PROGRAMMABLE INDICATORS AND PROCESS
CONTROLLERS

60 SERIES

User Guide
Version 3.0

SPX | **GSE** scale systems

60 SERIES

User Guide

Version 3.0

GSE 60 Series User Guide

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CHAPTER 1: INTRODUCTION

GSE 60 Series programmable indicators come standard with a number of features that make them the most versatile and powerful systems in their price class. Accurate and durable, 60 Series controllers will provide you with years of quality weighing service even in the most demanding industrial environments.

This User Guide contains basic operating information. Subjects covered include controller installation, operation modes, custom transmits, variable or string operations, the clock feature, legal-for-trade issues, and troubleshooting.

Subjects such as the Setup Mode and the macro programming language are beyond the scope of a User Guide. For more detailed operating instructions, a 60 Series Technical Reference Manual is available. Contact your GSE Distributor for more information.

COMMON WEIGHING APPLICATIONS

Typical weighing applications for GSE 60 Series controllers include:

- Small parts weighing
- Large parts weighing
- Parts counting
- Vehicular truck loading (truck in / truck out)
- Tank weighing
- Process control
- Inventory control
- Order picking
- Floor and hopper scales control
- Conveyor weigh systems control
- Batching (mixing)

Figure 1: Model 660

FEATURES

GSE 60 Series controllers share the following standard features:

- Sealed elastomer keypad for protection against harsh environments
- Capability to power as many as 14 350-ohm load cells for demanding applications (12 350-ohm load cells on 460 and 465)
- AC/DC power operation
- Front panel calibration and linearization execution
- Full scale response time from 0.06 to 8 seconds
- Selectable weighing units: pounds, kilograms, ounces, grams, etc.
- Programmable RS-232 communications software
- Remote display support capability
- Expandable memory for increased data storage
- Battery-backed time and date clock
- Weighing increments of 1, 2, or 5 units, from .00001 to 500

CONTROLLER DESCRIPTIONS

All 60 Series models excluding the 663 come with a swivel bracket for positioning on a tabletop or mounting to any fixed surface. They are also available in panel-mount versions.

A stainless steel NEMA 4X enclosure for washdown environments comes standard on all 60 Series models. The model 663 is also available in a powder coat mild steel enclosure.

GSE offers many options to enhance the 60 Series of controllers. The number of options that can be used varies among the different models.

See the *Specifications* section on page 11 for enclosure dimensions.

DISPLAY

Display types differ according to model. The table below describes the display(s) offered for each controller.

Table 1: 60 Series Displays

Model	Display
460, 465, 560 660	6 digit, Vacuum Florescent display (VFD) 0.75" (19mm) height with 2X5 matrix
661	4-line by 20-character alphanumeric VF display (8mm)
562, 662	240 x 64 backlit LCD graphic, 3 font sizes
663	Available in two versions: • 6 digit, Vacuum Florescent display (VFD) and 4x20 character alphanumeric VF display OR • 240x128 backlit LCD display
665	Available in two versions: • 6 digit, Vacuum Florescent display (VFD) and 4x20 character alphanumeric VF display OR • 240x128 backlit LCD display

The vacuum fluorescent (VF) display is divided into two sections: a large, six-digit numeric area to the left, and a smaller, two-line-by-five-character dot matrix area to the right.

The large digit area displays numeric data, such as Gross Weight, Net Weight or Tare Weight. The dot matrix area has several purposes:

- The first two characters on the upper line show the weighing units of the displayed data.
- The last three characters on the upper line show a CENTER ZERO (-->0< --) condition at times.
- The lower line of the dot matrix area specifies the type of data, such as Gross, Net, Tare, etc.

The dot matrix area also displays specific messages during controller operation and setup.
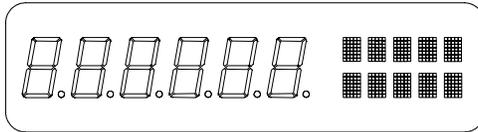
Figure 2: 6 Digit Vacuum Fluorescent Display (VFD)
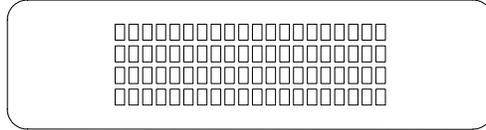
Figure 3: 4x20 Vacuum Fluorescent Display (VFD)

Figure 4: 240x64 Backlit LCD Display
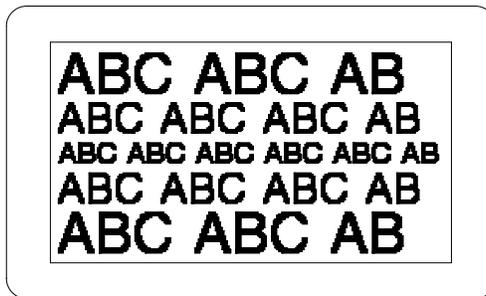
Figure 5: 240x128 Backlit LCD Display
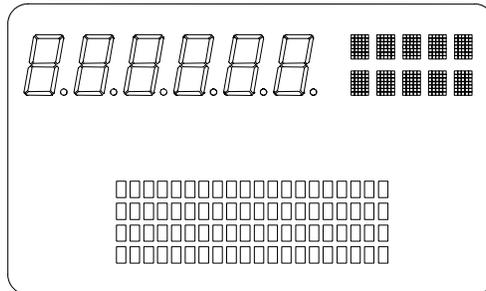
Figure 6: 6 Digit VFD and 4x20 VFD

KEYPAD

A sealed elastomer keypad comes standard on all 60 Series controllers. A TTL alpha keypad is also available as an option on the model 663 controller. For more information on the alpha keypad option, please refer to the 60 Series Technical Reference Guide.

Detailed descriptions of each key and its associated function follow below.
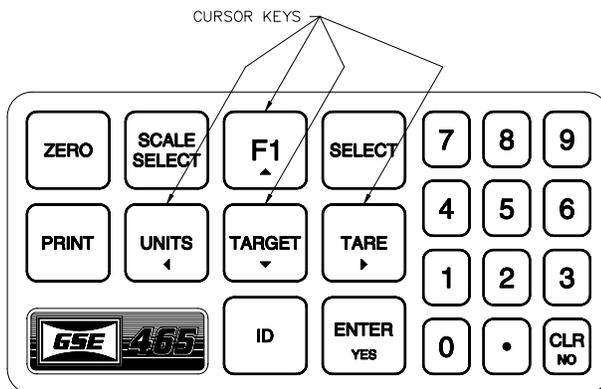
Figure 7: 465 Keypad
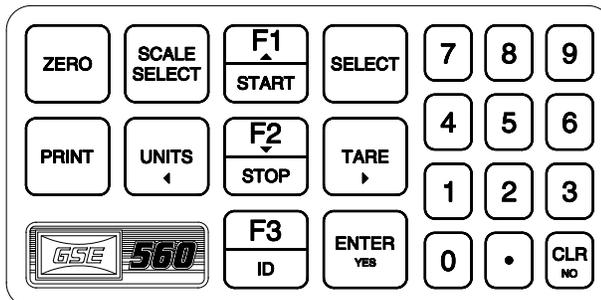
*Figure 8:*560/562 Series Keypad
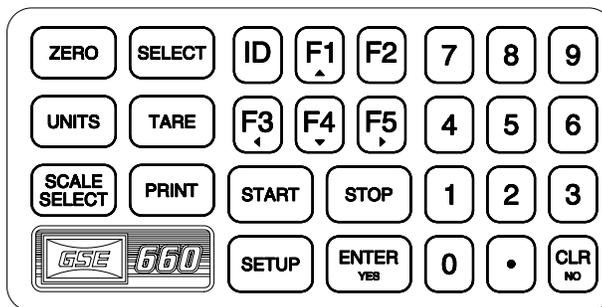
Figure 9: 660 Series Keypad

ZERO	Press **[ZERO]** to zero the current quantity/weight reading. When the meter is at Center Zero center-of-zero indication will appear on the upper line of the dot matrix display. If a Custom Unit's name is greater than 2 characters, the Center Zero indication is not displayed. If in the quantity mode, pressing **[ZERO]** will set the current mode to a gross zero quantity. If in the Weigh Mode, pressing **[ZERO]** sets the current mode to Gross Weight.
UNITS	Pressing **[UNITS]** from the Weigh Mode will toggle the displayed units through the available selections. Converted units are automatically rounded to the appropriate increment.
SELECT	Pressing **[SELECT]** will toggle you through the Net Weight, Tare Weight and Gross Weight or other enabled operating modes.
TARE	Pressing **[TARE]** by itself will perform an auto-tare. A Net Zero is then displayed. You can enter a known Tare weight by keying in the number and pressing **[TARE]**. In either case, the indicator will be placed in the Net Mode, unless you are in the Tare Mode.
ENTER/YES	Press the **[ENTER]** key following certain numeric entries. Doubles as a **[YES]** key for answering operator prompts.
PRINT	Press to send data to a printer, computer or other device.
ID	Used for entering ID numbers.
[F1▲]	The **[F1▲]** key is used as an up arrow key for scrolling or as a function key (such as accessing a menu or starting a process). Not available on Model 460.

[F2]	The **[F2]** key is used as a function key (such as accessing a menu or starting a process). 560 and 660 Series only. Not available on Model 460 or Model 465.
[F3◄]	The **[F3◄]** key is used as a left arrow key for scrolling or as a function key (such as accessing a menu or starting a process). Not available on Model 460 or Model 465.
[F4▼]	The **[F4▼]** key is used as a down arrow key for scrolling or as a function key(such as accessing a menu or starting a process) . Not available on 460 or 560 Series.
[F5►]	The **[F5►]** key is used as a down arrow key for scrolling or as a function key (such as accessing a menu or starting a process) . Not available on 460 Series or 560 Series.
TARGET	Only available on the Model 465. Used as a function key and a down arrow key.
START	The **[START]** key is used as a function key. 560 and 660 Series only. Not available on 460 Series.
STOP	The **[STOP]** key is used as a function key. 560 and 660 Series only. Not available on 460 Series.
SETUP	The **[SETUP]** key is used as a function key. 660 Series only. Not available on 460 Series or 560 Series.
0 - 9 & .	Press the numeric keys to enter numeric values 0 through 9. Press **[.]** to establish a decimal point or perform an accumulation in the weigh or count mode. Not available on Model 460.
CLR	Press this key to clear a numeric entry mistake prior to entering it into memory. Also doubles as a **[NO]** key for answering questions.
SCALE SELECT	Pressing **[SCALE SELECT]** will toggle through all the enabled scale inputs. Not available on Model 460.
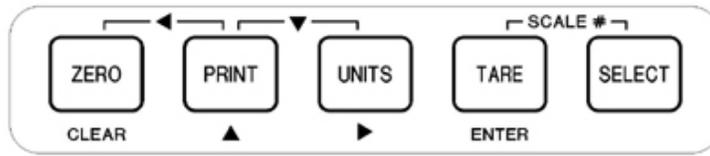
Figure 10: 460 Keypad

Table 2: 460 Key Functions

KEYPRESS	GROSS/NET	QTY	OTHER MODES
[ZERO / CLEAR]	Zero Scale	Zero Quantity	ZERO * CLEAR [†]
[PRINT]	Print custom transmit	Print custom transmit	Character Entry ▲
[UNITS]	Toggle though enabled units	N/A	Space ►
[TARE / ENTER]	Tares Scale	Tares Scale	ENTER
[SELECT]	Selects Parameters	Selects Parameters	SELECT
Multiple Key Combinations			
[ZERO] + [PRINT]	◄	◄	◄
[ZERO] + [TARE]	N/A	N/A	Clear Entry
[ZERO] + [UNITS]	N/A	N/A	N/A
[PRINT] + [UNITS]	▼	▼	▼
[PRINT] + [SELECT]	ext. res. OIML	ext. res. OIML	ext. res. OIML
[TARE] + [SELECT]	Scale Select	Scale Select	Move backwards
[UNITS] + [SELECT]	Performs an Accumulation	Performs an Accumulation	ENTER
[UNITS] + [TARE]	N/A	N/A	N/A
[PRINT] + [TARE]	N/A	N/A	N/A

* = No entry in progress
= Entry in progress

OPTIONS

Numerous hardware options that maximize the capabilities and functions of the standard 60 Series controllers are available. These options can be installed by your GSE distributor when you order your controller or added later. All options must be installed by your GSE distributor or a qualified technician. Please do not return the controller to GSE for installation of options. Consult your GSE products distributor for installation instructions.

