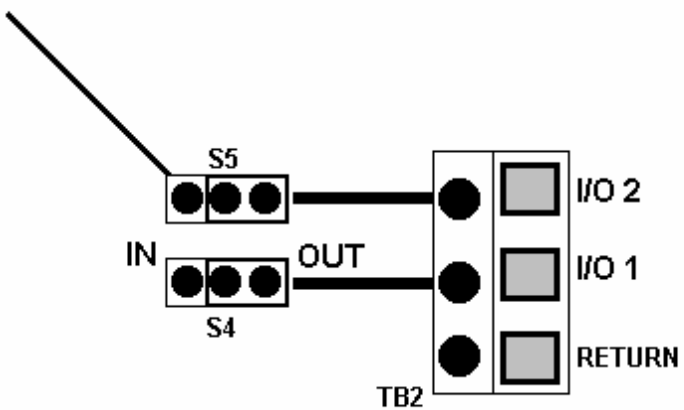


Figure 5-3, Digital Out

Section 6.1

SERIAL DATA OVERVIEW

General:

The 7550 offers easy access and configuration of two (2) serial communication ports, PORT 1 and PORT 2. Both com ports are ASCII - compatible and thus the serial data output formats are compatible with most printers, scoreboards, or other remote serial devices. Port 1 may be configured for bi-directional, Full Duplex, or Half Duplex (*duplex* = two way communication) mode of operation while Port 2 is restricted to a Simplex output mode only (*simplex* = one way communication). The two (2) communication ports support both RS232 and 20 mA current loop (passive or active). In addition, Port 1 also supports RS485, or RS422 communication.

The transmission of serial output data strings can be initiated in one of three (3) ways:

1. on demand output
2. continuous output
3. by serially soliciting the indicator in a duplex (bi-directional) mode of communication.

Section 6.2

SETTING UP THE SERIAL PORT CONNECTION

Port Modes:

The ports can operate in the following modes:

Port 1 (set up selections)

OFF Turns Port 1 Off.

PRINTER On demand printout of the data when the PRINT key is pressed or the Remote Print input is issued. The Printer mode is a simplex output mode.

DUPLEX Bi-directional communication in which serial data can be both received and transmitted between the indicator and a remote device such as a computer.

SIMPLEX Continuous serial transmission.

Port 2 (set up selections) - No DUPLEX communication


OFF Turns Port 2 Off.

PRINTER Same as Port 1.

SIMPLEX Same as Port 1.

Printer (Port 1 or Port 2)

The selection of the **PRINTER** format is an on demand serial data transmission that is initiated each

time the Front Panel **Print**  key is pressed or when a Remote Print input is issued. This mode of serial data output is used when interfacing to printers. The **PRINTER** mode of communication is a simplex serial output. However, for this to work, "Port 1 PTR" must be set to ON. Please refer to the part of section 6.2 entitled "Establishing Communication."

Front Panel **Print**  key **INPUTS 1 and/or 2** can be configured to initiate a print command (Refer to section 5.1, entitled 'Digital In').

The following is a diagram illustrating how the print option can be used:

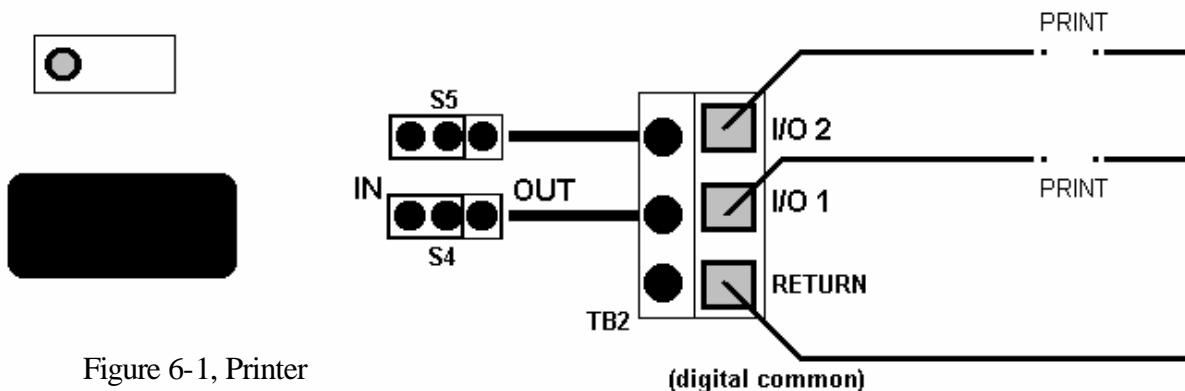















Figure 6-1, Printer

Establishing a Connection

Note: The following steps will help to set up a connection to a standard device such as a computer serial port. There are many different ways to configure the meter to communicate, but these settings should act as a basic guide.

1. Use a cable to connect the 25pin port on the back of the meter to the 9pin serial port on your computer. We used a DB9 Female to DB25 Male Modem Cable, but a similar cable should also work.
2. Close dip switch 1, as explained in section 4.1. Press the NO  key until “I/O ?” is on the screen. Then press the YES  key.
3. “Port 1?” should now be displayed. Again, press the YES  key.
4. The first item to come up is “Port 1.” This should be set to **Duplex**. Press the NO  key to advance. Use the left and right arrow keys to change this value and the following ones.
5. Press the NO  key until “Baud” is displayed. Change the setting to **9600**.
6. Press the NO  key until “Parity” is displayed. The setting should be **None**.
7. Again, Press the NO  key. “Port 1” should be displayed. This item should be set to **Modify**.
8. Press the NO  key until “Port 1 PTR” is displayed. Change the setting to **On**. This step is not mandatory, but if you want the meter to be able to send the reading to the computer with the PRINT  key, this needs to be enabled.

9. Again, press the NO  key until “Port 1 Cont” is displayed. The recommended setting is **Off**. If it is enabled, the data will continuously send the reading to the computer screen.
10. Press the NO  key until “Resp” is displayed. Change the setting to **Echo**. This setting will allow your commands to be displayed on the computer screen.
11. Finally, press the NO  key until “Exit ?” is displayed. Press the YES  key and then open dipswitch 1.

The meter is now set up and connected, but you must now open up a program which will display the information. Any terminal emulation program such as Hyperterminal should be able to display the data. Be sure to choose the correct com port which corresponds to the serial port and to have the port on or open. Finally, ensure that the terminal is set to echo the typed text so that you can see the commands you are typing.

If one terminal program is not working well, try a different one.

Section 6.3

DATA FORMATS

ASCII - Data Formats:

Each serial character sent out in the serial data string is in ASCII - compatible format. The data format selection is based on Parity selection in the I/O SET UP mode (Refer to Section 6.2 for configuration of Serial Ports). The data format for each ASCII character is of the general form described below.

One ASCII character consists of:

- (1) Start Bit,
- (7) or (8) Data Bits (data bits are the bits that actually encode for the ASCII character)
- (1) or No Parity Bit
- (1) Stop Bit

ASCII - Data Formats Overview:

The table below summarizes the different Data formats available through Parity selection.

Table 6-1, ASCII Data

	Parity Selection	ODD	EVEN	NONE	MARK
Start Bit	ASCII Data Formats	1	1	1	1
Data Bits		7	7	7	8
Parity Bit		1	1	(No Parity)	(No Parity)
Stop Bit		1	1	2	1

The data output format of the serial transmission is of the general form shown below:

<Data><space><Units><space><Mode><space><space><CR><LF>

Where:

<,> Brackets are not sent in the transmission of the output data string.

Data= Seven (7) digit numeric data field that includes decimal point and/or fixed dummy zero when applicable. Leading zeroes are suppressed and an ASCII space character (20H) is transmitted to hold the position of each leading zero.

Space= Space character (20H).

Units= A character field that defines the current units of the display data.

Example:

lb tons

Mode = An alpha character field that describes the current mode the indicator is in.

Example:

GR / NT Gross, Net etc.

CR = Carriage return.

LF = Line feed.

Section 6.4

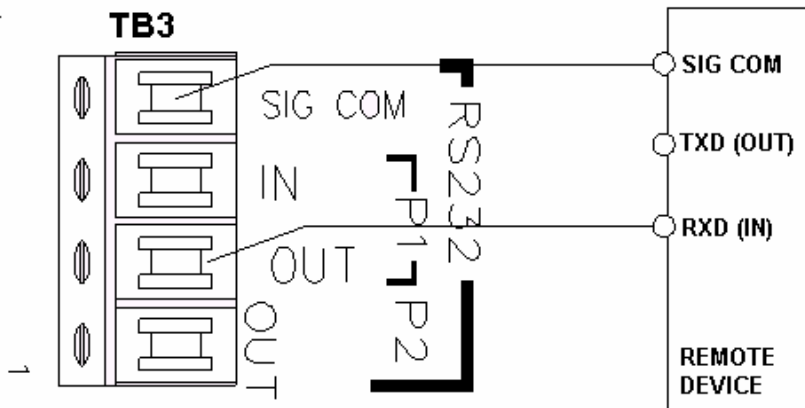
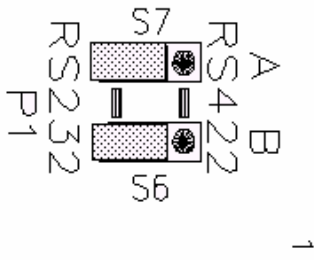
SERIAL OUTPUT WIRING And HARDWARE CONFIGURATION:

This section details the wiring configuration for serial transmission to a Remote Device such as a Printer. All direct wiring on Terminal Block (TB3) and hardware settings are well marked and can be located at the rear portion of the CPU board assembly.

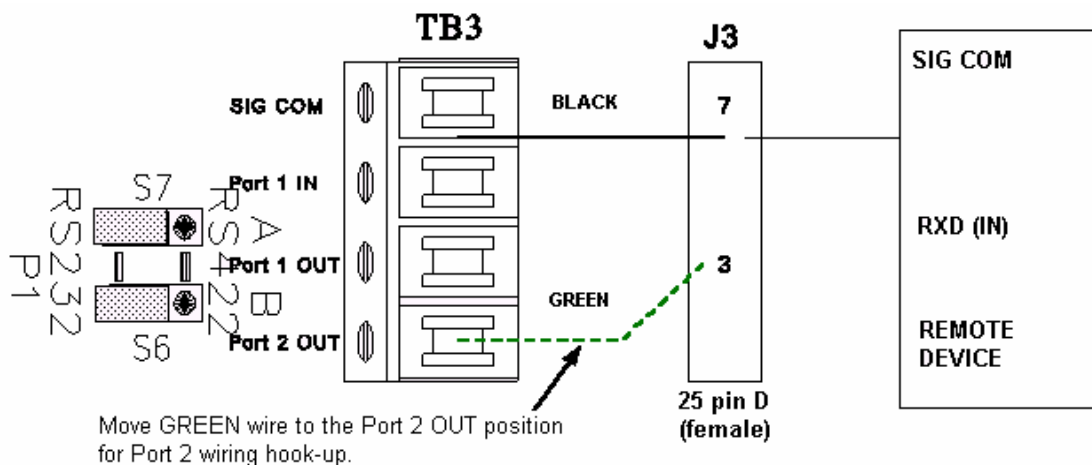
The 7550 Panel mount indicators come equipped with a twenty five (25) pin “D” female serial I/O connector mounted at the rear of the enclosure which provides access to Port 1 RS232 or RS485 hook up.

SERIAL PORT 1- Direct Terminal Block (TB3) Wiring - PORT 1 - RS232 (Simplex):

Jumper plugs on S6 and S7 are positioned as shown for Port 1, RS232 hardware configuration.



