MODELS 708, 708-AC and 708-ACD

Weight Indicating Instrument
Operation Manual

8558-M022-O1 Rev F
12/98

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INTRODUCTION

This manual contains information describing the installation, calibration and operation of the Models 708, 708-AC and 708-ACD Weight Indicating Instruments. It is intended to be used as a guide to the operation of your new weight indicating instrument. Please take time to review this manual before attempting to install or operate the weight indicator. This manual should be stored in a safe convenient place for ready reference.

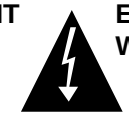
FCC COMPLIANCE STATEMENT

WARNING! This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures necessary to correct the interference.

PRECAUTIONS

Before using this instrument, read this manual and pay special attention to all "WARNING" symbols:

IMPORTANT



ELECTRICAL WARNING

SERIAL NUMBER _____

DATE OF PURCHASE _____

PURCHASED FROM _____

_____

_____

RETAIN THIS INFORMATION FOR FUTURE USE

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SPECIFICATIONS

Power Requirements:	115 VAC 60 Hz (optional 230 VAC 50/60 Hz) powering a 12 VDC 300 mA wall plug-in UL/CSA listed power supply for the Desktop enclosure. 115 VAC 60 Hz (optional 230 VAC 50/60 Hz) at 0.1A for the NEMA 4X enclosure.
Battery Operation:	12 VDC input jack for operation from an external battery 12 volt, 1.6 Ah for 8 hours operation
Enclosure Size:	Desktop: 8.65" W x 6.5" H x 3" D NEMA 4X: 9.8" W x 7.3" H x 3.2" D
Operating Temperature:	14° to 104° F or -10° to +40° C
Display:	5-digit, 0.6" high, 7-segment red LED
Sensitivity:	0.7uV/graduation (0-3.3 mV/V), Class III
Signal Input Range:	1.0mV min. to 50 mV max.
Transducer Excitation:	8.0 VDC
Number of Load Cells:	8 each, 350 OHM minimum load cells
Load Cell Cable Length:	150' max.; 30' max w/o sense lines
Resolution:	1 part in 20,000 displayed - 1 part in 80,000 internal
Capacities:	1,000 to 10,000 divisions commercial Up to 99,999 divisions noncommercial
Graduation Value:	1, 2 or 5 x 1, 0.1, 0.01 or 0.001
Sample Rate:	1 to 12 samples per second selectable
Auto Zero Range:	0.5 or 1 through 9 graduations
Weighing Units:	Pounds, kilograms, ounces, grams or pounds/kilograms
Keyboard:	Membrane type with 21 keys

STANDARD FEATURES:

- Keyboard or Push Button Tare
- Gross, Tare, Net Conversion
- Metric Conversion
- Bi-directional Serial Interface
- Dual Preset Weight Comparator or Checkweigher with Outputs
- Auto Shut-Off Feature
- Selectable Sleep Mode
- Selectable Filtering
- Selectable Automatic Power On

OPTIONAL FEATURES:

- NEMA 4X Enclosure
- External Relay Box for Preset Weight Comparators or Checkweigher (desktop only)
- Internal Relay Board for Preset Weight Comparators or Checkweigher (NEMA 4X only)

INSTALLATION

The Model 708 Weight Indicating Instrument is available in either a stainless steel desktop enclosure or a stainless steel NEMA 4X wall-mount enclosure. Determine which enclosure version you have and refer to the appropriate section for installation and interconnection.

AUTO-ON

The AUTO-ON jumper J1, when connected, will cause the indicator to power on automatically whenever power is applied to the power input connector. If power is lost momentarily and then reapplied, the indicator will turn on without pressing the ON key. See Figure No. 9 for location.

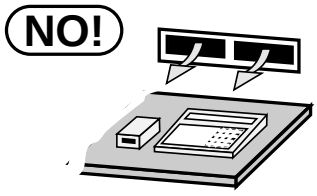
INTERNATIONAL/ DOMESTIC JUMPER (J14Intl)

Install the International/ Domestic jumper, J14, to comply with OIML requirements (see Figure No. 9). With J14 installed, the 708 will perform the following functions:

1. A “lamp test” will be performed on power-up.
2. The printout of keyboard tare will be designated as “PT.”

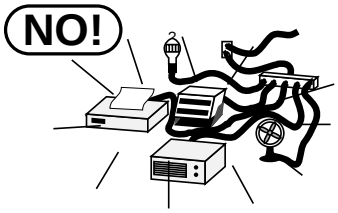
Please note the installation precautions.

DON'T EXPOSE TO DIRECT SUNLIGHT

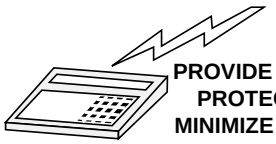


DON'T PLACE IN FRONT OF HEATING/COOLING VENTS

DON'T EXPOSE TO TEMPERATURE EXTREMES



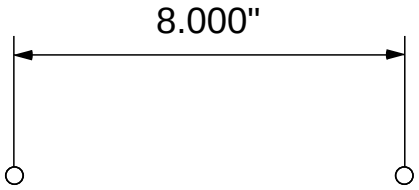
PROVIDE GOOD, SAFE GROUND AND CLEAN AC POWER



PROVIDE ADEQUATE PROTECTION TO MINIMIZE LIGHTNING DAMAGE

KEEP THE AREA AROUND THE SCALE CLEAR TO PROVIDE ADEQUATE AIR CIRCULATION

DESKTOP ENCLOSURE



The 708 desktop enclosure may be mounted on a desktop or other smooth, flat, horizontal surface or it may be mounted on a wall. Refer to Figure No. 1 for a layout of the wall-mounting bolts. Regardless of the manner in which the 708 is installed, the location chosen should be free of temperature extremes and water. It should be in a location where the display is easily viewed and is not subject to direct sunlight. The indicator should be mounted such that it is within easy reach of the operator. If wall mounted, make certain that the structure and mounting bolts are of sufficient strength to support the 708.

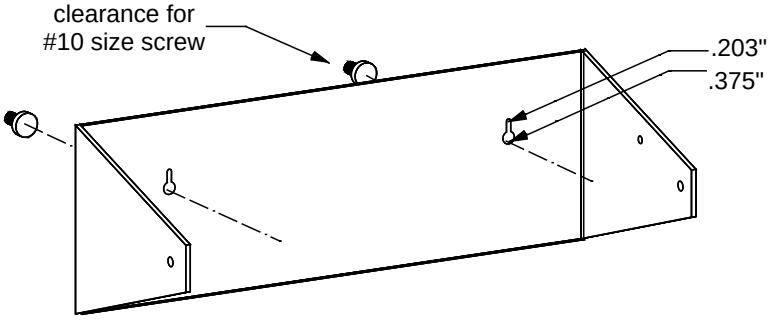


Figure No. 1

All terminations to the Model 708 Desktop Weight Indicating Instrument are made at the rear panel of the instrument. Connections for the Load Cell input, the PWC output and the Serial I/O are all made via “D” subminiture connectors while the 12VDC power is connected using a jack connector. Figure No. 2 illustrates the layout of the connector panel.

CAUTION! When in parallel runs, locate Load Cell Cables a minimum of 24 inches away from all AC wiring.

Load Cell Connection with Over 30 Feet of Cable

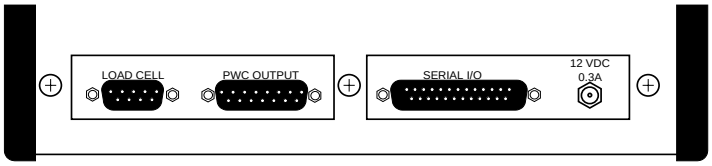


Figure No. 2

For installations with over 30' of cable between the indicator and the load cells, sense wires should be used. The sense wires must be connected between the +SENS, -SENS terminals on the indicator and the +EXCITATION, -EXCITATION wires of the load cells or the +SENS, -SENS terminals of the load cell trim board or the section seal trim board. For the indicator to utilize the sense wires, the +SENS jumper J2 and the -SENS jumper J3 must be open (see Figure No. 9).

Load Cell Connection

The load cell cable is terminated via a 9-pin connector on the rear panel. Figure No. 3 shows the pin identification for the load cell connector. Make certain that the pins are correctly identified before soldering a wire to them. NOTE! If you use sense leads in your load cell installation, jumpers J2 and J3, located on the printed circuit board, should be disconnected or placed on one pin only. If you do not use sense leads, jumpers J2 and J3 must be installed to connect the sense leads to the excitation (refer to Figure No. 9). Make certain that the connector retaining screws are used to hold the load cell mating connector securely to the rear panel.

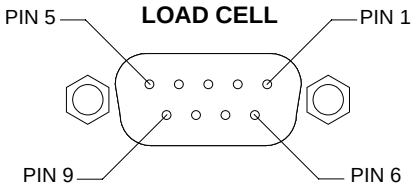


Figure No. 3

Pin No.	Function
1	+EXCITATION
9	+SENSE
7	+SIGNAL
2	-SIGNAL
4	-SENSE
6	-EXCITATION
5	SHIELD

Mating Connector Information	
CONNECTOR	DE9-P
CONNECTOR SHELL	DE-24657
SCREW LOCK	DE-20419

Serial I/O Connection

Your Model 708 may be connected to a printer to record weight and associated data or it may be connected to a remote display or even to a computer for transmission of weight data. The weight data may be transmitted on demand (pressing the PRINT key or on receipt of a command from the computer) or continuously. Figure No. 4 shows the Serial I/O connector along with the identity of the pins used.

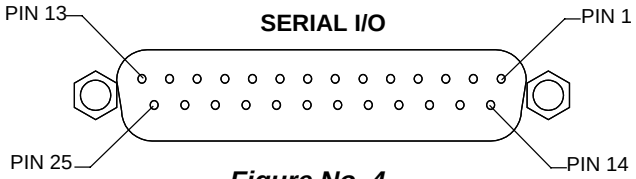


Figure No. 4

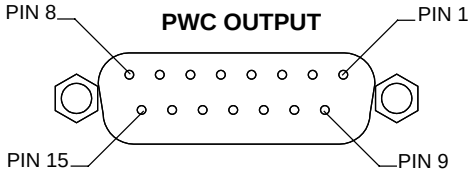
PIN NO.	FUNCTION
2	DATA OUTPUT (RS232)
3	DATA INPUT (RS232)
7	DATA COMMON
10	20MA TX SOURCE
11	20MA TX RETURN

Note: Place a jumper on J6 for 20MA interface or on J7 for RS232 interface (see Figure No. 9).

