MDL64 ABS Technical Manual

PENNSYLVANIA SCALE COMPANY

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Manual MDL64TM2020REV1

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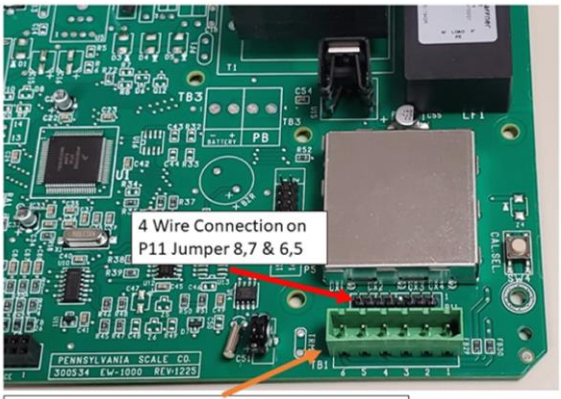
Unpacking and Startup

Unpack The Scale Electronics and Base

- Gently remove scale electronics, remote displays and scale base from packaging
- Plug the scale in to 110/120 VAC
- If needed - connect to Scale Base with terminal connection inside the indicator enclosure.



Scale Base Setup

- Adjust the corner leveling feet until the level bubble indicates the unit is level.
- Firmly tighten hex jam nuts on the leveling feet. (Any time the scale is relocated, it should be leveled.)
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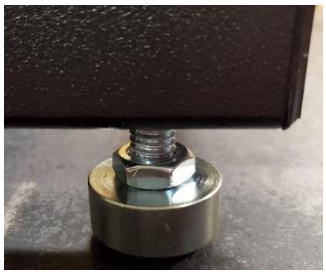
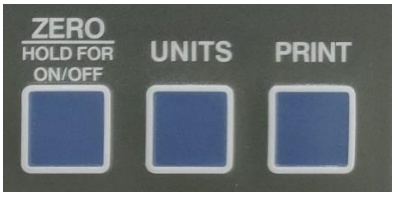


Scale Operation

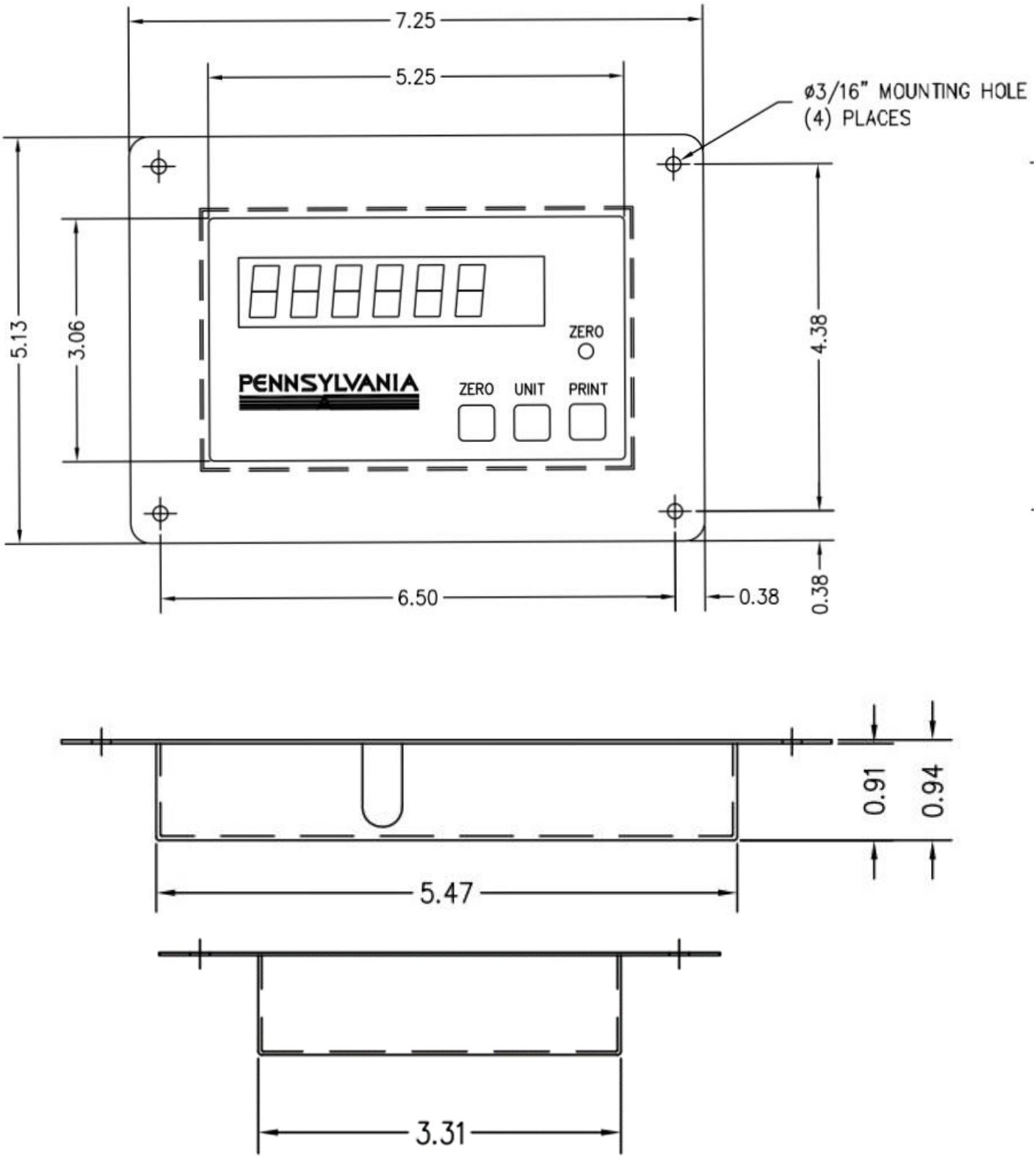
- Press the ZERO button to zero the scale
- Press the UNITS button to cycle through units of measure
- Press the PRINT button to send scale data to a printer or connected software