SERIAL PORT 1- J3 (25 pin “D” wiring)

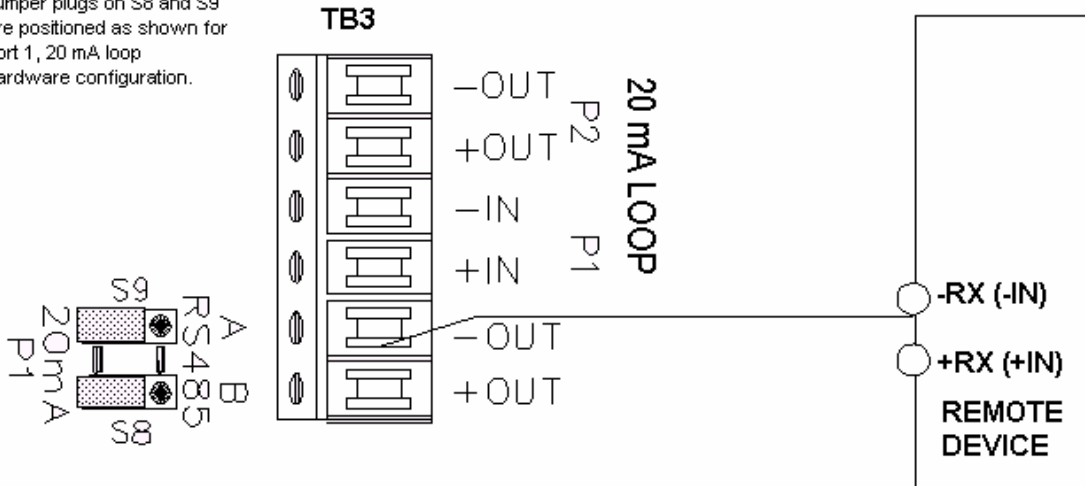


Section 6.5

SIMPLEX MODE

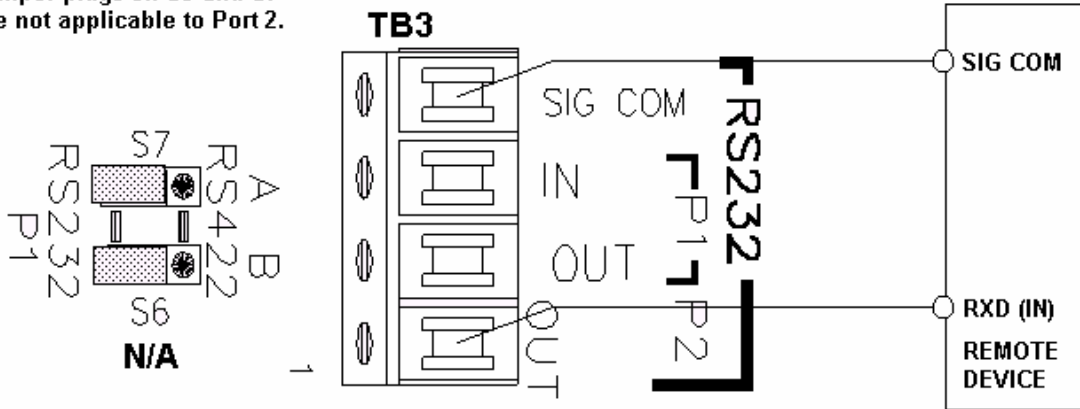
SERIAL PORT 1 - Active 20 mA Loop (Simplex): (Direct Terminal Block Wiring on TB3)

Jumper plugs on S8 and S9 are positioned as shown for Port 1, 20 mA loop hardware configuration.



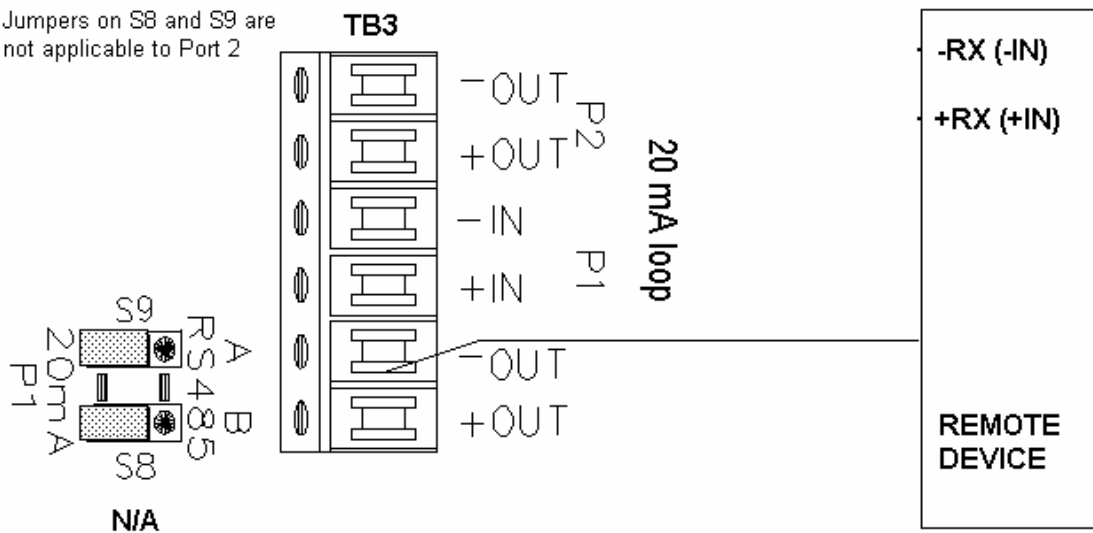
SERIAL PORT 2

Jumper plugs on S6 and S7 are not applicable to Port 2.



SERIAL PORT 2 - Active 20 mA Current Loop (Simplex): (Direct Terminal Block Wiring on TB3)

Jumpers on S8 and S9 are not applicable to Port 2

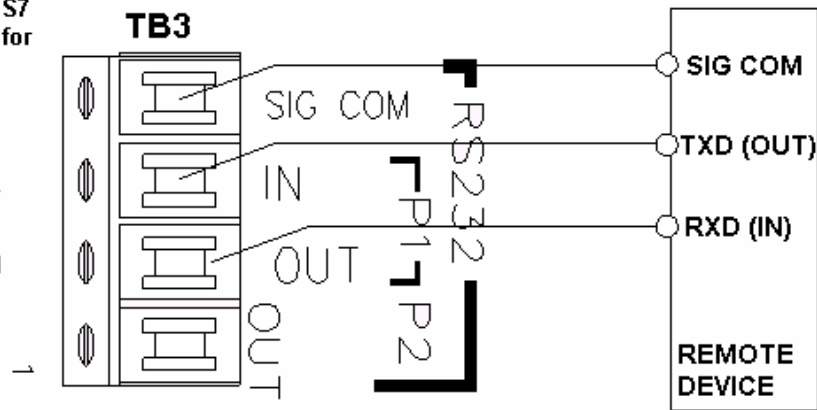
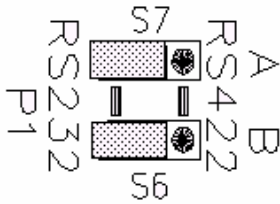


Section 6.6

DUPLEX MODE

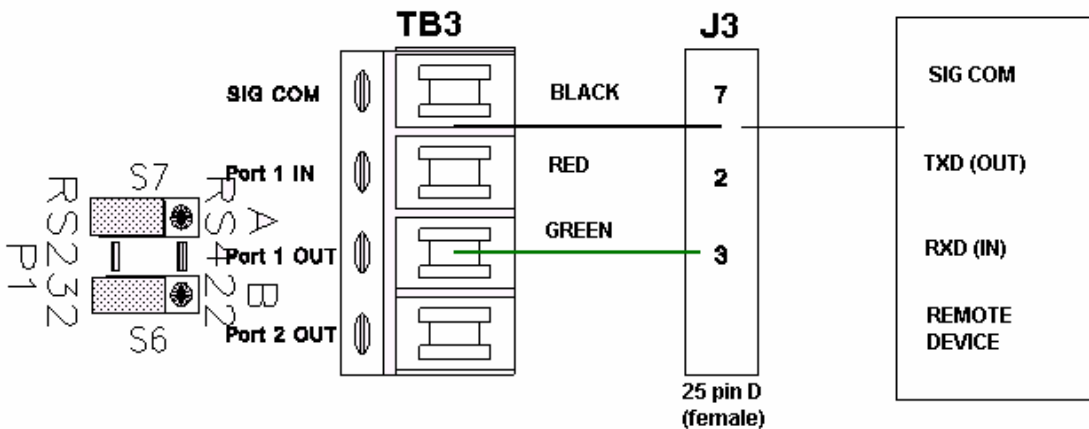
SERIAL PORT 1 - RS232 (Full Duplex):

Jumper plugs on S6 and S7 are positioned as shown for Port 1, RS232 hardware configuration.



SERIAL PORT 1 - RS232 (Full Duplex):

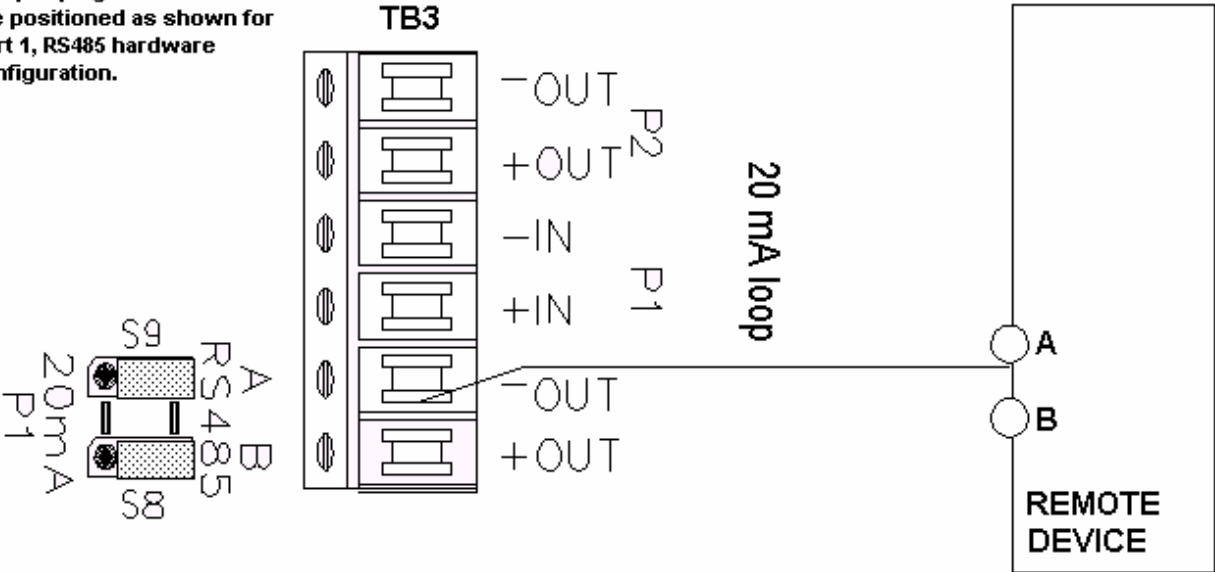
J3 (25 pin "D" wiring)



SERIAL PORT 1 - RS485 (Half Duplex):

Direct Terminal Block (TB3) Wiring for RS485 (two wire)

Jumper plugs on S8 and S9 are positioned as shown for Port 1, RS485 hardware configuration.



Section 6.7

DUPLEX SERIAL PROTOCOL

General:

The duplex protocol includes the following basic functions:

1. Special commands for filling.
2. Setup entry and recall.
3. Current pressure data recall.
4. Calibration and correction recall and entry.
5. All front panel key functions.
6. Temperature calibration and correction recall and entry.
7. The protocol between the "standard" full duplex and the RS485 will only differ by the addition of the origin and destination address characters.
8. The protocol will be designed to be expandable for future growth and special applications.