Preset Weight Comparator/Checkweigher Logic Level Outputs

Depending on the mode selected during setup, your Model 708 can function either as a checkweigher or as a weight indicator with two independent preset weight comparators or with neither. Regardless of which is selected, the 708 provides logic level outputs that can be used to control external peripherals. For example, as a checkweigher, these outputs could be used to control signal lights or buzzers indicating when a weight is within the acceptance range. If the preset weight comparators are selected, these outputs could be used to control the flow of material onto the scale. Note, however, that these outputs are at logic level and require a solid state relay to drive the

external load. When selecting the relays make certain that they are of sufficient capacity to drive the external load. A setup selection determines whether the device is on or off below the preset value. Refer to Figure No. 5 for the layout of the PWC Output connector.



PIN NO.	FUNCTION
10	OVER/PWC1
2	UNDER/PWC2
1	ACCEPT
12	GROUND

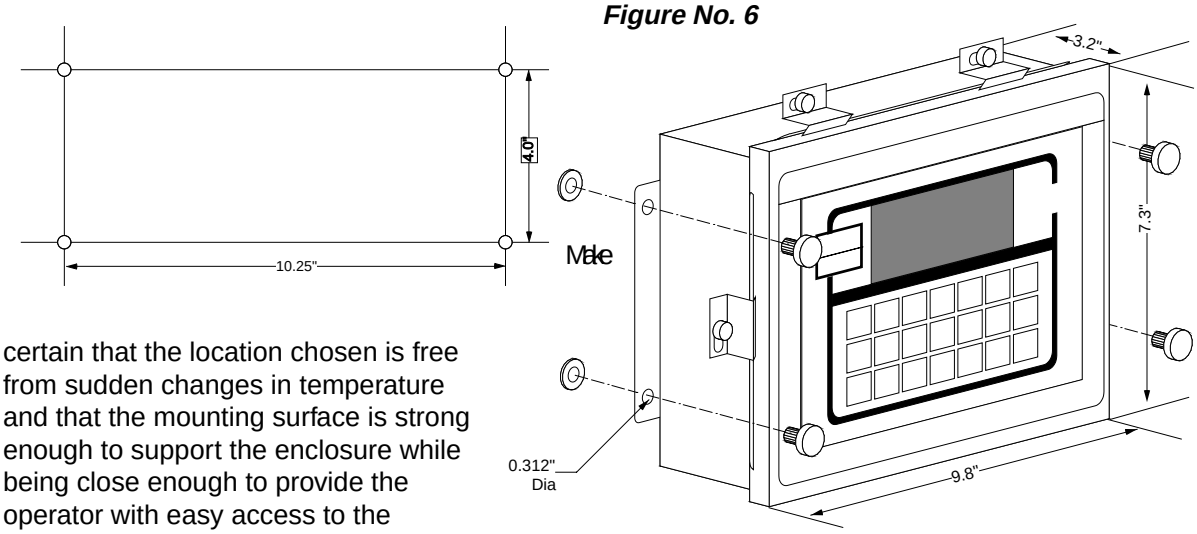
Figure No. 5

NEMA 4X ENCLOSURES

For desk mounting of the 708 in the NEMA 4X enclosure, it is necessary to order separately a "DESK-MOUNT" kit. Refer to Assembly Instruction for Desk-Mount Kit (8539-M097-O1) for mounting instructions.

The Model 708 in a NEMA 4X enclosure is normally mounted on the wall or some other vertical surface. The enclosure is attached to the wall with four (4) bolts. Refer to Figure No. 6 for the hole layout for the NEMA 4X enclosure.

Figure No. 6



certain that the location chosen is free from sudden changes in temperature and that the mounting surface is strong enough to support the enclosure while being close enough to provide the operator with easy access to the keyboard. Carefully locate the mounting hole locations on the wall then drill and install the anchor bolts. Attached the enclosure to the wall and securely tighten the retaining bolts.

Continue installation by opening the front cover on the instrument enclosure. Loosen all four (4) retaining screws and rotate each of the clips to the side. DO NOT REMOVE THESE SCREWS. Fully open the front cover exposing the internal printed circuit board.

Load Cell Connection

Loosen the cable gland connector for the load cell cable. This gland connector is located on the bottom of the enclosure on the right-hand side. Refer to Figure No. 7 for an illustration of the connector layout.

Slip the single cable from the load cell or load cell junction box through the gland connector and into the enclosure. Remove 2 inches of the outer insulation jacket then remove 1/4 inch of insulation from each of the wires (either 4 or 6). Refer to Figure No. 8 for an illustration of the proper method of preparing and then connecting wires to the terminal blocks. Once the cable has been properly prepared, connect it to terminal block P4 on the main printed circuit board. Figure No. 9 shows the location of the terminal blocks on the main printed circuit board.

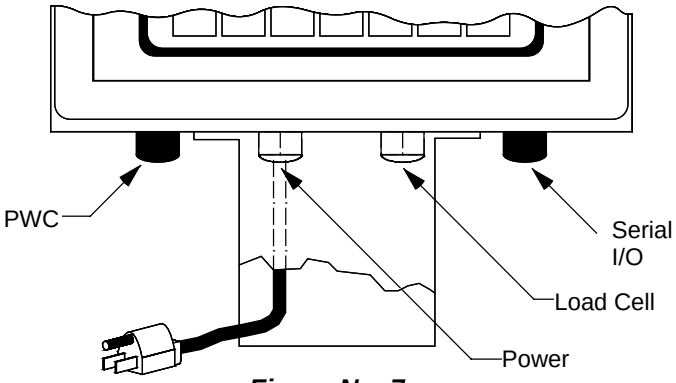


Figure No. 7

Locate the one for the load cell and connect the cable as shown. To install a wire in a terminal block, first press down on the release bar for the terminal, insert the wire into the terminal opening then release the bar locking the wire in place. Repeat this procedure until all of the wires and shield have been installed. NOTE! If the load cell cable does not contain sense leads, you must install plug-in jumpers at J2 and J3 to connect the sense inputs to the excitation leads on the PC board. If the load cell cable does contain sense leads, these jumpers must be removed and stored by placing them on one pin only.

Printer Cable Installation

Loosen the gland connector adjacent to the power cable gland connector (see Figure No. 7). Remove 2 inches of the outer insulating jacket from the cable then remove 1/4 inch of insulation from each of the wires (see Figure No. 8). These wires are to be connected to terminal block P8 at the bottom edge of the printed circuit board. Refer to Figure No. 9 for the location of this terminal block.

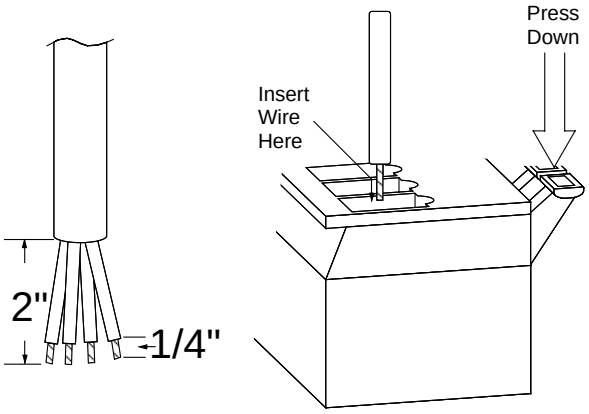


Figure No. 8

To terminate the wires, first press down on the terminal release bar then insert the wire into the terminal opening and release the bar to lock the wire in place.

Preset Weight Comparator/Checkweigher Logic Level Output

If you so choose, you may use the logic level outputs from your 708 indicator's preset weight comparators or checkweigher to control peripheral devices used to manage the flow of material or signal when the weight is within preset limits. Note that these outputs are at logic level and cannot drive external devices directly. Solid state relays can be used to accept the logic level output from the 708 and in turn drive the external device.

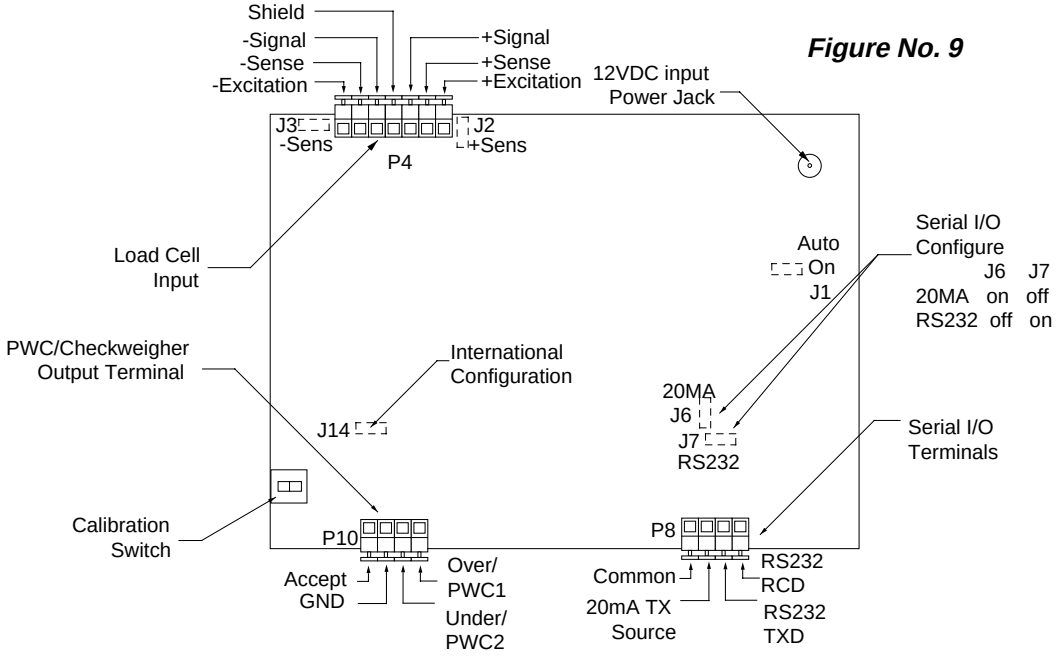


Figure No. 9

To connect the control cable to the preset weight comparator/checkweigher logic level outputs, first loosen the gland connector located on the bottom of the 708 on the right side. Refer to Figure No. 7 for the exact location of this connector. Slip the cable through this connector and into the enclosure. Remove 2 inches of the cable insulating jacket then 1/4 inch of insulation from each of the internal wires. Refer to Figure No. 8. Make the proper terminations on terminal block P10. To terminate a wire, first press down on the terminal block release bar, insert the wire into the terminal and remove pressure from the release bar locking the wire in place.