SPECIFICATIONS

- **LOAD CELL A/D CONVERTER**
- **TYPE:** 24-bit delta sigma (1:16,777,216)
- **EXCITATION**: 5 VDC, 120 mA max.
- **SIGNAL INPUT**: 16 mv
- **SENSITIVITY**: 0.1 Uv/grad
- **UPDATE RATE**: 30 update/second
- **DISPLAY:** Six (6) Digits, 0.6-inch LED
- **KEYPAD:** Full numeric plus controls
- **POWER INPUT**: 117/217 VAC, 50−60 HZ, 20 watts, fuse 0.50 A Slo-Blow.
- **SERIAL PORTS:** RS232C
- **ENCLOSURE**: Cast Aluminum Chassis and Load Cell Spider, Stainless Steel Platter.
- **NTEP:** Class III/IIIL, 5,000 divisions CoC 97-009A3
- **MEASUREMENT CANADA:** MAL-AM-4869

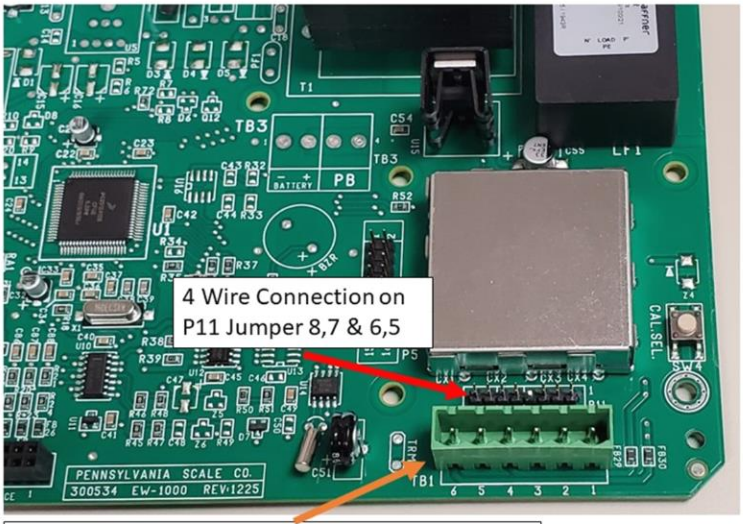
Display Housing Dimensions



Connections:

Remote Base Connection

Quick Disconnect CPC Connector



Internal Load Cell Connection
6 – EX+, 5 – Sen+, 4 – Ex-, 3 – Sen-, 2 Sig-, 1 – Sig+

RS-232 PIN ASSIGNMENTS AND IMPLEMENTED FUNCTIONS

Connection to the Serial Port is made via a DB-9 female connector found in the access area under the scale. Internal Instrument connection is on the main board, TB2-1,2,3.