4-Position I/O Board
60 Series supports the eight following 4-position I/O boards:

- Low Voltage AC 2 input 2 output
- High Voltage AC 2 input 2 output
- AC 4 output
- Low Voltage AC 4 input
- High Voltage AC 4 input
- DC 2 input 2 Output
- DC 4 output
- DC 4 input

16-Position I/O Board
The 16-position I/O board can be used in combination with the 4-position boards listed above. As many as 128 I/O circuits can be configured.

Alpha Keypad (663 only)
Allows easy entry of alphanumeric characters.

Alphanumeric Serial Keyboard Converter Kit
Adapts PC keyboard to the indicator serial port (includes keyboard).

Analog Output
Up to 8 analog output cards can be added for analog output signals of each scale value or any other independent variable.

Database
Adds capability for creating database records, consisting of fields, for data storage and retrieval. Battery-backed SRAM increases internal storage to 256K, 1M, or 2M.

DeviceNet Module
Provides a communication path between multiple end-points (Devices). The GSE indicator will act as a slave on the network device layer.

Dura-Shield
A clear weatherable film lexan that adheres over the keypad and display. Recommended when high-pressure washdown, petroleum distillates or harsh cleaning agents are present. (Not available for the 663).

Ethernet Module
Communicate via internet or intranet connection.

Memory Expansion (Not available for 460 Series)
An 8Kmemory chip can replace each of the two standard 2K memory chips, increasing internal E2 memory from the standard 4K to 16K maximum.

Multi-Scale
Enables the use of as many as seven additional scale platforms per controller.

Network Module
Addressable RS-485 network card. Full or half duplex.

Profibus Module
Allows joint operation of several systems with their distributed peripherals on one bus. The GSE indicator acts as a slave on the network line.

SCR Module
DIN rail mount controller suitable for controlling AC devices such as vibratory feeders.

Severe Transient Voltage Suppression
Protects the controller from power line transient damage.

Splash Guards
A clear flexible vinyl cover for use in harsh environments. It will keep the indicator well protected and looking like new.

SPECIFICATIONS

Performance

- Full Scale   Selectable
- Resolution   100,000 displayed (+/-500,000 internal)
- Display Update   Selectable 0.05-20 seconds
- A/D Conversion   60 Hz
- Non-Linearity   0.005% of full scale (input dependent)
- Zero Track   0.05-20.0 displayed divisions
- Zero Range   Selectable from 0.01-100% of full scale
- Calibration   Selectable, 5 multi-point calibration for linearization
- Division Size   .00001 through 500
- Warranty   2 year

Electrical

- Power input 90-250 VAC, 50/60 Hz; 10-32 VDC
- Fuse 0.8 amp time lag

Load Cell Input

- Connections 4 lead or 6 lead with sense, jumper selectable
- Power 14 350-ohm cells (560 and 660 Series)
- Power 12 350-ohm cells (460 Series)
- Signal Range 0.1 to 20 mV/V at full scale
- Excitation 10 VDC, short circuit protected
- Current 400 mA maximum

Communications

- Bi-directional RS-232 serial ports
- Independent custom transmit tables for labels, reports, transmitting control characters, etc.
- Transmit output: continuous transmit, on request, motion inhibited
- Selectable baud rate
- Selectable protocol

- Selectable data formatting

Display

- Vacuum fluorescent, 0.75 in. high digits
- 240x64 LCD display, 5 in. x 1.34 in. usable area
- 240 x 128 LCD display, 4.72 in. x 2.52 in. usable area
- Four-line by 20-character alphanumeric display, 0.20 in. high digits
- Increments 1,2, 5, 10, 20, 50, 100, 500
- Selectable decimal point
- Display values -99,999 through 999,999
- Polarity "-" sign to left of most significant active digit
- Status indicator 10-character dot matrix prompting display

Enclosure Dimensions

Model	Width	Height	Depth
465/560/562//660/661/662	11 in* (279 mm)	9 in* (228 mm)	4.4 in* (112 mm)
460	11 in* (279 mm)	8 in* (203 mm)	4 in* (101 mm)
460 Panel Mount	10 in** (254 mm)	7 in** (177 mm)	4 in** (101 mm)
465/560/562/660/661/662 Panel Mount	10 in** (254 mm)	9 in** (228 mm)	4.4 in** (112 mm)
663	16.18 in** (411 mm)	22.5 in** (571.5 mm)	9.28 in** (235.7 mm)
663 Big Box	24 in** (609 mm)	32 in** (812 mm)	9.28 in** (235.7 mm)
665	11.07 in* (281.20 mm)	12.16 in* (308.9 mm)	4.70 in* (119.4 mm)

mm =millimeter; in = inch
*Includes mounting stand.
**Includes mounting flange.

CHAPTER 2: INSTALLATION

This chapter outlines the basic installation of the 60 Series instruments. Please take the time to review these important guidelines.

⚠ **IMPORTANT!**

The 60 Series indicators do not include an on/off switch, and therefore must be installed near a power outlet socket that is easily accessible and in keeping with UL/CSA safety standards.

TABLE-TOP USE

All models excluding the model 663 have been designed with a swivel bracket, which lets you tilt the instrument face to any desired angle. When the instrument is placed on a table, the non-slip rubber feet prevent scratching and slipping across the surface when keys are pressed.

PANEL MOUNT USE

All models excluding the Model 663 are available in panel mount versions. When properly installed, the units are suitable for washdown environments. The panel mount version functions identically to the table top version. The only difference between the two package types is the mechanical aspects of the enclosure and the positioning of the main board and display. Refer to the 60 Series Technical Reference Manual for further panel mount version installation procedures and available options.

PERMANENT MOUNTING

Refer to pages 21 - 24 for panel mount cutout and mounting hole dimensions.

ENVIRONMENT SUITABILITY

60 Series instruments are supplied in a NEMA 4X (IP66) enclosure and may be used in a washdown environment. Care must be taken to ensure that the AC power socket outlet is properly protected.

The keypad is made of silicon rubber. It may be cleaned periodically with a soft damp non-abrasive cloth. The display window is made from a

polycarbonate material, which may scratch due to aggressive cleaning. Care must be taken to avoid such damage.

Connections from the load cell to the single channel input require gaining access to J1 inside the sealed enclosure. In addition, peripherals and options can be interfaced to 60 Series instruments by means of connections within the enclosure. However, physically accessing the unit may void the warranty. Refer to the Technical Reference Manual or contact your local GSE distributor.

Calibrating the unit requires entering the Setup Mode and selecting the calibration parameters specific to your application needs. Contact your local GSE distributor for calibration service.

MODEL 460 OUTLINE DRAWINGS
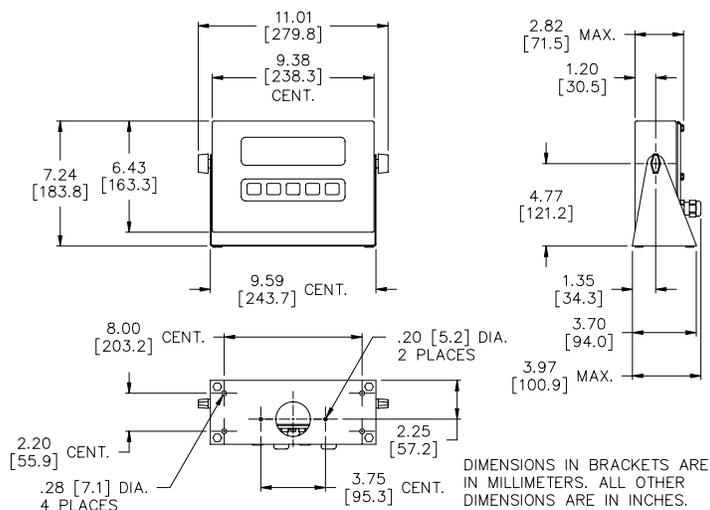
Figure 11: 460 Standard Enclosure
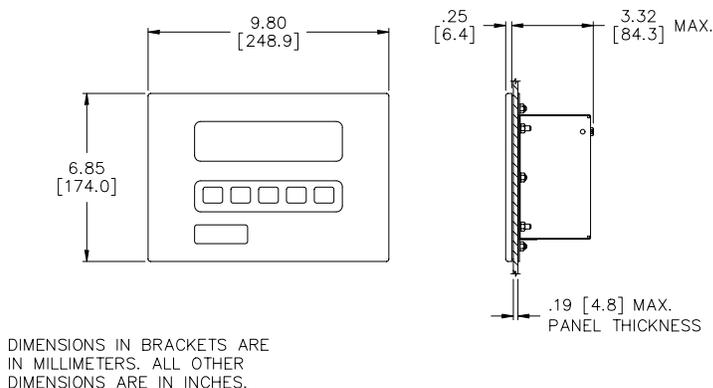
Figure 12: 460 Panel Mount Enclosure

MODEL 465, 560, 562, 660, 661, 662 OUTLINE DRAWINGS
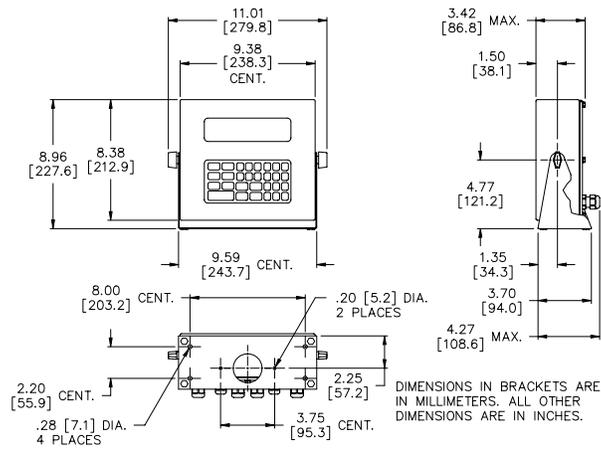
Figure 13: Standard Enclosure (excluding 460, 663, 665)
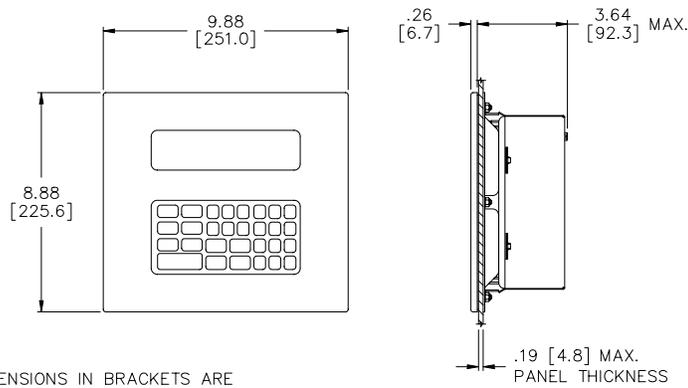
Figure 14: Panel Mount Enclosure (excluding 460, 663, 665)