NOTE: After all terminations have been made, remove the excess cable from within the instrument enclosure and securely tighten each of the cable gland connectors. Do not over-tighten these connectors but make certain they are snug. DO NOT USE TOOLS TO TIGHTEN THE CONNECTORS! Tighten only by hand.

Relay Board

The relay board is mounted to the NEMA 4X enclosure bottom or in an external junction box for use with the desktop enclosure.

The individual relays can be configured to be on (closed) or off (open) at weights under the preset weight and switch at the preset weight from on-to-off or off-to-on by setting the under weight condition to on or off during setup and calibration or setup review.

EXAMPLE: Und1=on. . . PWC1 relay is on (closed) for weights under the preset weight and off (open) for weights equal to or over the preset weight.

NOTE: All relays are the normally-open type that will open when power to the indicator is lost.

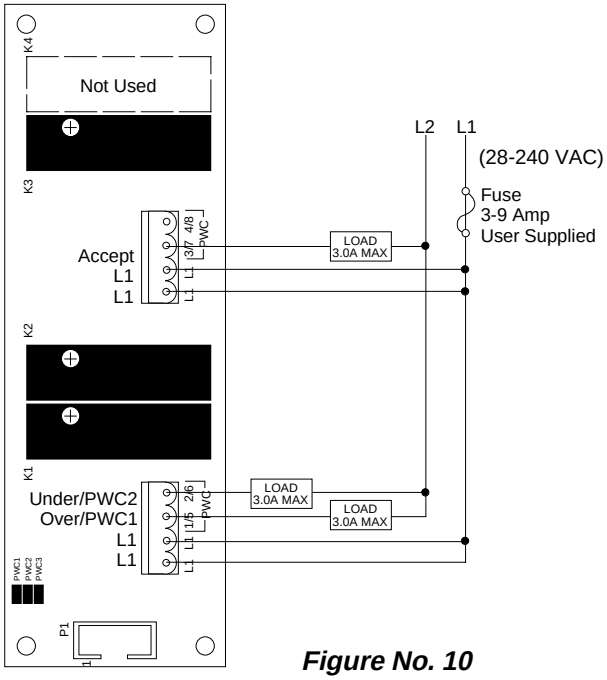


Figure No. 10

8539-C062-0K

Connect the devices to be controlled as shown in Figure No. 10.

DATA FORMAT SPECIFICATIONS

Serial Data Format

The serial data formats are defined during the setup and review operations. At these times it is possible to select operation with a computer, remote display (scoreboard) or printer as well as select the baud rate. Baud rates of 1200, 2400, 4800, 9600 and 19.2K baud are supported. The data format is fixed at 8 bits with no parity and 1 stop bit.

The serial interface can be configured to operate with a printer (transmits weight data when PRINT key is pressed), a scoreboard (continuously transmits weight data) or to a computer (transmits data on receipt of a command from the computer). The actual selection of the mode of operation is made during the setup and calibration of the instrument. Refer to the applicable section of this manual for detailed information.

Printer Data Format

If the printer continuous output was not selected during setup and calibration of the instrument, pressing the PRINT key will cause the 708 to transmit weight data to a printer. The transmitted data can be in one of two formats depending on the operating mode of the instrument. In the gross mode, the instrument will transmit the gross weight only but, in the net weight mode, the gross, tare and net weights will be transmitted to the printer. The data format for these modes of operation are:

Gross Weight Mode:	Net Weight Mode:
XXXXX^lb^G CRLF	XXXXX^kg^G CRLF
	XXXXX^kg^T CRLF
	XXXXX^kg^N CRLF

where: XXXXX = Five (5) numeric digits of weight with decimal point if required and leading zeros suppressed
^ = Space (hex 20)
lb = ASCII letters “l” and “b” to identify weighing units as pounds
kg = ASCII letters “k” and “g” to identify weighing units as kilograms
G = ASCII letter “G” for Gross weight
T = ASCII letter “T” for Tare weight
N = ASCII letter “N” for Net weight
CRLF = Carriage Return and Line Feed commands (can be CR only if selected during the setup and calibration of the 708)

Computer Data Format

If the 708 is connected to a computer and so indicated during the setup and calibration of the instrument, the 708 will transmit data on receipt of a command from the computer. Each time the computer sends an ENQ (hex 05) to the 708, it will respond by transmitting a single set of weight data. If the 708 is in the gross weight mode, only the gross weight will be transmitted to the computer. While it is in the net weight mode, only the net weight will be transmitted to the computer. Only the display weight is transmitted. The weight data always includes the units of measure (lb or kg). An example of the computer data output is shown below:

If the prompt 400? is answered YES, the weight data will be transmitted in the following formats:

Pxxxxx^UU^M^SS^CR (no decimal point in weight display)
PxxxxxD^UU^M^SS^CR (decimal point in weight display)

where: CR - carriage return (hex 0D)
D - decimal point (embedded where necessary)
M - mode, upper case (G=gross, N=net)
P - polarity (space if positive, - if negative)
SS - status, upper case (CZ=center-of-zero, MO=motion, BZ=gross weight below zero, ee=entry - input in progress, OC=over capacity)
UU - units, upper case (LG, KG, TN, etc.)
xxxxx - weight with leading spaces
^ - space

Scoreboard Data Format

If the prompt 400? is answered NO, the weight data will be transmitted in the following format:

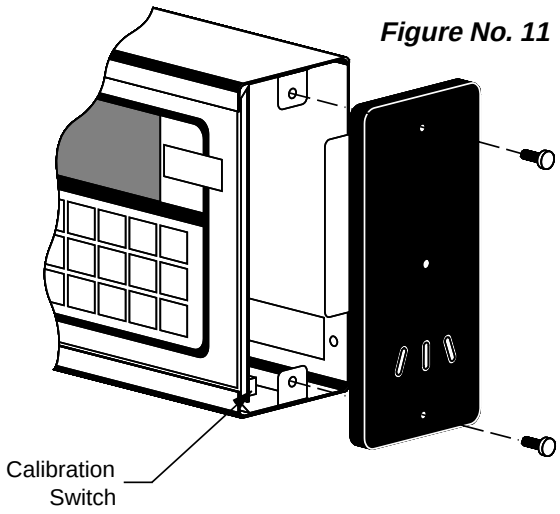
CRPzzzzzDs^uu^m^^ETX

where: CR - carriage return (hex 0D)
D - decimal point (embedded where necessary)
ETX - end of text (hex 03)
m - mode, lower case (g=gross, n=net)
P - polarity (space if positive, - if negative)
s - status, lower case (m=motion, e=entry - input in progress, c=over capacity)
uu - units, lower case (lb, kg, tn, etc.)
zzzzz - weight with leading zeros
^ - space

SETUP AND CALIBRATION

Calibration of the 708 Weight Indicating Instrument is accomplished by turning on the instrument with the calibration switch set to the CAL position. The calibration switch is mounted on the printed circuit board and is behind the right-hand end cap (as viewed from the indicator front) of the desktop enclosure. See Figure No. 11 for location of the switch. To gain access to the switch, first remove the instrument from the gimbal mounting by removing the two (2) large knobs and sliding the enclosure from the bracket. Remove the top and bottom screws from the end cap as shown.

Figure No. 11



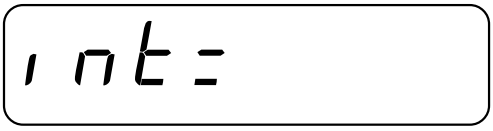
Access to the calibration switch in the NEMA 4X enclosure is gained through the front cover of the enclosure. Refer to Figure No. 9 for the location of the switch.

Once the calibration switch has been located, make certain the instrument is turned off, then set the calibration switch to the CAL position. Press the ON key. When the display shows int= release the calibration switch to the OPR (operation) position. The instrument is now ready for setup and calibration.

NOTE! During the setup and calibration process it will be necessary to respond with either a YES or NO to questions asked by the indicator. Pressing the 1 key will display a YES response while pressing the 0 key is a NO response.

The membrane keyboard is not to be operated with pointed objects (pencils, pens, fingernails, etc.). Damage to keyboard resulting from this practice will ***NOT*** be covered under warranty.

INTERNAL VALUE



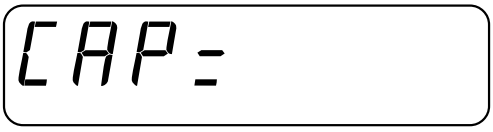
press the ENTER key to show the current setting. If you wish to change the setting, press the 1, 2, or 5 key to select the new interval value then press the ENTER key. To leave the value displayed unchanged, press the ENTER key again without entering a new value.

DECIMAL POINT

press the ENTER key to show the current setting. If the current setting is acceptable, press the ENTER key again to save it, otherwise, press the 0, 1, 2, or 3 key to select the new location and then press the ENTER key to save the new setting.

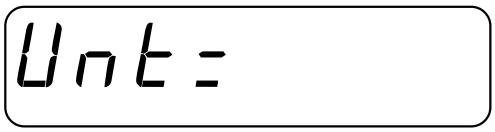
0 = XXXXX 2 = XXX.XX
1 = XXXX.X 3 = XX.XXX

CAPACITY



press the ENTER key to view the current setting. If the value shown is acceptable, press the ENTER key again to save it, otherwise, use the numeric keys to enter the new scale capacity up to 99,999 and press the ENTER key to save the new value.

WEIGHING UNITS



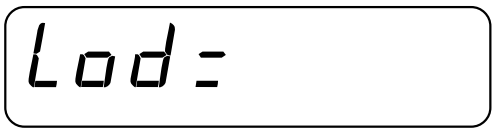
press the ENTER key to view the current setting. If the setting shown in acceptable, press the ENTER key again to save it, otherwise, press the 1, 2, 3, 4, 5 or 6 key to select the new weighing units and then press the ENTER key to save the new setting.