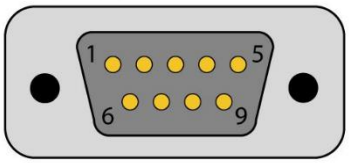
PIN FUNCTION

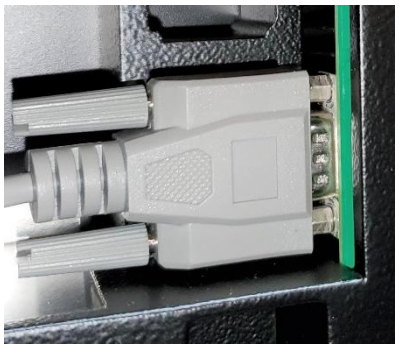
5 Signal Ground

2 Transmit Data

3 Receive Data

DB9M Connector





Calibration/Configuration Access, Selecting/Changing Parameters Navigating the Menus

To access instrument configuration, calibration:

Press and Hold the ZERO button for 5 seconds	ZERO	- 5 seconds
The Audit Trail counters [P x C x] are displayed first followed by access code request [AC P]. Press the UNITS button 4 times until 0000 is displayed then press the PRINT button	UNITS PRINT	- 4 times - 1 times

MDL64 3-Key access functions:

Increment the number or selection	ZERO
Advance or add a 0 to the right	UNITS
Enter the Selection	PRINT
Decimal Point/Clear	**Cal SW-4**

NOTE: Some older units may have an "ADV" button instead of "UNITS"

Example: To enter [150], press the ZERO 2 times, UNITS 1 time, ZERO 5 times, UNITS 1 time, PRINT 1 time to enter. To enter a decimal point, use the internal calibration switch

Menu Layout

CAL 20	Capacity, Resolution, Zero Range, Units, Print, Overrange, Zero Tracking
CAL 30	Secondary Resolution and Setup
CAL 40	Filter Settings, Load Cell Zero/Deadload and Span Calibration
CFG 60	RS232 Configuration: Baud Rate, Word, Stop, Parity, Echo, Address
CFG 80	Save and Exit Calibration
CAL 0	Save and Exit Calibration

- Configuration/Calibration Main Blocks: 10, 20, 30, etc. can be stepped to directly by incrementing [CAL 10] to [CAL 20] and "**PRINT**(enter)".
- The sub parameters need to step through to the next "main" before a direct change.
- From any "main" point, exit by changing to [CAL 0] and "**PRINT**(enter)".
  - A [SAVE NO] will need to be changed to [SAVE YES] to save any changes.
- Changing to [CAL 0] from within [CAL 40] allows exit prior to adjusting span.

EXAMPLE: To go directly to Load Cell calibration [CAL 40] from [CAL 20] press the ZERO 5 times, UNITS 1 time, PRINT 1 time to enter.

NOTE: During the setup procedure each step will be printed to any device interfaced to the RS-232 port. If options are not present, steps will not appear.

Configuration Calibration Menus

CAL 20 Calibration setting entry point. Use PRINT to enter this menu and enter selections

STEP	Parameter	Description
CAP 21	Full capacity of the scale	Standard capacities are 2, 5, 10, 20, 50, 100, 150 and 200 lbs.
RES 22	Displayed resolution or count by, rounded up to nearest 1, 2 or 5	Default entry is scale capacity divided by 5,000 (NTEP – Legal for trade configuration). In some applications and environments up to 20,000 divisions of capacity may be possible non legal for trade
-0- 23	1 – 99	Zero Range - Input the Zero Range in % of full scale. The amount of weight the scale can Zero.
UNS 24	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,	Select the primary weighing unit by keying in a number :1 = lb*, 2 = kg, 3 = g, 4 = oz t, 5 = lb t, 6 = g, 7 = dwt, 8 = oz, 9 = c, 10 = oz f, 12 = l, 11 = ml, 13 = tons, 14 = lb – oz
PRT 25	Stable, First, Unstbl, ntEP, Auto, Prn-1	Select whether the scale will respond to a data output/print request when stable, first (positive) stable, any time (unstable), or NTEP. Auto: Data output/print when stable and min 10 grads above zero, prints again with min 25 grad change from last print. Does not need to return to zero data output/print again. Prn-1: Single stable data output/print, must return to zero to data output/print again.
CNd 26	YES, NO	Measurement Canada legal for trade overrange configuration: Select YES (9d) or NO (105%) *
0-T 27	0.00 – 5.00	Zero tracking value entered as a percent of display resolution. Entering a 0.25* equals 25% of one display graduation. “0” disables the zero tracking feature.
SbL 28	OFF, 1, 3, 5, 10	Stable/Motion configuration in grads/sec.