MODEL 663 OUTLINE DRAWINGS
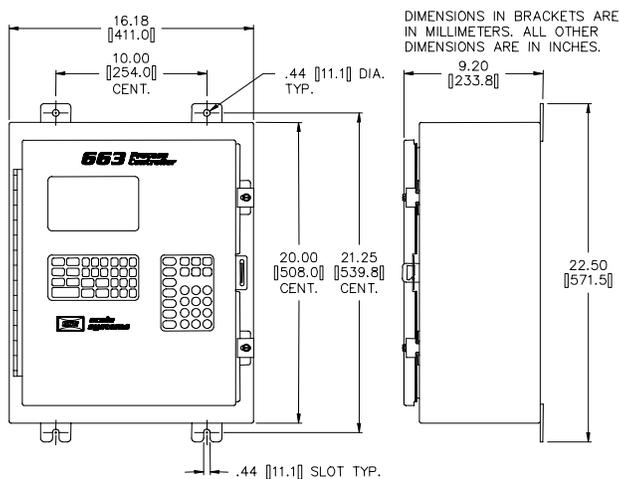
Figure 15: Model 663 Standard Enclosure
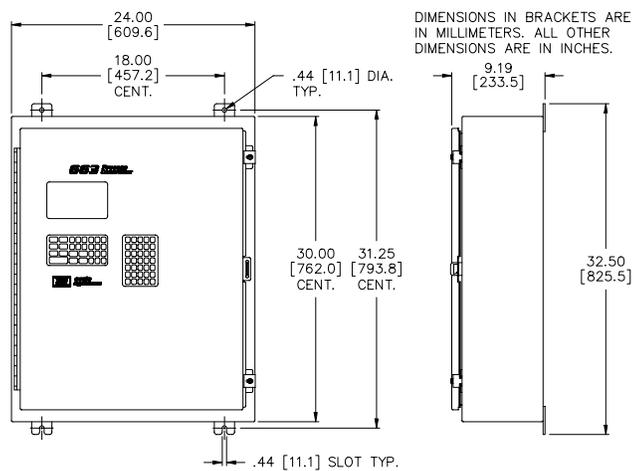
Figure 16: Model 663 Big Box Enclosure

MODEL 665 OUTLINE DRAWINGS
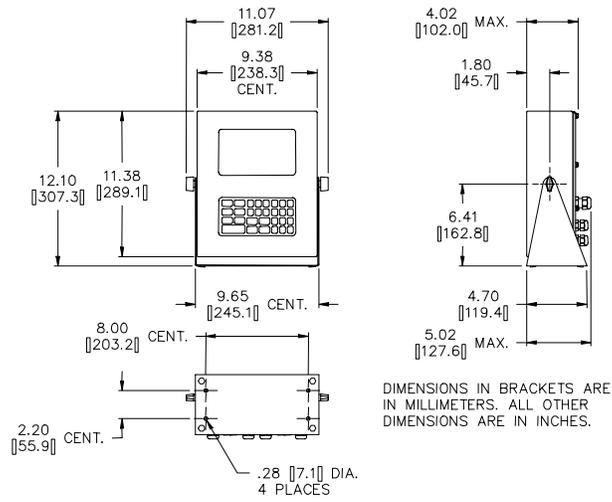
Figure 17: Model 665 Standard Enclosure
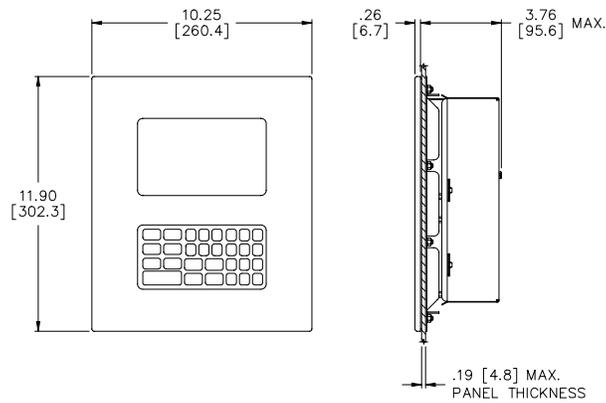
Figure 18: Model 665 Panel Mount Enclosure

PANEL MOUNT CUTOUTS
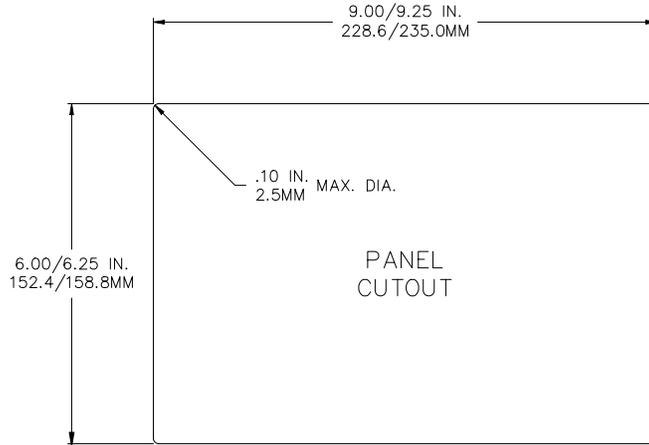
Figure 19: Model 460 Panel Mount Cutout
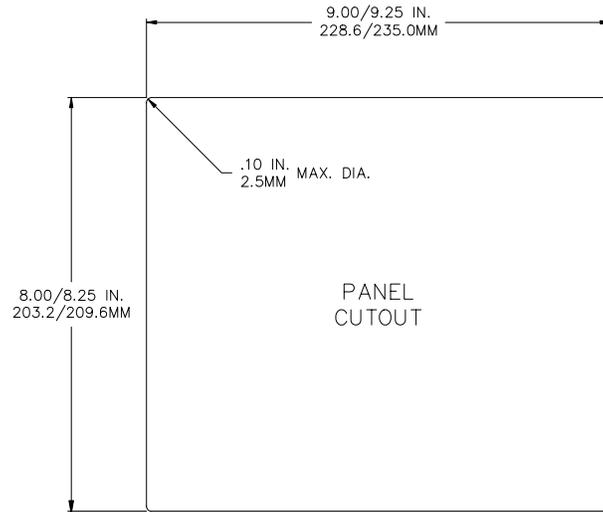
Figure 20: Model 465, 560, 562, 660, 661, 662 Panel Mount Cutout

9.37/9.62 IN.
238.0/244.3MM

.10 IN. MAX. DIA.
2.5MM

11.02/11.27 IN.
280.0/286.3MM

PANEL
CUTOUT
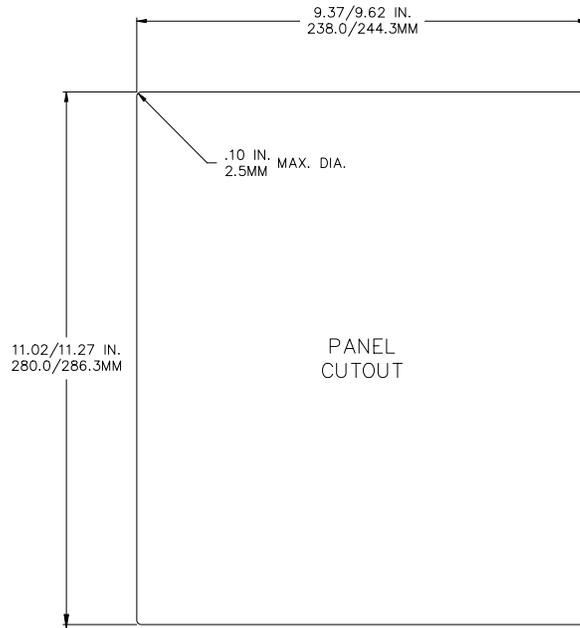
Figure 21: Model 665

CHAPTER 3: CALIBRATION

The 60 Series indicators can be calibrated several ways. The following method is a quick calibration procedure and assumes that the necessary parameters are selected before the actual calibration is performed (i.e. full scale value, graduation size, etc.). Your local GSE distributor will normally set up these parameters.

QUICK CALIBRATION

⚠ | A certified weight is required to perform a calibration. Serious inaccuracies could result from using non-certified standards for calibration.

To access calibration on the Model 460:

- From the Weigh Mode press

    [ZERO]+[SELECT]

    [ZERO] [PRINT] [UNITS] [TARE/ENTER]

To access calibration on all other 60 Series indicators:

- From the Weigh Mode press

    [100] [SELECT] [5 4 3 2 1] [ID] [ENTER]

The controller will briefly prompt you with ***QUICK CAL!*** And then ***New Zero?***. If multiple scales are enabled, the controller will prompt you with ***Keyin Scl #***. Key in the scale number being calibrated and press **[ENTER]**. Use the **[PRINT]** and **[UNITS]** keys to enter the scale number on the Model 460. Refer to *Table 2: 460 Key Functions* on page 8. After the scale number is entered the ***New Zero?*** prompt will be displayed.

Press the **[SELECT]** key to toggle through the available calibration selections, and **[ENTER]** when the desired calibration method is displayed. Press **[ENTER]** to begin calibration when the desired calibration selection is displayed. Pressing the **[CLR]** key at any point in the calibration routine will back you up one step.

The calibration selections are as follows, starting with *New Zero?*:

- New Zero?
- Last Zero?
- Temp Zero?
- Only Zero?
- Cal Reset
- Known Load Cell

-

NEW ZERO?

New Zero? is the selection for establishing the first or a new calibration. If *New Zero?* is selected, the controller displays the dead load (which might not be in precise units) that is present on the scale. The controller assumes a "NO LOAD" condition.

Remove the load, and press **[ENTER]**. As soon as **[ENTER]** is pressed, a new zero is established. This is reflected on the main display with the prompt *Adj'g Zero* followed by the prompt *Keyin CalWt*.

At this point, the controller is waiting for the actual calibration value to be entered. Place the calibration weight on the platform, key in the weight value, and press **[ENTER]**.

⚠ | If you key in a cal weight and press **[ENTER]** without adding any weight since the last calibration weight, the controller will prompt you to add *CalWT*. Add the weight and press **[ENTER]**.

ENTERING NUMERIC VALUES

Where appropriate, you can use the numeric keypad to enter numeric values. Use the **[PRINT]** and **[UNITS]** keys to enter numeric values on the Model 460. Refer to *Table 2: 460 Key Functions* on page 8. If an error is made while entering data, press **[CLR]** before you press **[ENTER]**. The controller will perform the calibration, display the value of the calibration weight, and prompt *CAL OK?*. At this point, you can check the accuracy of the calibration by weight without leaving the Calibration Mode.

- If the calibration was accurate, press **[ENTER]**.
- The controller will prompt you to save the new calibration plus any other changes you have made. Press **[ENTER]** twice to save and exit.

- If the calibration is not accurate, press **[CLR]**.

    The controller will return to the *New Zero?* prompt. Repeat the above steps to calibrate.