1 = Pounds Only
2 = Kilograms Only
3 = Pounds/Kilograms
4=Kilograms/Pounds
5=Ounces Only
6=Grams Only

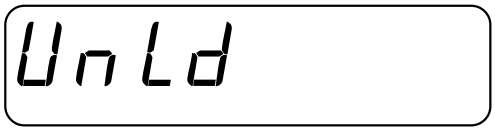
Press the ENTER key twice to skip this step and proceed to the Zero Tracking Range

OR

CALIBRATION WEIGHT

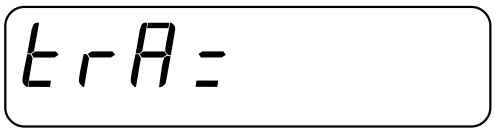


press the ENTER key and enter the desired value of test weight to be used. Make certain the scale platform is empty and free of debris then place the test weight(s) on the platform and press the ENTER key. The display will then indicate segments in sequence.



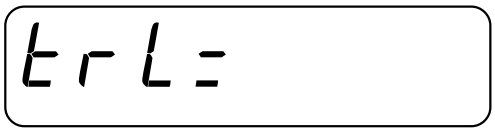
remove the test weight(s) from the scale and press the ENTER key. After a few moments the display will prompt for the auto zero tracking limits.

ZERO TRACKING RANGE



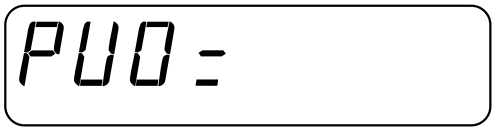
press the ENTER key to view the current range of automatic zero tracking range. If the value shown is acceptable, press the ENTER key to save it otherwise enter the new number of divisions of automatic zero tracking range and press the ENTER key to save it. Available settings are: 0, .5, 1, 2, 3, 4, 5, 6, 7, 8, and 9. Entry of a “0” turns off the zero tracking feature.

4% ZERO RANGE



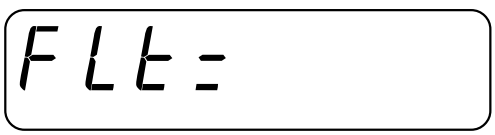
press the ENTER key to view the current setting for this feature. If a YES is displayed, the push button zero and zero tracking range features are limited to a maximum range of 4% of the scale capacity. If a NO is shown the push button zero and zero tracking range features will operate up to the full capacity of the scale. Press the 1 key to change the setting to YES or the 0 key to change the setting to NO then press the ENTER key to save the setting.

POWER UP ZERO



press the ENTER key to view the current setting for this feature. If YES is shown, the weight display will be reset to zero automatically on power up but if NO is shown the weight display will not be reset to zero. Pressing the 1 key will change the setting to YES while pressing the 0 key will change the setting to NO. Once the proper setting is displayed, press the ENTER key to save it.

FILTERING



press the ENTER key to show the current setting of the 708’s filter: 0 = NO FILTERING

1 = MINIMAL FILTERING (sample rate = 2)
2 = MODERATE FILTERING (sample rate = 1)
3 = CUSTOM FILTERING

If the setting displayed is acceptable, press the ENTER key to save it, otherwise, enter 0,1, 2, or 3 for the new setting and press the ENTER key. If you selected 3 (Custom Filtering) the 708 will ask for two additional parameters:

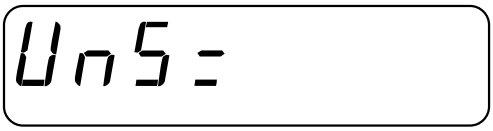
Filter Level

press the ENTER key to show the current setting for the filter level. The filter level is a number from 1 to 16 that corresponds to the level of filtering with 16 being the greatest filtering and 1 the least. To accept the value displayed, press the ENTER key, otherwise, use the numeric keys to enter a new value and press the ENTER key to save it. The 708 will then ask for a second parameter:

Break Range

press the ENTER key to show the current setting for the break range. The break range is a number from 1 to 64 that corresponds to the number of division change to break out of the filtering. Press the ENTER key to keep the displayed value or use the numeric keys to enter a new value and press the ENTER key to save the new setting.

MOTION RANGE

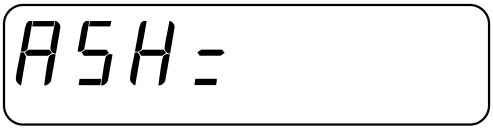


press the ENTER key to view the current setting for the range of motion detection. If the displayed value is acceptable, press the ENTER key to save it. Otherwise, enter the new range by entering the number of divisions of change permitted before indicating unstable, then press the ENTER key to save the new setting. Ranges of 1 to 9 divisions are acceptable.

Unless Filters 1 or 2 were selected the display will show

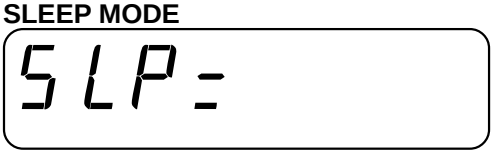
press the ENTER key to show the current setting for the sample rate. The value displayed is the sample rate in samples per second. Press the ENTER key to save the displayed value or use the numeric keys to enter a new value (1 to 12) and press the ENTER key to save it.

AUTO SHUTOFF



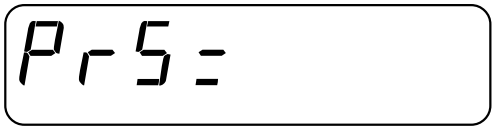
press the ENTER key to show the current status for this feature. A number other than 0 indicates that the auto shutoff feature is enabled and the displayed number corresponds to the number of minutes of stable weight display before the 708 is turned off automatically. A 0 indicates that the feature has been turned off. This feature is handy for turning the scale off when it is not in use. Press the ENTER key to save the current setting or enter a new value (0 to 9) and press the ENTER key to store the new setting.

SLEEP MODE



press the ENTER key to show the status of this feature. If a number other than 0 is shown, this feature is selected and the number shown corresponds to the number of minutes of a stable zero weight reading before the indicator enters the power-conserving sleep mode. If the current setting is to remain unchanged, press the ENTER key, else, use the numeric keys to enter a new value (0 to 9) and press the ENTER key. Note that entry of a 0 disables this feature.

PRESET WEIGHT COMPARTATORS

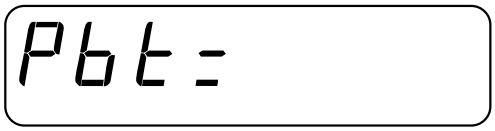


press the ENTER key to display the current status for the preset weight comparator feature. If YES is displayed, the two preset weight comparators are enabled while if NO is displayed the preset weight comparators are turned off. Press the 1 key to change the setting to YES or the 0 key to change the setting to NO then press the ENTER key to save the setting. If the YES setting was selected, the display will show Und1 for the operating mode of preset number 1. Press the ENTER key to view the current setting. If ON is displayed, it means that the output associated with preset number 1 is ON when the displayed weight is less than the preset value for the number 1 preset while if OFF is displayed, the output associated with preset number 1 is ON when the displayed weight is equal to or greater than the preset value for the number 1 preset. To change the setting, press the 1 key for ON or the 0 key for OFF, then press the ENTER key to save the setting. The display will then show Und2 for the operating mode of preset number 2. Use the same procedure as used for preset number 1 to view and change the operational setting for this preset weight comparator. Press the ENTER key to save the settings.

CHECKWEIGHER (if PrS=no)

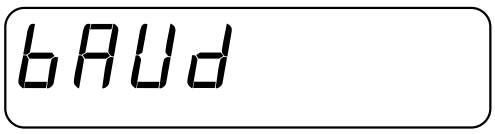
if the YES setting was selected, the display will show UndU for the operating mode the UNDER output. Press the ENTER key to view the current setting. If OFF is displayed, it means that the output associated with the under annunciator is on when the under annunciator is on. If ON is displayed, the output associated with the UNDER annunciator is off when the under annunciator is on. To change the setting, press the 1 key for ON and the 0 key for OFF, then press the ENTER key to save the setting. The display will then show UndA for the operating mode of the ACCEPT output. Use the same procedure as used for UNDER output to view and change the operational setting of the ACCEPT output to the same as the UNDER output. Press the ENTER key to save the settings. The display will then show Undo for the operating mode of the OVER output. Use the same procedure as used for UNDER output to view and change the operation settings of the OVER output to the same as the UNDER output. All three settings must be the same. Press the ENTER key to save the settings.

PUSH BUTTON TARE



press the ENTER key to view the current setting for this feature. If a YES is displayed, the feature has been enabled; a NO indicates the feature is disabled. Press the 1 key to change the setting to YES or the 0 key to change it to NO then press the ENTER key to save the setting. If selected, pressing the TARE key will enter the current gross weight as the new tare weight and automatically enter the net weight display mode.

BAUD RATE SELECTION



press the ENTER key to show the current setting for the baud rate for the serial I/O connector. If acceptable, press the ENTER key to save it, otherwise, enter a two digit number corresponding to the desired baud rate and press the ENTER key to save it. The numbers corresponding to different baud rates are:
12 = 1200 24 = 2400 48 = 4800 96 = 9600 19 = 19200

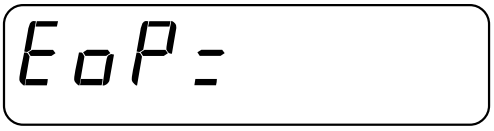
PRINTER CONTINUOUS OUTPUT

press the ENTER key to view the current setting for this feature. If a YES is displayed, the feature has been enabled and the 708 emit a continuous output of weight data at the serial I/O connector. If a NO is displayed the data will only be transmitted when the PRINT key is pressed or on receipt of an ENQ command from an external device. The 1 key may be pressed to change the display to YES or the 0 key to change the display to NO. Once the correct response is shown, press the ENTER key to save the setting. The YES display will show 400?, which asks if the continuous output is to be in a format compatible with the Cardinal 400 Series Remote Display. Press the ENTER key to display the setting. A YES display means that data compatible with this remote display and with a computer will be transmitted; a NO display means that the data will be in a format compatible with the Cardinal 200 series remote display. The 1 key may be pressed to change the setting to YES or the 0 key to change it to NO. Once the proper response is displayed, press the ENTER key to save it.

DATA FORMAT TERMINATION

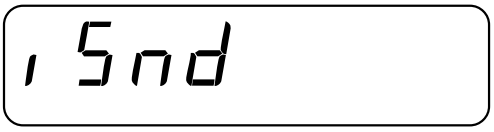
data transmitted from the serial I/O port can be terminated with a single carriage return and either no line feed or a single line feed command. Press the ENTER key to view the current setting. An ON display means the data will be terminated with a carriage return AND a line feed while an OFF display means the data will be terminated with a single carriage return only. Press the 1 key to change the setting to ON or the 0 key to change it to OFF. Once the proper setting is displayed, press the ENTER key to save it.

