



777 and 777S
Programmable
Weight Indicating Instrument
Operation Manual

TABLE OF CONTENTS

INTRODUCTION	2
SPECIFICATIONS	3
Standard Features	3
PRECAUTIONS	4
Static Electricity	4
Environmental	4
SITE PREPARATION REQUIREMENTS	5
INSTALLATION	5
Unpacking	5
Placement	5
Wall Mounting	6
Load Cell Connection	8
Load Cell Connection with Over 30 Feet of Cable	8
Load Cell Wiring Diagram	8
Serial I/O Connections	9
SERIAL DATA FORMAT	9
KEYPAD FUNCTIONS	10
Standard Keys	10
Alphanumeric Keys	12
Soft Keys	12
SETUP and CALIBRATION	15
LOADING and SENDING PROGRAMS	18
Load a Program.	19
Send a Program.	20
CARE and CLEANING	21
ERROR and STATUS MESSAGES.	21
BEFORE YOU CALL SERVICE.	22
CALIBRATION SEAL INSTALLATION.	22
777S (NEMA 4X ENCLOSURE)	23
Installation Instructions	23
Load Cell Connection	24
RS-232 Serial Cable Installation	25
RS-485 Ser ial Cable Installation.	25
KB-101 Keyboard Cable Installation	26
AC Power Connection	26
I/O (Input/Output) Cable Installation	27
777 PART IDENTIFICATION	23
777S PART IDENTIFICATION	31
APPENDIX A – SCALE TOTALIZER	37

INTRODUCTION

Thank you for purchasing the Cardinal 777 Programmable Weight Indicating Instrument. This instrument was built with quality and reliability at our factory in Webb City, Missouri.

The 777 incorporates the latest in digital technology and innovative features for the weighing industry. With programmable software, a user friendly program language and modular hardware design, the 777 has the versatility and high performance to be used in any type of standard or custom application. Configuration and upgrades to the application can easily be performed in the field, while still maintaining the rigid control the most demanding installations require. This flexibility insures the 777 will be able to meet your weight indicating needs for years to come.

The purpose of this manual is to provide you with a guide through installation, calibration, and operation of your new weight indicating instrument. Please read it thoroughly before attempting to install or operate your 777 Indicator and keep it handy for future reference.

FCC COMPLIANCE STATEMENT

WARNING! This equipment generates, uses and can radiate radio frequency and if not installed and used in accordance with the instruction 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 may cause interference in which case the user will be responsible to take whatever measures necessary to correct the interference.

You may find the booklet "How to Identify and Resolve Radio TV Interference Problems" prepared by the Federal Communications Commission helpful. It is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 001-000-00315-4.

All rights reserved. Reproduction or use, without expressed written permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has been taken in the preparation of this manual, the Seller assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from use of the information contained herein. All instructions and diagrams have been checked for accuracy and ease of application; however, success and safety in working with tools depend to a great extent upon the individual accuracy, skill and caution. For this reason the Seller is not able to guarantee the result of any procedure contained herein. Nor can they assume responsibility for any damage to property or injury to persons occasioned from the procedures. Persons engaging the procedures do so entirely at their own risk.

SERIAL NUMBER _____

DATE OF PURCHASE _____

PURCHASED FROM _____

RETAIN THIS INFORMATION FOR FUTURE USE

PRECAUTIONS

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



IMPORTANT



**ELECTRICAL
WARNING**



**STATIC
SENSITIVE**

SPECIFICATIONS

Displayed Resolution	10,000 divisions (commercial) 100,000 divisions (maximum) (non - commercial)
Internal Resolution	400,000 divisions
Division Value	1 to 9 X 10, 1, 0.1, 0.01, 0.001 and 0.0001
Sample Rate	selectable 1 to 60 samples per second
Auto Zero Range	0, 0.5 divisions or 1 through 9 divisions
Load-cells	Up to twelve (12) 350 Ω load cells (with sense)
Excitation Voltage	10.75 VDC
Sensitivity Range	30 nV/V/ division maximum
Calibration	Digital
Dimensions	280mm W X 245mm H X 220mm D
Weight	10.5 lb (desktop version)
Construction	All steel housing, NEMA 12
Power Requirements	90 to 260 VAC 50/60HZ
Temperature Range	14 to 104 °F (-10 to +40 °C)
Printer Output	RS232 serial
Protocol	9600 BAUD, 8 Data, No Parity, 1 Start, 1 Stop

STANDARD FEATURES

- 4 "Soft" Keys placed below the display that can be user defined for each application.
- Full QWERTY Alphanumeric keys.
- Large, back-lit LCD display with light sensor
- Time & Date with battery backup.
- Ten (10) digits of numeric identification.
- Keypad tare.
- Gross, tare, net conversion.
- One (1) Bi-directional RS232 port (for printers).
- One (1) Bi-directional combination RS-232 and RS-485 port.
- Selectable and custom filtering.
- Integral diagnostics.
- 101 key PC keyboard interface.
- One (1) scale input card.

PRECAUTIONS

Static Electricity



CAUTION! This device contains static sensitive circuit cards and components. Improper handling of these devices or printed circuit cards can result in damage to or destruction of the component or card. Such actual and/or consequential damage IS NOT covered under warranty and is the responsibility of the device owner. Electronic components must be handled only by qualified electronic technicians who follow the guidelines listed below:



ATTENTION! ALWAYS use a properly grounded wrist strap when handling, removing or installing electronic circuit cards or components. Make certain that the wrist strap ground lead is securely attached to an adequate ground. If you are uncertain of the quality of the ground, you should consult a licensed electrician.

ALWAYS handle printed circuit card assemblies by the outermost edges. NEVER touch the components, component leads or connectors.



ALWAYS observe warning labels on static protective bags and packaging and NEVER remove the card or component from the packaging until ready for use.

ALWAYS store and transport electronic printed circuit cards and components in anti-static protective bags or packaging.

Environmental

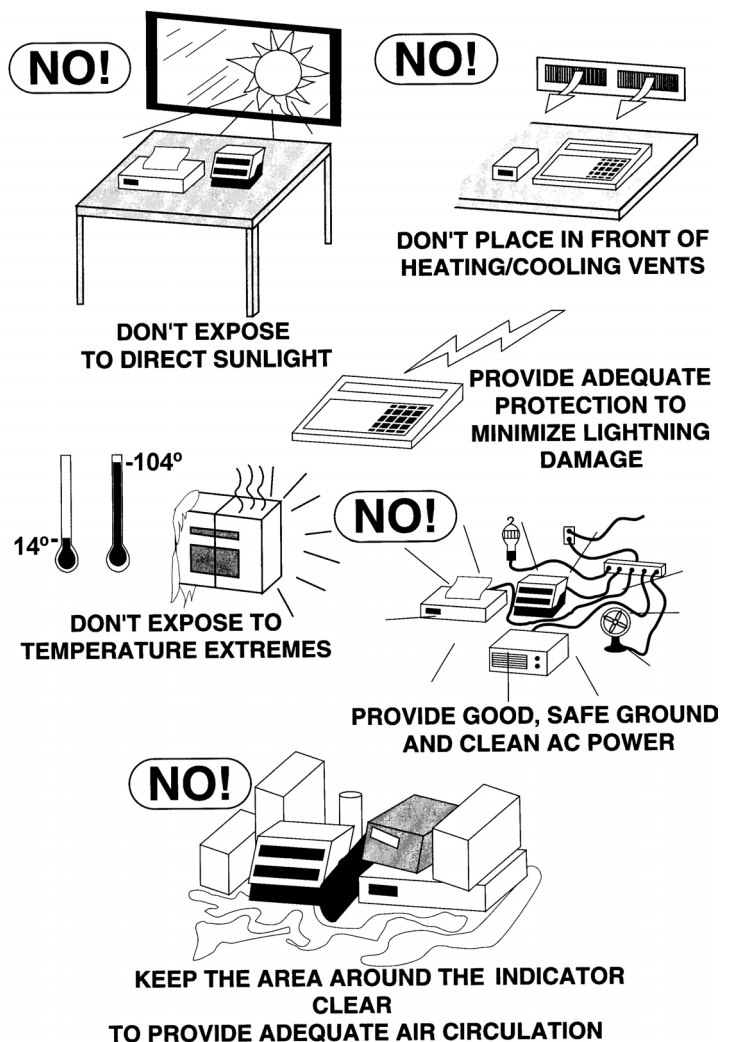
In general, the 777 Indicator will perform well within a temperature range of 14 to 104 °F (-10 to +40 °C).

In order to keep cooling requirements to a minimum, the indicator should be placed out of direct sunlight and to provide adequate air circulation, keep the area around the indicator clear.

Make certain the instrument is not directly in front of a heating or cooling vent. Such a location will subject the indicator to sudden temperature changes which may result in unstable weight readings.

Insure that the indicator has good, clean AC power and is properly grounded.

In areas subject to lightning strikes, additional protection to minimize lightning damage, such as surge suppressors, should be installed.



SITE PREPARATION REQUIREMENTS

The 777 Programmable Weight Indicator is a precision measuring instrument. As with any precision instrument, it requires an acceptable environment to operate at its peak performance and reliability. This section is provided to assist you in obtaining such an environment.

Electrical Power

The 777 is designed to operate from 90 to 260 VAC at 50/60 Hz. No special order is required for operation at 230 VAC.



Caution!!! - To avoid electrical hazard and possible damage to the indicator, DO NOT, under any circumstance, cut, remove, alter, or in any way bypass the power cord grounding prong.

On models requiring 230 VAC power, **it is the responsibility of the customer** to have a qualified electrician install the proper power cord plug which conforms to national electrical codes and local codes and ordinances.

The power outlet for the 777 should be on a separate circuit from the distribution panel. This circuit should be dedicated to the exclusive use of the indicator. The wiring should conform to national and local electrical codes and ordinances and should be approved by the local inspector to assure compliance.

To prevent electrical noise interference, make certain all other wall outlets for use with air conditioning and heating equipment, lighting or other equipment with heavily inductive loads, such as welders, motors and solenoids are on circuits separate from the 777. Many of these disturbances originate within the building itself and can seriously affect the operation of the instrument. These sources of disturbances must be identified and steps must be taken to prevent possible adverse effects on the instrument. Examples of available alternatives include isolation transformers, power regulators, uninterruptible power supplies, or simple line filters.



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

INSTALLATION

Unpacking

Carefully unpack and remove the indicator from the packing box. Inspect the unit for any signs of damage due to shipping, such as exterior dents and scratches. Retain the packing and shipping carton for return of instrument if necessary. It is the responsibility of the Purchaser to file all claims for any damages or loss in transit incurred, unless the responsibility has been accepted by the Seller in its proposal.

Placement

Place the indicator on a stable, vibration-free location, either a desk or solid table or wall mounted. Be certain all cords and cables are out of normal traffic. If wall mounted, make certain that the structure and mounting bolts are of sufficient strength to support the 777.



It is the responsibility of the customer to provide adequate mounting hardware appropriate to wall mounting conditions assuring safety to both the operator and the instrument.

INSTALLATION, Cont.

Wall Mounting

The 777 can be mounted on the wall using two (2) #10 x 1 1/2" screws placed 5 1/2" apart. To prepare the 777 for wall mounting, perform the following procedure:

1. With the power cord unplugged, remove the four (4) screws securing the front cover assembly to the main housing. See Figure No. 1.
2. Lift front cover assembly from the main housing, taking care not to stretch the cable and wires between the front cover and main housing excessively.
3. Locate the flat ribbon Parallel Internal Bus (PIB) cable. *One end of the PIB cable is plugged into the display board and the other end is loose in the main housing.* Unplug the end of the PIB cable connected to the display board.