Full Duplex Protocol:

Communications from the host computer into the 7550:

```
*<DD><OO><cmd><{><data entry><}><CHECK><CR>
```

Response from the 7550:

```
:<OO><DD><cmd r><{><data resp><}><CHECK><CR>
```

Where:

"<",">"	Brackets are not sent
*	= Message from master (host computer)(2AH).
:	= Response from 7550 (3AH).
DD	= 7550 unit address (two digit) if in RS485.
OO	= Master address (fixed at 00) if in RS485. If RS485 mode not selected the "DD" and "OO" are not transmitted.
cmd	= Three character command to 7550.
cmd r	= Three character command echoed from 7550.
{	= Start of data character (7BH).
}	= End of data character (7DH). '{' and '}' only sent if data entry or recall.
data entry	= Data entered into 7550 if entry command.
data resp	= Data response from 7550 if in response.
CHECK	= Optional two character check if selected.
CR	= Message terminator (0DH). A "LF" character following the "CR" will be ignored. All characters following the "CR" and preceding the "*" will be ignored.

Note 1: The asterisk (*) is what tells the meter it needs to respond to the command. ALWAYS begin with the *.

Note 2: The colon (:) indicates a response from the meter. However, the response :NAK means that the command was not correct and :NAC means that the syntax was correct, but the command could not be completed.

Note 3: For most of the commands, you do not need to enter the DD or OO items. Instead, you may just start with the command itself.

Example: *CPE{001000}

will set the capacity to 1000. Notice that most of the items from the top description have been omitted.

Note 4: Many of the setup and configuration commands must be done with dipswitch 1 closed.

Command Code <Cmd> Description:

The <cmd> consists of three (3) characters "ppt" where:

pp = the command parameter
t = the command type

The three (3) command types (t) are as follows:

1. Direct cmd code = < D > character (44H).

'D' Commands have no data associated with them.

Examples:

General commands (Zero, Tare, etc.)

Display commands (Min,Max, etc.)

Weight calibration (Zero Cal, etc.)

2. Data request code = < R > character (3FH)

'R' Commands requesting data from the host to the 7550.

Examples:

Torque data

Status

Setup data

Calibration data

3. Data entry code = < E > character (45H).

'E' Commands with data sent from the host to be entered into the 7550.

Examples:

Setup data

Calibration data

Note 1: For complete listing of command codes see Table 6-15.

Note 2: The D, R, or E letters are already included within the 3 letter commands. Do not add it at the end as a fourth character.

Data Format:

When data is transmitted it is always bracketed with the '{' and '}' characters.

The separation character '|' (7CH) is used to separate data in a string.

All 7550 recalled data has leading zero suppression with the zeros transmitted as "spaces".

All data entered into the 7550 can have leading zero suppression with the zeros transmitted as "spaces" but is not required.

Section 6.8

RESPONSE

In the print/port 1/duplex setup the response by the 7550 from the direct commands and data entry commands can be selected for 'None' or Echo'. This was briefly covered in step 10 of 'Establishing a Connection' in section 6.2. The following is a brief description of each command:

'None': no response is given a direct cmd (D) or data entry cmd (E) if valid or invalid.

'Echo': the command (direct or entry) is echoed as received if valid; the start of transmission character is returned with a ':' not the '*' character. If invalid a 'NAK' is returned

'Ack/Nak': instead of echoing back the received command code and entered data the 7550 responds with 'ACK' (41H, 43H & 48H) in place of the code. If an error in received data is detected the 7550 responds with 'NAK'(4EH, 41H & 48H).

Ack response: :ACK<CR>

Nak response: :NAK<CR>

An **invalid** input consists of the following:

1. Parity error.
2. Check error if enabled.
3. Invalid command code.
4. Invalid data format.

Response in Echo or **Ack/Nak** mode = :NAK<CR>

Commands Received As Valid But That Can Not Be Performed

A valid command in the Echo or **Ack/Nak** mode that can not be performed will respond with:
:NAC<CR>

The conditions that give you a 'NAC' response are:

1. Not in a valid mode for the command. For example, a 'Cal' command in the 'normal (run)' mode (Refer to Command Performance Status Table Below).
2. The Command is acting on a parameter that is disabled in Configuration. For example, Peak data recall command when the Peak is configured for 'off'. (Refer to Command Performance Status Table below).
3. The command is acting on a parameter that can not be performed due to the unit conditions such as motion or over range.

The following table shows which commands can be used in which modes. Refer to section 4.1 to see which jumper positions correspond to each operating mode. In general, most of the commands can be performed without any dipswitches closed or with dipswitch 1 closed.

Table 6-2, COMMAND 'PERFORM' STATUS			
CATEGORY	COMMANDS	MODE VALID	CONFIG. ENABLED
GENERAL	ZED, TAD	RUN	YES
DATA RECALL	PDR, PGR	RUN/CAL	NO
DATA RECALL	PNR, PWR, PRR, PPR, PMR, PVR, PHR	RUN	YES
STATUS RECALL	PSR, MSR, ISR, OSR	RUN	YES
DISPLAY SELECT	MGD	RUN/CAL	NO
DISPLAY SELECT	MND, MRD, MPD, MMD	RUN	YES
UNITS SELECT	UxD	RUN	YES
UNITS SELECT	UUE/UUR	CAL	NO
PRINT	PRD	RUN	YES
CAPACITY/RES	CPE/CPR, REE/RER	CAL	NO
CALIBRATION	ZRD, LRD, RxD, LxE, ZFE/ZFR, LXE/LXR, LFE/LFR, LCE/LCR, HCE, HFE/HFR	CAL	NO
SETUP	SUE/SUR, FLE/FLR, P2E/P2R, INE/INR, TME/TMR, DTE/DTR, TIE/TIR, PAE/PAR, TCE/TCR, ANE/ANR	CAL	-
TEMPERATURE CAL	TPD, TXD, TRD, TFR, RZD, RSD, HxD, CxD, TxE/TxR	CAL	NO
TOTAL	TLD, TOD, TOR	RUN	YES

Protocol of Responses

The following examples show sample outputs for each of the three different modes for the display.

Direct cmd code: cmd = *<cmdD><CR>

<u>RESPONSE</u>	<u>VALID ENTRY</u>	<u>INVALID ENTRY</u>	<u>CAN NOT PERFORM</u>
(NONE) =	(NONE)	(NONE)	(NONE)
(ECHO) =	:<cmd D><CR>	:NAK<CR>	:NAC<CR>
(ACK) =	:ACK <CR>	:NAK<CR>	:NAC<CR>

Data request code: cmd = *<cmdR><CR>

<u>RESPONSE</u>	<u>VALID ENTRY</u>	<u>INVALID ENTRY</u>	<u>CAN NOT PERFORM</u>
(NONE) =	:<cmdR><{data}><CR>	(NONE)	(NONE)
(ECHO) =	:<cmdR><{data}><CR>	:NAK<CR>	:NAC<CR>
(ACK) =	:<cmdR><{data}><CR>	:NAK<CR>	:NAC<CR>

Data entry code: cmd= *<cmdE><{data}><CR>

<u>RESPONSE</u>	<u>VALID ENTRY</u>	<u>INVALID ENTRY</u>	<u>CAN NOT PERFORM</u>
(NONE) =	(NONE)	(NONE)	(NONE)
(ECHO) =	:<cmdE><CR>	:NAK<CR>	:NAC<CR>
(ACK) =	:ACK<CR>	:NAK<CR>	:NAC<CR>

Section 6.9

RECALLED DATA

Many of the commands are entered with the Data entry codes. Similarly, the current value can be recalled by using the Data request codes. The following is a summary of the Data request codes:

COMMANDS:

PDR = Display data
PGR = Torque data
PNR = Net Torque
PRR = Rate data
PPR = Max data
PMR = Min data

RESPONSE DATA:

LENGTH: fixed at 11 characters.

DATA FORMAT: <pr><units><par><stat>

Where:

pr: Eight (8) character data field for torque including polarity and decimal point. Has "space" for positive data and "minus" (-) for negative data.

units: One (1) character (Refer to Table 6-3)

TABLE 6-3			
TORQUE 'units 1' ASSIGNMENT			
units 1	DESCRIPTION	units 1	DESCRIPTION
A	lb ft	K	gram
B	lb in	L	R.P.M.
C	oz in	M	rad/sec
D	Nm	N	deg/sec
E	kgm	O	revs/sec
F	kpm	P	HP
G	lb	Q	Ftlb/sec
H	kg	R	Btu/min
I	Newton	S	Watts
J	dram	T	

par: one (1) character data field per Table 6-4

TABLE 6-4	
'par' ASSIGNMENT	
<par>	DESCRIPTION
'sp'	Standard Torque
N	Net (torque with Tare)
T	Tare

H	HP
R	R.P.M.
P	Max
M	Min
F	Freeze

stat: one (1) character data field;

- I = Invalid data
- O = Over range
- U = Under range
- M = Motion
- C = Center of zero
- 'Sp' = None of the above

Status Recalled

COMMANDS:

PSR = Torque status (motion, etc).

MSR = Unit/mode status

ISR = Input status.

OSR = Output status.

The following is a more detailed description of some of the important commands:

Units/Mode status (MSR command)

DATA FORMAT: <units><mode>

LENGTH: Fixed at 2 characters.

WHERE:

units: One (1) character field. For character assignment refer to Table 6-3.

par: One (1) character field. For character assignment refer to Table 6-5.

TABLE 6-5	
'mode' ASSIGNMENT	
<mode>	DESCRIPTION
N	Standard
C	Cal/config
T	Temp
D	Diagnostic

Pressure status (PSR command)

DATA FORMAT: <stat>

LENGTH: Fixed at 1 character

WHERE:

stat: one character data field;

I = invalid data
O = over range
U = under range
M = motion
C = center of zero
'Sp' = none of the above

Input status (ISR command):

DATA FORMAT: <i1>|<i2>

LENGTH: Fixed at 3 characters

WHERE:

i1 = input 1 status

i2 = input 2 status

0 represents an open input (logic 1)

1 represents a closed input (logic 0)

| = separation character.

Output status (OSR command):

DATA FORMAT: <o1>|<o2>

LENGTH: Fixed at 3 characters

WHERE:

o1 = output 1 status

o2 = output 2 status

0 represents an open output (logic 1)

1 represents a closed output (logic 0)

| = separation character.

Section 6.10

CHECK OPTION and RS485:

Check Option

The check option is available under the **I/O** menu under **Port 1**. The check option is set up in the print duplex mode of port 1. It can be applied to the duplex serial in the RS485 mode or in non addressable mode.

If check setup is set for 'NONE' (OFF), no characters are transmitted for check.

Checksum: if checksum is selected the check consists of two ASCII characters.

1. All ASCII characters including the starting character and terminating character preceding the checksum are included in the checksum.
2. The ASCII characters are binary summed (not including the parity bit).
3. The least significant byte is divided into four bits each "nibbles" and 30H is added to each. Therefore a sum of 5EH will be transmitted as 35H and 3EH or '5>'.

Xor: if exclusive or is selected the check consists of two ASCII characters.

1. All ASCII characters preceding the checksum are exclusively or'ed together.
2. The check byte is then calculated to give a result of zero when it is exclusively or'ed in.
3. The check byte is divided into four bits each and 30H is added to each.

RS485

The RS485 protocol is the same as the standard duplex except the two character destination address and two character origin address are included after the starting character.

The host computer's address is fixed at '00' and the 7550 address can be set between 1 and 98.

When the setup is not set for the RS485 mode the RS485 transceiver is set for transmit only (RS422 applications).

Section 6.11

CAPACITY/RESOLUTION ENTRY, BASE UNITS ENTRY, AND RECALL

Two important commands for the calibration are the capacity and resolution. The capacity must be set in order to properly calibrate the 7550 and the resolution, or count by setting, must also be appropriately set. The following is a summary of the commands needed to enter these settings.

COMMANDS:

CPE{} / **CPR** = Capacity.

REE{} / **RER** = Resolution.

The **CPE{}** command is used to enter the capacity and the **CPR** command will recall the current capacity.

DATA FORMAT: <data>

LENGTH: Fixed at 6 characters.

WHERE: data: Six (6) character data field with no polarity and decimal point.

-Entry with or without leading zero blanking.