END-OF-PRINT LINE FEEDS



at the end of a data transmission to a printer, the 708 can transmit a pre-selected number of line feed commands to space the paper in the printer to the desired position for withdrawal or for the next print. Press the ENTER key to view the setting (0 to 66). If the setting shown is acceptable, press the ENTER key to save it, otherwise, use the numeric keys to enter the desired value and press the ENTER key to save it.

INHIBIT SERIAL DATA



Yes/No to inhibit sending serial data during input. If yes, all serial output will stop while weight is not being displayed (i.e. while inputting tare and presets).

SETUP AND CALIBRATION COMPLETED

at the end of the setup and calibration the 708 will automatically return to normal operation. Press the OFF key to turn off the 708 and replace the end caps on the desktop model or close the front panel and tighten the retaining screws on the NEMA 4X model. If the indicator is to be used in a commercial application a lead security seal must be applied to prevent access to the calibration switch.

FINE SPAN ADJUSTMENT

with power applied and weight displayed, press and hold the calibration push button switch, then press the 1 key to increase the span setting or the 0 key to decrease it. **NOTE:** The Fine Span Adjustment must be performed only in the base weight units the indicator was calibrated in. Using the Fine Span Adjustment in converted weight units will result in weight errors when returning to the base weight unit. For eample, if the indicator was calibrated in pounds DO NOT attempt to fine span in the kilograms mode or vice versa.

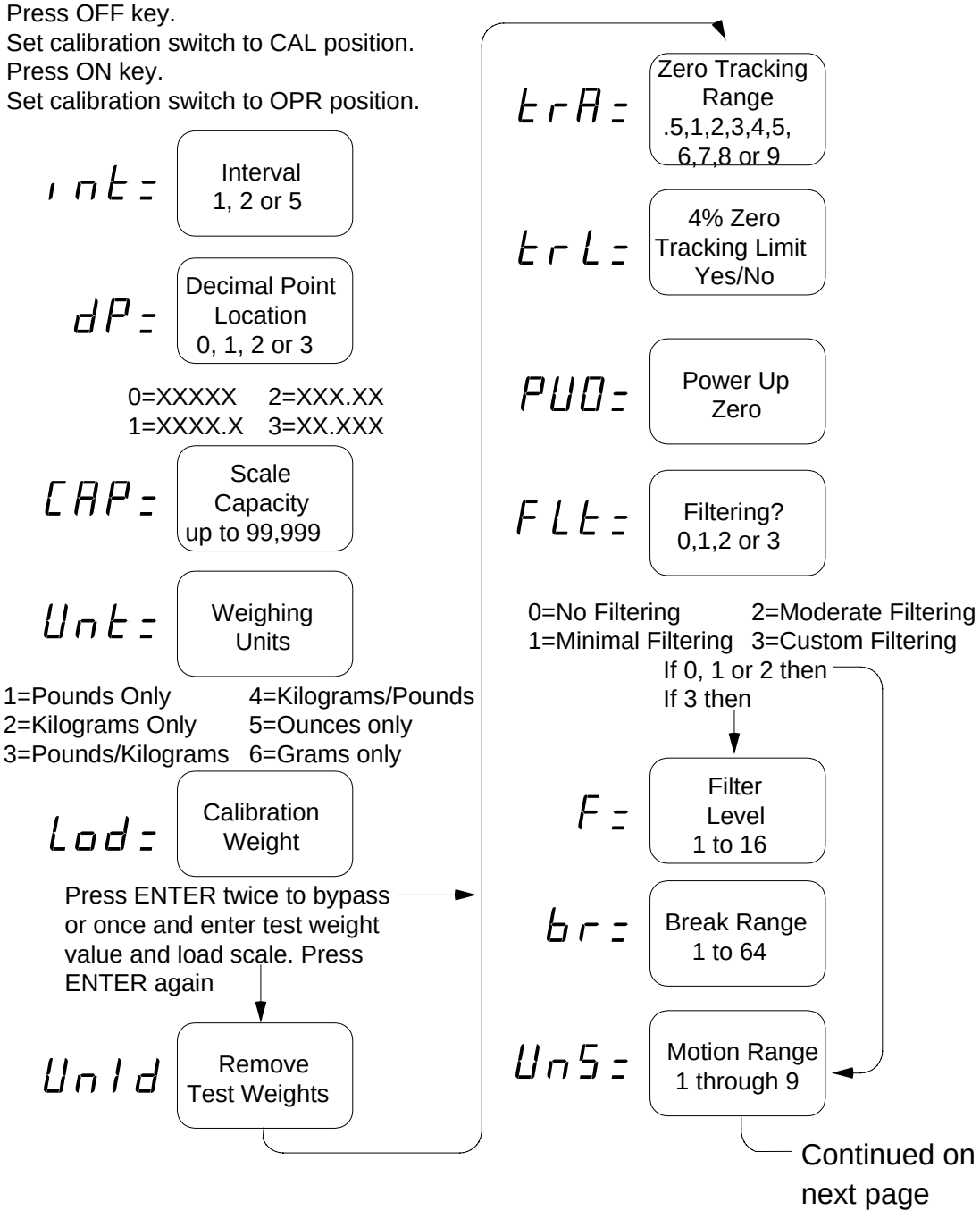
SETUP REVIEW

The 708 allows several operational parameters to be reviewed and changed without having to break the calibration seal to gain access to the calibration switch. These operational parameters are:

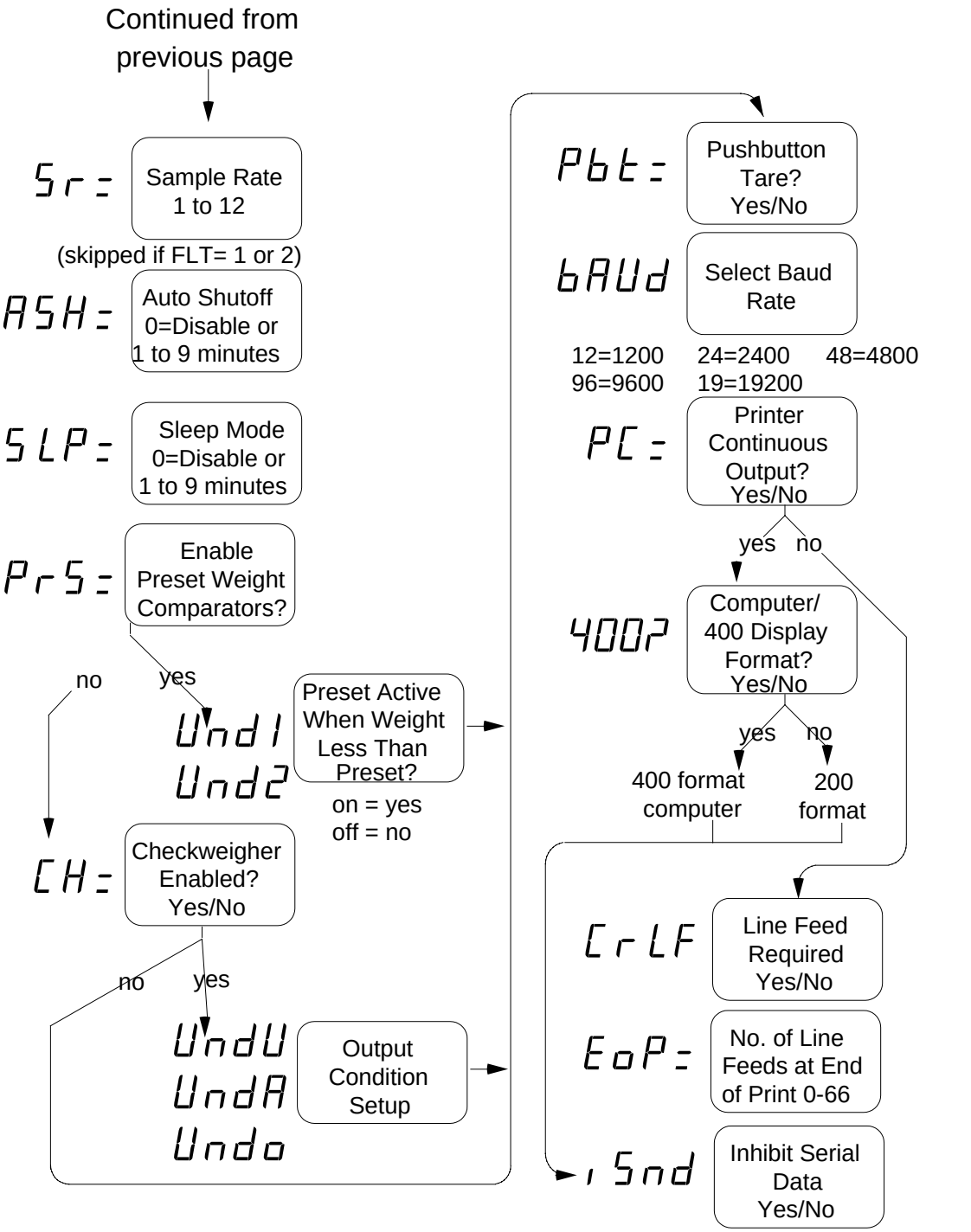
- Power Up Zero Enable/Disable
- Auto Shutoff
- Sleep Mode
- Preset Weight Comparators Enable/Disable
- Checkweigher Enable/Disable
- Push Button Tare
- Baud Rate
- Continuous Serial Data Output Enable/Disable
- Carriage Return/Line Feed Selection
- End-Of-Print Line Feeds

To enter the Setup Review mode, first turn the 708 off by pressing the OFF key. Press and hold any key (except ON or OFF keys) and press the ON key. Release the key after the display prompts for the Power Up Zero enable/disable (PU0=). Using the same procedure as described in the Setup and Calibration section of this manual, make the required changes. A chart illustrating the basic procedure is included in this manual for a quick reference but refer to the section on Setup and Calibration for detailed information if in doubt.

1. Press OFF key.
2. Set calibration switch to CAL position.
3. Press ON key.
4. Set calibration switch to OPR position.



Continued on next page



CALIBRATION COMPLETE

The indicator will now reset, return to the operation mode, and is ready for use.

KEYPAD FUNCTIONS

The 708 is equipped with a 21-key keypad. The keypad is used to enter commands and data. This section describes each key along with the function it performs. It will be helpful to refer either to Figure No. 12 or to the actual 708 keypad while reading this section.