CAL 30 Secondary units, resolution. Use PRINT to enter this menu and enter selections

STEP	Parameter	Description
2UN 31	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,	Select the secondary weighing unit by keying in a number :1 = lb*, 2 = kg, 3 = g, 4 = oz t, 5 = lb t, 6 = g, 7 = dwt, 8 = oz, 9 = c, 10 = oz f, 12 = l, 11 = ml, 13 = tons, 14 = lb – oz
2RE 32	Displayed resolution or count by, rounded up to nearest 1, 2 or 5	Default entry is scale capacity divided by 5,000 (NTEP – Legal for trade configuration). In some applications and environments up to 20,000 divisions of capacity may be possible non legal for trade
PUd 39	PrI, SEC, SEC On, COUnt, SELECt	Power up: Primary units, Secondary units, Secondary units only (Locks out Primary Units) and Count, Count.

CAL 40 Load Cell Calibration. Use PRINT to enter this menu and enter selections

STEP	Parameter	Description
FIL 41	1-15	Response time: 0-9 selects conversions to average directly. 11-15 correspond to 25, 30, 35, 40, & 50 conversions for extended filtering.
ADJ CAP	NO, YES Use ZERO button to select	Select yes to enter calibration.
NOL 42	Zero/Dead Weight Calibration	With the platform in place but no weight on the scale, press PRINT. Display will indicate ------ and advance to Span Calibration if successful
NOTE: Dead Load Zero can be updated without changing span by keying in a "0" and **PRINT** to jump back to starting point (CAL 40) and repeating to exit. Note on exit to change [SAVE NO] to [SAVE YES] with **ZERO** key before **PRINT** to save changes.		
HLF 43	Span Calibration	Apply a half capacity weight to the platform and Press **PRINT**. If ½-capacity weight is unavailable, place a substitute weight on the platform and key in the amount of weight being used and press **PRINT**. * Display will indicate ------ and advance to Span Calibration if successful.
FUL 44	Span Calibration	Apply a full capacity weight to the platform and press **PRINT**. If a full-capacity weight is unavailable, place a substitute weight on the platform, key in the amount of weight being used and press **PRINT**. * Weight used in 43 can be keyed in again.
NOL 45		Remove all weight from the platform and enter, or just use **PRINT** to skip this step.

*Example: To enter [150], press the ZERO 2 times, UNITS 1 time, ZERO 5 times, UNITS 1 time, PRINT 1 time to enter a value of 150.

CFG 60 RS-232 Port Configuration. Use PRINT to enter this menu and enter selections

STEP	Parameter	Description
bAU 61	300,600,1200,2400, 4800, 9600, 19200, 38400	Baud Rate Setting. Use **ZERO** button to select.
LEN 62	7, 8	Word Length 7 or 8 bits. Use **ZERO** button to select.
SPb 63	1, 2	Stop Bits 1 or 2. Use **ZERO** button to select.
PAR 64	None, Odd, Even	Parity None, Even, Odd. Use **ZERO** button to select.
ECH 65	No Ech, Ech	No Echo or Echo Use **ZERO** button to select.
CdR 66	0 – 255	Address, Key in a number from 0* to 255, 0 disables this feature.

CAL 80 Programmable data output. Use PRINT to enter this menu and enter selections

Building a programable data output.

The user programmable data output feature is the string of information sent from the RS-232 port (Or optional Ethernet, Wi-Fi and USB) when the PRINT button is pressed, scale is setup to auto output or the scale receives an SRP command from a computer or terminal. Select the format of this string by entering two-digit print codes into the 30 available data output slots, PSL 81 through PSL 119. When finished entering data to construct the programable data output, "99" is entered to mark the end of print formatting.