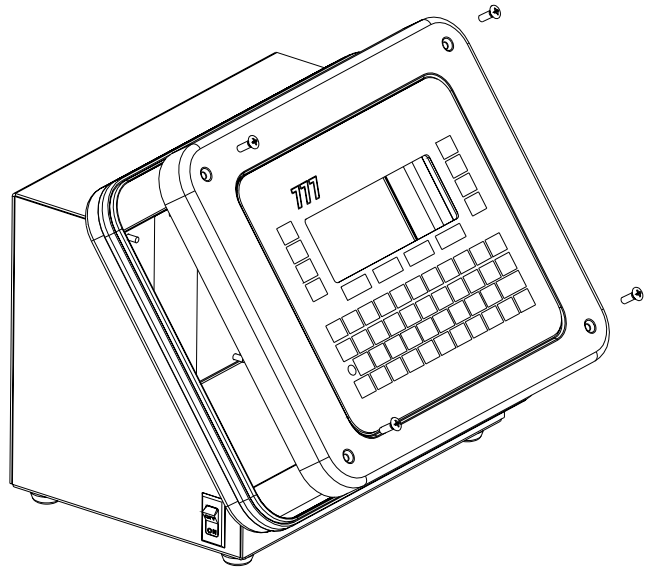


Figure No. 1

4. Rotate the front cover assembly 180 degrees. See Figure No. 2.
5. Plug the end of the PIB cable that was loose in the main housing into the display board. Insure that no cables or wires are exposed between the main housing and front cover assembly and place the front cover onto the main housing.

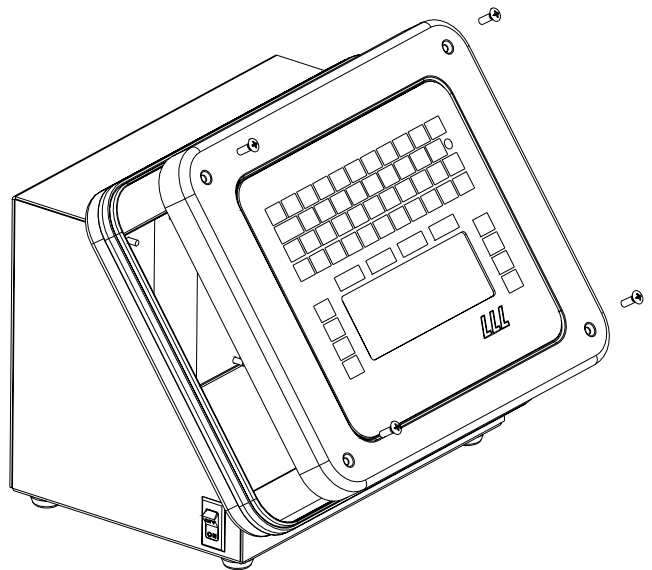


Figure No. 2

6. Secure the front cover to the main housing with the four (4) screws removed in step 1. See Figure No. 3.

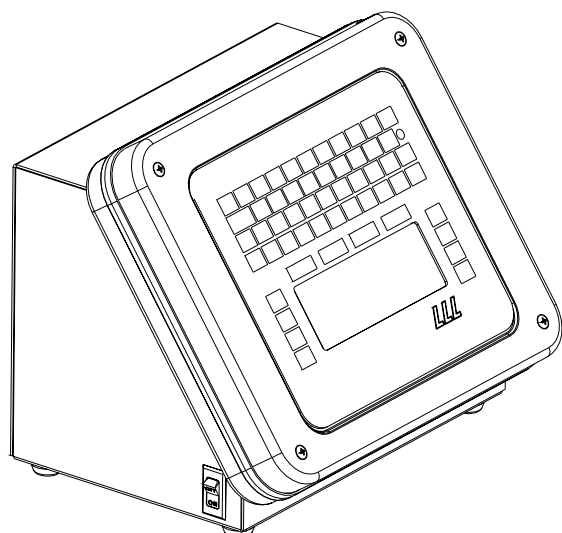


Figure No. 3

INSTALLATION, Cont.

7. Turn the indicator on its side and remove the rubber footpads from the bottom of the main housing. See Figure No. 4.
8. With the front cover assembly rotated and the footpads removed, what was the bottom of the indicator is now the back of the indicator. See Figure No. 5.
9. With the cable connections down (towards the floor), place the large end of the slotted hole in the back of the indicator over the screw heads and gently pull down to secure the indicator. See Figures No. 6 and 7.

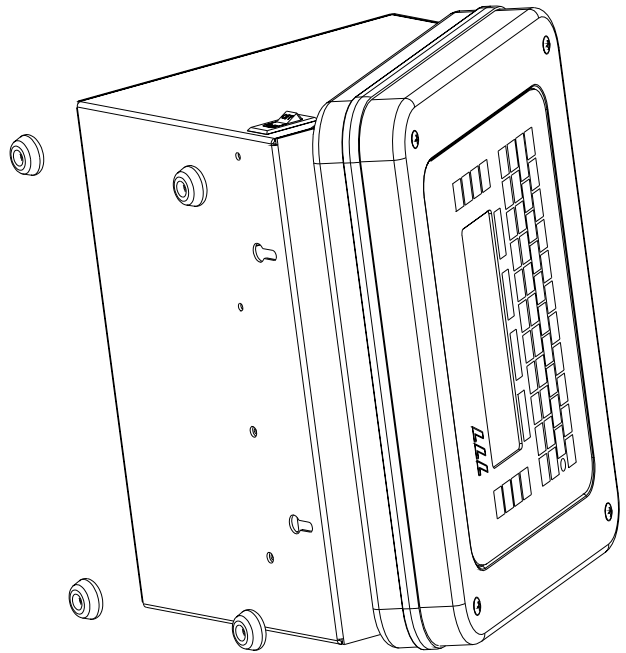


Figure No. 4

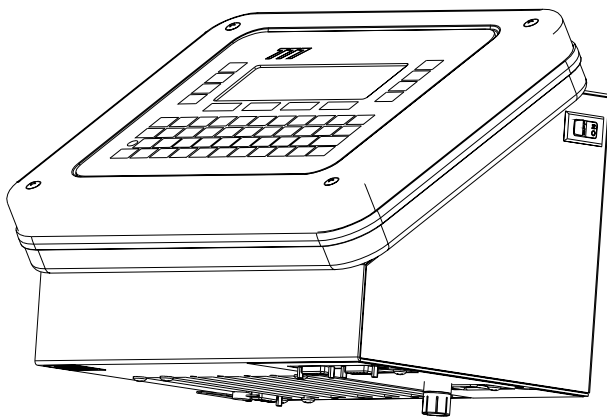


Figure No. 5

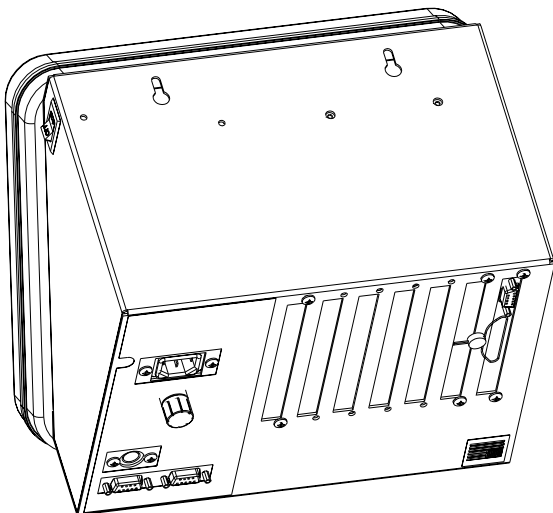


Figure No. 6

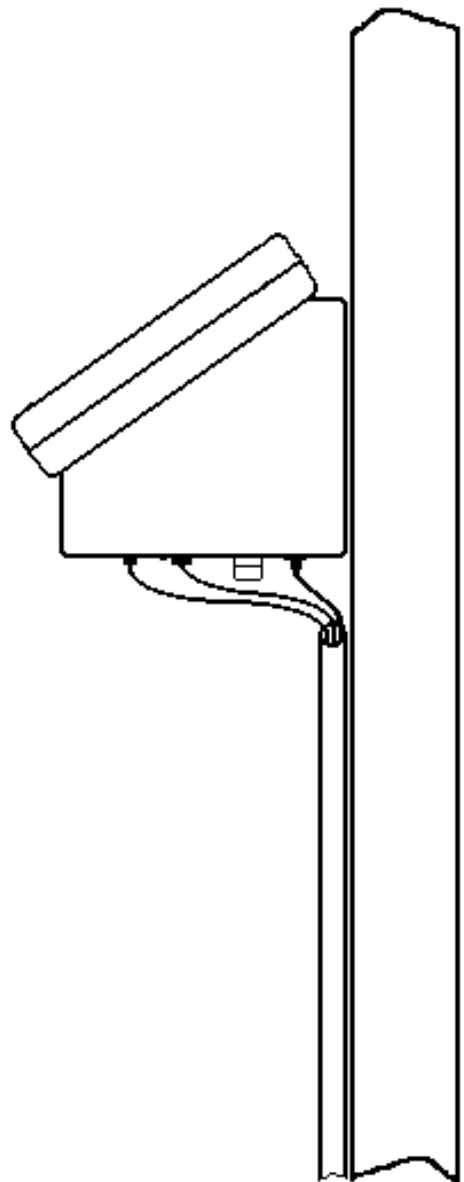


Figure No. 7

INSTALLATION, Cont.

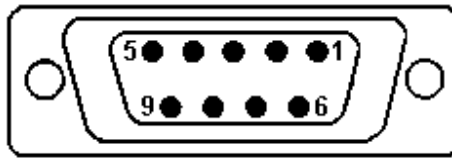
Load Cell Connection

The load cell is connected to the 777 scale input board via a DE-9P connector. Figure No. 8 shows the pin identification for the connector. Make certain the pins are correctly identified before soldering a wire to them. Make certain that the connector retaining screws are used to hold the load cell cable connector securely to the scale input board. **NOTE:** The 777 is shipped with the sense jumpers J5 and J6 (located on the Scale Input Board) removed for use with load cell installations that use sense leads (as in motor truck scales). If you don't use sense leads in your load cell installation, insure jumpers J5 and J6 are connected or placed on both pins to connect the sense leads to the excitation.

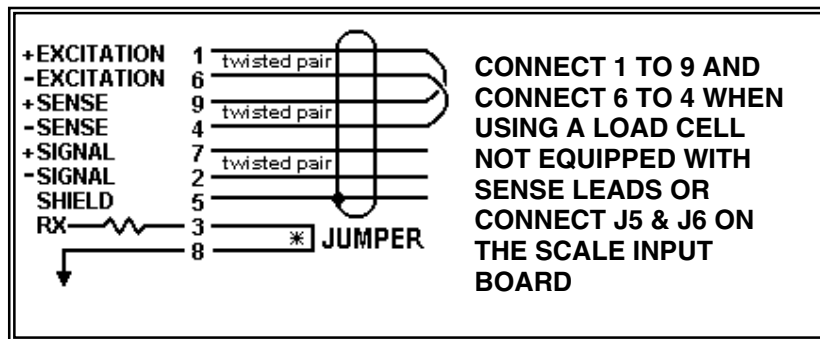
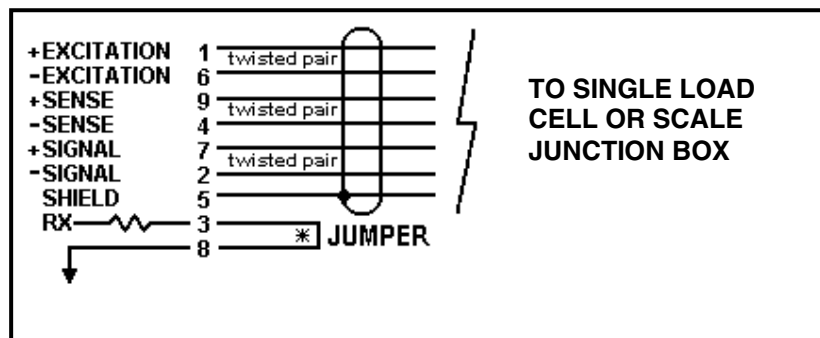
Load Cell Connection With Over 30 Feet Of Cable

For installations with over 30 feet of cable between the indicator and the load cells, sense wires should be used. The sense wires must be connected between the +SENSE, -SENSE terminals on the indicator and the +EXCITATION, -EXCITATION wires of the load cells or the +SENSE, -SENSE terminals of the load cell trim board or the section seal trim board. For the indicator to use the sense wires, the SENSE jumpers J5 and J6 must be open on the Scale Input Board.