The membrane keyboard is not to be operated with pointed objects (pencils,pens, fingernails, etc.). Damage to keyboard resulting from this practice will ***NOT*** be covered under warranty.

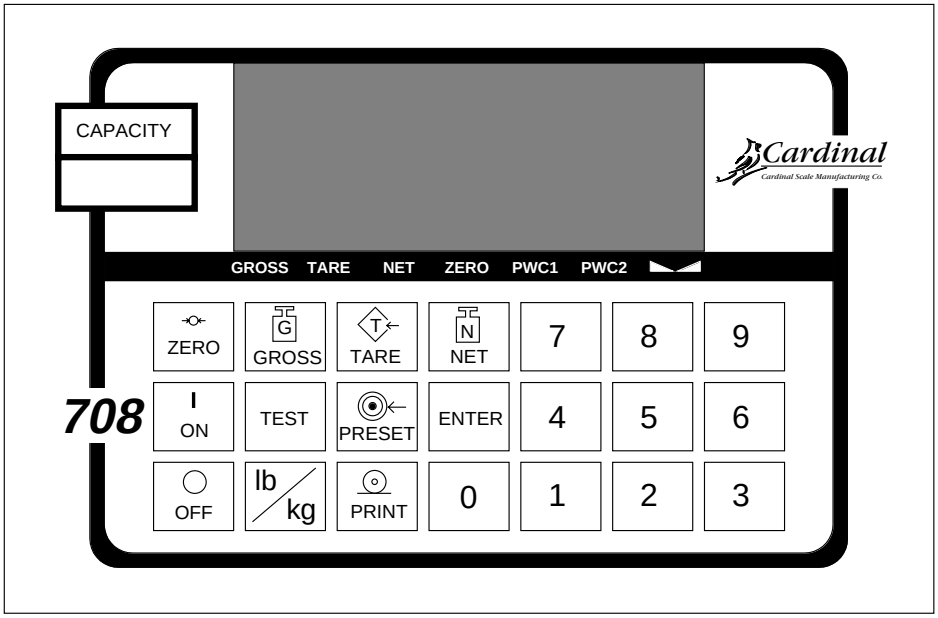


Figure No. 12

I
ON

ON KEY
Pressing this key applies power to the 708 and turns on the display.

OFF

OFF KEY
Pressing this key removes power from the 708 and turns the display off.

ZERO

ZERO KEY
This key is used to reset the gross weight to zero. If the gross weight exceeds the preset limit for this key an error message will be displayed when the key is pressed. The zero limit may be set to either 4% or 100% of scale capacity during setup and calibration of the 708.

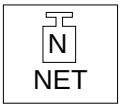
G
GROSS

GROSS KEY
This key is used to return the weight display to the Gross Weight mode.In the gross weight mode, the total of all weight placed on the scale since the display was zeroed is displayed. The GROSS annunciator beneath the display window is turned on to signal the display of gross weight.

T
TARE

TARE KEY
This key is used to enter a tare weight of up to four (4) digits and can operate in one of two modes depending on the setup of the 708. If the push button tare feature was selected during the setup of the instrument, pressing this key will cause the 708 to enter the current gross weight as the new tare weight value and automatically enter the net weight mode. The NET annunciator will be turned on to indicate that the 708 is now displaying a net weight. If the push button tare feature was not selected, pressing the TARE key will cause the currently stored tare weight to be displayed and the TARE annunciator will be turned on. The numeric keys may be used to enter a new tare value and the ENTER key pressed to store the new value. Once the new tare value is entered the 708 will automatically enter the Net Weight mode indicated by turning on the NET annunciator.

NET KEY



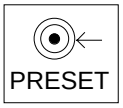
Pressing this key will cause the 708 to enter the Net Weight mode where the weight displayed is the gross weight less the stored tare weight. The NET annunciator is turned on to show that the displayed weight is the net weight. Note that the 708 will only enter the Net Weight mode if a valid tare weight is currently stored.

TEST KEY

The TEST key is used to conduct a test of all display and memory elements. The test consists of 4 cycles each lasting 2 seconds:

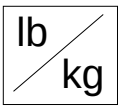
1. All vertical display segments on (no annunciators).
2. All horizontal display segments on (no annunciators).
3. All annunciators and decimal points on.
4. All display elements off.

PRESET KEY



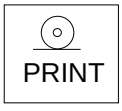
The PRESET key is used to enter the weight values for either the two preset weight comparators or for the checkweigher feature depending on which feature was selected during setup and calibration of the 708. If the Preset Weight Comparator feature was selected, the PWC1 annunciator will flash and the display will show the currently stored value for the number 1 preset weight comparator. If the value displayed is acceptable, press the ENTER key, otherwise, use the numeric keys to enter the new preset value and press the ENTER key. The PWC2 annunciator will now flash and the display will show the currently stored value for the number 2 preset weight comparator. As before, if the value displayed is acceptable, press the ENTER key, otherwise, use the numeric keys to enter the new value and press the ENTER key. If the Checkweigher feature was selected and the PRESET key pressed, the ACCEPT and UNDER annunciators will flash and the preset value for the minimum acceptable weight will be displayed. Press the ENTER key if the displayed value is correct or use the numeric keys and enter the new value and press the ENTER key. The ACCEPT and OVER annunciators will now flash and the display will show the minimum value of weight over the accepted range. As before, if the value shown is correct, press the ENTER key. If the value is incorrect, enter the new value and press the ENTER key to save it. Note that this value must be greater than the accept value. Remember that both the preset weight comparators and checkweigher functions operate on the absolute value of the weight ignoring the polarity. After the second preset value is entered, the 708 will return to normal operation.

lb / kg KEY



Pressing this key will change the weighing units to the alternate units of measurement if selected during setup of the instrument. With pounds displayed (lb annunciator turned on) pressing this key will change the weighing units to kilograms (kg annunciator turned on). Note that this feature must be enabled during setup and calibration for this key to be operational.

PRINT KEY

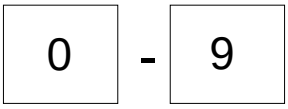


Pressing this key will initiate the transmission of weight data via the serial I/O port unless the continuous data output feature was enabled during setup and calibration or setup review. Note that if the continuous data output feature was selected, this key will be disabled.

ENTER KEY

The ENTER key serves two purposes. First, when reviewing setup parameters, pressing the ENTER key will cause the current setting of the parameter to be displayed. Second, the ENTER key is used to signal the completion of the entry of data and causes the 708 to process the data entered.

0 THROUGH 9 KEYS



These keys are used to enter numeric data during the setup and calibration as well as during normal operation of the instrument.

ANNUNCIATORS

Note that annunciators are turned on to indicate that the display is in the mode corresponding to the annunciator label or that the status indicated by the label is active. Some annunciators are flashed on and off to signal that the 708 is waiting for an input from the keypad for use by the feature indicated by the annunciator.

ZERO
The ZERO annunciator is turned on to indicate that the weight is within +/- 1/4 division of the center of zero.

GROSS
The GROSS annunciator is turned on to indicate that the displayed weight is the gross weight which is the total of all weight placed on the scale platform since the display was last reset to zero.

TARE
The TARE annunciator is flashed on and off to show that the 708 is in the tare weight input mode and that the new tare weight value should be entered on the numeric keys.

NET
The NET annunciator is turned on to show that the displayed weight is the net weight which is the gross weight less the tare weight.

PWC1
The PWC1 annunciator is turned on to indicate that the displayed weight is equal to or greater than the weight value stored as preset number 1. Note that this annunciator is active only when the Preset Weight Comparator feature has been enabled.

PWC2
The PWC2 annunciator is turned on to indicate that the displayed weight is equal to or greater than the weight value stored as preset number 2. Note that this annunciator is active only when the Preset Weight Comparator feature has been enabled.

STABLE
The STABLE annunciator is identified with two small triangular shapes and is turned on when the weight display is stable. This means that the change in successive weight samples is less than the motion limits selected during setup and calibration of the 708.

UNDER
The UNDER annunciator is located to the left of the weight display and is used to signal that the displayed weight is less than the minimum value of acceptable weight used in the Checkweigher feature. Note that this annunciator is active only when the Checkweigher feature is enabled.

ACCEPT
The ACCEPT annunciator is located just above the weight display and is used to signal that the displayed weight is within the acceptable weight limits for the Checkweigher feature. That is, it is equal to or greater than the minimum acceptable weight and equal to or less than the maximum acceptable weight. Note that this annunciator is active only when the Checkweigher feature has been enabled.

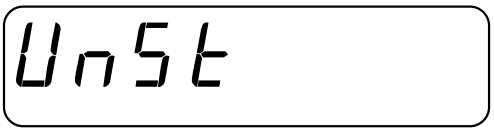
OVER
The OVER annunciator is located to the right of the weight display and is used to signal that the displayed weight is equal to or greater than the minimum value of over weight used in the Checkweigher feature. Note that this annunciator is active only when the Checkweigher feature has been enabled.

lb
The lb annunciator is located to the right of the weight display and is turned on to show that the displayed weight units of measure is pounds.

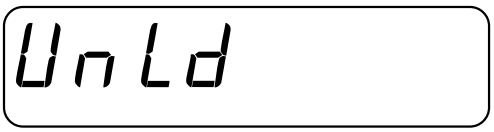
kg
The kg annunciator is located to the right of the weight display and is used to signal that the units of measurement for the displayed weight is kilograms.

ERROR CODES

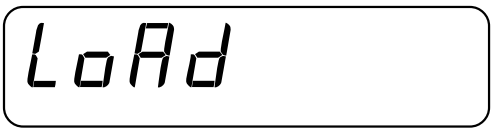
The 708 is equipped with software that detects when an error in operation takes place. The following lists the error code displays supported by the 708 along with their meaning. Should you encounter an error display, please refer to this list for the cause and corrective action.



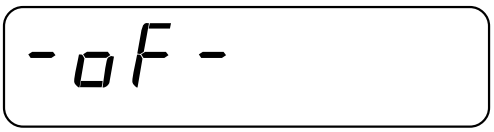
Motion is present when trying to power up, print, zero or perform a push button tare function. CORRECTIVE ACTION: wait for a stable weight display (STABLE annunciator on) before performing these operations.



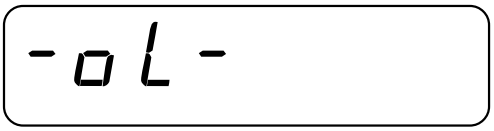
The weight on the scale exceeds the zero range when powering up. CORRECTIVE ACTION: remove the excess load from the scale then press the ZERO key. If the scale has not been calibrated previously, calibration should be completed before attempting further operation.