Example: To build a programable data output to send to a printer the following print codes could be entered

PSL	Data Output Code	Description
PSL81	30	Gross Weight with Prefix, Data and Suffix
PSL82	65	Carriage Return Line Feed
PSL83	03	Date (Optional on MDL 64)
PSL84	65	Carriage Return Line Feed
PSL85	99	End

Would print the following:

Gross 100.55 lb
04/13/2020

Or send a data string to a program:

Gross(sp)(sp)100.55(sp)lb(cr)(lf)04/12/2020(cr)(lf)

Special Data Output Codes

Code	Description
50	Continuous output. Data output will be sent continuously while the scale is turned on.
51	Toggled continuous output. The data output will be sent continuously after the PRINT button is pressed or an SRP command is received by the scale. Pressing the PRINT or sending SRP a second time will turn off the continuous output.
52	Status Character. May be used by a computer to determine the condition of the scale at any given moment.
53	ABO Checksum. May be used in building a continuous output compatible with other Pennsylvania Scales.
54	Select Leading Zeros for weight and count data. Example, "7.00 lbs" on scale data outputted is "007.00"

55	1 Second delay	56	2 Second delay	57	3 Second delay

Data Output Codes

Data Output Code	Description	Data Output Code	Description
02	OPTIONAL time	03	OPTIONAL date
04	Unit of measure suffix label	05	“Gross” prefix
06	“Tare” prefix	07	“Net” prefix
14	FR”F1” for use with Barcode Printer programming	15	? symbol used with Barcode Printer Programming
16	P1 for use with Barcode Printer programming		
20	Gross weight data	21	Tare Weight data
22	Net or Peak weight data	30	Gross weight, prefix, data and suffix
31	Tare weight, prefix, data and suffix	32	Net weight, prefix, data and suffix
39	UPS Worldship Format	40	User defined data string 1
41	User defined data string 2	42	User defined data string 3
43	User defined data string 4	44	User defined data string 5
45	User defined data string 6	46	User defined data string 7
47	User defined data string 8	48	User defined data string 9
49	User defined data string 10	59	Print Display
ASCII Characters			
60	ASCII space (SP)	61	ASCII horizontal tab (HT)
62	ASCII line-feed (LF)	63	ASCII start of header (SOH)
64	ASCII carriage return (CR)	65	ASCII carriage return and line feed (CR LF)
66	ASCII form-feed (FF)	67	Turn on large print (PA Scale printer)(SO, HEX 0EH)
68	Turn off large print (PA Scale printer)(SI, HEX 0FH)	69	ASCII null (NUL)
72	STX – Start of text code	73	ETX – End of text code
74	TAB code all lines	75	RP-DIO cut command
78	Invert print (PA Scale printer)(DC3, HEX 13H)	79	End inverted print (PA Scale printer)(DC4, HEX 14H)
99	End of programmable data output		

NOTE: After PSL 119 or after data output code 99 the display will show Set.rSd. which is a feature not available on the MDL64. To skip press the PRINT button

Scale Remote Command Formats

Pennsylvania Scale Bench Weighing and Counting Scales or Indicators can be controlled from an external device (such as a computer, terminal or barcode scanning) by various commands, each three letters long sending with a Carriage Return or Enter (cr)

Examples:

- ZERO the scale: ZRO(cr)
- Send programmed data: SRP(cr)
- Acquire a TARE WEIGHT: ATW(cr)

Remote Scale Commands <XXX>(cr) XXX = Command

Command	Description	Command	Description
ATW	Acquire Tare Weight	**CHK**	Initiate self-diagnostics Check
LCK	Lock Out Keypad	**RES**	Reset, clears tare weight and count information
SSS	Selects Sample Size (7500 & 7600)	**UNP**	Select Primary Weighing Unit
UCK	Unlocks Keypad	**ZRO**	Zero the Scale
SCI	Output Configuration	**UNS**	Select Secondary Weighing Unit

Remote Scale Commands to Enter Data into Scale

Command	Description	Format
ITW	Input Tare Weight and Enter Net Weight Mode. 7600 Only	**ITW(sp)XXXX(cr) XXXX = Tare Weight Value, Example: 10.5**
IUS(X)	Input User Defined Data String, 1-9 these correspond to data output codes 40 – 49 up to 22 alphanumeric characters. **X = 1-9**	**IUS1(sp)XXXXXXXXXX(cr) = XXXXXXXXXX = User defined Data String, Example: 456-DEF-12**