Load Cell Connection Wiring Diagram



PIN LOCATION AS VIEWED FROM CABLE ATTACHMENT SIDE



MATING CONNECTOR:

PART NO.
6610-2379
6610-1131

VENDOR PART NO.
DE-9P CONNECTOR
DE-24657 SHELL

Figure No. 8

INSTALLATION, Cont.

Serial I/O Connections

The 777 comes standard with 2 bi-directional serial ports that can be used for I/O. Located on the rear panel of the indicator, COM1 is a RS-232 only port and COM2 is a RS-232/RS-485 port. Both COM1 and COM2 may be used with RS-232 serial devices (printer, computer, etc.), up to 25 feet away. When used as a RS-485 port, COM2 may be used with serial devices up to 1000 feet away. Refer to Figure No. 9 and the table below to identify the pins used.



NOTE: When using the STD (EPROM) program, the serial device must be connected to the Com1 (RS-232 only) port. The data will be transmitted on demand when the **PRINT** key is pressed. The data format is fixed at 9600, 8,N,1 (9600 baud, 8 data bits, No parity and 1 stop bit).

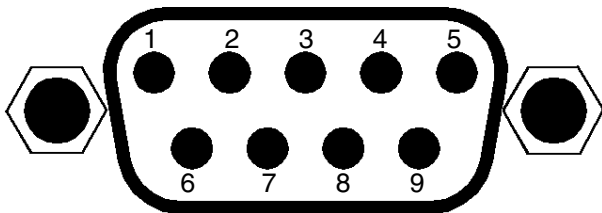


Figure No. 9

(PIN LOCATION OF COM1 AND COM2 AS VIEWED FROM THE CABLE ATTACHMENT SIDE)

COM 1 (RS-232 only)		COM 2 (RS-232 and RS-485)	
PIN NO.	FUNCTION	PIN NO.	FUNCTION
1	NO CONNECTION	1	NO CONNECTION
2	DATA INPUT (RXD)	2	DATA INPUT (RXD)
3	DATA OUTPUT (TXD)	3	DATA OUTPUT (TXD)
4	DTR (+9 VOLTS OUTPUT)	4	RS-485 (-) TRANSMIT
5	SIGNAL GROUND (GND)	5	SIGNAL GROUND (GND)
6	NO CONNECTION	6	RS-485 (-) RECEIVE
7	INTERNALLY CONNECTED TO 8	7	RS-485 (+) TRANSMIT
8	INTERNALLY CONNECTED TO 7	8	RS-485 (+) RECEIVE
9	+ 5 VDC @ 200mA max (OUTPUT)	9	+ 5 VDC @ 200mA max (OUTPUT)

SERIAL DATA FORMAT

With the STD (EPROM BASED) program loaded and running, pressing the **PRINT** key will send data to a serial device connected to COM1. The data sent will be in one of two formats depending on the operating mode of the 777. In Gross weight mode, the data sent will include the Time, Date and the Gross Weight only. If the 777 is in Net weight mode, the Time, Date, Gross, Tare and Net weights will be sent to the serial device. The data formats are as follows:

Gross Weight Mode

HH:MM^MM/DD/YYYY^CRLF
 XXXXXXXX^G^kgCRLF

Net Weight Mode

HH:MM^MM/DD/YYYY^CRLF
 XXXXXXXX^G^lbCRLF
 XXXXXXXX^T^lbCRLF
 XXXXXXXX^N^lbCRLF

where:

- HH:MM = Hours (two (2) digits), colon (:), Minutes (two (2) digits)
- MM/DD/YYYY = Month (two (2) digits), Day (two (2) digits), Year (four (4) digits),
- XXXXXXXX = Seven (7) numeric digits of weight, with decimal point if required and leading zeros suppressed.
- ^ = Space (hex 20)
- G = ASCII letter "G" for gross weight
- T = ASCII letter "T" for tare weight
- N = ASCII letter "N" for net weight
- kg = ASCII letters "k" and "g" to identify the weighing unit as kilograms
- lb = ASCII letters "l" and "b" to identify the weighing unit as pounds
- CRLF = Carriage Return and LineFeed commands.

KEYPAD FUNCTIONS

The 777 indicator has 8 standard function keys, a full “QWERTY” alphanumeric keypad and 4 soft (programmable) keys. The keypad is used to enter commands and data into the instrument. Refer to Figure No. 10 or the actual instrument while reading this section.



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

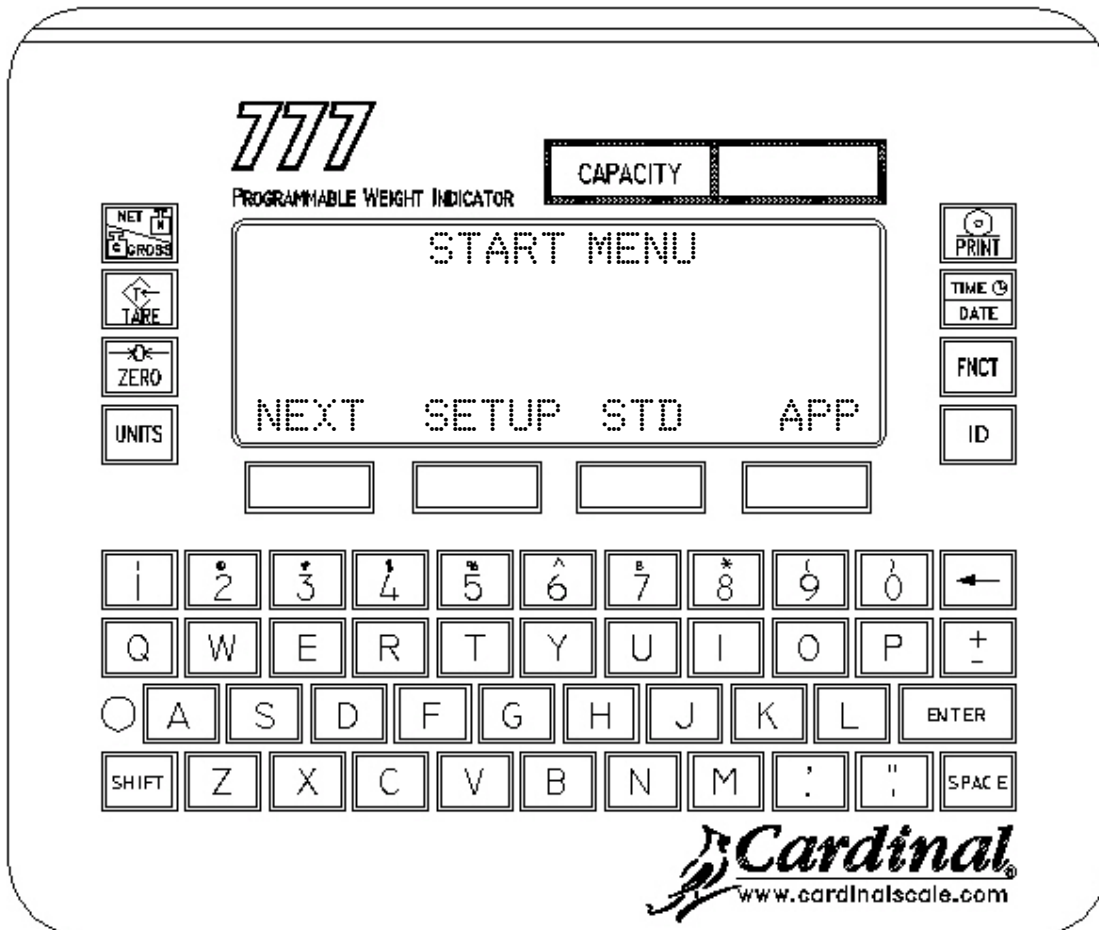


Figure No. 10

STANDARD KEYS

This section describes the standard keys along with its function as programmed by the 777 EPROM program (as it comes from the factory). **NOTE:** The application program can change the function of the standard keys.

NET/GROSS KEY

This key is used to switch the display between Gross Weight mode and Net Weight mode. In the Gross Weight mode, the total of all weight placed on the scale since the the display was zeroed is displayed. In the Net Weight mode, the gross, tare and net weight is displayed. **NOTE:** If a valid tare weight has not been entered, the 777 will ignore this key.

TARE KEY

This key is used to enter a tare weight of up to the capacity of the scale. Press the **TARE** key, then using the keypad, input the tare weight and press the **ENTER** key. The Weight Screen will return displaying the gross, tare and net weights.

NOTE: The tare weight will remain until another tare weight is entered or it is cleared. Clearing the tare weight can be performed in one of two methods. The first method is to press the **TARE** key, then with the TARE prompt displayed, press the **FNCT** key. The second method is to press the **TARE** key and enter zero (0) for the tare weight. In either case, the 777 will return to the Weight Screen, displaying gross weight only.

KEYPAD FUNCTIONS, Cont.

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. The limit is set during setup and calibration of the scale (see Setup and Calibration, Z LIMIT).

UNITS

Pressing this key will change the weighing units to the alternate units if selected during the setup and calibration of the instrument. For example; with pounds (lb) showing, pressing this key will change the weight units to kilograms (kg). **NOTE:** This feature must be enabled during setup and calibration of the 777 (see Setup and Calibration, UNITS).

PRINT KEY

Pressing this key will initiate the transmission of weight data via the COM 1 serial port. If displaying gross weight, the time, date and gross weight are printed. If displaying net weight, the time, date, gross, tare and net weights are printed. **NOTE:** This key will be ignored if the weight is unstable, or the weight is less than zero.

TIME/DATE KEY

Pressing this key will change the display to the TIME prompt and display the current time. If the time displayed is correct, press the **ENTER** key. If the time displayed is incorrect, use the alpha-numeric keypad to input the correct time, then press the **ENTER** key to reset the time. In either case, after the **ENTER** key has been pressed, the instrument will proceed to the DATE prompt and display the current date.

NOTE: The time is displayed and entered in a 24 hour format with 12 added to all times after noon, i.e. 3 PM would be 1500.

If the date displayed is correct press the **ENTER** key. If the date displayed is incorrect, use the alpha-numeric keypad to input the correct date, then press the **ENTER** key to reset the date. In either case, after the **ENTER** key has been pressed, the instrument will proceed to the Weight Screen.

NOTE: The date is displayed and entered in a MMDDYYYY, two (2) digit month, two (2) digit day, and four (4) digit year format, i.e. July 5, 2001 would be 07052001.

FNCT

This key is used to return to the previous screen prompt. Pressing the **FNCT** key at any Setup and Calibration prompt (except INTERVAL) will cause the 777 to return to the previous step. At the INTERVAL prompt, pressing the **FNCT** key will return the instrument to the Start Menu. In normal operation, this key is used to display the **MENU** key, which when pressed allows the operator to return to the Start Menu.