The scale deadload is less than the zero range when powering up. CORRECTIVE ACTION: replace the scale platform or items normally on the scale when it was calibrated and press the ZERO key. If the scale has not been calibrated previously, calibration should be completed before attempting further operation.



The 708 is attempting to display a positive number greater than 5 digits in length or a negative number of more than 4 digits. CORRECTIVE ACTION: return to the Gross Weight mode and review the Tare value.

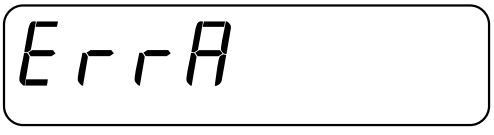


The load on the scale exceeds the scale capacity plus 9 divisions. CORRECTIVE ACTION: remove the over capacity load from the scale platform.

An invalid keypad entry was attempted:

1. PRINT key pressed with a negative weight displayed.
2. TARE key pressed to enter a push button tare value of zero or a negative value.
3. ENTER key pressed to enter a tare weight value that exceeds scale capacity.
4. ENTER key pressed to enter a tare weight value that is inconsistent with the scale's division value. (i.e. attempt to enter a tare value of 123 with scale division value of 5).
5. ZERO key pressed when the gross weight is outside the scale zero weight range.
6. lb/kg key pressed to change to kilograms when the kilogram tare weight value exceeds 4 digits in length.

CORRECTIVE ACTION: determine which of the reasons for the error display is applicable then take the appropriate corrective action.



The proper load cell signal is not getting to the signal processing circuit for one or more of the following possible reasons with corrective action:

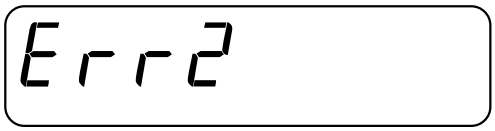
The load cell output is below the indicator minimum input of 1.OmV. Consult your scale serviceman;

Sense lead jumpers are not installed for four (4) wire load cells. Install both SENS jumpers (see Figure No. 9);

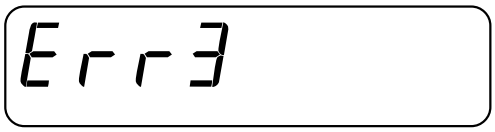
The load cell wiring is incorrect. Check load cell connector wiring;

Load cell or circuit failure. Consult your scale serviceman.

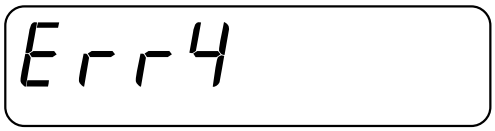
A program checksum mismatch has been detected. CORRECTIVE ACTION:contact your scale serviceman.



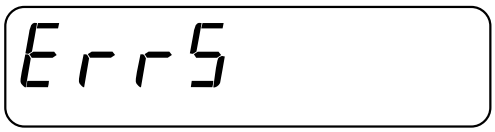
A write command to the NOVRAM was attempted while the NOVRAM was in a protected mode (loss of control by program). CORRECTIVE ACTION: contact your scale serviceman.



RAM test failure. CORRECTIVE ACTION: contact your scale serviceman.



NOVRAM failure during startup. CORRECTIVE ACTION: contact your scale serviceman.



NOVRAM response failure. CORRECTIVE ACTION: contact your scale serviceman.

MAINTENANCE

The maintenance on the Model 708 Weight Indicating Instrument should be limited to an occasional cleaning of the outside of the instrument enclosure. There are no user-serviceable components within the enclosure. To clean the enclosure and keyboard, use a soft cloth dampened with water. If you wish to use a detergent, make certain that it is safe and then use it sparingly. Do not wash the Desktop enclosure. Only the NEMA 4X version of the 708 may be washed down.

PART IDENTIFICATION

The figures on the following pages illustrate the construction of the Desktop and NEMA 4X versions of the Model 708 weight indicating instrument. Use these figures to identify parts or assemblies and use the corresponding part number when ordering a replacement.

DESKTOP ENCLOSURE

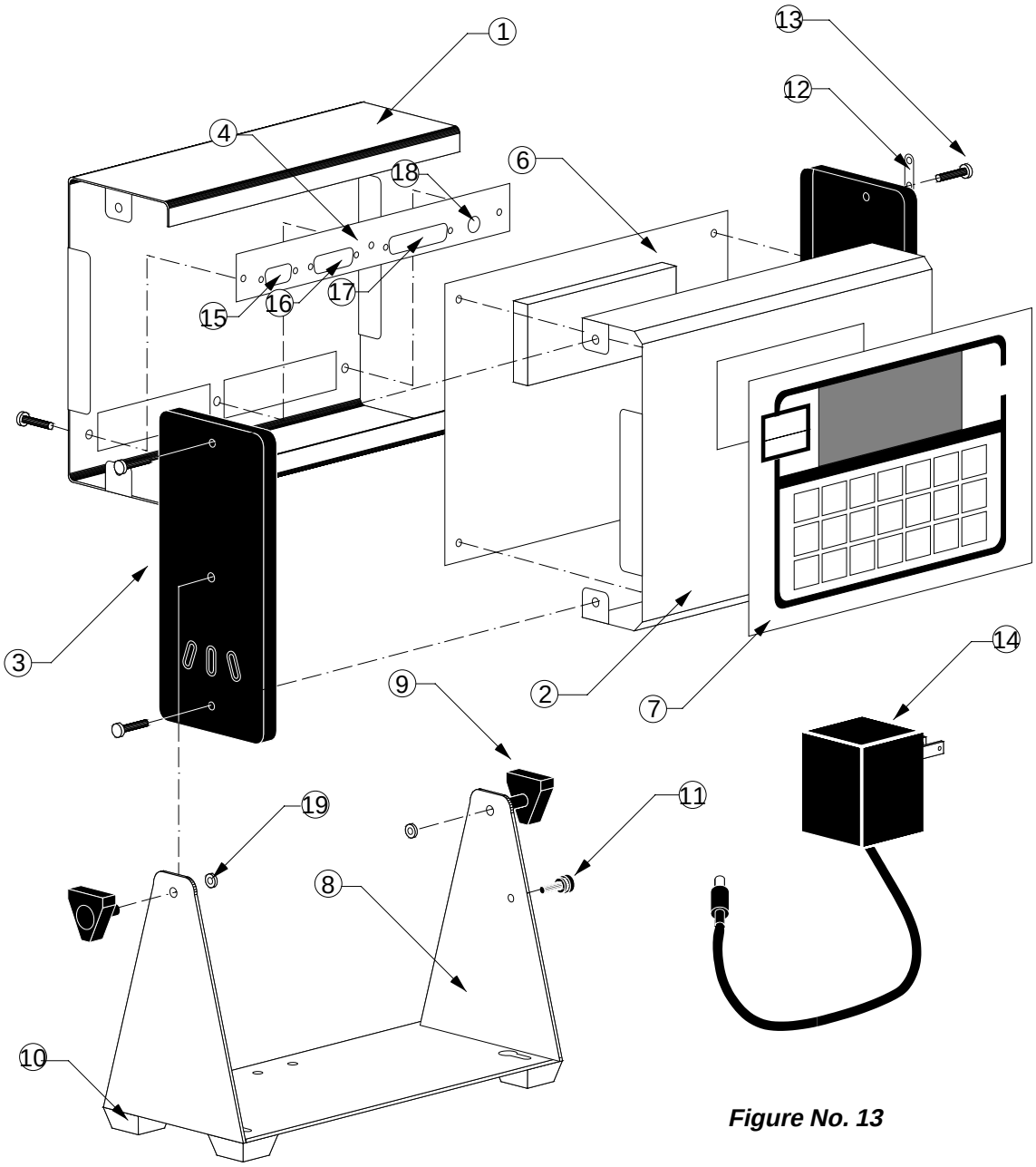


Figure No. 13

Item	Part No.	Description
1	8558-D007-08	Back Cover
2	8558-C008-0A	Front Cover
3	8539-D005-18	End Cap
4	8558-C009-0A	Connector Panel
5	*8558-C011-08	Rear Panel overlay
6	8558-D001-0A	PC Board Assy
7	8558-D003-08	Keypad
8	8558-D010-08	Gimbal
9	6540-1052	Knob
10	6540-1004	Rubber Foot

Item	Part No.	Description
11	6021-1199	Thumbscrew
12	8530-B159-08	Seal Tab
13	6021-1251	Screw-Truss Head
14	728R90	Power Supply
15	8539-B014-0A	Cable, Load Cell
16	8558-B004-0A	Cable, PWC
17	8558-B005-0A	Cable, Serial I/O
18	8558-B006-0A	Cable, Power
19	6024-0083	Rubber Washer