Remote Scale Commands Which Request Information

Command	Description	Response Format
SGW	Send Gross Weight, 7600 only	**Gross(sp)XXXXXXX(cr)(lf)**
SMI	Send Metrological or Load Cell Calibration Information	
SNW	Send Net Weight	**Net(sp)XXXXXXX(cr)(lf)**
SPC	Send Data Output Codes	
SRP	Send Formatted Data Output	
STW	Send Tare Weight, 7600 only	**Tare(sp)XXXXXXX(cr)(lf)**
SVN	Send Firmware Version	**V(sp)X.XX.X(cr)(lf)**

Scale Displayed Status and Error Messages

Error Message	Description
dAC	D/A card detected - Displayed under the check function.
IIC.ERR	IIC short - Power-up hardware failure indication.
ON	Displayed on power-up when the DC power push-button is pressed.
AUTO	EEPROM is reset - Power-up message
ERR6.x	A Key-pad button is stuck.
-232-	Serial calibration/setup is active
UPdATE	Enhancement calculation in progress
LO.bATT	Low battery
d bATT	Dead battery
ULULUL	Under-load (-400 graduations under dead-zero)
OLOLOL	Over-load (+9 graduations or 105% from dead-zero reference)
-------	A/D acquisition is in progress.
7x00	Instrument mode selection.
ERR 10	Number > 999999
ERR 13	Number < -99999
AdC.ERR	A/D hardware failure (channel one only)
CHECK	Check mode accessed.
RC.xxxx	Lower four-digits of the ROM checksum
ERR.80	Serial command data error
ERR.81	Unknown serial command.
-CAL-	Remote Calibration
ERR.OFF	Hardware failure of the D.C. power on/off circuitry
RTC.RST	The clock is reset to 01:01:04 12:00:00am
RST Id	The ID EEPROM has been reset since it was detected as corrupt.
AC OK	Access code entered has been accepted.
E-1234	EEPROM set 1,2,3, and/or 4 have been fixed.
ERR 40	Positive or negative signal overload (check sense connections).
ERR 31	Incorrect tare entry
ERR 30	Push to Zero out of range
PC ERR	Piece Weight Entry is out of range

Replacement Parts List

Part No:	Description	Notes
59266-2	Complete DISPLAY assembly Specify GREEN LED's (standard) or RED LED displays. Includes SS bezels, display assys., Y-cable – all items. *RECOMMEND ASSEMBLY vs. INDIVIDUAL PARTS*	(1) Buttons ZERO/UNITS/PRINT + (1) NO BUTTONS for customer side Specify capacity and we will install the capacity label when assembling.
57807	Main Board (M64 – all applications)	For key operation, set board as 7300 model (ZERO/UNITS/PRINT)
59260	Y-Cable for dual displays – assembly	Supports (2) displays – cable only
59126-3	Brick Load Cell & cable for M64 – 500 lbs Brick Load Cell & cable for M64	500 lbs/250 kg capacity models
59126-4	Brick Load Cell & cable for M64 – 1000 lbs Brick Load Cell & cable for M64	1000 lbs/500 kg capacity models
57409-8	Keypad Overlay w/buttons LB/KG models	ZERO/UNITS/PRINT
57409-2	Keypad Overlay w/buttons single unit models	ZERO/ADVANCE/PRINT
57409-1	Keypad Overlay NO BUTTONS	No buttons
47451-1	Compression fitting for power cord #3214 Heyco w/nut	Back panel – indicators
48673-1	Compression fitting #3210 Heyco w/nut	Back panel – indicators
44766	2-Pin Power connector, nylon	Included n/c with 57434 10' HD AC line cord
49025-3A	Leveling Foot, 6400 and M64 Note: SOLE SOURCE FOR THIS ITEM	All M64 and 6400 applications includes jam nut. Thread 7/16-13 UNF, 1-1/4" high
48230	Fish eye Level	Replacement, all series
56110	Fillister head SS Sealing Screw	7X00 Indicators
57827	1/2A Slow Blow	Standard 7X00 applications