-Recall with leading zero blanking.

EXAMPLE:

*CPE{001000}

This will set the capacity to 1000 in the default units.

The **REE{}** command is used to enter the resolution and the **RER** command will recall the current resolution.

DATA FORMAT: <data>

LENGTH: Fixed at 5 characters.

WHERE: data: Five (5) character data field including decimal point when required.

-On Entry and Recall, if a decimal point is included then use full leading zeros; if no decimal point is included then begin data with a space followed by leading zeros.

EXAMPLES:

*REE{ 0001 }

This will set the resolution to count by ones. Note the space before the first zero.

*REE{0.001 }

This will set the resolution to count by thousandths.

Base Units Entry And Recall

The base units command is used to set the default value for the units. The following is a description of the command.

COMMANDS:

UUE{}/UUR = Base Units Entry And Recall

The **UUE{}** command is used to enter the base units and the **UUR** command will recall the current base units.

FORMAT: <unit1>

LENGTH: Fixed at one (1) character.

WHERE:

unit1 : see Table 6-3 (example: A=lb ft, etc.)

EXAMPLE:

*UUE{B}

This will set the base units to lb-in, as shown in Table 6-3.

Section 6.12

CALIBRATION:

General:

The calibration feature is one of the most important procedures for the unit. Because of this, there are commands which specifically help to go through the calibration procedure. The following is a summary of these commands:

Note: The unit must be set for Calibration (dipswitch 1 or 2 closed) for these commands to work.

COMMANDS:

ZCD	= Perform Zero Cal
LRD	= Perform Linear Reset
RxD	= Perform Linear Reset at point x (x is # from 1 - 9 or letter 'A')
LxE{}	= Perform Linear Cal at point x (x is a # from 1 - 9 or the letter 'A').
ZFE{}/ZFR	= Zero Cal correction.
LXE{}/LXR	= Span Cal linear corr. All X's.
LFE{}/LFR	= Span Cal linear corr. All S's.
LCE{}/LCR	= Span Cal linear corr. All C's.
HCE{}	= Perform Hysteresis cal.
HFE{}/HFR	= Hysteresis correction.

Calibration 'Perform' command data entry. The LxE{} is used to do calibration and linearization at the span points. The x is not typed in, but replaced with the number of the cal point you are using. Note that the value entered inside the braces is dependent upon what the resolution or count by is set to.

COMMANDS:	LxE{}, HCE{}
DATA FORMAT:	<data>
LENGTH:	Fixed at 6 characters.
WHERE:	data: Six (6) character data field with no decimal point.
EXAMPLE:	*L1E{000500} With the resolution set to 1's, this will perform the first span point at a value of 500

Calibration 'Correction' command data entry and recall:

Zero Cal and Hysteresis correction data:

COMMANDS:	ZFE{}/ZFR, HFE{}/HFR
DATA FORMAT:	<x1><c1>
LENGTH:	Fixed at 17 characters.
WHERE:	x1, c1 = Eight (8) character data fields each.

Span Cal Linear corrections (all X's, S's, C's) commands entry and recall data:

COMMANDS:	LXE{}/LXR, LFE{}/LFR, LCE{}/LCR
DATA FORMAT:	<x1>< ><x2>< ><x3>< ><x4>< ><x5>< ><x6>< ><x7> < ><x8>< ><x9>< ><xA>
LENGTH:	Fixed at 89 characters.
WHERE:	x1 - xA: Eight (8) character data field each.

Section 6.13

SETUP DATA

General:

FORMAT: <par 1>|<par 2>| - - - <par x>

Setup data is set in a string using the separation character '|' between parameters.

The parameters are listed in the order of the function diagram as they appear in the manual.

'Arrow' select parameters are represented as a number starting with '0'.

Numeric entered data is directly represented by its data value.

When entering setup data, the full string of parameters need not be entered.

The following is a summary of the commands available to change in the setup menus. Note that the command with braces is the command to enter a value and the one that ends in an R is to recall the current value.

COMMANDS:

SUE{} / SUR	= Main Torque setup
HNE{} / HNR	= RPM/HP setup
FLE{} / FLR	= Filter setup
P1E{} / P1R	= Port 1 serial setup
P2E{} / P2R	= Port 2 serial setup
INE{} / INR	= Input setup
TME{} / TMR	= Time
DTE{} / DTR	= Date
TIE{} / TIR	= Time/Date Setup
PAE{} / PAR	= Parallel I/O setup
TCE{} / TCR	= Total setup
RTE{} / RTR	= Rate setup
ANE{} / ANR	= Analog setup
KYE{} / KYR	= Keyboard setup

Main Torque Setup

COMMAND = **SUE{} / SUR**

DATA FORMAT: <afil>|<d/s>|<ze%>|<z+%>|<azm>|<mot>|<min>|<max>|<frez>

LENGTH: Fixed at 17 characters.

WHERE:

afil	= Analog filter select.
d/s	= Display per Second update rate fixed at 1 number code.
ze%	= Zero Aperature % of FS (Zero %) fixed at 1 number code.
z+%	= Zero Band in % of FS (Zero ±%) fixed at 1 number code.
azm	= AZM Band in divisions (AZM ±) fixed at 1 number code.
mot	= Motion Band in divisions (Motion) fixed at 1 number code.
min	= Minimum Mode enable (Min) fixed at 1 number code.
max	= Max Mode enable (Max) fixed at 1 number code
frez	= Freeze mode select.

Table 6-6, CODE # / PARAMETER ASSIGNMENT									
CODE#	AFIL	DSP/ SEC	ZERO %	ZERO± %	AZM±	MOT ION	MIN	MAX	FREZ
0	OFF	AUTO	OFF	FULL	OFF	OFF	OFF	OFF	OFF
1	ON	2	2	0.1	0.5	1	ON	ON	ON
2		3	5	0.2	1	3			
3		5	10	0.5	3	5			
4			20	1.0	5	10			
5			100	1.5	10	20			
6						50			

Filter Setup:

COMMAND = **FLE/FLR**

DATA FORMAT: <code>

LENGTH: Fixed at 2 characters.

WHERE:

code = Two (2) digit Filter code # from 00 to 20 per table below.

Table 6-7, CODE # / FILTER PARAMETER ASSIGNMENT (FILTR1)									
CODE#	FILTR 1	CODE#	FILTR 1	CODE #	FILTR 1	CODE#	FILTR 1	CODE#	FILTR 1
00	1	05	6	10	12	15	25	20	50
01	2	06	7	11	14	16	30		
02	3	07	8	12	16	17	35		
03	4	08	9	13	18	18	40		
04	5	09	10	14	20	19	45		

EXAMPLE: A filter setting of 14 would be *FLE{11}<CR>

RPM/HP Setup

COMMAND: **HNE{/HNR**

DATA FORMAT: <HP>|<rP dSP>|<SP rES>|<FILter>|<tEEth>|<dSP UP>|<HP rES>

LENGTH: Fixed at 16 characters.

WHERE:

HP = RPM/HP Option select.

rP dSP = RPM display enable.

SP rES = Speed (RPM) display resolution.

FILter = RPM digital filter.

tEEth = Number of gear teeth on speed sensor (xxx from 002 to 999).

dSP UP = Rate speed (RPM) is updated to display.

HP res = Work (horsepower) display resolution (2 digit code).

Table 6-8, CODE # / PARAMETER ASSIGNMENT								
CODE#	HP	rP dSP	SP rES	FILter	tEEth	dSP UP	HP rES	
0	OFF	OFF	x .01	1	xxx	1/SEC	x.001	
1	ON	ON	x .02	2	xxx	2/SEC	x.002	
2			x .05	5	xxx	5/SEC	x.005	
3			x .1	10	xxx	10/SEC	x.01	
4			x .2	15	xxx	20/SEC	x.02	
5			x .5	20	xxx		x.05	
6			x 1	25	xxx		x.1	
7			x 2	30	xxx		x.2	
8			x 5		xxx		x.5	
9					xxx		x1	
10					xxx		x2	
11					xxx		x5	
12					xxx		x10	
13					xxx		x20	
14					xxx		x50	
15								

Note: xxx = 002 to 999

Port 1 Serial Setup

COMMAND: **PIE/PIR**

FORMAT: <mode>||<t&d>|<data>|<eol>|<sot>|<eot>|<ptr>|<ct>

LENGTH: Fixed at 15 characters.

WHERE: (all codes fixed at one (1) number code; see code tables below)

mode = Format mode select for Printer or Simplex mode.

del = Delay select.

t&d = Time and Date.

data = Data select.

eol = End of line terminator.

sol = Start of text character.

eot = End of text character.

Ptr = Printer select in Duplex mode.

ct = Continuous select in Duplex mode.

Table 6-9, CODE # PORT1 PARAMETER ASSIGNMENT									
CODE#	MODE	DELAY	T & D	DATA	EOL	SOT	EOT	PTR	CT

0	STD	AUTO	OFF	DISP	CR/LF	STX	NONE	OFF	OFF
1	MOD	1 SEC	ON	GTN	CR	NONE	EOT	ON	ON
2	CUST	2 SEC	ABOVE			SOH	ETX		
3		3 SEC	BELOW				FF		
4		4 SEC					LF		
5		5 SEC							

Port 2 Serial Setup

COMMAND: **P2E/P2R**

DATA FORMAT: <mode>||<t&d>|<data>|<eol>|<sot>|<eot>

LENGTH: Fixed at 15 characters.

WHERE: (all codes fixed at one (1) number code; see code tables below)

mode = Format mode select.

del = Delay select.

t&d = Time and Date.

data = Data select.

eol = End of line terminator.

sol = Start of text character.

eot = End of text character.

Table 6-10, CODE # PORT 2 PARAMETER ASSIGNMENT							
CODE#	MODE	DELAY	T & D	DATA	EOL	SOT	EOT
0	STD	AUTO	OFF	DISP	CR/LF	STX	NONE
1	MOD	1 SEC	ON	GTN	CR	NONE	EOT
2	CUST	2 SEC	ABOVE			SOH	ETX
3		3 SEC	BELOW				FF
4		4 SEC					LF
5		5 SEC					
6							

Input Setup

COMMAND = **INE/INR**

DATA FORMAT: <I1>|<I2>

LENGTH: Fixed at 3 characters.

WHERE: (all codes fixed at one (1) number code; see code table 6-11 below)

I1 = Input #1

I2 = Input #2

Table 6-11, CODE # INPUT 1 and 2 PARAMETER ASSIGNMENT	
CODE#	MODE
0	OFF
1	Freeze

2	Zero
3	Tare
4	Print

Time/Date Setup

COMMAND: **TIE/TIR**
 DATA FORMAT: <t1>|<t2>|<t3>|<t4>
 LENGTH: Fixed at 3 characters.
 WHERE: (all codes fixed at one (1) number code; see code table 6-12 below)
I1 = Input #1
I2 = Input #2

Table 6-12, CODE # INPUT 1 and 2 PARAMETER ASSIGNMENT	
CODE#	MODE
0	OFF
1	Freeze
2	Zero
3	Tare
4	Print

Parallel Setup

COMMAND: **PAE/PAR**
 DATA FORMAT: <par>
 LENGTH: Fixed at 1 character.
 WHERE: **par**: code fixed at one (1) number code; see code table below

Table 6-13, CODE # PARALLEL PARAMETER ASSIGNMENT	
CODE#	MODE
0	Parallel OFF
1	Parallel ON

Analog Setup

COMMAND: **ANE{}/ANR**
 DATA FORMAT: <anlg 1>|<anlg 2>|<anlg 3>|<zero>|<fs>|<zr adj>|<sp adj>
 LENGTH: Fixed at characters.
 WHERE:

- anlg 1** = Analog Option select.
- anlg 2** = Unipolar or Bipolar..
- anlg 3** = Select type of data for the analog output.

- zero** = Zero offset entry.
- fs** = Full scale entry.
- zr adj** = Zero adjust entry.
- sp adj** = Span adjust entry.