*Not Shown

NEMA 4X ENCLOSURE

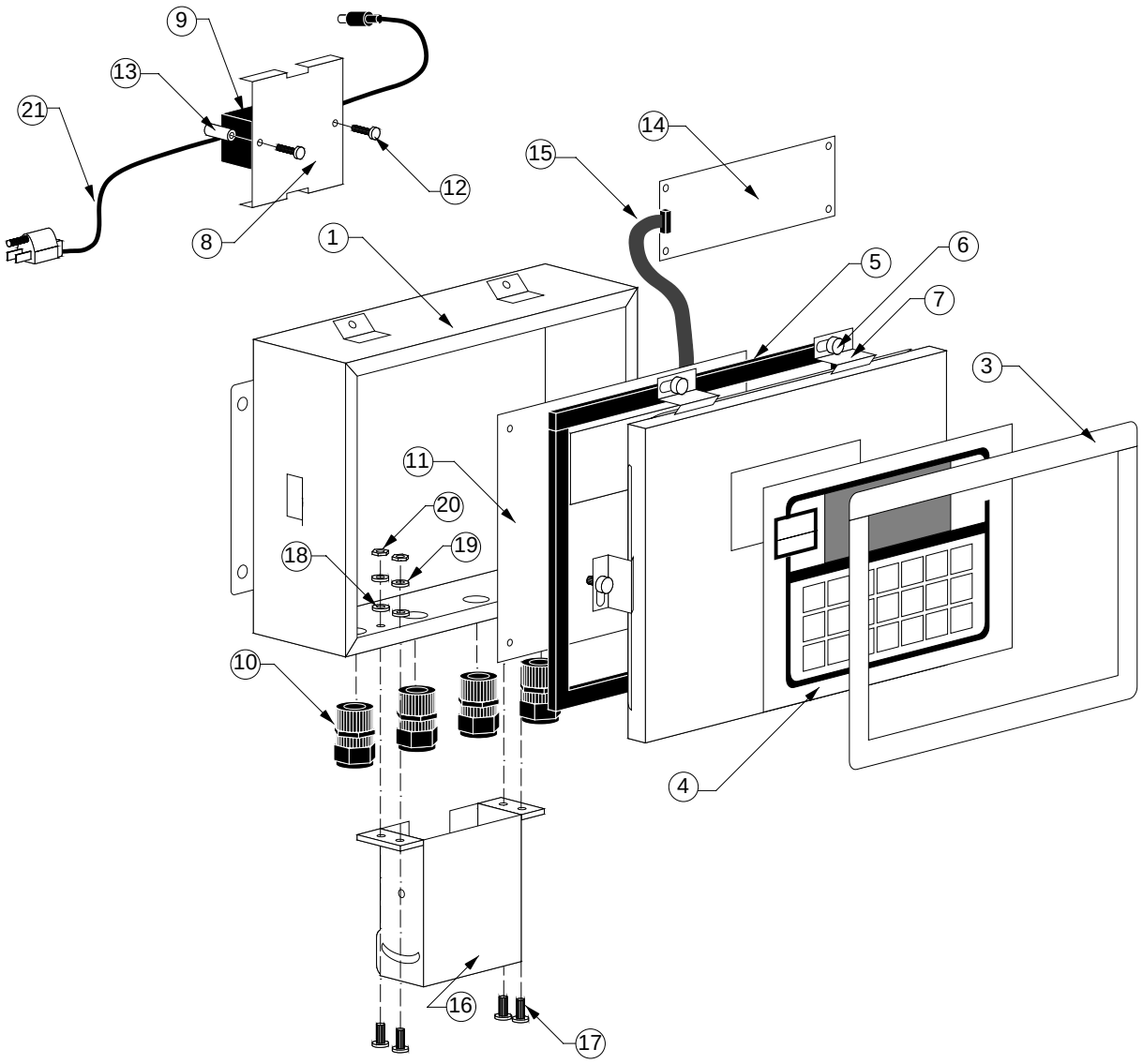


Figure No. 14

Note: Hinge is removed for illustrative purposes.

Item	Part No.	Description
1	8558-D015-0A	Enclosure Bottom Assy
3	8558-C021-08	Keyboard Bezel Ring
4	8558-D003-08	Keyboard
5	8558-C017-08	Enclosure Gasket
6	6021-0699	Screw, Enclosure Clamp
7	8530-C088-08	Clamp
8	8558-B032-08	Power Supply Cover
9	728R90	Power Supply,115VAC Input, 12V, .3A Output
	728R901	Power Supply, 230VAC Input, 12V, .3A Output
10	6610-2248	Gland Connector
11	8558-D001-1A	PC Board, Main
12	6021-0624	Pan Head Machine Screw, 6-32 x 0.625
13	6680-1042	Threaded Spacer
14	8539-C062-0A	PC Board, Relay
15	8558-B023-0A	Cable, PWC Relay
16	8534-D390-08	Mounting Bracket
17	6021-1061	Screw, 10-32
18	6024-0081	Washer, Rubber Backed
19	6024-0037	Lock Washer, #10
20	6013-0297	Hex Nut, #10
21	6980-1014	Power Cord

APPENDIX A

CALIBRATION SEAL INSTALLATION

If your Model 708 Weight Indicating Instrument is used in a commercial application it must be tested and sealed by your local weights and measurements official. The 708 is designed to accept a lead and wire security seal to prevent unauthorized access to the calibration adjustments. Installation of this seal differs with the type of enclosure. Refer to the following figures for details on the installation of these seals.

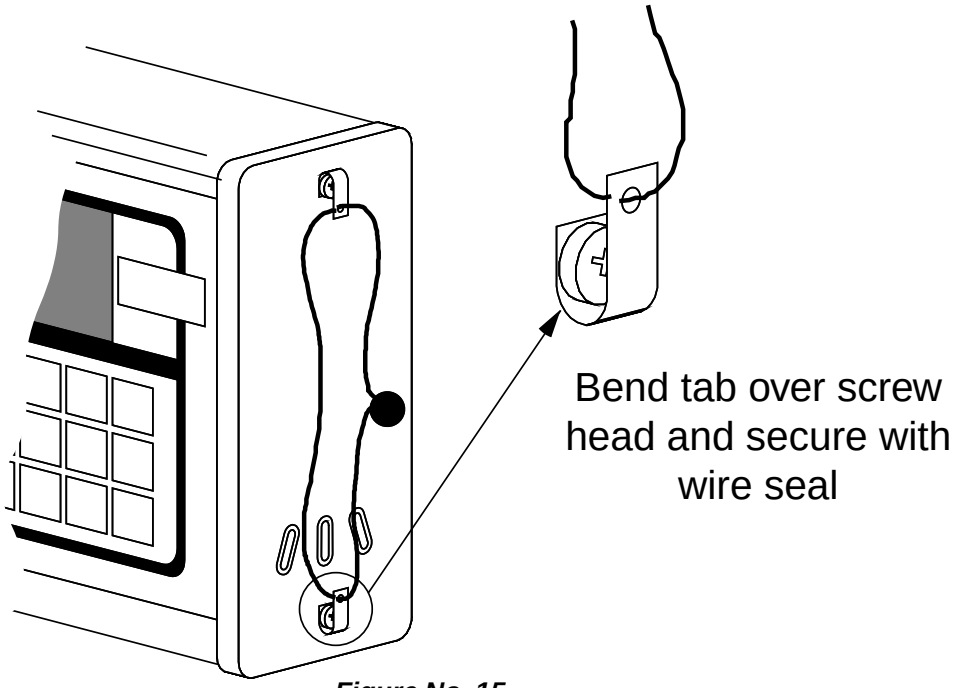
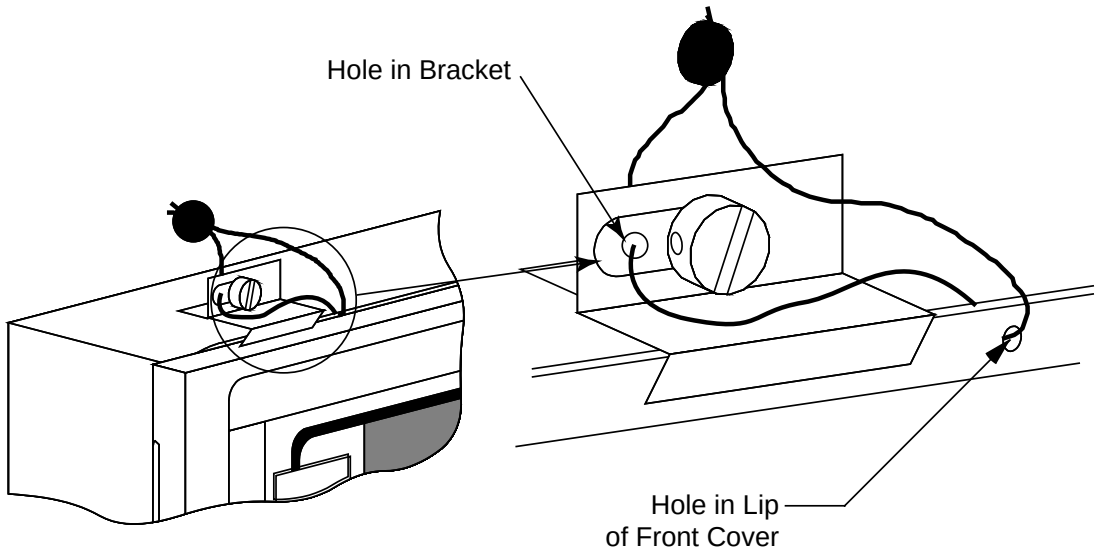


Figure No. 15

Figure No. 16



APPENDIX B

SETUP PARAMETERS FOR MODELS 708-AC AND 708-ACD

708-AC

The 708-AC is a version of the standard Model 708 Weight Indicating Instrument that allows a value of 1 to 99 to be selected for INTERVAL (division value). NOTE: All other setup parameters are the same as the standard 708.

[inE] = (1 to 99)

708-ACD

The 708-ACD is a version of the standard Model 708 Weight Indicating Instrument that incorporates the automatic selection of certain SETUP parameters. These settings are established on power-up and cannot be changed afterwards. In addition, these automatically selected parameters are not displayed during SETUP or SETUP REVIEW operations. These setup parameters and the fixed values are as follows:

Power Up Zero	=	NO
Auto Shutoff	=	0
Sleep	=	0
Preset Weight Comparators	=	NO
Checkweigher	=	OFF
Push Button Tare	=	NO
Printer Continuous Output	=	YES
400 Series Format (400?)	=	NO
Data Format Termination	=	Set by 200 series format (PC = YES and 400? = NO)
End of Print Line Feeds	=	0
Inhibit Serial Data	=	YES

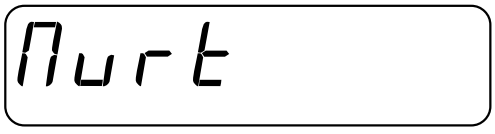
The 708-ACD also sets limits on the SAMPLE RATE and FILTER selections. The value selected for SAMPLE RATE [Sr-] must be between 8 and 12 samples (greater than or equal to 8 *OR* less than or equal to 12). The value selected for FILTER [FLt-] is limited to 0 or 3 (no filtering *OR* custom filtering).

Sample Rate	=	8 - 12
Filter	=	0 or 3

INVERT SETUP PARAMETER

Both the 708-AC and 708-ACD have an additional setup parameter after the InSd (Inhibit Serial Data) prompt. The additional parameter is INVERT with nurt displayed for the prompt. INVERT, when on, makes the indicator weight *backwards*. For example, an add-mix hopper will actually have the maximum weight on the load cell when the hopper is empty due to the load cell signal increasing as the mix leaves the hopper. Calibration steps remain the same and operation of the scale, to the operator, appears normal. However, as the mix leaves the hopper, the weight decreases.

INVERT



press the ENTER key to view the current setting. If YES is displayed, the feature has been enables, while a NO indicates the feature is disabled. Press the 1 key to change the setting to YES or the 0 key to change it to NO. Then press the ENTER key to save the setting.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