NOTE: With multiple analog cards installed in the 777, the **FNCT** key is used to display the scale select menu. Pressing the **FNCT** key will show the **SCL** and **MENU** keys. Press the **SCL** key to switch to the other scale. With more than 2 analog cards installed, continued pressing of the **SCL** key will toggle between the additional scales. Pressing the **MENU** key will return the 777 display to the Start Menu.

KEYPAD FUNCTIONS, CONT.

ID

This key is used to display and enter identification numbers for use in printing. Pressing this key will display the current setting of the identification number. If the displayed number is correct, press the **ENTER** key to retain it. If you choose to change the ID number, use the alpha-numeric keys to enter up to a ten (10) digit identification number, then press the **ENTER** to save it.

NOTE: Once an ID number has been entered, it will remain until another number is entered or it is cleared. To clear an ID number, first press the **ID** key, then with the **ID** prompt displayed, press the **FNCT** key.

ALPHANUMERIC KEYS

This section describes the alphanumeric keys along with any special functions. The alphanumeric keys are used to enter commands and data into the instrument.

ENTER

This key serves two (2) purposes. First, when reviewing setup parameters, pressing the **ENTER** key will cause the current setting to be retained and the screen prompt advanced to the next step. Second, the **ENTER** key is used to signal the completion of the entry of data and causes the 777 to process the data entered.

← (BKSPC)

This key is used during numeric data input to delete a number entered. If the last number entered is incorrect, press the **BKSPC** key once to delete the number. If more than the last number is incorrect, press the **BKSPC** key for each number to be deleted. **NOTE:** If a number has not been entered, the 777 will ignore this key.

SHIFT

Pressing this key before pressing an alphanumeric key will toggle the key to output its alternate meaning. For example, when combined with alphabetic keys, the **SHIFT** key causes a lower case (not a capital letter) to be output. Note, that pressing and holding the **SHIFT** key will cause all keys pressed afterward to output their alternate meaning.

NUMERIC (0 to 9)

These keys are used to enter numeric data during setup and calibration as well as during normal operations. When combined with the **SHIFT** key, their alternate meaning is output. For example, pressing the **SHIFT** key then the **4** key will output the \$ dollar sign.

ALPHA KEYS

These keys are used to enter alpha data during setup and calibration as well as during normal operations. Pressing the **SHIFT** before pressing an alpha key will toggle the key to output its alternate meaning. For example, pressing the **SHIFT** key then the **A** key causes a lower case "a" (not a capital letter) to be output.

SOFT KEYS

This section describes each soft key along with its function as programmed by the 777 EPROM program (as it comes from the factory). **NOTE:** The application program can change the function of the soft keys.

NEXT

Pressing this key will advance to the next menu screen.

KEYPAD FUNCTIONS, CONT.

SETUP

Pressing this key with the calibration sealing screw removed, will change the screen to the Setup or Adjust Menu (see Figure No 11). Pressing this key without the calibration sealing screw removed, will display an error message, CAL SEAL PRESS ENTER. The Setup or Adjust Menu contains the following selections:

SETUP

Press this key to start the Setup and Calibration procedure.

ADJ

Press this key to perform the Fine Span Adjustment (refer to step 13, Setup and Calibration section).

EXIT

Press this key to start the Start Menu.

STD

Pressing this key will load and run the 777 standard weight indicating program. This program is EPROM based, can not be changed and is always in the indicator. The EPROM program allows the 777 (as it comes from the factory) to be used as a complete indicator. **NOTE:** The STANDARD.BAS program included with the SmartWeigh software development package is equivalent to the standard EPROM program.

APP

The application program is automatically loaded after approximately a five (5) second delay when turning on the indicator or changing from setup, receive, etc. modes. Pressing this key will bypass the delay and load and run your application program quicker.

LOAD

Pressing this key will start the procedure to load an application program into the 777 from a computer or another 777. See the LOADING and SENDING PROGRAMS section of this manual for more information.

ESC

Press this key to abort the load procedure and return to the LOAD / SEND / DSPLY Menu.

SEND

Pressing this key will start the procedure to send the currently loaded application program from the 777 to a computer or another 777. See the LOADING and SENDING PROGRAMS section of this manual for more information.

ESC

Press this key to abort the load procedure and return to the LOAD / SEND / DSPLY Menu.

DSPLY

This key is used to adjust the contrast of the LCD display. Pressing this key will change to the contrast adjust screen. This screen will show a test pattern and a row of keys at the bottom labeled, **UP**, **PREV**, **NEXT** and **DOWN**.

Press the **UP** key to increase the screen contrast.

Press the **DOWN** key to decrease the screen contrast.

Press the **PREV** or **NEXT** keys to return to the previous menu screen.

KEYPAD FUNCTIONS, CONT.

REVV

Pressing this key displays information on the 777 hardware and allows the Setup and Calibration parameters to be viewed without breaking the calibration seal. The hardware information displayed includes the version number of the 777 EPROM program, the version number of the display EPROM program, which function cards are installed, and how many of each card are installed in the instrument. The setup parameters displayed include the SIB (scale input board) address, the scale number, the version of the SIB EPROM program and the Setup and Calibration settings.

Press the **MORE** key to display additional information on other option cards and/or additional setup parameters. Press the **PREV** or **NEXT** keys to return to the previous menu screen.

Press the **PRINT** key (right of the display) to print the review information. If the 777 has the 777B Dual Parallel Printer Card installed, when the **PRINT** key is pressed the screen will display the prompt, `SELECT COM OR LPT`. The operator presses the **COM** key to print using one of the serial ports or the **LPT** key to print using one of the parallel ports.

If the **LPT** key is pressed, the screen will prompt for the number of the LPT port to use. Input the port number and press the **ENTER** key or press the **ENTER** key alone to use the current selection. The review data will then be printed.

If the **COM** key is pressed, the screen will prompt for the number of the COM port to use. Input the port number and press the **ENTER** key or press the **ENTER** key alone to use the current selection. The screen will prompt for the baud rate to use. Select the baud rate by pressing the **BAUD** key. Pressing the **OK** key will use the current setting and the review data will be printed.

DIAG

Pressing this key will start the self Diagnostic procedure. There are four (4) screens of information displayed to report the status of the 777. They are as follows:

APPLICATION SOFTWARE

This screen displays information about the application program (if loaded) in 777. The file name of the program currently loaded, the date the program was created, the SmartWeigh registration number, the company SmartWeigh is registered to and the program checksum status will be displayed. **NOTE:** If a application program is not loaded in the 777, the screen will display: `APPLICATION SOFTWARE NOT LOADED`. Press the **PREV** key to return to the to the REVU / DIAG menu or the **NEXT** key to proceed to the next test.

PIB CARD TEST

This screen displays information about the cards installed in the 777. It will show each type of card installed and the quantity, the address of each card (a different address is needed for multiple cards of the same type) and any error on the card. Press the **PREV** key to return to the previous test or the **NEXT** key to proceed to the next test.

RAM DISK

This screen displays information about the 777 RAM DISK. The ram disk is 1,559,040 bytes of the system 2M ram that is used to store files created by your program. The information displayed includes the total bytes, the bytes used in the user file(s) and the bytes free. **NOTE:** The size of the ram disk is fixed by the 777 operating system (Cardinal Basic) and can not be changed by your application program. The remainder of the 2M system ram is used by Cardinal Basic and your application program. Pressing the **MORE** key will display additional information. Press the **PREV** key to return to the previous test or the **NEXT** key to proceed to the next test.

KEYPAD FUNCTIONS, CONT.

RAM DISK DIRECTORY

This screen displays information about the files in the RAM DISK, which is designated drive A:\ . The volume label assigned to A:\ will be displayed, along with the filename(s) and size of the file(s). Pressing the **MORE** key will display additional information. Press the **PREV** key to return to the previous test or the **NEXT** key to return to the REVU / DIAG menu.

MENU

When displayed, pressing this key will return the 777 display to the Start Menu.

SETUP AND CALIBRATION

Your 777 Programmable Weight Indicator has been thoroughly tested and calibrated before being shipped to you. If you receive the indicator attached to a scale, calibration is not necessary. If the 777 is being connected to a scale for the first time or recalibration is necessary for other reasons, proceed as indicated.

Calibration of the 777 indicator is accomplished entirely by the keypad.

With the power off, first remove the calibration sealing screw on the scale input board on the back of 777, see Figure No.11. With the screw removed, turn the 777 on with the power switch. The screen will display *Cardinal 777* for a few seconds, then change to the Start Menu (see Figure No. 12).

With the Start Menu showing, press the **SETUP** key. The 777 will display the SETUP / ADJ Menu. Press the **SETUP** key again. The 777 is now ready for setup and calibration.

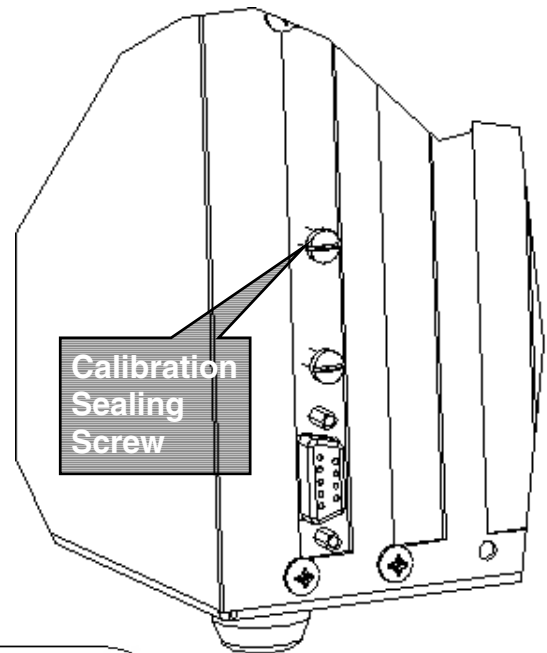


Figure No. 11

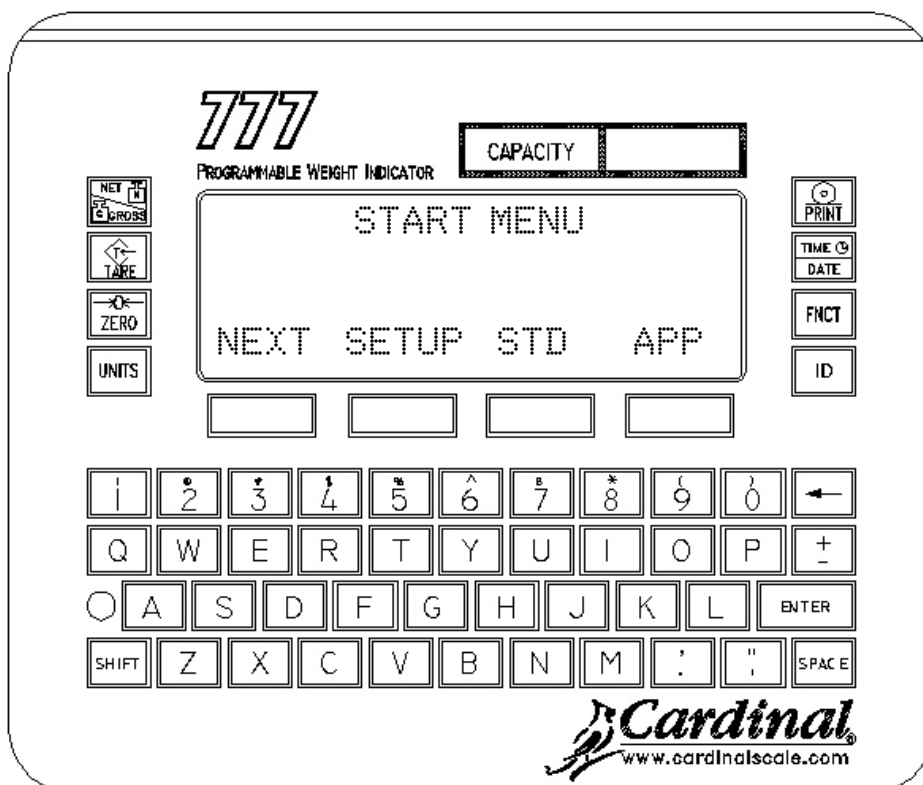


Figure No. 12

SETUP AND CALIBRATION, Cont.