⚠️ | If the calibration weight was less than 5% of capacity, or if there was a large change in the calibration, the controller prompts *ReCal Req'd*. Press **[ENTER]** and repeat the calibration, or press **[CLR]** to obtain the *CAL OK?* prompt as described above and override the re-calibration requirement.

LAST ZERO?

The Last Zero procedure allows recalibration of the weighing device using an existing test load. This is especially beneficial when checking high capacity applications such as tank weighing to minimize the task of placing and removing test weights.

1. Remove all weight from the scale

2. Press **[ZERO]** to zero the scale in the weigh mode.

3. Apply the calibration test weight.

4. Access the Calibration Mode (see page 23).

5. Use the **[SELECT]** key to toggle to *Last Zero?*.

6. At the *Last Zero?* prompt, the **[ENTER]** key is pressed.

7. Key in the calibration weight value in terms of the default calibration units and press **[ENTER]**. For the Model 460, use the **[PRINT]** and **[UNITS]** keys to enter numeric values. Refer to *Table 2: 460 Key Functions* on page 8.

8. After establishing span, *Cal OK?* is displayed. Or if *Recal ???* is displayed, repeat the calibration process.

9. Press **[ENTER]** to save the calibration.

10. At the prompts *Save Mods?* and *Enter = Save* are displayed, **[ENTER]** is pressed to save the new calibration factors.

11. At the *Enter = Exit* prompt, **[ENTER]** is pressed again and the controller returns to the Weigh Mode.

TEMP ZERO?

Temp Zero? is used to recalibrate without establishing a new zero. In some applications you might want to perform a calibration without removing the currently applied load. This is particularly useful in tank weighing applications where it is both time-consuming and costly to drain the tank being weighed.

During the calibration procedure, at the **Temp Zero?** prompt you press **[ENTER]**. This action causes the controller to zero the displayed weight temporarily so additional weight can be added to assure system calibration. The zero determined during the previous calibration is not affected.

1. Access the Calibration Mode (see page 23).

2. Use the **[SELECT]** key to toggle to **Temp Zero?**.

3. At the **Temp Zero?** prompt, press **[ENTER]**.
   The displayed value will zero out.

4. Apply the calibration weight.

5. Key in the value of the calibration weight: for example, **1 0 0 0 [ENTER]**. For the Model 460, use the **[PRINT]** and **[UNITS]** keys to enter numeric values. Refer to *Table 2: 460 Key Functions* on page 8.
   The numeric display should show the entered value.

6. Remove the calibration weight. The display should return to zero. If the display reads as specified, at the **Cal OK?** prompt press **[ENTER]**. To repeat the calibration process, press **[CLR],** and then repeat steps 2 through 5.

7. Save the newly determined calibration weight: At the **Enter = Save** prompt, press **[ENTER]**

8. To return to the Weighing Mode, at the **ENTER = EXIT** prompt, press **[ENTER]**.

ONLY ZERO?

Only Zero is used to establish a new calibration zero without affecting the span. This is useful for correcting changes to the scale's dead load, for example in tank weighing applications where the re-zero parameter (P118) is set very low in order to prevent inadvertent re-zeroing. A build-up of sludge can be zeroed out in this manner.

1. Remove all weight from the scale.

2. Access the Calibration Mode (see page 23).

3. Press **[SELECT]** to toggle to the *Only Zero?* routine.

4. At the *Only Zero?* prompt, press **[ENTER]**.
   The displayed value zeroes out. *Adj Zero!* is displayed briefly, followed by *CAL OK?*.

5. Press **[ENTER]** to accept the newly established zero, or **[CLR]** to repeat the calibration.

9. At the *Enter = Save* prompt, press **[ENTER]**

10. To return to the Weighing Mode, at the *ENTER = EXIT* prompt, press **[ENTER]**.

CAL RESET

Cal Reset may be necessary when an over-load or under-load condition exists, preventing the completion of the calibration process. Calibration Reset adjusts the zero and gain factors of the A/D amplifier to factory default values for maximum sensitivity.

After performing a calibration reset, a complete recalibration is required. The effects of a calibration reset do not take effect until the indicator is recalibrated and calibration information has been saved.

⚠ If *Code 02* (under-load) or *Code 03* (over-load) is displayed during calibration, press **[CLR]** to perform a calibration reset.

When reset, these parameters are adjusted to the lowest possible values. Contact your GSE Distributor regarding *Information Parameters* for a more detailed explanation on the gain factors.

Normally, a Cal Reset is performed if the amplifier is locked in at an extremely high gain factor and will not allow a new calibration to be performed.

1. Access the Calibration Mode (see page 23).

2. Press **[SELECT]** to toggle to the *Cal Reset.*

Once the Cal Reset is performed, the controller returns to the ***New Zero?*** prompt. Press **[SELECT]** to toggle to the desired calibration routine.

Following a Cal Reset, a re-calibration should be performed before exiting the calibration or Setup Modes. The reset will not be saved unless a re-calibration is performed and changes are saved.

KNOWN LOAD CELL?

Known Load Cell is used to calibrate without test weights. The exact full scale mV/V rating must be known for each load cell. All load cells must be of the same full scale capacity. This procedure works best for hopper scales where weight is evenly distributed and signal trimming is not required.

1. Access the calibration mode (see page 23).

2. Press **[SELECT]** to toggle to the ***Known LCOut*** routine.

3. Press **[ENTER]** at the ***Known LCOut*** prompt to display ***#of LC***.

    The number of load cells specified during the last calibration will also be displayed. A value of zero (0) indicates that this calibration method has not yet been performed.

4. Key in the number of load cells and press **[ENTER]**. For the Model 460, use the **[PRINT]** and **[UNITS]** keys to enter numeric values. Refer to *Table 2: 460 Key Functions* on page 8.
    - or -
    Press **[ENTER]** to accept the displayed value.

5. The display prompts ***LC#x mVv*** (where 'x' is the load cell number) and then shows the mV/V value (0.1 $\rightarrow$ 5.0) last entered for this load cell.

6. Key in the load cell's mV/V value and press **[ENTER]**. For the Model 460, use the **[PRINT]** and **[UNITS]** keys to enter numeric values. Refer to *Table 2: 460 Key Functions* on page 8.
    - or -
    Press **[ENTER]** to accept the displayed value.

7. Steps 5-6 will be repeated for as many load cells as specified in step 4.

8. The display prompts ***LC FS*** showing the value last entered for the load cell full scale.

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9. Key in the full scale capacity for the load cell(s) and press **[ENTER]**. For the Model 460, use the **[PRINT]** and **[UNITS]** keys to enter numeric values. Refer to *Table 2: 460 Key Functions* on page 8.
    - or -
    Press **[ENTER]** to accept the displayed value.

10. The display briefly shows ***Updtg Gains*** as it updates the gain values, then prompts ***CurWt Zero?***.

11. Press **[ENTER]** to establish the current input signal as the zero reference.
    - or -
    Press **[SELECT]** to display ***Zero=0mVv?***. Press **[ENTER]** to use a 0mV/V output as the zero reference.
    - or -
    Press **[SELECT]** to display ***Keyin CurWt***. Key in the known gross weight already applied to the scale and press **[ENTER]**.
    - or -
    Press **[CLR]** to bypass the zeroing option.

12. The display shows ***CAL OK?*** suggesting that the calibration is acceptable.

    Accept the calibration by pressing **[ENTER]** at the ***CAL OK?*** prompt.
    - or -
    Repeat the calibration by pressing **[CLR]** at the ***CAL OK?*** prompt.

13. Once the calibration is accepted, press **[ENTER]** at the ***ENTER=SAVE*** prompt and again at the ***ENTER=EXIT*** prompt to save the new calibration and exit the calibration mode.
    - or -
    To exit the calibration mode <u>without</u> saving the new calibration, press **[CLR]** at the ***ENTER=SAVE*** prompt. Then press **[ENTER]** at the ***ENTER=UNDO*** prompt and again at the ***ENTER=EXIT*** prompt to exit the calibration mode.

SAVE CALIBRATION

The indicator will perform the calibration, display the value of the calibration weight, and display the prompt, ***CAL OK?***. At this point, you can

check the accuracy of the calibration by weight without leaving the Calibration Mode.

If the calibration was accurate, press **[ENTER]**. The indicator will prompt you to save the new calibration plus any other changes you made. Press **[ENTER]** to save, then **[ENTER]** again to exit. If the calibration is not accurate, press **[CLR]**. The indicator will return to the *New Zero?* prompt.

If the calibration weight is less than 5% of capacity or if there is a large change in the calibration, the indicator will prompt *ReCal Req'd*. Press **[ENTER]** and you will be returned to the beginning of the calibration selections, or press **[CLR]** to obtain the *CAL OK?* prompt as described above and override the re-calibration requirement.

A variation of the calibration process is the linearization procedure. Linearization is useful in improving the absolute accuracy of large-capacity systems, which often exhibit poor linearity. This feature is documented in the 60 Series Technical Reference Manual.

CHAPTER 4: COUNTING MODE

The front panel keys on the 60 Series take on different functions depending on the selected mode. This chapter will define the front panel key operation for the Counting Mode.

COUNTING MODE (KEY OPERATION)

To activate the counting operation, the indicator must be in the *Quantity mode*. To access the Quantity mode on a Model 460, the quantity mode must be in the selectable modes of instrument operation. Simply press the **[SELECT]** key to step through all enabled modes of instrument operation. The Quantity mode may be accessed directly by pressing **[30] [SELECT]** (not available on the Model 460).

SAMPLING TO DETERMINE A PIECE WEIGHT

Although the sampling process may be performed in a number of ways, the recommended method is to first access the Quantity mode, then place an empty box or empty container on the scale platform, and press **[ENTER]**. The first time a sample is performed, the display will read *Must Sampl and* press **[ENTER].** The indicator will then perform an auto-tare resulting in a zero net weight. The display will prompt you to *Add xx*, where the "xx" is the sample quantity of parts (sample size)—the manufacturer default setting is 10 pieces. Add the requested number of parts to the scale and press the **[ENTER]** key.

If the sample's total weight was sufficient, the piece weight will be calculated and the sample quantity will be displayed. Otherwise, you may be prompted to add additional parts. The exact prompts will depend on whether the auto-enhance and/or minimum accuracy assurance features have been enabled. The minimum amount of weight required for the sample routine to meet the selected accuracy requirements for the specified scale capacity is considered.

If the weight of the sample is un-detectable or barely detectable then the message *Code 32 ADD MORE!* is displayed briefly. This will most often occur when the **[ENTER]** key is pressed without adding any parts. If the parts were in fact placed on the scale, either the parts are too light to count on that capacity platform or a much larger quantity of parts must be hand counted in order to perform the sample.

NEGATIVE SAMPLING TO DETERMINE A PIECE WEIGHT

In order to perform a negative sample routine, access the Quantity mode, place a full or partially full container of parts on the scale, and press **[ENTER]**.
The indicator will then perform an auto-tare resulting in a zero net weight. The display will then prompt you to *Add xx* where the "xx" is the sample size. In this case, the prompt *Add xx* actually means *take* parts from the container. Proceed to remove the requested number of parts, and then press the **[ENTER]** key. If the sample's total weight was sufficient, the piece weight will be calculated and the sample quantity will be displayed (-10 parts). Otherwise, you may be prompted to take additional parts. The exact prompts will depend on whether the auto-enhance and/or minimum accuracy assurance features have been enabled.