Table 6-14, CODE # / PARAMETER ASSIGNMENT								
CODE#	anlg 1	ranlg 2	anlg 3	zero	fs	zr adj	sp adj	
0	ANLG OFF	UNIPOLAR	TORQUE	xxxx	xxxx	xxxxx	xxxx	
1	ANLG ON	BIPOLAR	DELTA T		xxx			
2			R.P.M.		xxx			
3			HP		xxx			
4					xxx			
5					xxx			
6					xxx			
7					xxx			
8					xxx			

Section 6.14

TOTAL and TEMPERATURE CALIBRATION:

Total

COMMANDS:

TLD = Accumulate to total.

T0D = Clear total.

T0R = Total recall.

Total recall data:

COMMAND: **TOR**

DATA FORMAT: <total><units><par><stat>

LENGTH: Fixed at 14 characters

WHERE:

total: eleven (11) character data field including decimal point. Has leading zero suppression with the zeros transmitted as "spaces".

units: one (1) character data field (Table 6-2).

par: one (1) character data field; B = total

stat: one (1) character data field;

'Sp' = normal

O = over run

I = loss of data

Temperature Calibration

COMMANDS:

TPD = Temperature Cal on.

TXD = Temperature Cal off.

TRD = Temperature reset.

TFR = Temperature reading.

RZD = Zero Temp Reference acquire.

RSD = Zpan Temp Reference acquire..

HxD = Zero Temp Hot acquire (x=1,2 or 3).

HxD = Span Temp Hot acquire (x=X,Y or Z).

CxD = Zero Temp Cold acquire.

CxD = Span Temp Cold acquire.

DxE{}/DxR = Temperature corrections (x=1 or 2).

TxR = Temperature diagnostic data recall (x=1,2 or 3).

Temperature reading recall:

COMMAND: **TFR**

DATA FORMAT: <t data>

LENGTH: Fixed at 8 characters

WHERE: <t data> = eight (8) character data field (temp data not in calibrated standard units).

Temperature Corrections data entry and recall:

COMMANDS: **D1E{/D1R** and **D2E{/D2R**

DATA FORMAT (1): < zr>|< z1>|< z2>|< z3>|< zh1>|< zh2>|< zh3>|< sr>|< sl1>|< sl2>|< sl3>|< sh1>|< sh2>|< sh3>

DATA FORMAT (2): < tr>|< tl1>|< tl2>|< tl3>|< th1>|< th2>|< th3>|< fzl1>|< fzl2>|< fzl3>|< fsl1>|< fsl2>|< fsl3>|< fzh1>|< fzh2>|< fzh3>|< fsh1>|< fsh2>|< fsh3>

DATA LENGTHS: Part (1)=Fixed at 126 characters

Part (2)=Fixed at 171 characters

WHERE (all parameters eight (8) characters in length):

zr = Zero Reference
z1/2/3 = Zero low temperature a/d readings.
zh1/2/3 = Zero high temperature a/d readings.
sr = Span Reference
sl1/2/3 = Span low temperature a/d readings.
sh1/2/3 = Span high temperature a/d readings
tr = Reference temperature
tl1/2/3 = Low cal temperatures.
th1/2/3 = High cal temperatures.
fzl1/2/3 = Zero functions at low temperatures.
fsl1/2/3 = Span functions at low temperatures.
fzh1/2/3 = Zero functions at high temperatures.
fsh1/2/3 = Span functions at high temperatures.

Temperature Diagnostics data recall:

COMMANDS: **T1R , T2R and T3R**

DATA FORMAT (1): < zc>|< sc>|< wa>|< ft1>|< ft2>|< ft3>|< fth>|< fth2>|< fth3>|< zr>|< z1>|< z2>|< z3>|< zh1>|< zh2>|< zh3>

DATA FORMAT (2): < sr>|< sl1>|< sl2>|< sl3>|< sh1>|< sh2>|< sh3>|< tr>|< tl1>|< tl2>|< tl3>|< th1>|< th2>|< th3>

DATA FORMAT (3): < fzl1>|< fzl2>|< fzl3>|< fsl1>|< fsl2>|< fsl3>|< fzh1>|< fzh2>|< fzh3>|< fsh1>|< fsh2>|< fsh3>

LENGTH: Part (1)= Fixed at 143 characters

Part (2)= Fixed at 125 characters

Part (3)= Fixed at 107 characters

WHERE (all parameters eight (8) characters in length):

zr = Zero Reference
z1/2/3 = Zero low temperature a/d readings.
zh1/2/3 = Zero high temperature a/d readings.
sr = Span Reference
sl1/2/3 = Span low temperature a/d readings.
sh1/2/3 = Span high temperature a/d readings

tr = Reference temperature
tl1/2/3 = Low cal temperatures.
th1/2/3 = High cal temperatures.
fzl1/2/3 = Zero functions at low temperatures.
fsl1/2/3 = Span functions at low temperatures.
fzh1/2/3 = Zero functions at high temperatures.
fsh1/2/3 = Span functions at high temperatures.

Section 6.15

COMMAND CODE SUMMARY

The Response is shown in the 'Ack/Nak' mode.

The 'D' column represents the data character length including the '|' separator but not the '{or}' brackets.

Table 6-15, COMMAND CODE SUMMARY TABLE II			
COMMAND	RESPONSE	D	DESCRIPTION
GENERAL:			
ZED	ACK	-	Zero.
TAD	ACK	-	Tare.
WEIGHT/PRESSURE/RATE DATA RECALL:			
PDR	PDR {pr,units,par,stat}	11	Display data recall.
PGR	PGR {pr,units,par,stat}	11	Torque recall.
PVR	PVR {pr,units,par,stat}	11	R.P.M. recall
PHR	PHR {pr,units,par,stat}	11	HP recall
PNR	PNR {pr,units,par,stat}	11	_T recall.
PRR	PRR {pr,units,par,stat}	11	Rate data recall.
PPR	PPR {pr,units,par,stat}	11	Max data recall.
PMR	PMR {pr,units,par,stat}	11	Min data recall.
STATUS RECALL:			
PSR	PSR {stat}	1	Pressure status recall (motion, etc.)
MSR	MSR {units,mode}	3	Unit/mode status recall.
ISR	ISR {i1 i2}	3	Input status recall.
OSR	OSR {o1 o2}	3	Output status recall.
DISPLAY:			
MRD	ACK	-	Display to Rate mode.
MPD	ACK	-	Display to Max mode.
MM D	ACK	-	Display to Min mode.
UNITS:			
UxD	ACK	-	Conv. Select units (x=A,B,C etc. per Table 6-3)
UUE {unit1 unit2}	ACK	1	Base 'Cal' units entry.
UUR	UUR {unit1 unit2}	3	Base 'Cal' units recall.
PRINT:			
PRD	ACK	-	Print to printer Port 2.
CAPACITY:			
CPE {cap}	ACK	6	Capacity entry.

Table 6-15, COMMAND CODE SUMMARY TABLE II

COMMAND	RESPONSE	D	DESCRIPTION
CPR	CPR {cap}	6	Capacity recall.
REE {res}	ACK	5	Resolution entry.
RER	RER {res}	5	Resolution recall.
CALIBRATION:			
ZCD	ACK	6	Perform zero cal.
LRD	ACK	-	Perform linear reset (SETKDG-2).
RxD	ACK		Perform linear reset at span x; Where x is a # from 1 - 9 or letter 'a'.
HCE {x1 c1}	ACK	166	Perform hysteresis correction.
LxE {data}	ACK	6	Perform linear cal at point x; Where x is a # from 1 - 9 or the letter 'a' (linear on).
ZFE {x1 c1}	ACK	17	Zero cal correction entry.
ZFR	ZFR {x1/c1}	17	Zero cal correction recall.
LXE {x1 ---x9 xA}	ACK	89	Span cal linear corr. All X's entry.
LXR	LXR {x1 ---x9 xA}	89	Span cal linear corr. All X's recall.
LFE {x1 ---x9 xA}	ACK	89	Span cal linear corr. All S's entry.
LFR	LFR {x1 ---x9 xA}	89	Span cal linear corr. All S's recall.
LCE {x1 ---x9 xA}	ACK	89	Span cal linear corr. All C's entry.
LCR	LCR {x1 ---x9 xA}	89	Span cal linear corr. All C's recall.
HFE {x1 c1}	ACK	17	Hysteresis (X and C) corr. entry.
HFR	HFR {x1 c1}	17	Hysteresis (X and C) corr. recall.
SETUP DATA:			
SUE {ze% ---lin}	ACK	13	Main Pressure setup entry.
SUR	SUR {ze% ---lin}	13	Main Pressure setup recall.
FLE {fil}	ACK		Filter setup entry.
FLR	FLR {fil}		Filter setup recall.
INE {i1 i2}	ACK		Input setup entry.
INR	INR {i1 i2}		Input setup recall.
P2E {s1 ---s7}	ACK		Port 2 serial setup entry.
P2R	P2R {s1 ---s7}		Port 2 serial setup recall.

Table 6-15, COMMAND CODE SUMMARY TABLE II

COMMAND	RESPONSE	D	DESCRIPTION
TME {hhmm}	ACK		Time entry.
TMR	TMR {hhmm}		Time recall.
DTE {mmddyy}	ACK		Date entry.
DTR	DTR {mmddyy}		Date recall.
TIE {time/date}	ACK		Time and Date setup entry.
TIR	TIR {time/date}		Time and Date setup recall.
PAE {p1}	ACK		Parrallel I/O setup entry.
PAR	PAR {p1}		Parrallel I/O setup recall.
TCE	ACK		Total setup entry.
TCR	TCR		Total setup recall.
RTE	ACK		Rate setup entry.
RTR	RTR		Rate setup recall.
ANE	ACK		Analog setup entry.
ANR	ANR		Analog setup recall.
KYE	ACK		Keyboard setup entry.
KYR	KYR		Keyboard setup recall.
TEMPERATURE CAL:			
TPD	ACK	-	Temperature Cal on.
TXD	ACK	-	Temperature Cal off.
TRD	ACK	-	Temperature Cal Reset.
TFR	TFR {t data}	8	Temperature reading (current) recall.
RZD	ACK	-	Zero Temp Reference acquire.
RSD	ACK	-	Span Temp Reference acquire.
HxD	ACK	-	Zero Temp Hot acquire (x=1,2 or 3).
HxD	ACK	-	Span Temp Hot acquire (x=X,Y or Z).
CxD	ACK	-	Zero Temp Cold acquire(x=1,2 or 3).
CxD	ACK	-	Span Temp Cold acquire(x=X,Y or Z).
DxE {---}	ACK		Temp. corrections entry (x=1 or 2).
DxR	DxR {---}		Temp. corrections recall (x=1 or 2).
TxR	TxR {---}		Temp. diag. data recall (x= 1,2 or 3).
TOTAL:			
TLD	ACK		Accumulate to total.

Table 6-15, COMMAND CODE SUMMARY TABLE II

COMMAND	RESPONSE	D	DESCRIPTION
TOD {total-----}	ACK	14	Clear total.
TOR	TOR {total-----}	14	Total recall.