During the setup and calibration process it will be necessary to enter operational parameters via the 777's keypad. Pressing the **ENTER** key without entering a new value will retain the current setting and advance the 777 to the next screen prompt. To change a setting, enter a new value and press the **ENTER** key. This will save the new value and advance the 777 to the next screen prompt.



NOTE: With the exception of the `INTERVAL` and `CAL WT 1` prompts, pressing the **FNCT** key at any setup prompt will return the 777 screen to the previous setup step. Pressing the **FNCT** key at the `INTERVAL` prompt will return the 777 to the Start Menu. Pressing the **FNCT** key at the `CAL WT 1` prompt will first write all the setup parameters (up to the `C1` prompt), then return to the `START` Menu.

1. After pressing the **SETUP** key, the 777 will prompt: `INTERVAL`, the interval value (division value) and display the current setting. To change the setting, use the keypad to select a new interval value (1 to 99), then press the **ENTER** key to save the setting and proceed to the next step.
2. The screen will prompt: `DPP`, the decimal point position and display the current setting. To change the setting, use the keypad to select a new value for the decimal point position (0 to 5), then press the **ENTER** key to save the setting and proceed to the next step. Numbers zero (0) through five (5) are available and correspond to the following decimal point positions:

0 = XXXXXXX	1 = XXXXXX.X	2 = XXXXX.XX
3 = XXXX.XXX	4 = XXX.XXXX	5 = XX.XXXXX

3. The screen will prompt: `CAPACITY`, for the scale capacity and display the current setting. To change the setting, use the keypad to enter a new capacity (0 to 9,999,999), then press the **ENTER** key to save the setting and proceed to the next step.
4. The screen will prompt: `UNITS`, for the weighing units and display the current setting. To change the setting, use the keypad to select a new value for the weighing units (1 to 3), then press the **ENTER** key to save the setting and proceed to the next step.

1 = Pounds only	2 = Kilograms only	3 = Pounds/Kilograms
-----------------	--------------------	----------------------

5. The screen will prompt: `Z TRACK`, for the automatic zero tracking range and display the current setting. This is the value in scale divisions that will be automatically zeroed off. That is, if the scale divisions are five (5) and the zero tracking is set to three (3) the 777 will automatically zero weights of 15 or less. To change the setting, use the keypad to select a new value for the zero tracking range (0, 0.5 or 1 to 9), then press the **ENTER** key to save the setting and proceed to the next step.
6. The screen will prompt: `Z LIMIT`, for the zero tracking range limit and display the current setting. If `YES` is displayed, the push button zero and zero tracking features are limited to a maximum of 4% of the scale capacity. If `NO` is displayed, the push button zero and zero tracking feature will operate up to the full capacity of the scale. To change the setting, use the keypad to select a `YES` or a `NO`, then press the **ENTER** key to save the setting and proceed to the next step.

SETUP AND CALIBRATION, Cont.

7. The screen will prompt: **FILTER**, for the digital filtering and display the current setting. Four (4) levels of filtering (0, 1, 2 and 3) are available. They are as follows:

0 = NO FILTERING

1 = MINIMAL FILTERING

2 = MODERATE FILTERING

3 = CUSTOM FILTERING

To change the setting, use the keypad to select a new value for the digital filtering, then press the **ENTER** key to save the setting and proceed to the next step.



NOTE: Custom filtering, three (3) is used when zero (0), one (1) or two (2) are inadequate. If you select custom filtering, the 777 will display two (2) more prompts.

If you selected Custom Filtering (3), the 777 will prompt: **F MAX** for the maximum filter level and display the current setting. The filter level is a number from 1 to 256 that corresponds to the level of filtering with 256 being the greatest filtering and 1 the least. To change the setting, use the keypad to select a new maximum filter level, then press the **ENTER** key to save the setting and proceed to the next step.

Next, the 777 will prompt: **F BREAK**, for the filter break range and display the current setting. The break range is a number from 1 to 64 that corresponds to the number of division change to break out of filtering. To change the setting, use the keypad to select a new value for the filter break, then press the **ENTER** key to save the setting and proceed to the next step.

8. The screen will prompt: **MOTION**, for the range of motion detection and display the current setting. Changes in weight exceeding the selected number of divisions will cause the **-MOTION-** message to display. To change the setting, use the keypad to select a new value from 0 to 9 divisions for the motion range, then press the **ENTER** key to save the setting and proceed to the next step.
9. The screen will prompt: **S RATE**, for the sample rate and display the current setting. The value displayed is the sample rate in samples per second. To change the setting, use the keypad to select a new value from one (1) to sixty (60) samples per second for the sample rate, then press the **ENTER** key to save the setting and proceed to the next step.
10. The screen will prompt: **C1**, the current value of the C1 number. If the 777 was calibrated previously and you recorded the four (4) "C" (calibration) numbers, you may enter the value for C1. By entering the "C" numbers previously recorded, you can return to that calibration setting without having to use test weights.* If you wish to use test weights for calibration, leave the C1 value unchanged and press the **ENTER** key.



* If any components have been changed that affect calibration and your scale is used in a commercial application and must be "Legal for Trade" you can not use "C" numbers to re-calibrate.

11. The screen will prompt: **CAL WT 1**, the first of two calibration weights and display the current setting. This setting could be ZERO (NO LOAD) or the TEST WEIGHTS (TEST LOAD). If the first calibration weight is to be ZERO or NO LOAD, use the keypad to input a 0, then press the **ENTER** key. If the first calibration weight is to be the TEST WEIGHTS or TEST LOAD, use the keypad to input the value of the calibrated test weights. Place these weights on the scale platform, then press the **ENTER** key.

SETUP AND CALIBRATION, Cont.

12. After a few seconds, the screen will prompt: `CAL WT 2`, the second of two calibration weights and display the current setting. If the first calibration weight was ZERO or NO LOAD, this weight should be equal to the test weight total. If, however, the first weight was the test weight total, then this weight should be zero.

If this second calibration weight is to be zero, make certain the scale platform is empty, use the keypad to input a 0, then press the **ENTER** key. If this second calibration weight is to be the test load, use the keypad to input the value of the calibrated test weights. Place the weights on the scale platform, then press the **ENTER** key.

13. After a few seconds, the screen will prompt: `FINE SPAN ADJUSTMENT`. Place a known weight on the scale. Any small error will be displayed and can be corrected as follows:

Press the **UP** key to increase displayed weight 1 grad per press.

Press the **DOWN** key to decrease the weight 1 grad per press.

Press the **ZERO** key to zero the scale.

Press the **EXIT** key to save the settings and proceed to the next step.

14. After a few seconds, the screen will prompt: `SCALE X CALIBRATED` (x = scale number), indicating the setup and calibration process has been completed. The "C" numbers will be displayed and should be recorded for future use. After recording the "C" numbers, press the **EXIT** key. The instrument will reset, display the Start Menu and then advance to the Weight Screen. Replace the calibration sealing screw on the scale input board, and proceed with normal operations.



NOTE: Changes to the 777 setup parameters can be performed WITHOUT affecting the calibration. This is accomplished by entering the changes necessary up to the screen prompt `C1` and pressing the **ENTER** and **FNCT** keys. That is, follow the standard Setup and Calibration procedure up to the screen prompt, `C1`. Then instead of entering a value for C1, press the **ENTER** key, then at the `CAL WT 1` prompt, press the **FNCT** key. The instrument will reset, display the Start Menu and then load the application program or standard program. Replace the calibration sealing screw on the scale input board, and proceed with normal operations.

This allows inputting new Setup parameters, without the need to re-calibrate the scale.

LOADING AND SENDING PROGRAMS

The 777 Programmable Weight Indicator can receive and send application programs to and from another 777 indicator or with the optional SmartWeigh software development package to and from a computer.

To transfer application programs between 777 indicators, one indicator must be in the Receive mode, the other in the Send mode and a 8545-B099-0A (778 to HOST PC) transfer cable must be connected from the COM port of one indicator to the COM port of the other indicator.

To transfer application programs between the computer and the 777 indicator, the SmartWeigh program must be loaded and running on the computer, and a 8545-B099-0A (778 to HOST PC) transfer cable connected between the COM port on the computer and the COM port of the 777. The indicator and the SmartWeigh program must be in the appropriate modes (one in send, the other in receive) to transfer application programs. Refer to the SmartWeigh Programming and Simulator Manual (8545-M095-O1) for operation of SmartWeigh transfer procedures.

LOADING AND SENDING PROGRAMS, Cont.

Load A Program

The steps to load an application program on the 777 are as follows:

1. Apply power to the 777 indicator.
2. While the Start Menu is displayed, press the **NEXT** key. The screen will change to the LOAD / SEND / DSPLY Menu.
3. Press the **LOAD** key.
4. The screen will display, `SELECT COM 1 OR COM 2.`
5. Press the **COM1** key or the **COM2** key depending on which port you are using to receive the program OR press the **ESC** key to abort the load procedure and return to the LOAD / SEND / DSPLY Menu.
6. The screen will display, `RECEIVE?` and the current baud rate selected.
 - If the baud rate displayed is correct, press the **YES** key to continue.
 - If the baud rate displayed is incorrect or you wish to use a different rate, press the **BAUD** key. The screen will display the next baud rate available. Continue pressing the **BAUD** key until the desired baud rate is displayed. Press the **YES** key to continue.
 - When the **NO** key is displayed, the load procedure may be canceled. Pressing the **NO** key will display, `CANCELLED LOCALLY.` Press the **OK** key to return to the LOAD / SEND / DSPLY Menu.

7. The screen will display the following warning message:

```
WARNING
APP WILL BE ERASED
PROCEED?
YES  NO
```

8. If the **NO** key is pressed, the operation will be cancelled and the current application program will be unchanged.
9. If the **YES** key is pressed, the current application program will be erased in preparation for downloading a new application program.
10. The screen will display `ERASING PROGRAM` and erase the application currently stored in the 777 memory.
11. After erasing the program, the screen will display:

```
SETUP REMOTE TO SEND
PRESS -READY- TO
CONTINUE
READY
```

12. Make sure the remote (computer or other 777 indicator) is ready to send, and press the **READY** key.
13. The screen will display `RECEIVING FROM COM:x` (x = the com port selected in step 5), the record number the indicator is receiving and a status message.
14. To stop or pause the load process, press the **ESC** key. The screen will display `QUIT?`.
 - To stop loading (receiving) the program, press the **YES** key. The screen will display, `CANCELLED LOCALLY.` Press the **OK** key to return to the LOAD / SEND / DSPLY Menu.
 - Press the **NO** key to continue loading (receiving) the program from the point at which it was interrupted.

LOADING AND SENDING PROGRAMS, Cont.

Load A Program, Cont.

15. When the 777 is finished loading (receiving) the program, the screen will display **DONE**. Press the **OK** key to return to the **LOAD / SEND / DSPLY** Menu, then press the **NEXT** key twice to load and run the program.

NOTE: To load and run your program quicker, press the **NEXT** key twice, then press the **APP** key. This will bypass the five (5) second delay at the Start Menu.