If the weight of the sample removed was un-detectable or barely detectable then the message *Code 32 ADD MORE!* is displayed briefly. This indicates that more weight must be removed adding to the overall sample weight. This occurs most often when the **[ENTER]** key is pressed without taking out any parts. If the parts were in fact taken from the scale, either the parts are too light to count on that capacity platform or a much larger quantity of parts must be hand counted out in order to perform the sample.

⚠ | The first method is recommended to avoid the possibility that inappropriate tare weights may affect the piece weight calculation.

⚠ | When the Quantity mode is accessed and the residing piece weight value is "0.00", the prompt *Must Sampl* will be displayed. Press the **[ENTER]** key to proceed with the sampling to determine a piece weight.

PIECE WEIGHT ENHANCEMENT

⚠ | The presence of this feature depends on the internal setup of your controller. It is intended for the accurate counting of extremely light parts.

1. Access the quantity mode.

2. Place an empty container on the platform (optional).

3. Press **[ENTER]**. The indicator tares to a zero net weight. The display shows the current net weight and the prompt: ***Add 10***.

4. Place the specified number of parts on the scale.

5. Press **[ENTER]**. The indicator then calculates the piece weight of the sample parts and momentarily displays the maximum number of parts which may be added for a piece weight enhancement to occur. The minimum achieved accuracy is then displayed.

6. If a greater accuracy is desired, add additional parts but not more than the maximum enhanceable quantity.

7. As soon as motion ceases, the indicator will recalculate the piece weight and then briefly display the new maximum number of pieces which can be added and still accurately enhance the piece weight.

8. Repeat as many times as necessary to achieve the desired accuracy.

KNOWN CONTAINER WEIGHT

Place the full container of parts on the weigh platform. At any point in the counting process, the known weight of a container can be keyed in followed by the **[TARE]** key in order to cancel the affect of the container. Make certain that the weighing units of your entry are consistent with the current unit selection (lb, kg, etc.)

AUTOMATIC SCALE SELECT (WITH MORE THAN ONE WEIGHING PLATFORM)

The 60 Series has the capability of automatically selecting a predetermined scale before and after the sample routine. One or more multi-scale option cards must be installed for this feature to work.

One scale will be a pre sample and the other will be an after sample. During operation, press the **[ENTER]** key and the indicator will automatically select the predetermined sample scale. The prompt ***add XX*** will be displayed. Place the specified number of pieces on the sample scale and again press **[ENTER]**. The average piece weight having been established, the indicator automatically selects the appropriate "bulk" scale for higher capacity counting.

COUNTING MODE LISTING

The **[SELECT]** key will advance to the next mode. Alternatively, keying a mode number then pressing **[SELECT]** will change the current mode to be the mode whose number was keyed in. The following six modes are counting related. Any one of these parameter numbers listed may be printed out on a ticket.

Table 3: Counting Mode Parameter Numbers

Mode Number	Description
30	Quantity
31	Quantity Total
34	Piece Weight
35	Piece Weight x 1000
36	Percentage Accuracy Achieved
37	Last Sampled Amount

CHAPTER 5: ACCUMULATION MODE

60 Series controllers offer three main memory registers into which weighing data may be accumulated. The three registers are the Gross Total, Net Total and the Quantity Total.

PERFORMING ACCUMULATIONS

First, enter the desired "Accumulation Mode" either by pressing the **[SELECT]** key until one of the Accumulation Modes appears on the display or key in one of the accumulation parameters directly. Refer to *Table 4: Accumulation Mode Numbers* on page 36. Once in an Accumulation Mode, press **[UNITS]** + **[SELECT]** on the Model 460 or **[.] [ENTER]** on all other 60 Series indicators to add the displayed value to the accumulated total. Accumulate operations are motion delayed. If motion is occurring when an accumulation is requested, the ***Mot'n Delay*** prompt is displayed until motion ceases. If motion does not stop, press **[CLR]** to abort the accumulation.

There are six Accumulation Modes with corresponding Mode Numbers as shown in *Table 4*. When an accumulation is made, both the Gross and Net totals are affected. After an accumulation occurs, these values are frozen at their new accumulate total values until the Gross Weight returns to zero. The weight must return to zero before another accumulation is allowed. At that time, these values again resume their active state. This feature prevents double accumulations. A ***CLEAR WGHT*** prompt appears to warn of such situations.

INITIALIZING ACCUMULATION TOTALS

The Accumulation Registers may be reset to a new number. This would permit you to enter a total from the previous day or shift to continue the accumulation, or to reset the number to "0". Access the Accumulation Mode by keying in the single or two-digit mode number from *Table 4* and pressing **[SELECT]** (not available on the Model 460). If the mode is one of the pre-programmed selectable modes simply toggle to the corresponding mode using the **[SELECT]** key. Key in the desired reset value and press **[ENTER]**. You will then be prompted to confirm the accumulation modification by a display of ***MOD AC?*** for 1 second followed by ***ENTER =MOD***. Press **[ENTER]** to confirm the change or any other key to abort the modification of the accumulation total.

The **[ZERO] + [ENTER]** keys on the Model 460 or the **[CLR]** key on all other 60 Series may be used to reset both the net and Gross Totals to zero. The prompt ***CLEAR ACS?*** will appear briefly followed by ***ENTER =CLR!***. Press **[ENTER]** to complete the clearing or press any other key to abort the clear operation.

Table 4: Accumulation Mode Numbers

Mode Number	Description
3	Gross Total (GrTOT)
6	Net Total (GrTOT)
9	Accumulation Counter (# Accum)
31	Quantity Total (QtTOT)

*C*HAPTER *6: A*DDITIONAL *O*PERATING *M*ODES

We have taken popular application files and incorporated them into the firmware in an easy to use menu format. Use the arrow keys to scroll through the choices or the **[SELECT]** key on the Model 460 and press **[ENTER]** to setup the chosen application file. An explanation of each application file can be found at the bottom of the display on the LCD models only. With 5 different display choices available on the 60 series instruments, menu selections may vary in appearance. Operator prompts will also vary with display type.

P*IECE* W*EIGHT* D*ATABASE* M*ODE* – APW L*OOKUP*

A specific average piece weight may be recalled from a database. The average piece weight will be associated with an ID#.

*S*TORE *APW* – *S*TORE A SPECIFIC *APW* TO THE DATABASE –
M*UST* P*ERFORM A* S*AMPLE* B*EFORE* U*SING*.

1. To store an average piece weight, Press **[SELECT]** until APW is displayed. Key in the average piece weight and press **[ENTER]**.
2. From the gross weight, press **[F1].** Prompt = *"Key In ID"*.
3. Key-in the desired ID number.
4. Press **[ENTER].** Prompt = *"store new#?"*.
5. Press **[ENTER]** to store the ID. Or **[CLR]** to abort.
6. Add sample parts (default value = 10) to the scale.
7. Press **[ENTER]** to store APW.

[CLR] will abort the process.

*G*ET *APW* – *R*ETRIEVE A SPECIFIC *APW* FROM THE DATABASE

1. Press **[F1].** Prompt = *"Key In ID"*.
2. Key in the ID number. If the ID# exists, "*Found ID#*" will be displayed briefly and then ID#.
3. The display will return to the QTY mode. Press **[ENTER]** to accept entry**.**
4. The piece weight register is updated with the associated value.

Note: If the ID# does not exist you will be prompted to add default number of pieces to store a new APW.

[CLR] will abort the process.

PRINT APW'S – PRINTS ALL STORED RECORDS IN ROW/COLUMN FORMAT.

1. Press **[TARGET] or [F2]**. Prompt = *"Delete ID# XXX?"*.
2. Press **[CLR/NO]** to advance to print mode.
3. Press **[ENTER]** to print stored APW's in row/column format.
4. Indicator returns to the gross mode.

CLEAR ONE APW – CLEARS CURRENT RECORD FROM THE DATABASE.

1. Press **[TARGET] or [F2]**. Prompt = *"Delete ID# XXX?"*.
2. Press **[ENTER]** at the prompt to confirm deletion.

Note: this will only remove the current APW from the database.

CLEAR ALL APW'S – CLEARS ALL RECORDS FROM THE DATABASE.

1. Press **[TARGET] or [F2]**. Prompt = *"Delete ID# XXX?"*.
2. Press **[CLR/NO]** until "*Clear ALL?"* is displayed.
3. Press **[ENTER]** to delete all ID#s from the database. Prompt = *"Clear SURE?"*.
4. Press **[ENTER]** at the prompt to confirm deletion.
5. Indicator returns to the previous display mode.

TRUCK IN/OUT (MODELS 465,560,562 AND 660 SERIES)

Used for vehicle weighing where product is being loaded or unloaded.

TRUCK IN

Weigh the vehicle in.

1. With the truck on the scale. Press **[F1].** Prompt = *"Key In ID#"*.
2. Press **[ENTER]** for Automatic ID# *or* key-in the ID number and press **[ENTER].**
3. The indicator flashes *Weigh In* and returns to the gross mode.
4. If a printer is connected, a ticket will automatically be printed.

Note: look at ticket to find the trucks ID# if Automatic ID# is used.

TRUCK OUT

Weigh the vehicle out.

1. With the truck on the scale. Press **[F1]**. Prompt = *"Key In ID#"*.
2. Key-in truck ID#.
3. Press **[ENTER]** prompt flashes *"Weigh Out"*.
4. If a printer is connected, a ticket will automatically be printed.

PRINT ID'S?

Prints all ID's in a row column with header format.

1. Press **[TARGET] or [F2].** Prompt = *"Print ID's?"*. All stored ID numbers will be printed.
2. Press **[ENTER]**. Prompt = *"Clear One?"*.
3. Press **[CLR/ NO].** Prompt = *"Clear ALL?"*.
4. Press **[CLR/NO]** indicator returns to previous display mode.

CLEAR ONE ID

Clears 1 record from the database.

1. Press **[TARGET] or [F2].** Prompt = *"Print ID's?"*.
2. Press **[CLR/NO].** Prompt = *"Clear One?"*.
3. Press **[ENTER].** Prompt = *"ID to Delet"*.
4. Key in the ID number to be deleted and press **[ENTER].**
5. If the ID number is not stored in the database, *"Not Found"* will be displayed briefly. The indicator returns to the weigh mode.
6. Otherwise, if the ID number was found *"Done"* will be displayed briefly and the indicator will return to the weigh mode.

CLEAR ALL

Clears all records from the database.

1. Press **[TARGET] or [F2].** Prompt = *"Print ID's?"*.
2. Press **[CLR/NO].** Prompt = *"Clear One?"*.
3. Press **[CLR/NO].** Prompt = *"Clear ALL?"*.
4. Press **[ENTER].** Prompt = *"Clear Sure?"*.
5. Press **[ENTER]** indicator returns to previous display mode.

Note: **[CLR]** will abort the process.

STORE TRUCK IN TARE WEIGHT

Make a permanent record in the database for a truck tare weight.

1. Press **[F1].** Prompt = *"KeyIn ID#"*.
2. Press **[TARE].** Prompt = *"Press tare or KeyIn"*.
3. Key-In tare weight of truck *or* have truck on the scale.
4. Press **[TARE].** Prompt = *"KeyIn ID#"*.
5. Key in the ID number and press **[ENTER].**

CHECK WEIGH ABSOLUTE AND PERCENTAGE OPERATION

The standard check-weigh operation is designed to check the weight of an item against a given standard or target weight. In the check weigh absolute mode, values are entered as target limits. In the check weigh percent mode, the values are entered based on percentage.