Alphabetical Command Code Listing

(xxD=COMMAND, xxR=RECALL & xxE=ENTRY):

AxE / AxR	= Fill Preact
CPE / CPR	= Capacity.
CxD	= Zero Temp Cold acquire (x=1,2 or 3).
CxD	= Span Temp Cold acquire (x=X,Y or Z).
DTE / DTR	= Date.
DxE / DxR	= Temperature Corrections entry and recall (x=1 or 2)
FLE / FLR	= Filter setup.
HCD	= Perform Hysteresis cal.
HFE/HFR	= Hysteresis correction.
HNE/HNR	= RPM/HP setup data.
HxD	= Span Temp Hot Acquire.(x=X,Y or Z).
HxD	= Zero Temp Hot Acquire (x=1,2 or 3).
INE / INR	= Input setup.
ISR	= Input status.
KYE / KYR	= Keyboard setup.
LCE / LCR	= Span Cal Linear corr. All C's.
LFE / LFR	= Span Cal Linear corr. All S's.
LRD	= Perform Linear reset (Set KDG-2 only).
LxE	= Perform Linear Cal at point x; Where x is a # from 1 - 9 or the letter A.
LXE / LXR	= Span Cal Linear corr. All X's.
MGD	= Display to torque mode.
MMD	= Display to min mode.
MND	= Display to net mode.
MPD	= Display to max mode.
MRD	= Display to rate mode
MSR	= Unit/mode status
OSR	= Output status.
PAE/PAR	= Parallel I/O setup
PDR	= Display data.
PGR	= Torque data.
PHR	= HP data

PMR	= Min data.
PNR	= Applied tare.
PPR	= Max data.
PRD	= Print to printer port 2.
PRR	= Rate data.
PSR	= Torque status (motion, etc).
P2E / P2R	= Port 2 serial setup.
PVE/PVR	= RPM data.
REE / RER	= Resolution.
RSD	= Span temp reference acquire.
RTE / RTR	= Rate setup.
RxD	= Linearization Reset (x = 1-9 or A)
RZD	= Zero temp reference acquire.
SUE/SUR	= Main Pressure setup.
TAD	= Tare. / is function of motion, etc.
TCE / TCR	= Total setup.
TFR	= Temperature reading.
TIE/TIR	= Time and Date setup.
TLD	= Accumulate to total.
TME / TMR	= Time.
T0D	= Clear total.
T0R	= Total recall.
TPD	= Temperature cal on.
TRD	= Temperature reset.
TXD	= Temperature cal off.
TxR	= Temperature diagnostic recall (x=1,2 or 3)
UUE/UUR	= Base 'cal' units config
UxD	= Select units
ZCD	= Perform Zero Cal.
ZED	= Zero.
ZFE / ZFR	= Zero cal correction.

Section 7.0

ANALOG I/O SPECIFICATIONS

General:

The Analog I/O provides an analog output of a 4 - 20 mA, 0 - 10 VDC or ± 5 VDC. The unit can be configured for either bipolar or unipolar operation. All analog outputs are scaled and linearized. The outputs are updated on every conversion. Default setting is bipolar ± 5 VDC.





Specifications:

DAC size:	16 bit
Analog output resolution:	10VDC/50,000cts
Analog outputs available:	4 - 20 mA & 0 - 10 VDC in unipolar mode, ± 5 VDC in bipolar. Other outputs can be obtained by resistor modifications to the circuit (such as ± 10 VDC & 12 ± 8 mA).
4 - 20 mA analog output, maximum impedance:	$\leq 600 \text{ K}\Omega$
Bipolar / Unipolar selection:	By menu selection and jumper plug or switch on option board.
Analog Zero setting:	Zero to positive full scale capacity (Typically set to zero setting).
Analog Full Scale setting:	Zero to full scale capacity; applies to both plus and minus data in bipolar mode (Typically set to full scale).
Zero Trim:	± 10 % full scale for unipolar and ± 20 % full scale in bipolar.
Span Trim:	± 10 % Full scale.
Data Select:	Torque, Delta Torque, R.P.M. or HP Data.
Over Load:	Typically set for 20% full scale (with no Trims Set).
UnderLoad:	Typically set for 10% full scale (with no Trims Set).
Default Analog Output:	Under Load.

Section 7.1

PRELIMINARY ANALOG OUTPUT SETUP

Getting To The Analog Setup

1. Close S1, switch 1
2. Press the  key until 'I/O' is displayed.
3. Press the  key to enter the 'I/O' setup
4. Press the  key until 'ANALOG' is displayed.
5. Press the  key to enter the analog setup.

NOTE: You can skip directly to the I/O sub-menu by closing S1, switch 3 instead of S1, switch 1. However you will only have access to the I/O sub-menu functions.

Section 7.2



ANALOG SETUP PARAMETERS


Menu Options

ANALOG

ANLG ON ® ANLG OFF

Turns analog output on or off.



Use  or  arrow keys to make selection.


Press the  arrow key to advance to the next step

ANALOG

UNIPOLAR ® BIPOLAR

Selects unipolar or bipolar operation for analog.



Use  or  arrow keys to make selection.

Press the  arrow key to advance to the next step

ANALOG

TORQUE → DELTA T → R.P.M. → HP

Selects the type of data for the analog to output.

Use  or  arrow keys to make selection.



The default setting is 'TORQUE' which refers to the 'BASE' units measurements (i.e. LOAD for lb., Kgm, gram, etc...)

ZERO


Zero offset entry.

Press  or  arrow keys to enable entry mode.

Use  or  arrow keys to select digit.

Use  or  arrow keys to increment/decrement digit.

Press  to save or  to clear the entry.

Press the  arrow key to advance to the next step






FS

Full Scale entry.

This is the full scale capacity of the sensor in the engineering 'BASE' units that was entered in the 'CAL' sub-menu. (Refer to section 4.4, the 'Calibration' section of this manual for further detail)

Press  or  arrow keys to enable entry mode.

Use  or  arrow keys to select digit.

Use  or  arrow keys to increment/decrement digit.
 Press  to save or  to clear the entry.
 Press the  arrow key to advance to the next step










Zr Adj

Fine Tune Zero Adjust entry. The meter’s zero point can be slightly corrected or adjusted with this feature if you feel the no load reading is too far from zero. Perform this operation as described under ‘ZERO’, also within section 7.2 of this manual. The entry must be between +4999 and -4999. This is a value in mV with the decimal to the left of the least significant digit. For example, 0047 = 4.7 mV

Note 1:The correction factor requires that you enter approximately HALF of the value needed for the correction.

For example, if the reading is 1.0mV, you would enter -0.5mV, or -0005. This is half the value and the negative will make the value decrease to 0.0mV.

Note 2: This correction factor only affects the analog output from the port on the back of the unit. It will not affect the display on the front of the meter.

Press  or  arrow keys to enable entry mode.
 Use  or  arrow keys to select digit.
 Use  or  arrow keys to increment/decrement digit.
 Press  to save or  to clear the entry.
 Press the  arrow key to advance to the next step



SP Adj



Fine Tune Full Scale Span Adjust entry. The meter’s full scale value can be slightly corrected or adjusted with this feature if you feel the full scale reading is too far from the desired output value. Perform this operation as described under ‘ZERO’, also within section 7.2 of this manual. The entry must be between +4999 and -4999. This is a value in mV with the decimal to the left of the least significant digit. For example, 0056 = 5.6 mV.



Note 1:The correction factor requires that you enter approximately HALF of the value needed for the correction.



For example, if the reading is 4.9990V, you would enter 0.5mV, or 0005. This is half the value and the positive sign will increase the value to 5.0000V.


Note 2:This correction factor only affects the analog output from the port on the back of the unit. It will not affect the display on the front of the meter.

Press  or  arrow keys to enable entry mode.

Use  or  arrow keys to select digit.

Use  or  arrow keys to increment/decrement digit.

Press  to save or  to clear the entry.

Press the  arrow key to advance to the next step

Note: To EXIT

Press  key to exit or  key to wrap around to the beginning.

Calibration

1. The zero and span calibration of the analog output is performed by adjusting the Zero and Span Adjust described above in the “Menu Options” section.
2. The analog output adjustments apply to only one type of output: either the 4-20ma, ± 5 volt or the 10 volt output. The analog out must be re-calibrated if a different type of output is required than the type that was used to perform the calibration.

Hardware Setup:

1. Bipolar/Unipolar selection:

With KKV8924- PCB assembly (DLR-101): Set J3 to the left for Bipolar and to the right for unipolar operation (As viewed from the front of the instrument). Refer to Figure 7-1.

With KKY8924 Assembly (DLR-103):

Set S14 to the left for Bipolar and to the right for unipolar operation (As viewed from the front of the instrument). Refer to Figure 7-2.

2. Volts out/4-20mA out selection:

With KKV8924- PCB assembly (DLR-101):

For Volts out connect Hi lead to TB1-3 and Lo lead to TB1-2
 For 4-20mA out connect Hi lead to TB1-1 and Lo lead to TB1-2
 Refer to Figure 7-1.

With KKY8924- PCB assembly (DLR-103):

For Volts out connect Hi lead to TB8-3 and Lo lead to TB8-2
 For 4-20mA out connect Hi lead to TB8-1 and Lo lead to TB8-2

Refer to Figure 7-2.

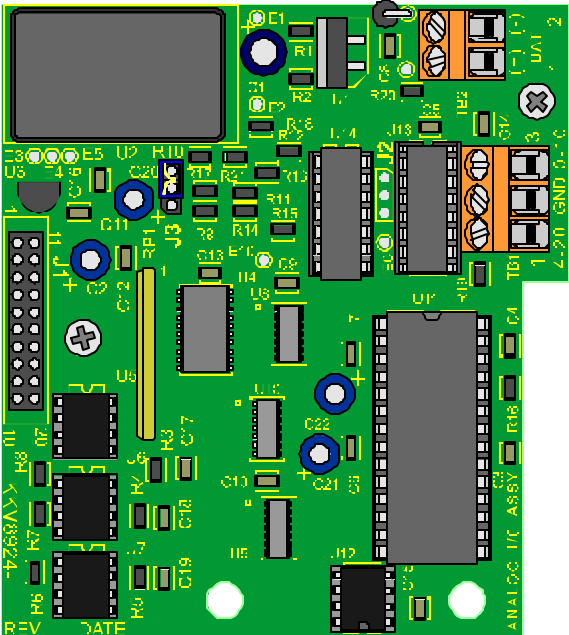


Figure 7-1. (KKV8924)

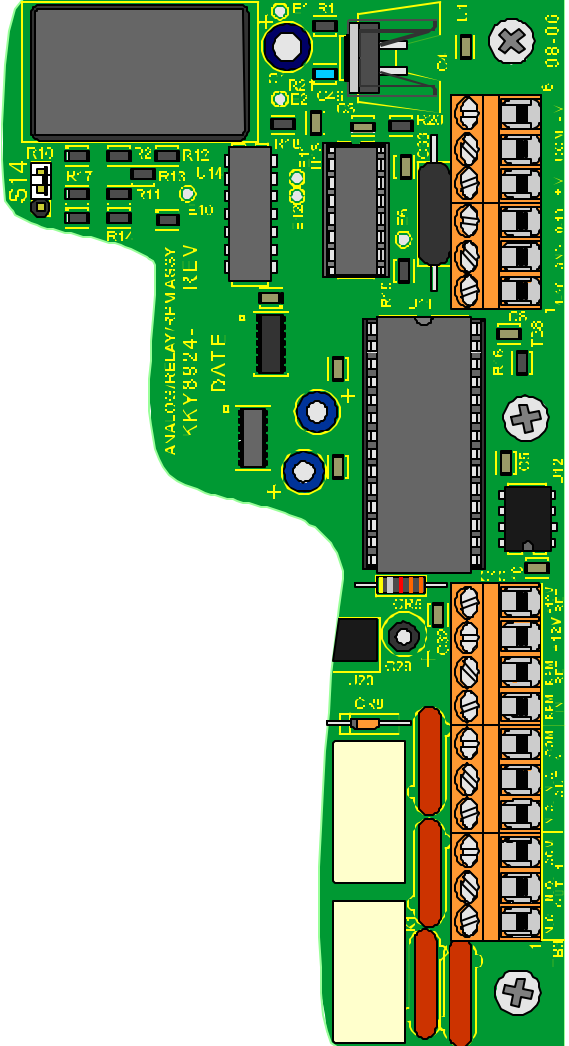


Figure 7-2. (KKY8924)

Section 8.0

RELAYS OVERVIEW (DUAL BAND TRIP OPTION)

General:

The Dual Band Trip Option is a dual band trip (trip point) performed in the meter's CPU on the processed Torque data. The "Trip Option" provides relay contact closures as well as a visual indication whenever a recorded data value is in or out of a preset band as set by the configuration. The Configurable hysteresis settings are included which can be used to decrease drop-out threshold levels thus minimizing noise effects. Each limit hysteresis can be configured for either ascending or descending hysteresis application.