Send A Program

The steps to send an application program to the 777 are as follows:

1. Apply power to the 777 indicator.
2. While the Start Menu is displayed, press the **NEXT** key. The screen will change to the **LOAD / SEND / DSPLY** Menu.
3. Press the **SEND** key.
4. The screen will display, **SELECT COM 1 OR COM 2**.
5. Press the **COM1** key or the **COM2** key depending on which port you are using to send the program OR press the **ESC** key to abort the send procedure and return to the **LOAD / SEND / DSPLY** Menu.
6. The screen will display, **SEND?** and the current baud rate selected.
 - If the baud rate displayed is correct, press the **YES** key to continue.
 - If the baud rate displayed is incorrect or you wish to use a different rate, press the **BAUD** key. The screen will display the next baud rate available. Continue pressing the **BAUD** key until the desired baud rate is displayed. Press the **YES** key to continue.
 - When the **NO** key is displayed, the load procedure may be canceled. Pressing the **NO** key will display, **CANCELLED LOCALLY**. Press the **OK** key to return to the **LOAD / SEND / DSPLY** Menu.
7. Make sure the remote (the computer or another 777 indicator) is ready and press the **YES** key to start sending. The screen will display **SENDING TO COMx** (x = the com port selected in step 5), the record number the indicator is sending and a status message.
8. To stop or pause the send process, press the **ESC** key. The screen will display **QUIT?**.
 - To stop sending the program, press the **YES** key. The screen will display, **CANCELLED LOCALLY**. Press the **OK** key to return to the **LOAD / SEND / DSPLY** Menu.
 - Press the **NO** key to continue sending the program from the point at which it was interrupted.
9. When the 777 is finished sending the program, the screen will display **DONE**. Press the **OK** key to return to the **LOAD / SEND / DSPLY** Menu, then press the **NEXT** key twice to load and run the program.

NOTE: To load and run your program quicker, press the **NEXT** key twice, then press the **APP** key. This will bypass the five (5) second delay at the Start Menu.

CARE AND CLEANING

- **DO NOT** submerge indicator in water, pour or spray water directly on instrument.
- **DO NOT** use acetone, thinner or other volatile solvents for cleaning.
- **DO NOT** expose equipment to temperature extremes.
- **DO NOT** place equipment in front of heating/cooling vents.
- **DO** clean the indicator with a damp soft cloth and mild non-abrasive detergent.
- **DO** remove power before cleaning with a damp cloth.
- **DO** provide clean AC power and adequate protection against lightning damage.
- **DO** keep the surroundings clear to provide clean and adequate air circulation.

ERROR AND STATUS MESSAGES

The 777 is equipped with a diagnostic software program that tests various portions of the instrument's circuitry and verifies proper operation. Should a problem be detected, an error or status message will be displayed alerting the operator to that condition. The following lists these errors and status messages and their meaning.

Message	POSSIBLE CAUSE	CORRECTIVE ACTION
--MOTION--	This message indicates that motion is present when attempting to power up, print, zero or perform a push button tare function.	Insure scale is stable, level and vibration-free. Wait for a stable weight display.
--ZERO ERROR--	The ZERO key was pressed when the gross weight is outside the scale zero weight range.	Check Setup parameter Z LIMIT. If YES, only 4% of scale capacity can be zeroed. Change as required.
--OVER CAPACITY--	This message indicates the weight on scale exceeds the scale capacity.	Remove the weight from the scale platform. Insure the scale is at zero. If problem persists, contact your scale serviceman.
SIB MISSING	Scale Input Board (SIB) data interface not functioning.	Both data and power cables must be plugged into SIB. If cables check okay, replace SIB.
CAL SEAL	Attempting to enter Setup and Calibration mode with the calibration sealing screw installed.	Remove the calibration sealing screw from the Scale Input Board (SIB) mounting bracket (refer to Figure No. 10).
--CENTER OF ZERO--	This message is displayed to indicate that the weight is within +/- 1/4 division of the center of zero.	No corrective action is necessary. This is a status message indicating the automatic zero tracking is working properly.

BEFORE YOU CALL FOR SERVICE

The 777 has been designed to provide you with years of trouble-free operation. In spite of this, troubles sometimes happen. Before calling for service assistance you should make some initial checks to verify that a problem does exist. The following describes several types of symptoms along with suggested remedies.

Problem	Possible Solutions
Screen does not turn on	Is AC power cord plugged into wall receptacle? Check wall receptacle for proper AC power. Try another electrical appliance in the same receptacle, does it work? Check the circuit breaker. Has there been a power failure of any kind?
Incorrect weight displayed	Has the instrument been calibrated? Insure that the scale platform isn't touching an adjacent object. Check the load cell connector wiring. Have proper operation procedures been followed?
Indicator will not display weight	Refer to Error and Status Messages section.

CALIBRATION SEAL INSTALLATION

If your Model 777 Programmable Weight Indicator is used in a commercial application, it must be tested and sealed by your local Weights and Measurements official. The 777 is designed to accept a lead and wire security seal to prevent unauthorized access to the calibration adjustments. Refer to Figure No. 13 and the following steps for details on the installation of the seals.

1. Make certain both calibration sealing screws are securely tightened before proceeding.
2. Thread the sealing wire through the hole in the both fillister head screws as shown.
3. Pull the wire tight and install the lead seal.
4. Neither screw can be removed without damaging the lead seal.

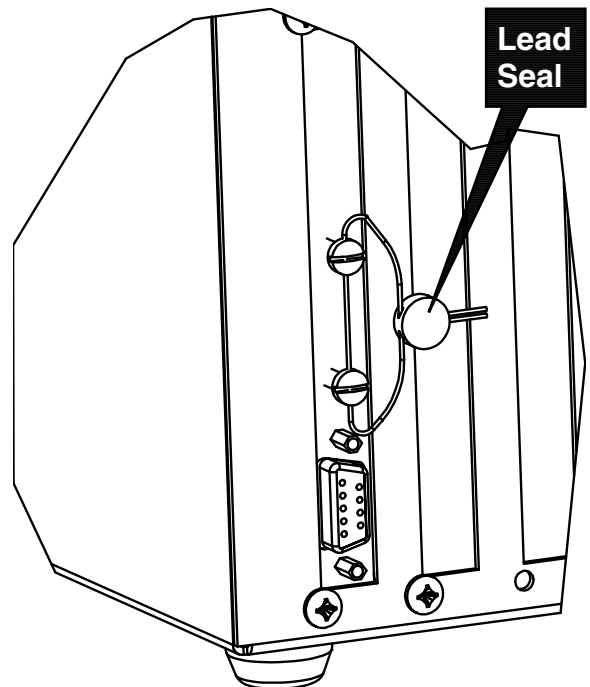
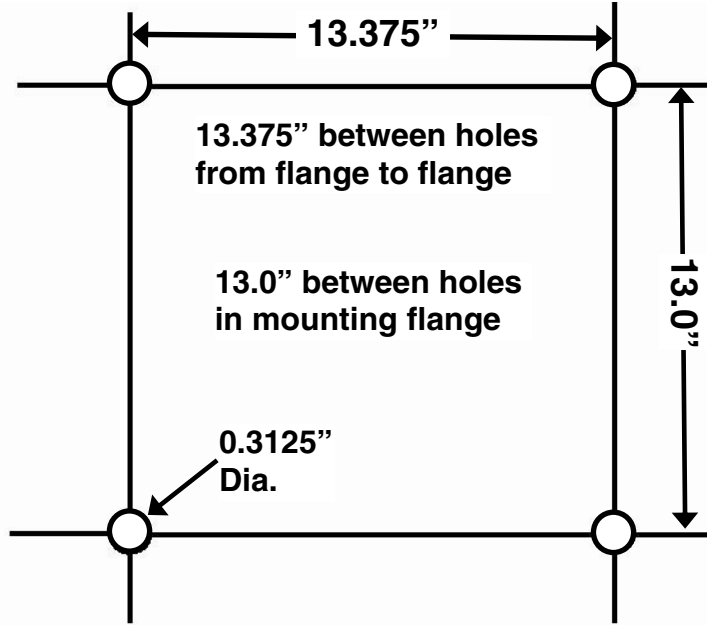


Figure No. 13

777S (NEMA 4X ENCLOSURE)

Installation Instructions

The Model 777S is housed in a NEMA 4X enclosure that 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. 14 for the hole layout for the NEMA 4X enclosure.



First make certain that the location 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 easy access to the keyboard. Carefully lay out the mounting hole locations, then drill and install the anchor bolts. Attach the enclosure to the wall and securely tighten the retaining bolts.

Continue by opening the front cover on the instrument enclosure. Loosen all four retaining screws and rotate each of the clips to the side. DO NOT remove these screws. Fully open the front cover of instrument exposing the internal circuit boards. See Figure No. 15.

Figure No. 15



777S (NEMA 4X ENCLOSURE), Cont.

Load Cell Connection



CAUTION! Disconnect any external load cell power supply before connecting load cells to the instrument. Failure to do so will result in permanent damage to the instrument.

Loosen the cable gland connector for the load cell. This gland connector is located on the bottom of the enclosure. Refer to Figure No. 18 for an illustration of the gland connector layout.

1. Slip the single cable from the load cell or load cell junction box through the gland connector and into the enclosure.
2. Remove 2" of the outer insulation jacket then remove 1/4" of insulation from each of the four (4) wires and shield without sense leads or six (6) wires and shield with sense leads (refer to Figure No. 16).
3. Connect each of the wires to the Scale 1 terminal block for scale input 1 referring to the labels on the circuit board for terminal connections. Refer to Figure No. 17 for terminal block locations.
4. To terminate, first press down on the release bar for the terminal, insert the wire into the opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place.

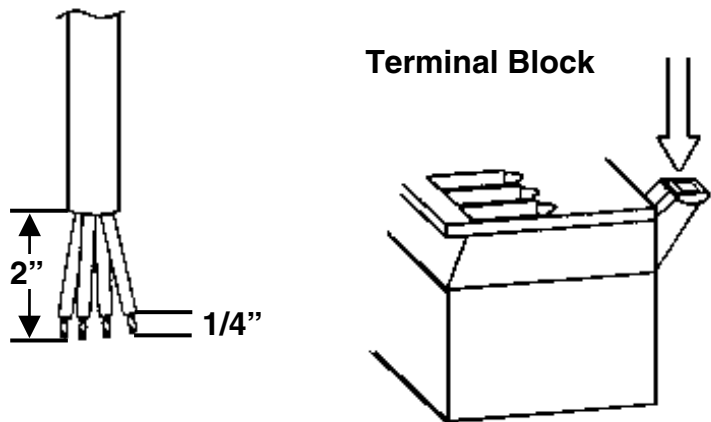


Figure No. 16

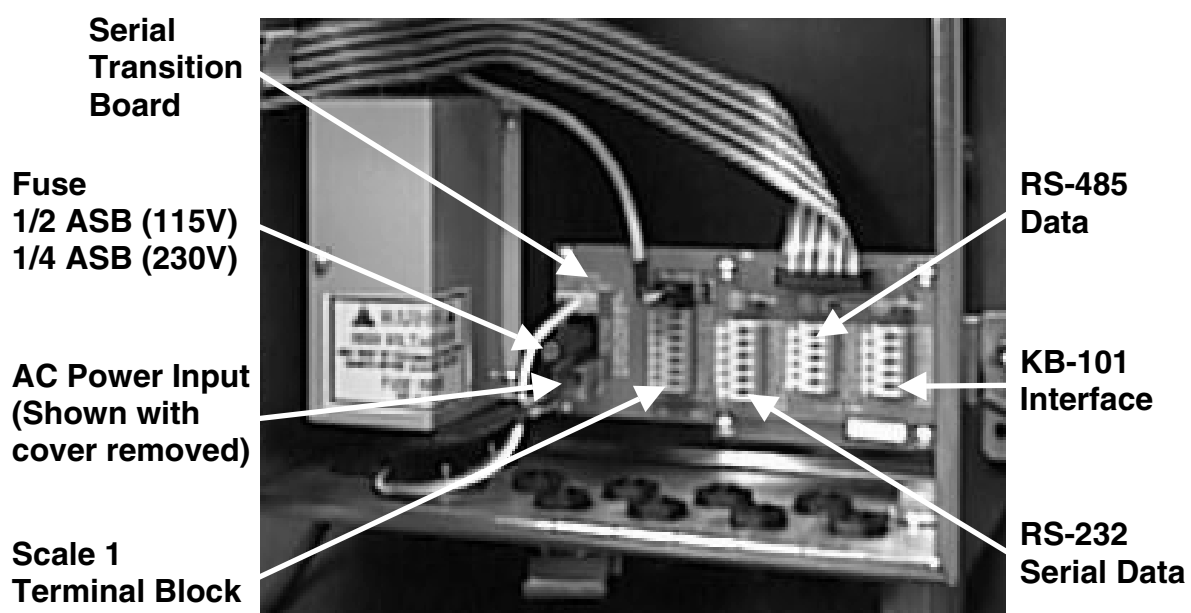


Figure No. 17



NOTE: To connect the wires for scale inputs 2 through 4, remove the Serial Transition Board to expose the scale 2 through 4 terminal blocks.