SET THE HI AND LO WEIGHTS (460)

1. Press **[SELECT]** until prompt = *"mName SETUP".*
2. Press **[TARE]** prompt ="*10.00 High*" (by default)
3. Use the **[PRINT]** key to enter a number **([UNITS]** key moves placeholder over 1 spot)
4. Press **[TARE]** prompt = "*5.00 Lo".*
5. Repeat steps 2 – 4 to enter in low value
6. Press **[TARE]** indicator returns to previous display mode.

USE CHECK WEIGH (460)

1. Press **[SELECT]** until prompt = "*mName START"*
2. Press **[ENTER]**. The display will return to the weigh mode.
3. To stop check-weighing, press **[SELECT]** until prompt = gross mode.

Note: if your weight is greater than your hi weight then the prompt = *"OVER"* is displayed. If your weight is less than your Lo weight the prompt = *"UNDER"* is displayed. If your weight is between the Hi and Lo then prompt = "GOOD" is displayed.

SET THE HI AND LO WEIGHTS (465,560,562 AND 660 SERIES)

1. Press **[TARGET] or [F2]** prompt = *"10.00 Hi". (by default)*
2. Key in the desired high value weight.
3. Press **[ENTER]** prompt = "*5.00 Lo". (by default)*
4. Key in the low value weight.
5. Press **[ENTER]** indicator returns to previous display mode.

USE CHECK WEIGH

1. Press **[F1]** to start check-weighing
2. Add your weight to the scale.
3. Press **[TARGET] or [F2]** key to stop check-weighing

Note: if the weight is greater than the high limit then the prompt *OVER"* is displayed. If the weight is less than the low limit the prompt "*UNDER"* is displayed. If the weight is between the high and low limits then prompt "GOOD" is displayed.

BATCHING OPERATION (465,560 AND 562) - FILL

SETTING SETPOINTS, PREACT, AND DRIBBLES

1. Press **[TARGET] or [F2]** prompt = *"current setpoint value + SP 1"*.
2. Key in Setpoint value.
3. Press **[ENTER]** prompt = *" current setpoint value + PAct."*.
4. Key in Preact value (if enabled), zero (0) for no preact.
5. Press **[ENTER]** prompt = *"current setpoint value + Drib"*.
6. Key in Dribble value (if enabled), zero (0) for no dribble.
7. Repeat steps 2 – 6 for each setpoint your systems has.
8. Systems returns to previous display mode.

BATCHING

1. Press **[ZERO]** to zero the indicator
2. Press **[F1].** Fill until the target is met. "*Done"* will be displayed when cycle completes
3. Empty the scale

CHAPTER 7: TIME AND DATE (CLOCK FEATURE)

The 560 and 660 Series indicators include a battery backed time/date feature. The 460/465 have an optional battery backed time/date module. Without this option on the 460 Series, the time/date will be reset when power is lost. This means that when the feature is used, the time and date does not need to be entered every time the instrument is powered up. The time/date feature permits printouts with time and day of the week and the date in many possible formats. Consult with your local GSE distributor or the 60 Series Technical Reference Manual for more information on time/date configurations.

> In the following discussion, HH is a 2-digit representation for hours, MM is minutes, SS is seconds, MO is month, DA is day and YR is year. When the 60 Series controller is powered up, the time and date clock is set to Jan 1, 1970, 00:00:00 am.

VIEWING TIME AND DATE

While in the Weigh Mode, the time and date can be displayed simultaneously in the dot matrix and main displays. Press **[SELECT]** on the Model 460 until the time/date is displayed or **[11] [SELECT]** on the other models. The date is then displayed on the large numeric display in the format "MM.DD.YY" (or DD.MM.YY for international style) and the time is displayed on the dot matrix display in the format "HH:MM:SS". The time may be displayed in a 24 or 12-hour format with an "am" or "pm" displayed as appropriate, depending on the setup of time-date.

ENTERING A NEW TIME AND DATE (EXCLUDING MODEL 460)

From the weigh mode, press **[11] [SELECT]** to access the time and date. Press **[ENTER]** to invoke the date prompt. A new date is entered by keying in "MM.DD.YY" (or "DD.MM.YY" if international format was selected) followed by the **[ENTER]** key. Month, day and year entries must be separated by decimal points. Leading zeroes need not be entered. For example, if you enter "4.1.96" and press **[ENTER]** the date is set to 04/01/96. If the date is entered improperly, the prompt *try m.d.y* (or *try d.m.y* for international format) is displayed. The word *Date* will then be

displayed. Press **[ENTER]** if the date is correct and move to the *Time* setting mode.

The new time is entered by keying in "HH.MM.SS" in a 24-hour format. Hours and minutes entries must be separated by a decimal point. Seconds entry is optional, and if omitted, they are set to zero. To specify seconds, it also must be separated from minutes by a decimal point. Leading zeroes need not be entered. For example, if you enter "8.9.45" and press **[ENTER]**, the time will be set to 08:09:45; if you enter "15.02" and press **[ENTER]** the time is set to 15:02:00. If time is entered improperly, the prompt *try h.m.s* is displayed. The word *Time* will then be displayed. Press **[ENTER]** if the time is correct.

ENTERING A NEW TIME AND DATE (MODEL 460)

From the weigh mode, **[SELECT]** until the time/date is displayed. Press **[ENTER]** to invoke the date prompt. The **[ENTER]** key may be pressed to bypass the date entry. A new date is entered by keying in "MM.DD.YY" (or "DD.MM.YY" if international format was selected) followed by the **[ENTER]** key. Month, day and year entries must be separated by decimal points. Leading zeroes need not be entered. Using the combination of the **[PRINT]** and **[UNITS]** keys, enter the in the date. If the date is entered improperly, the prompt *try m.d.y* (or *try d.m.y* for international format) is displayed. The word *Date* will then be displayed. Press **[ENTER]** if the date is correct and **[ENTER]** again to move to the *Time* setting mode.

The **[ENTER]** key may be pressed to bypass the time entry. The new time is entered by keying in "HH.MM.SS" in a 24-hour format. Hours and minutes entries must be separated by a decimal point. Seconds entry is optional, and if omitted, they are set to zero. To specify seconds, it also must be separated from minutes by a decimal point. Leading zeroes need not be entered. Use the **[PRINT]** and **[UNITS]** keys to enter time. If time is entered improperly, the prompt *try h.m.s* is displayed. The word *Time* will then be displayed. Press **[ENTER]** if the time is correct.

CHAPTER 8: LEGAL-FOR-TRADE

The 60 Series parameter setup does not ensure compliance with legal-for-trade installations as mandated by local weights and measures authorities. This chapter explains how to configure the 60 Series controllers to comply with various regulations and describes other features that will make your controller suitable for installations worldwide.

Legal-for-trade requirements vary by location. Ensure that your controller is installed in accordance with all local regulations.

OIML AND INTERNATIONAL OPERATION

The International Organization of Legal Metrology is an inter-governmental body, which harmonizes the national metrology regulations of its worldwide members. A list of regulation publications can be obtained from the Bureau International de Métrologie Légale (BIML) in Paris, France.

In order to configure the your controller to comply with OIML requirements, P410 must be enabled in the Setup Mode. Doing this will ensure the following:

- An over-load condition will result when the gross weight exceeds nine graduations over the full-scale capacity.

- Full scale capacity is always referenced from the last zero calibration reference, not the last zero acquired by pressing **[ZERO]**.

- The keypad is remapped for the international version.

- Presettable parameters will give indication that a value has been entered manually.

Most NTEP requirements will also apply.

⚠ For detailed information on enabling OIML operation, please see the 60 Series Technical Reference Manual.

NTEP

The National Type Evaluation Program (NTEP) is a widely accepted weights and measures standard in the United States. Most states abide by some or all of the requirements set forth by NTEP. A complete list of these regulations is available in the "Handbook 44" publication distributed by the National Institute of Standards and Technology (NIST). For more information on this and other NIST publications, visit their web site at http://www.nist.gov.

ENABLING NTEP OPERATION

In order to configure the 60 Series indicators to comply with NTEP requirements, the NTEP parameter (P440) must be enabled in the Setup Mode. This will have the following effects on the standard indicator's operation:

- Pressing **[TARE]** with a gross weight of zero (0) or pressing **0 [TARE]** will not automatically switch to the net mode.

- Negative tare values are not accepted regardless of the selection for the "Negative Tare Enable" parameter (P162).

- Tare values are automatically rounded regardless of the selection for the "Tare Rounding Enable" parameter (P163).

- Received serial data will not be processed while in the Setup Mode until P440 is manually enabled.

- Accumulations using the **. [ENTER]** method can only be performed from the gross, net or quantity mode.

- Printing using the **[PRINT]** key is only possible from the gross, net or quantity mode.

- Weight values that exceed the minimum width specified at P240 will be transmitted as dashes "-------".

Legal-for-trade installations using accumulations require the "number of accumulations" parameter (9) to be accessible when not using a printer. When using a printer, this parameter must be printed on the receipt.

NTEP CUSTOM SETUP

The "Custom Setup" parameter, P60205 of the information parameters, displays a list of parameters, which, if configured improperly, could facilitate fraud in a legal-for-trade installation. A weights and measures inspector might check this parameter and inquire about the configuration of any parameters that appear in this list.

ACCESSING THE CUSTOM SETUP LIST

DO NOT ATTEMPT TO ACCESS THE CUSTOM SETUP LIST DURING CRITICAL WEIGHT PROCESSING! It is important to note that all functions of the operating mode will be suspended immediately upon accessing the information parameters. This includes suspension of weight conversions, deactivation of all setpoints and cancellation of custom transmits.

The "Custom Setup" list may be accessed from the Weigh Mode. An access code is not required to view this list.

To access the custom setup list:

1. From the Weigh Mode, key in **60205 [SELECT]**.

2. The Custom Setup list begins scrolling through each parameter to check. If there are no parameters to check, *Std. Setup* is displayed.

3. The Custom Setup list may be repeated by pressing **[ENTER]** at P60205.

4. Press **[ZERO]** to return to the Weigh Mode.

A setup parameter that appears in the "Custom Setup" does not imply that it is improperly configured. Consider the application and refer to the following descriptions to determine if the parameter is configured appropriately.

P205 – Receive Mode

If the receive mode is enabled for any of the four communication ports, any device connected to that port should not be used to transmit data to the M660 which could facilitate fraud.

P205 will appear in the "Custom Setup" list for each receive port enabled. For example, if the receive mode is enabled for all four ports, the list will display `P205`, `P205`, `P205`, and `P205`.

P240 – Minimum Transmit Width

A weight value that cannot be displayed due to the 6-digit limitation of the standard VF display may not be printed. To ensure this is not possible, P240 must be set to a width of not greater than 7 (6 digits and a decimal point). NTEP must also be enabled at P440. Any weight value that exceeds the minimum width specified will be printed as dashes "-------".

P440 – NTEP Enable

P440 appears in the "Custom Setup" list if disabled. Refer to *Enabling NTEP Operation* on page 46 for possible implications.

P9990 – Macro Instance Selection

P9990 appears in the "Custom Setup" list if at least one macro is configured. Macro operation should be checked to verify its conformance to all regulations.