The trip band is defined by two trip points with individual hysteresis and polarity settings selected in the Trip Pt setup.

All settings related to the Trip Points are configured by the operator in the I/O menu under "Trip Pts?" and are stored in the non-volatile memory.

When enabled by the setup, the Trip Points can be modified from the front panel in the "run" mode.

Specifications:

Number of trip bands:	Two
Trip point range:	0 to $\pm 100\%$ of full scale capacity.
Data Select:	Torque, HP or RPM (HP/RPM will be added when the Option is incorporated).
Trip point settability:	Set in display (engineering) units with resolution of the base unit configuration.
Trip point Hysteresis:	Set in display (engineering) units with resolution of the base unit configuration to a maximum setting of full scale.
Output Relay:	Arrangement: Form C contact closure. Max Switching Voltage: 100VDC,220VAC <u>Max Current:</u> AC (resistive load): 120VAC: 1 A AC (resistive load): 220VAC: 1/2 A DC (resistive load): 1/2 A
Output Logic:	Trip 1 on OUT 1 and Trip 2 on OUT 2. A logic "0" is output "on" (energized).

- Output Activation select: If set for "IN BAND" the output relay is "ON" (energized) when the data is in the Trip Band. If set for "OUT BAND" the output relay is "ON" when the data is out of the Trip Band.
- Power-up reset Protection: All relays are held "off" until the CPU re-establishes proper operating conditions caused by power interruptions.
- Indicators: Can be set in configuration for two types of display indications. If set for "ACCEPT" and selected by the "DISPLAY" key, the alpha display will indicate "LOW", "ACCEPT" and "HIGH" for trip band 1. If set for "TRIP PTS", the display will indicate the active outputs by "TRIP 1 ", "TRIP 2", or TRIP 1 & 2". In this display mode the Units will not be displayed unless changed by the unit selection keys.
- Serial I/O: All Trip point parameters can be recalled or entered via the Serial Full Duplex in RS232 or RS485.

Section 8.1

RELAY OUTPUT:

The relay output is available on the KKY8924 assembly (see Figure 8-1. below) and rear panel terminal block:

Description	Connection KKY8924	Connection Rear Panel
OUT 1 N.C.	TB3 - 1	TB - 1
OUT 1 N.O.	TB3 - 2	TB - 2
OUT 1 COM	TB3 - 3	TB - 3
OUT 2 N.C.	TB3 - 4	TB - 5
OUT 2 N.O.	TB3 - 5	TB - 6
OUT 2 COM	TB3 - 6	TB - 7

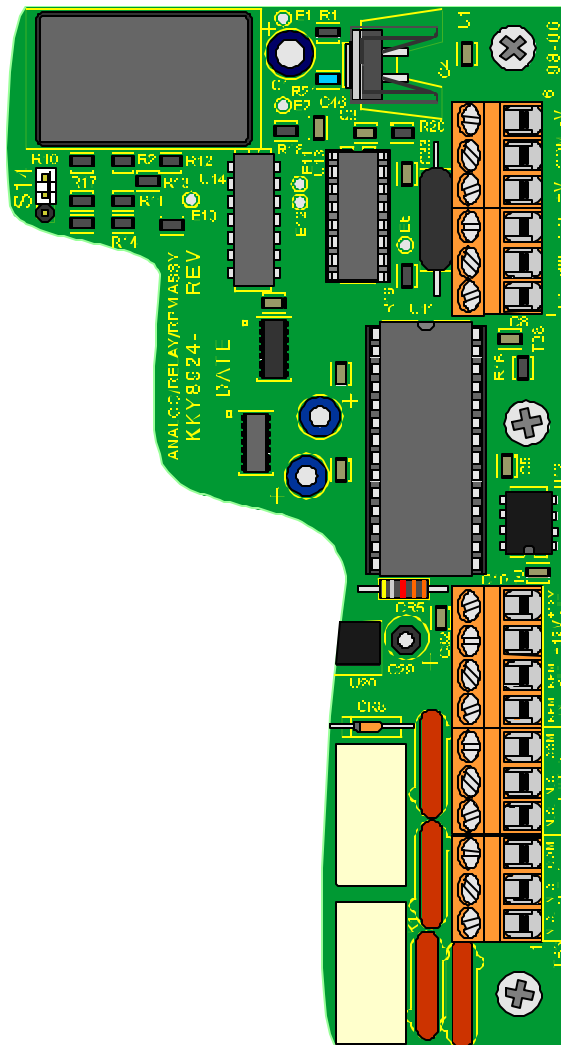


Figure 8-1.

Logic Output:

The logic output is available on the I/O terminal block TB2 on the CPU assembly.

Trip 1: TB2-2

Trip 2: TB2-3

The I/O must be selected by jumper plugs P4 and P5 for OUT on the CPU assembly.

P4 set for 2-3 (OUT)

P5 set for 2-3 (OUT)

A trip "ON" condition "relay energized" is a logic "0".





Section 8.2

SETTING UP TRIP PT



Getting to the Trip Point Menu

There are two different ways to enter the trip point menu. Choose the most convenient of the two methods.

Method 1:



1. MAIN SETUP: Close Dip switch 1 of S1 located at the front right corner of the main Printed Circuit Board (PCB) only.
2. Press the  key until the " I/O ?" is selected and then press  key.
3. In the I/O press the  key until the " TRIP PT ?" is selected and then press  key.

Method 2:





1. I/O (direct): Close Dip switch 3 of S1 on the PCB only.
2. Indicator is placed directly into the I/O set up mode.
3. In the SETUP I/O press the  key until the "SETUP TRIP PT ?" is selected and then press  key.





















Menu Items:

Note: To navigate through the Trip Point Menu,

Press  to advance to the next step or  to return to the previous step.

Press  or  to change the setting.



DISPLAY	CHOICES	EXPLANATION
TRIP	OFF	When OFF, front panel trip indication can not be selected and the Trip Menu is disabled.
	ON	Trip Option enabled
		Press  or  to change setting.
TRIP	TORQUE	Trip applies to the torque reading.
	HP	Trip applies to the Horsepower.
		Press  or  to change setting.
TRIP	TRIP PTS	Display indication for both trip band 1 and trip band 2.

ACCEPT	Applies to trip band 1 only (trip band 2 set to OFF).
	Press  or  to change setting. Press  to advance to the next step or  to return to the previous step.
DISPLAY NONE VIEW MODIFY	Can not view trip point status from front panel. Can view trip point status from front panel only. Can view and modify trip point status from front panel.
	Press  or  to change setting. Press  to advance to the next step or  to return to the previous step.
TRIP 1 OFF ON	Trip band 1 is disabled. Trip band 1 is enabled.
	Press  or  to change setting. Press  to advance to the next step or  to return to the previous step.
TRIP 1 IN BAND OUTBAND	Sets polarity of trip band 1 output to active in band. Sets polarity of trip band 1 output to active out of band.
	Press  or  to change setting. Press  to advance to the next step or  to return to the previous step.
TRIP1.H +XXXXXX	Trip band 1 upper value.
TRIP1.L ±XXXXXX	Trip band 1 lower value.
HYST1.H DESCEND ASCEND	Hysteresis upper trip band 1 applies to descending data. Hysteresis upper trip band 1 applies to ascending data.
	Press  or  to change setting. Press  to advance to the next step or  to return to the previous step.
HYST1.H ±XXXXXX	Hysteresis upper trip band 1 value.

HYST1.L DESCEND
ASCEND

Hysteresis lower trip band 1 applies to descending data.
Hysteresis lower trip band 1 applies to ascending data

Press  or  to change setting.

Press  to advance to the next step or  to return to the previous step.



HYST1.L ±XXXXXX

Hysteresis lower trip band 1 value.

TRIP 2 OFF
ON

Trip band 2 is disabled.
Trip band 2 is enabled.



Press  or  to change setting.

Press  to advance to the next step or  to return to the previous step.

TRIP 2 IN BAND
OUTBAND




Sets polarity of trip band 2 output active in band.
Sets polarity of trip band 2 output active out of band.


Press  or  to change setting.



Press  to advance to the next step or  to return to the previous step.



TRIP2.H ±XXXXXX



Trip band 2 upper value.



Press  or  to enter the edit mode, the least significant digit will now be flashing (the digit furthest to the right). Press 

or  to select a digit to be changed, the selected digit will now be

flashing. Use the  or  keys to change the value of the













digit. Press  or  to select another digit. Continue for all

necessary digits. Press  to accept the value or  to

abort. Press  to advance to the next step or  to return to the previous step.

TRIP2.L ±XXXXXX



Trip band 2 lower value.

Press  or  to enter the edit mode, the least significant digit will now be flashing (the digit furthest to the right). Press  or  to select a digit to be changed, the selected digit will now be flashing. Use the  or  keys to change the value of the digit. Press  or  to select another digit. Continue for all necessary digits. Press  to accept the value or  to abort. Press  to advance to the next step or  to return to the previous step.

HYST2.H DESCEND
 ASCEND













Hysteresis upper trip band 2 applies to descending data.
 Hysteresis upper trip band 2 applies to ascending data.

Press  or  to change setting.

Press  to advance to the next step or  to return to the previous step.

HYST2.H +XXXXXX



Hysteresis upper trip band 2 value.

Press  or  to enter the edit mode, the least significant digit will now be flashing (the digit furthest to the right). Press  or  to select a digit to be changed, the selected digit will now be flashing. Use the  or  keys to change the value of the digit. Press  or  to select another digit. Continue for all necessary digits. Press  to accept the value or  to abort. Press  to advance to the next step or  to return to the previous step.













HYST2.L DESCEND
 ASCEND



Hysteresis lower trip band 2 applies to descending data.
 Hysteresis lower trip band 2 applies to ascending data.

Press  or  to change setting.

Press  to advance to the next step or  to return to the previous step.


HYST2.L ±XXXXXX Hysteresis lower trip band 2 value.


Press  or  to enter the edit mode, the least significant digit will now be flashing (the digit furthest to the right). Press  or  to select a digit to be changed, the selected digit will now be flashing. Use the  or  keys to change the value of the digit. Press  or  to select another digit. Continue for all necessary digits. Press  to accept the value or  to abort. Press  to advance to the next step or  to return to the previous step.

EXIT? Press  to return to the previous menu or  to return to the beginning of the trip point setup menu. Otherwise open the Dip switch you used to enter the menu (i.e. switch 1 or 3 on S1). Opening the Dip switch will return you to the "RUN" mode.

Front Panel Entry:

Enable the Unit for front panel entry by setting the "Display" to "Modify" in the "Trip Point Menu".

Select the Trip Points by pressing the  key in the run mode until the trip point prompts (triP1.H, triP1.L, triP2.H or triP2.L) are indicated.

To modify the points utilize the arrow keys until the value is selected and then press the  key.

Section 9.0

RPM / HP OPTION

General:

The work (Horsepower) / Speed (RPM) Option is a measurement of speed and the calculation of horsepower in the meter's CPU on the processed speed and torque data.

The speed signal is usually taken from a magnetic or Hall Effect sensor mounted on the torque sensor housing. Each time a gear tooth passes by the sensor a pulse is generated and conveyed to the indicator. This signal is digitally converted by the indicator to an accurate digital indication of frequency using a crystal oscillator as a reference. The CPU utilizes the number of gear teeth, as set in the configuration mode, to derive the speed (RPM) and process the measured frequency. No calibration is required and the RPM filtering and display resolution is selectable in configuration.

The meter's CPU calculates the work (horsepower) from the measured RPM and torque data. The display resolution and filtering are applied to the computed horsepower as set by the configuration. No calibration of the horsepower is required.

All settings related to the horsepower and RPM are configured by the operator in the I/O menu under "RPM/HP ?" and are stored in the non-volatile memory.