777S (NEMA 4X ENCLOSURE), Cont.

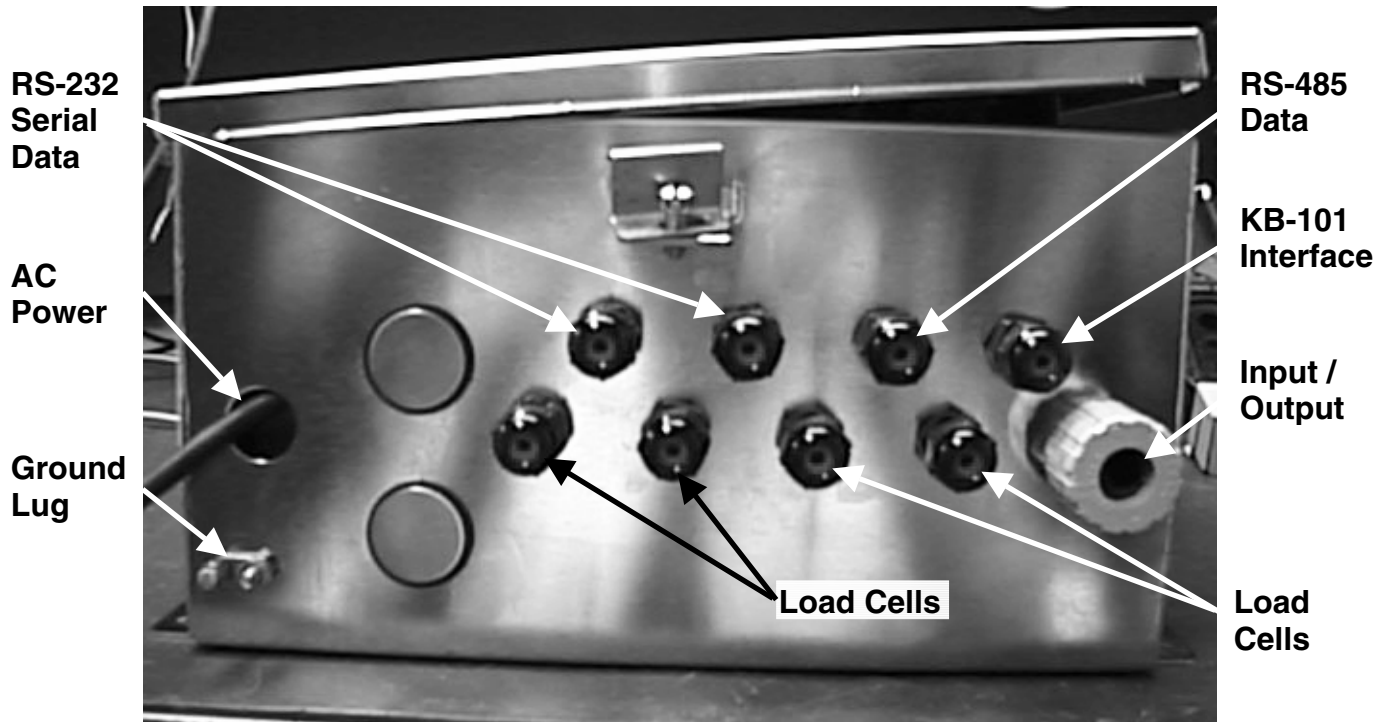


Figure No. 18

RS-232 Serial Cable Installation

1. Loosen the cable gland connector(s) for the RS-232 serial cable. The gland connector(s) for the RS-232 serial data are located on the bottom of the enclosure. Refer to Figure No. 18 for an illustration of the gland connector layout.
2. Slip the serial cable through the gland connector and into the enclosure.
3. Remove 2" of the outer insulation jacket then remove 1/4" of insulation from each of the wires (refer to Figure No. 16).
4. Connect each of the wires to the RS-232 Serial Data terminal block referring to the labels on the circuit board for terminal connections. Refer to Figure No. 17 for terminal block locations.
5. To terminate, first press down on the release bar for the terminal, insert the wire into the opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place.

RS-485 Serial Cable Installation

1. Loosen the cable gland connector for the RS-485 data cable. The gland connector for the RS-485 data cable is located on the bottom of the enclosure. Refer to Figure No. 18 for an illustration of the gland connector layout.
2. Slip the RS-485 data cable through the gland connector and into the enclosure.
3. Remove 2" of the outer insulation jacket then remove 1/4" of insulation from each of the wires (refer to Figure No. 16).
4. Connect each of the wires to the RS-485 Data terminal block referring to the labels on the circuit board for terminal connections. Refer to Figure No. 17 for terminal block locations.
5. To terminate, first press down on the release bar for the terminal, insert the wire into the opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place.

777S (NEMA 4X ENCLOSURE), Cont.

KB-101 Keyboard Cable Installation

1. Loosen the cable gland connector for the KB-101 Keyboard cable. The gland connector for the KB-101 keyboard cable is located on the bottom of the enclosure. Refer to Figure No. 18 for an illustration of the gland connector layout.
2. Slip the KB-101 keyboard cable through the gland connector and into the enclosure.
3. Remove 2" of the outer insulation jacket then remove 1/4" of insulation from each of the wires (refer to Figure No. 16).
4. Connect each of the wires to the KB-101 interface terminal block referring to the labels on the circuit board for terminal connections. Refer to Figure No. 17 for terminal block locations.
5. To terminate, first press down on the release bar for the terminal, insert the wire into the opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place.

AC Power Connection

1. Remove the (2) Phillips head screw retaining the AC power connection cover.
2. Referring to Figure No. 18 for an illustration of the gland connector and conduit hole layout, use the 1/2" conduit hole to bring the AC power into the enclosure. Use a seal-tite or rigid conduit fitting to make a water-tight connection.
3. With the AC wiring in the enclosure, remove 1/4" of insulation from each of the wires (refer to Figure No. 16).
4. Connect each of the wires to the AC power terminal block (P2) referring to the labels on the circuit board for terminal connections. Refer to Figure No. 17 for terminal block locations.
5. To terminate, insert the wire into the terminal block (P2) and tighten the screw, securing the wire in place. Repeat the procedure until all of the wires are in place.
6. Replace the AC power connection cover and re-installed the (2) Phillips screws removed.



NOTE! Use a minimum of 18AWG copper wire to connect the AC power to the instrument.

777S (NEMA 4X ENCLOSURE), Cont.

I/O (Input/Output) Cable Installation

Removal of the I/O cable from the 778I

NOTE: Each wire of the I/O cable is tagged with a number label that corresponds to the labels on the circuit board for terminal connections to the P17 terminal block.

1. Release the 2 clamps securing the enclosure cover on the 778I, then open the cover exposing the internal circuit board, I/O cable and relays.
2. Locate the I/O cable and I/O terminal block, P17.
3. Press down on the release bar of the terminal for the # 1 wire and remove the wire.
4. Repeat the procedure until all of the wires have been removed from the terminal block.
5. Loosen the gland connector for the I/O cable. The gland connector for the I/O cable is located on the left-hand side end of the enclosure (the large connector).
6. Pull the I/O cable through the gland connector and out of the 778I enclosure.

Installation of the I/O cable in the 777S

1. To open the front cover on the 777S enclosure, loosen all four retaining screws and rotate each of the clips to the side. **DO NOT** remove these screws. Fully open the front cover of instrument exposing the internal circuit boards.

NOTE: If the 778D Digital I/O Interface card has not been installed, following the installation guide provided with the card, install it in the 777S before proceeding.