ADDITIONAL CONFORMANCE CONSIDERATIONS

Several parameters must be considered on an individual basis as their configuration may vary with different applications. These parameters include, but are not limited to those listed in *Table 5*.

Table 5: Additional Conformance Parameters

| PARAMETER	DESCRIPTION	COMMENT
P110	Full Scale Capacity	Verify proper scale capacity.
P111	Division Size	Verify allowable scale divisions.
P112	Zero Track	Verify required selection.
P114	Motion	Verify required selection.
P118	Zero Range	Verify required selection.
P212	Print Stability	Verify required selection.
P126 → P130	Multi-Range	Verify proper configuration.
P151 → P154	Custom Units	Verify name and conversion factor.
P600 → P646	Rename Parameters	Verify acceptable names.

SEALING AND AUDIT TRAILS

Most legal-for-trade installations will require the indicator to be sealed. A sealed indicator cannot be accessed for setup or calibration changes without breaking a physical seal or incrementing an event counter, thus providing evidence that the unit has been tampered with. Each member of the 60 Series has two types of sealing provisions:

- Physical seal used in conjunction with an internal program jumper

- Three-event audit trail counter

Check with your local weights and measures authority to determine which method(s) are required.

PHYSICAL SEAL

The most common sealing method is a lead-wire seal. All standard units provide two tamper-proof screws used for sealing the rear panel to the front of the enclosure. A lead-wire seal can be applied by passing the lead-wire seal wire through a hole in these two screws, thus preventing the screws from being removed without breaking the seal. The 60 Series panel mount versions use a lead-wire seal and one screw. The Model 663 has a locking clasp on the front door to which the seal can be applied, or the scale can be sealed using the same method as that used with the panel mount versions.
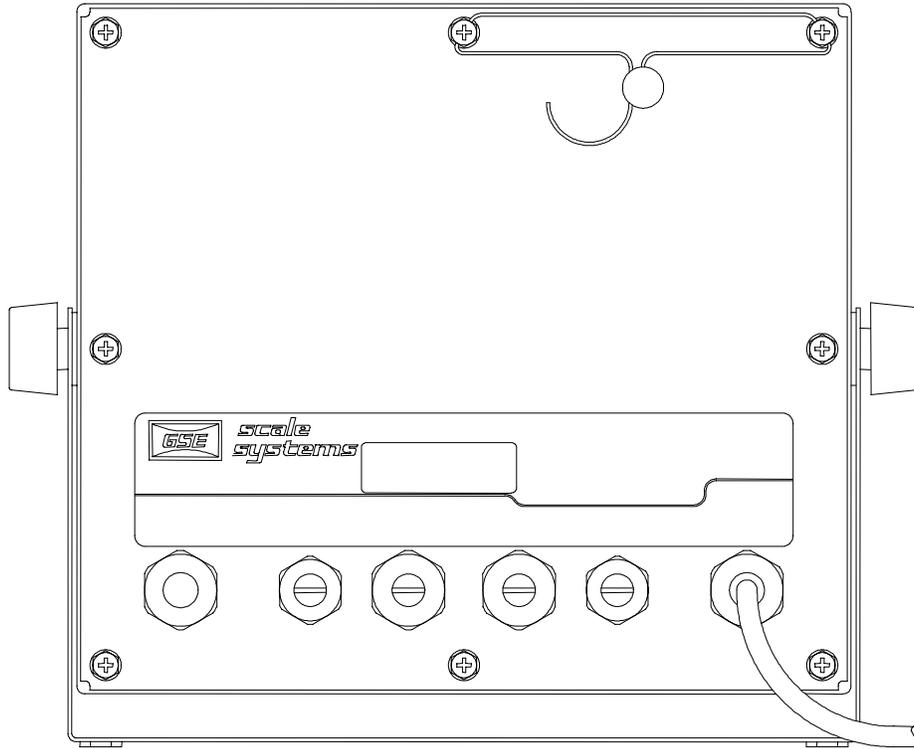
60 Series Standard Enclosure NTEP Seal
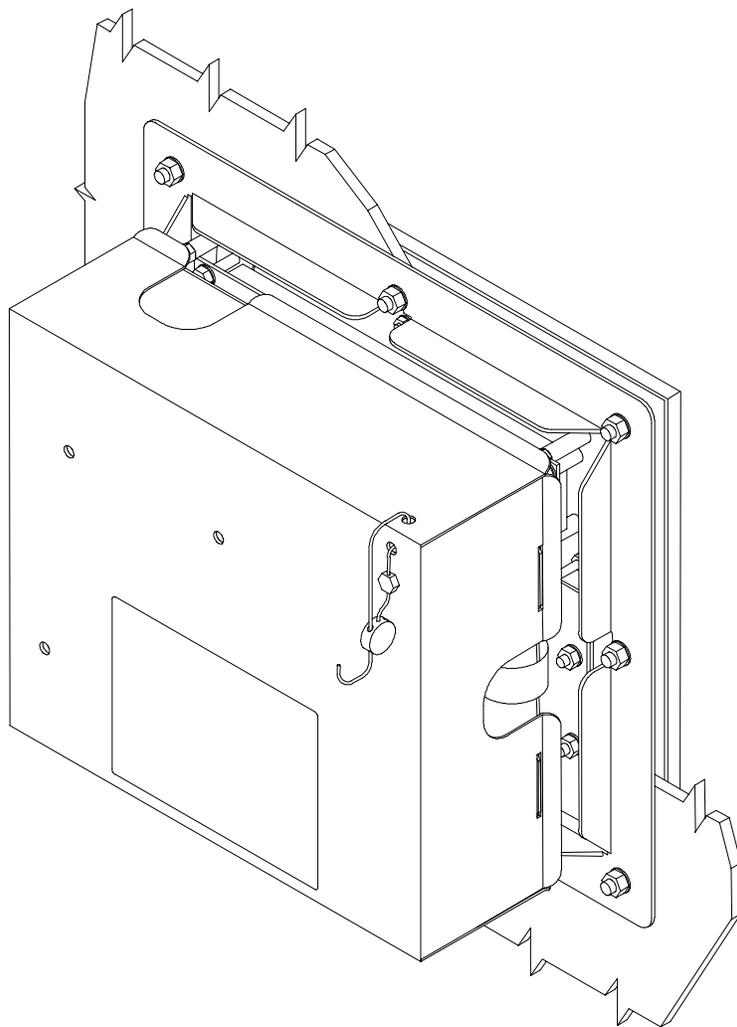
Panel Mount NTEP Seal
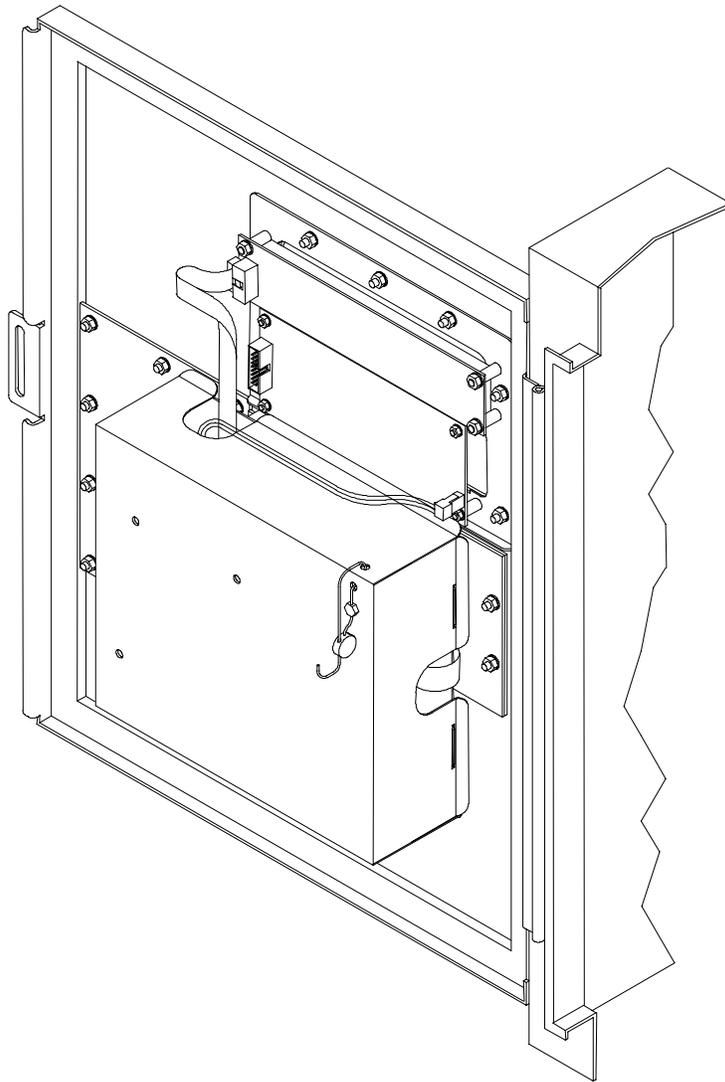
663 NTEP Seal

665 NTEP Seal

AUDIT TRAIL PARAMETERS

Three separate incrementing, non-resettable audit trail parameters are used by the M660 to indicate changes to various parameters:

- P60201 – OIML
- P60203 – Calibration
- P60204 – Setup

An audit trail counter will increment only once upon exiting the Setup Mode and saving changes regardless of how many settings were changed. Each audit trail counter will increment to 99999 before beginning again at 00001.
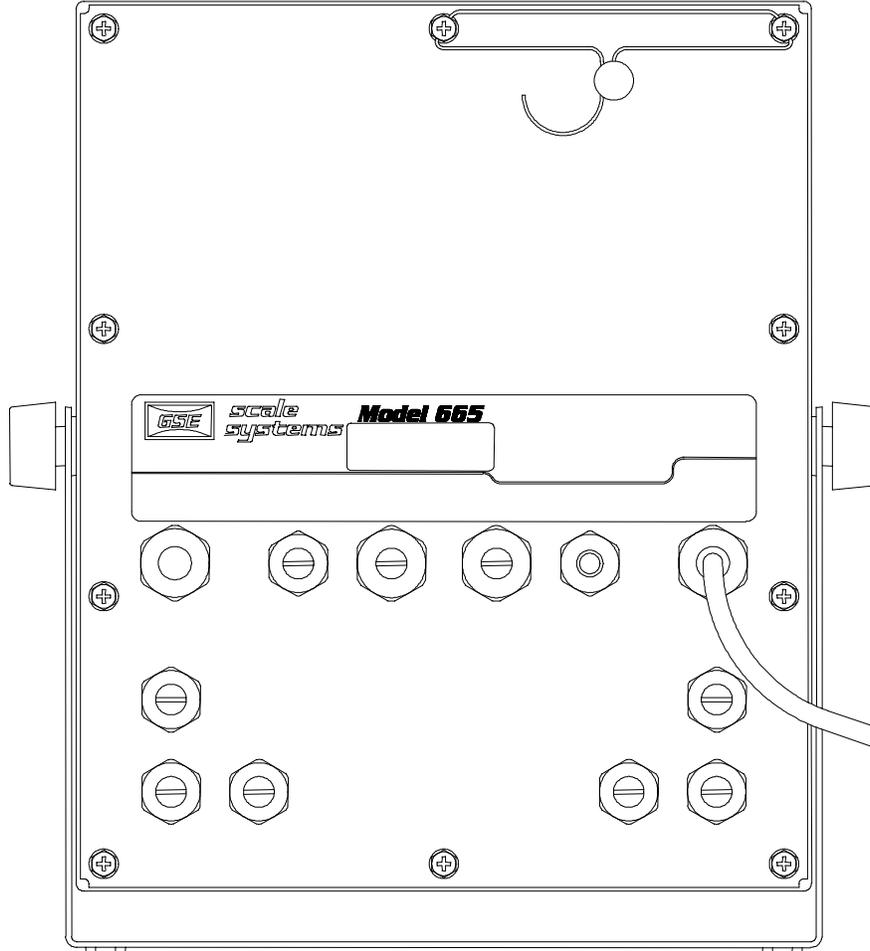
⚠ | DO NOT ATTEMPT TO ACCESS AUDIT TRAIL PARAMETERS DURING CRITICAL WEIGHT PROCESSING! Weight conversions and custom transmits will be suspended and all setpoints will be deactivated!