Speed (RPM) Specifications:

Frequency range:	2 Hz to 50 kHz
Input symmetry:	80/20% maximum duty-cycle
Input Amplitude:	1V P-P (.3536 VRMS) minimum to 70V P-P (24.75 VRMS) maximum.
Input Impedance:	50K Ω , <12.4 V P-P), decreasing to a minimum of 7.382k Ω at 70 P-P.
Output sensor voltage:	+12VDC at 30mA max
Accuracy:	0.01%
Gear teeth range:	2 to 999 (60 default)
Response (sample time):	50ms for > 50 Hz; 50 ms steps to a maximum of 1 second at 2 Hz.
Display Time:	Selectable for 1, 2, 5, 10 and 20 per second (limited by frequency)
Digital filter:	Selectable for 1, 2, 5, 10, 15, 20, 25 and 30

Display resolution: Selectable from .01 RPM to 5 RPM

Display units: Selectable- R.P.M. rad/sec, deg/sec and revs/sec.

Front panel conversion Yes.
select:

Work (HP) Specifications:

Accuracy: Function of RPM (0.01%) and torque accuracy.

Display Response time: 50ms for speed > 50 Hz; in 50 ms steps to a maximum of 1 second at 2 Hz.

Display resolution: Selectable from .001 HP to 50 HP.

Display units: Selectable- HP, ftlb/sec, Bt/min and Watts

Display polarity: + for positive torque and – for negative torque.

Front panel conversion Yes.
Select:

Display filter: Function of RPM and torque filter.

Section 9.1

SPEED SENSOR INPUT:

The Speed Sensor Input is available on the KKY8924 assembly (see Figure 9-1. below) and rear panel terminal block:

Description	Connection KKY8924	Connection Rear Panel
RPM IN	TB3 - 7	TB - 9
RPM RET	TB3 - 8	TB - 10
+12V	TB3 - 9	TB - 11
+12V RET	TB3 - 10	TB - 10

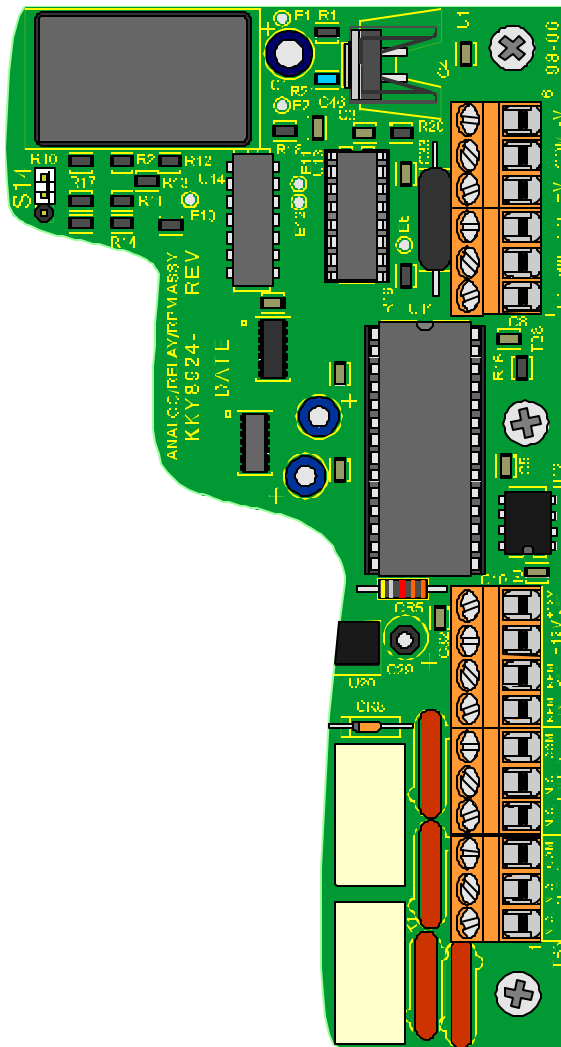


Figure 9-1.





Section 9.2

SETTING UP RPM/HP:



Instructions to set up the RPM/HP Option:

There are two different ways to enter the RPM/HP menu. Choose the most convenient of the two methods.

Method 1:



1. MAIN SETUP: Close Dip switch 1 of S1 located on main PCB (printed circuit board)
2. Press the  key until the " I/O ?" is selected and then press the  key.
3. In the I/O mode, press the  key until the " RPM/HP ?" is selected and then press the  key.

Method 2:

1. I/O (direct): Close Dip switch 3 of S1 on main PCB (printed circuit board)
2. Indicator is placed directly into the I/O set up mode.
3. In the I/O mode, press the  key until the "RPM/HP ?" is selected and then press the  YES key.

Menu Items:

Note: To navigate through the HP/RPM Menu,

Press  to advance to the next step or  to return to the previous step.

Press  or  to change the setting.

Display	Choices	Explanation
HP	OFF	When OFF, RPM and HP is disabled and can not be selected from front panel. Must be set to OFF if option board not connected
	ON	RPM and HP Option enabled
rP dSP	OFF	RPM data can not be selected from front panel.
	ON	RPM data can be selected from front panel.
SP rES	x .01	Max capacity= 9999 RPM; recommended max=100 RPM

x .02	Max capacity= 9999 RPM;	recommended max=200 RPM
x .05	Max capacity= 9999 RPM;	recommended max=500 RPM
x .1	Max capacity= 99999 RPM;	recommended max=1000.
x .2	Max capacity= 99999 RPM;	recommended max=2000.
x .5	Max capacity= 99999 RPM;	recommended max=5000.
x 1	Max capacity= 999999 RPM;	recommended max=10000.
x 2	Max capacity= 999999 RPM;	recommended max=20000.
x 5	Max capacity= 999999 RPM;	recommended max=50000.

FILter	Speed (RPM) 1,2,5 10,15, 20, 25 & 30	digital filter; number of input readings averaged.
tEEtH	XXX	Number of speed gear teeth settable from 2 to 999.
dSP UP	1/SEC 2/SEC 5/SEC 10/SEC 20/SEC	The rate the speed data is updated on the display.
HP rES	X .001 to X 50	Horsepower display resolution. The resolution should be set to be no greater than six (6) digits at full scale.

Section 10.0

TROUBLESHOOTING

No Power:

1. Problem:

There is no display on the 7550.

Resolution:

There may be a problem with the power cord. The power cord is a very standard component. If possible, try switching power cords with another unit to see if the power cable is defective.

2. Problem:

There is no display on the 7550.

Resolution:

Try plugging another device into the outlet. Make sure that the 7550 is not working in any outlet, while other devices do. If no devices work in the outlet, have the outlet checked.

Conversions:

3. Problem:

"No conversions selected" when pressing the up or down arrows.

Resolution:

The conversions have been turned off or have never been turned on. See section 4.5 for information on how to turn on the conversions.

4. Problem:

One or more conversion is missing when pressing the up or down arrows during normal operating mode.

Resolution:

Some of the conversions have been turned off or have never been turned on. See section 4.5 for information on how to turn on the conversions.

5. Problem:

Horsepower(HP) or Revolutions per Minute (RPM) conversions are not available in the conversions menu.

Resolution:

The HP option must be turned on in the I/O menu. See section 4.5 for details on enabling HP.

6. Problem:

Horsepower(HP) or Revolutions per Minute (RPM) conversions are not available in the conversions menu or do not work.

Resolution:

You need to have purchased the meter with the HP/RPM option. Without it, these options will not work.

Calibration:

Note: For step-by-step instructions on calibration, see section 4.3

7. Problem:

Problems calibrating with the toggle switch S13.

Resolution:

The steps referring to the toggle switch only apply if you are using a shunt cal. If you are using a shunt cal, be sure that it is seated and that the fastening screws are in tight. Also be sure to hold the switch long enough when performing the calibration.

8. Problem:

General problems calibrating.

Resolution:

First, remember to have a device connected to the terminal in the rear and to have it set for zero load at first.

Second, there must be a least one non-zero load for the +span and one non-zero load for the –span. It is important to add a load when the screen scrolls “+span 1 cal target = xxx”.

Third, although you may use up to 10 data points to calibrate, only one non-zero data point is necessary.

9. Problem:

“Entry must be > last cal pt.”

Resolution:

You cannot go out of order when choosing data points to calibrate the meter. Start with a small value and go in order of increasing magnitude.

10. Problem:

“No span cal. Input too small.”

Resolution:

The meter essentially uses a linearization to calibrate. If you pick two loads (which could correspond to points on a graph) which are too close together, the points are approximately the same and there is no linearization. The meter needs a range in order to extrapolate values.

To fix the problem, choose a larger difference in loads between data points.

Max/Min:

11. Problem:

The Min and Max options do not show up when pressing the left and right arrow keys during normal operating mode.

Resolution:

These options are off by default and must be turned on in the Config menu. Refer to section 3.3 for information on enabling the Min and Max options.

12. Problem:

Some of the conversions are wrong.

Resolution:

Note that the display is limited to roughly 6 digits. If you convert to a unit which runs over this limit, the conversion is incorrect. The meter will not give an error, however. The best approach is to use common sense when choosing units and doing conversions.

Ram Reset:

13. Problem:

Any of the following symptoms can occur after the RAM has been reset to factory defaults.

"Lost -span cal. perform the -span cal" scrolls continuously in normal operating mode.

"Lost +span cal. perform the +span cal" scrolls continuously in normal operating mode.

"No conversions selected" when pressing the up or down arrows

The serial port information will also be reset.

Resolution:

If the RAM was reset, all changes you made have been lost. You will want to refer to section 4.3 to recalibrate the meter. This will get rid of the "Lost \pm span cal. Perform the \pm span cal" errors. Then, refer to section 4.5 for instructions on how to enable the conversions and section 4.5 for instructions on how to enable the HP/RPM option. This will remedy the "No conversions selected" error. Finally, turn on the "Zero Set" option under the Config. menu to correct the "Key inactive" error when hitting the zero key.

Zero:

14. Problem:

"Out of Zero Negative band"

Resolution:

Go to the **config** menu (see section 4.3) and increase the value of “**Zero Set**”

Serial Data:

15. Problem:

There is no display on the screen from the meter

Resolution:

The terminal program you are using is not set up correctly or not very compatible. Try a different terminal emulator.

16. Problem:

There is no display on the screen from the meter

Resolution:

The cable you are using may not be correct or may be damaged. If possible, try another cable or try the cable with another device.

17. Problem:

There is no display on the screen from the meter

Resolution:

There could be a problem with the serial port or its configuration on the computer or equipment you are using. If available, try using the second serial port on the computer or equipment.

18. Problem:

There is no display on the screen from the meter

Resolution:

Ensure that the software is set with the correct COM port. Typically a computer serial port will use Com 1, 2, 3, or 4. Try using a different COM port number. Also be sure that the port is open and ready to receive information.

19. Problem:

There is no display on the screen from the meter

Resolution:

The display option must be set to **echo** to see the text. Refer to section 6.2 for the best settings to establish a connection.

20. Problem:

Pressing the PRINT key does not display the meter value on the screen.

Resolution:

The printer option must be set to **On** for this to work. Refer to section 6.2 for instructions on how to change this setting.

General Problems:

21. Problem:

I cannot enter any of the special configuration modes.

Resolution:

If any more than one dip switch is closed, the meter will default to the normal operating mode. Set all 4 dipswitches to OPEN and then close just one.

22. Problem:

“No Tare” message when pressing the TARE key on the front panel.
The Fixed Tare function is not working.

Resolution:

The “Zero Set” must be set to “Autotr” within the config. menu.

23. Problem:

Digital Input/Output is not working correctly.

Resolution:

Ensure that the two jumpers are set correctly. For Digital input, see sections 5.1 and 5.2 . For Digital output, see section 5.3.

24. Problem:

Freeze mode is not even an available option on the menu.

Resolution:

Freeze mode must be turned on in the config. menu. For details on enabling freeze mode, see section 5.2.