Accessing Audit Trails

The audit trails may be accessed from the Weigh Mode. An access code is not required to view audit trail parameters.

To access audit trails:

1. Key in **60201 [SELECT]** to access the OIML audit trail.

2. Key in **60203 [SELECT]** to view the Calibration audit trail.

3. Key in **60204 [SELECT]** to view the Setup audit trail.

4. Press **[ZERO]** to return to the Weigh Mode.

OIML Audit Trail

Changes to any of the following parameters will increment the OIML audit trail at P60201:

- P109 → P119   Scale Setup
- P122   Return to Zero
- P131 → P134   Units
- P150 → P154   Calibration & Custom Units
- P162, P163   Negative Tare Enable, Tare Rounding Enable
- P300 → P309   Selectable Modes

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- P410, P412   OIML Enable, Preset Enable
- P420   Standard VF Display Mode
- P600 → P646   Rename Parameters
- P800 → P820   Key Functions
- P989 → P4999   Custom Transmit
- P61101 → P61140   Calibration & Linearization
- P65001, P65002   Default All, Default –Cal

Calibration Audit Trail

Any changes to the existing calibration will increment the Calibration audit trail at P60203. This includes any changes to P60101 → P61140 of the information parameters.

Setup Audit Trail

Changes to any of the Setup Mode parameters will increment the Setup audit trail at P60204.

CHAPTER 9: TROUBLESHOOTING

This chapter of the User Guide provides information on error messages and trouble-shooting 60 Series controllers. Some information in this chapter refers to parameters that are not discussed in this guide. They are provided as a quick reference to problems and solutions. Please refer to the technical reference manual or consult your GSE distributor for additional information.

All 60 Series error messages are listed below in numerical order. The leading two digits will appear on the numerical portion of the display, and the message will appear on the two lines of dot matrix display. Following each message is a summation of possible causes and probable remedy.

OPERATIONAL MODE ERROR MESSAGES

02 UnderLoad!   Input signal less than negative full scale. Check the load cell connections. If a 4-wire load cell cable is being used, check that the sense jumpers are in place. Verify that the capacity selection P110 is correct. Use the information parameters, especially P61100 to check the setup and input signal.

03 Over-Load!   Input signal is greater than 104% of positive full scale. Use same check as for underload.

04 # > Dsply   Number to be displayed will not fit within 6 digits. This will not normally occur for the Gross, Net or Tare Weights but may result while displaying the accumulated totals if the amount exceeds 999,999. Clear the totals or settle for only being able to transmit the totals.

05 Zero> Max.!   An attempt was made to zero out more than allowed per P118 selection. Use the **[TARE]** key for subtracting off container weights or if large dead load is always to be present, apply this dead load during the *New Zero?* prompt during calibration to eliminate the offset.

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06 Tare>F.S.!   Tare entry was greater than full scale. Most likely the entered tare value was incorrect.

07 Tare < 0 !   Negative tare attempted, but not allowed per P162. For auto-tares, the GROSS Weight must be greater than zero unless P162 is changed to allow negative tares.

08 CheckConn.   Displayed if the signal into the A/D is +/- 2 times the Full Scale signal. This is effectively taken into consideration when the information sent to the microprocessor from the A/D is +/- twice the allowable F.S. reading. ie. P110 F.S. = 100. Error message will be displayed at +/- 208 taking into consideration the 4% overload.

SETUP MODE ERROR MESSAGES

10 Entry>Max!   An entry was made which had more characters than allowed.

11 WRONGCODE!   The incorrect access code was entered, thus preventing changes. In order to access the Setup Mode, either the proper code must be entered or **[ENTER]** must be pressed alone (to view selections without making changes).

12 No Mods!   The Setup Mode is being accessed, but changes are prevented.

13 OutOfRange   An entry made for a selection was beyond the range of valid choices.

14 Must Keyin   The choice for the current parameter must be keyed in.

15 Size>3999!   The size of a Custom Transmit setup has exceeded the limit.

16 CHECK JUMPR   A programming operation was attempted when the program jumper is installed. Installation of this jumper prohibits programming changes.

HARDWARE PROBLEM ERROR MESSAGES

17 A/D BAD!   The processor has detected a problem with the A/D chip. Contact your GSE distributor.

18 BufSzMax!   The accumulative total buffer size for both the TX and RX buffers of all four COMM ports is 4096 bytes. Displayed If entries to the "buffer size" parameters (P207-P208) exceed this total.

19 x06\x44\x61ta&Stop Certain combinations of protocol are not available. The protocol combination selections are in P201, P202 and P203. This error occurs if an illegal protocol combination is selected. Refer to the Communications chapter in the technical reference manual.

20 Deflt A/D   This message appears for 1 second. It will be displayed if the A/D calibration data gets corrupted. Contact your GSE distributor.

21 WriteNVErr   Error reading data from the EEPROM. Possible U16 and U17 problem.

22 ReadNVErr   Error writing data to the EEPROM. Possible U16 and U17 problem.

23 CheckNVPar   Supplementary error message for above errors.

24 NVParFull!   The setup being attempted requires more EEPROM than is currently installed.

25 DefltSetup   Upon power-up the indicator has not found the proper codes. Therefore all parameters have been reset to factory default values.

26 Bad Setup   The stored data has a checksum error. Check all parameters or re-load setup.

27 RE-BOOT!   The indicator cannot use the EEPROM for data storage, so it is attempting to power-up again to cure the problem.

28 NoRAMAVAIL   The current setup requires more RAM than is currently installed. Either contact your dealer or the manufacturer.

29 PIN error   This message will appear on power-up or setup if the E^2 is corrupted in the PIN section. Check E^2 for problems. The access code is defaulted to the manufacturer (GSE) access code. Also check Error 11.

CALIBRATION ERROR MESSAGES

30 F.S.>MAX!   The entered calibration weight, together with the currently applied signal, indicates that the full scale signal will be greater than the allowed maximum of the indicator. Verify that correct entries have been made for the capacity, P110, and for the calibration weight. If all appears correct, refer to the use of the information parameter P61100, and determine the output (in mv / volt) of the connected load cell.

31 F.S.<.1mVv   The entered calibration weight, together with the currently applied signal, indicates that the full scale signal will be less than the allowed minimum of the indicator. Verify the proper entries for the capacity, P110, and for the calibration weight. If all appears correct, refer to the use of the information parameter, P61100 and determine the output (in mv / volt) of the connected load cell.

32 ADD MORE!   The applied weight during calibration was less than 0.1% of capacity. More weight than this is required. Refer to P61100 if this is incorrect.

33 ReCALReq'd   The just completed calibration may not yield accurate results due to either the cal weight being less than 5% of capacity or this was the first calibration of this platform to this indicator and therefore the coarse gain was adjusted by the indicator.

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34 RES> 25K! The current combination of capacity P110 and increment P111 result in a resolution greater than 25,000 graduations. This is simply a warning in case this was not intended.

35 RES>100K! The current combination of capacity P110 and increment P111 result in a resolution greater than 100,000 graduations. This is not allowed and as soon as any key is pressed the instrument will jump back into the Setup Mode to parameter P110 to verify the settings.

36 RES< 100! The current combination of capacity P110 and increment P111 result in a resolution less than 100 graduations. This is simply a warning in case this was not intended.

37 RES< 1 !! The current combination of capacity P110 and increment P111 result in a resolution less than 1 graduation (i.e. the increment is greater than capacity). This is not allowed and as soon as any key is pressed the instrument will jump back into the Setup Mode to parameter P110 to verify the settings.

GENERAL ERROR MESSAGES

99 Can't Set! An attempt to enter a value for a parameter which is not field changeable, such as the serial numbers or the audit trail counter results in this message.

- - Cksumerror Upon each power-up, the indicator tests the integrity of its EPROM. If the result is not correct this message is displayed and the Indicator is not usable. Verify that the EPROM (U13) is installed properly (no bent pins).

MISCELLANEOUS MESSAGES

EntryError   This error message is the most commonly used. The primary causes are entering a value preceding a key (such as **[ZERO]**) which is not allowed, entering alpha data for a numeric selection, or entering a fractional value for an entry which only accepts whole numbers. Occurs in Setup Mode or an operational mode.

WhichTx#?   The instrument is setup with more than one custom transmit with parameter P991 set for *Prmpt* (Prompt) and the **[PRINT]** key is pressed. The *WhichTx#?* message is asking for a custom transmit number to be entered. Key in the custom transmit, then press **[ENTER]**. I.E. **[2] [ENTER]**, for custom transmit number 2.

COMMUNICATIONS ERROR MESSAGES

prtyXerror   This indicates that the parity of a received character did not match the parity specified in the Setup Mode, parameter P202. This could also result if the baud rate (P200) or the number of data bits (P201) is incorrect.

ovrnXerror   This indicates an over-run error where an additional character was received while the receive buffer of the 660 was full, and thus the extra received character will be lost.

frmgXerror   This indicates that the stop bit of a received character did not occur when it was expected. This could be the result of an incorrect baud rate (P200), incorrect number of data bits (P201), or incorrect parity setting (P202).

portX error   The 660 did not check its receive data register in time, thus missing a character. If this error should occur, please notify your GSE distributor

	or the factory. To prevent the problem, try reducing the baud rate (P200).
tx on hold	This will occur if a data transmission is held up for two seconds of more due to a de-asserted handshake. Refer to the description of parameter P206 in the technical reference manual for more information.
tx abort	This occurs if the **[CLR]** key is pressed when the tx on hold error message is shown or if P206 is set for abort and the transmit buffer becomes full.
tx con'd	This will appear briefly when the handshake is re-asserted after the tx on hold message occurs.

TROUBLE-SHOOTING

DATA TRANSMISSION: If a data transmission of any weight-related numeric data such as Gross, Net or Tare is sent as dashes, an overload or underload (negative overload) condition was in effect. Remove the cause of the overload (or underload) and repeat the transmission. Also check the setup of parameters P204 and P206.

DISPLAYED WEIGHT: If an overload or underload occurs due to an electrical overstress (EOS) normally due to lightning or ESD discharge, then press the **[CLR]** key. The message *wait 1* will appear for about 1 second. The A/D converter will then be reset and the system should again be functional. If not, power down for a few seconds. If the indicator still does not work properly after power-up, check the load cell or platform wiring. If okay, permanent damage may have occurred, most likely to the instrument amplifier.

SERVICE

There are no user-serviceable items in the GSE 60 Series. Service must be performed by qualified service technicians only. Attempts to service this instrument by unqualified personnel may void the warranty.

Your GSE Distributor is:

PART NUMBER: 39-10-37149