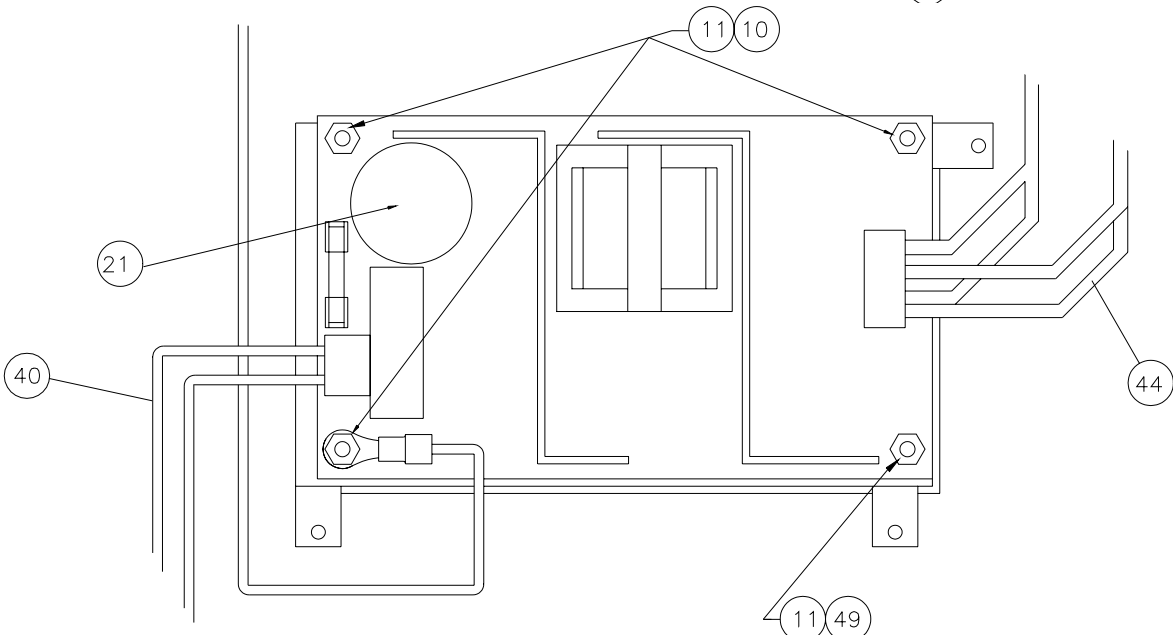
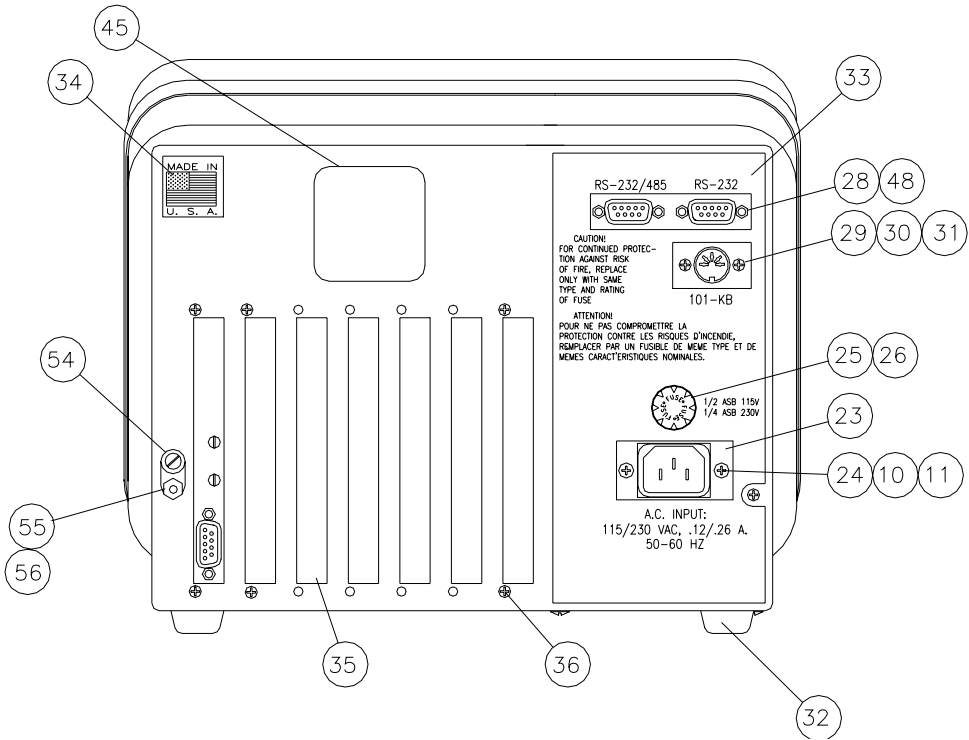
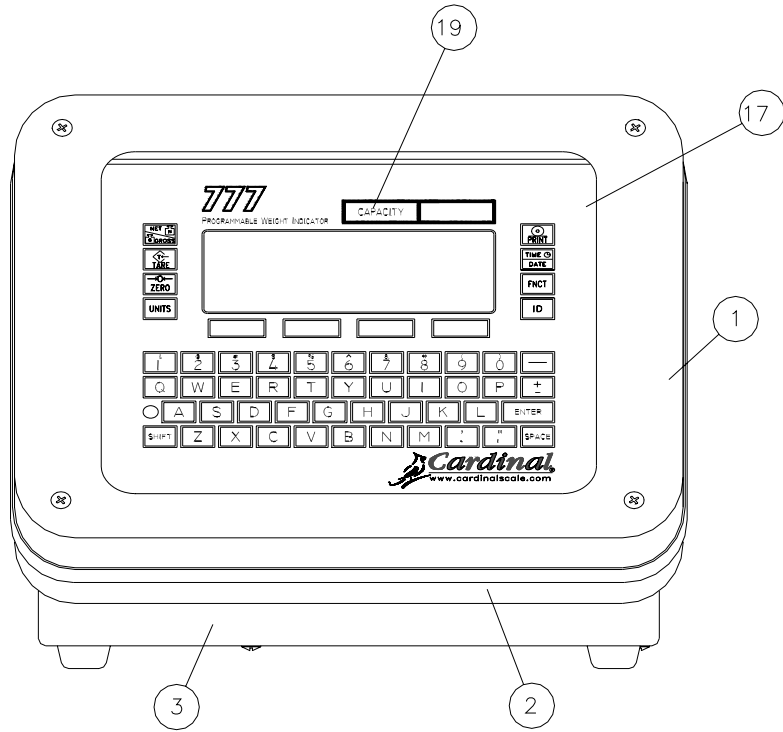
2. Loosen the gland connector for the I/O cable. The gland connector for the I/O cable is located on the bottom of the enclosure on the right-hand side (the large connector).
3. From inside the enclosure, slip the loose wires of the I/O cable through the gland connector and out of the 777S enclosure.
4. Connect the I/O cable to the interface card, remove the excess cable from within the instrument enclosure and securely tighten the cable gland connector. Do not over-tighten the connector, but make certain it is snug.
5. Close the cover, rotate each of the clips back to the locking position, and tighten the four retaining screws.

Re-Installation of the I/O cable in the 778I

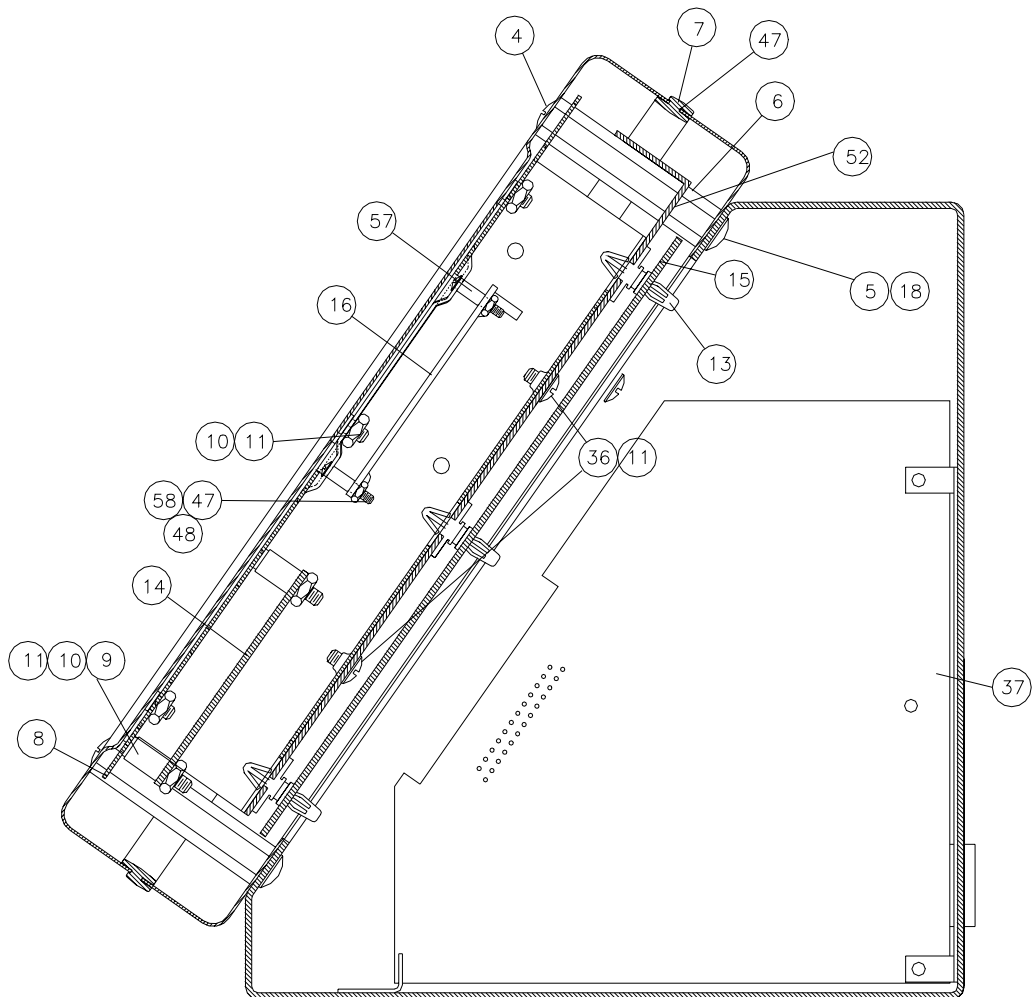
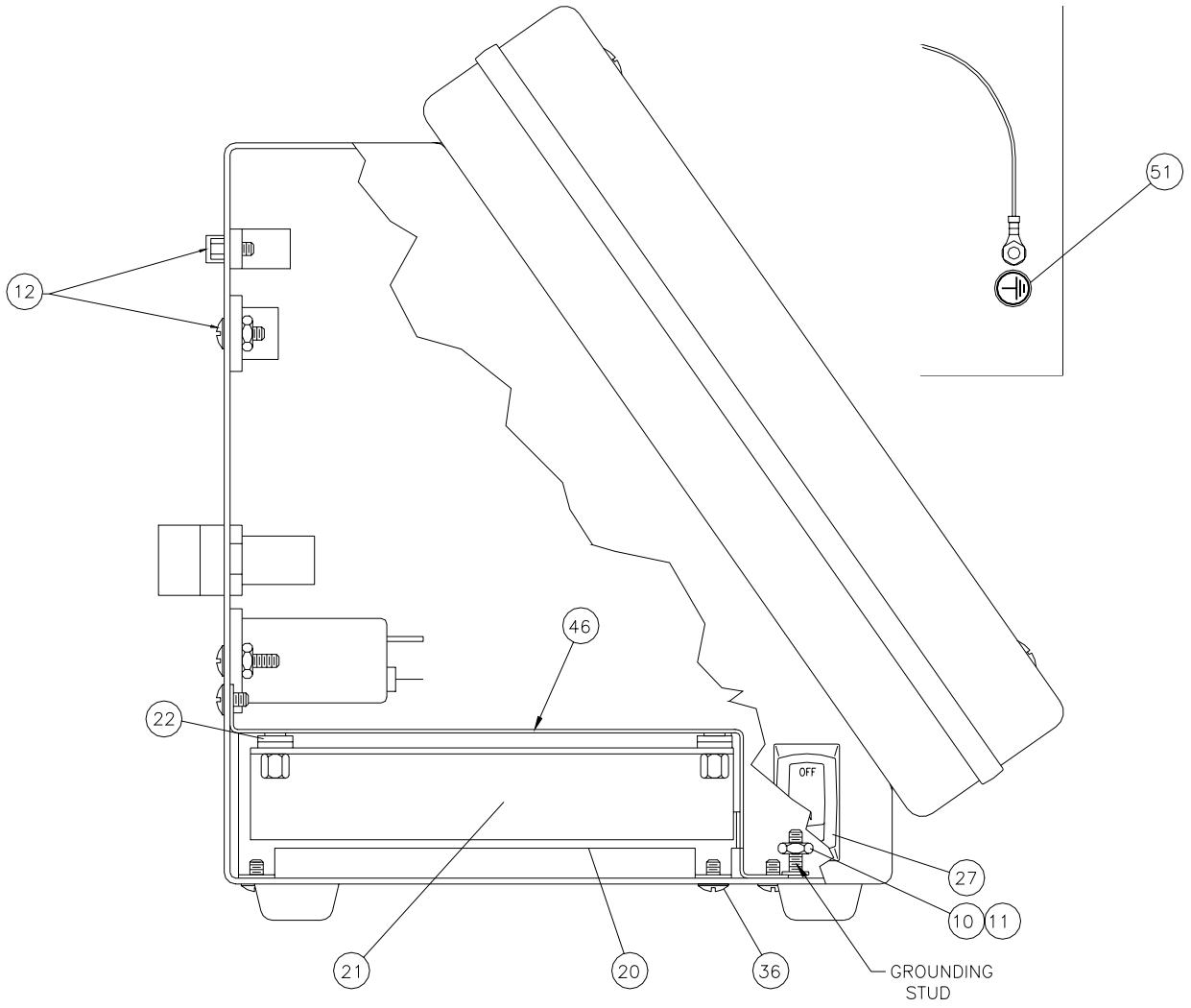
NOTE: Each wire of the I/O cable is tagged with a number label that corresponds to the labels on the circuit board for terminal connections to the P17 terminal block.

1. Slip the I/O cable through the gland connector and into the 778I enclosure.
2. Connect each of the wires to the I/O terminal block matching the labels on the circuit board for terminal connections with the labels on the wire of the I/O cable.
3. To terminate, first press down on the release bar for the terminal, insert the wire into the opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place.
4. After all terminations have been made, remove the excess cable from within the instrument enclosure and securely tighten the cable gland connector. Do not over-tighten the connector, but make certain it is snug.
5. Close the 778I enclosure cover and secure with the 2 clamps released previously.

777 PART IDENTIFICATION



777 PART IDENTIFICATION, Cont.



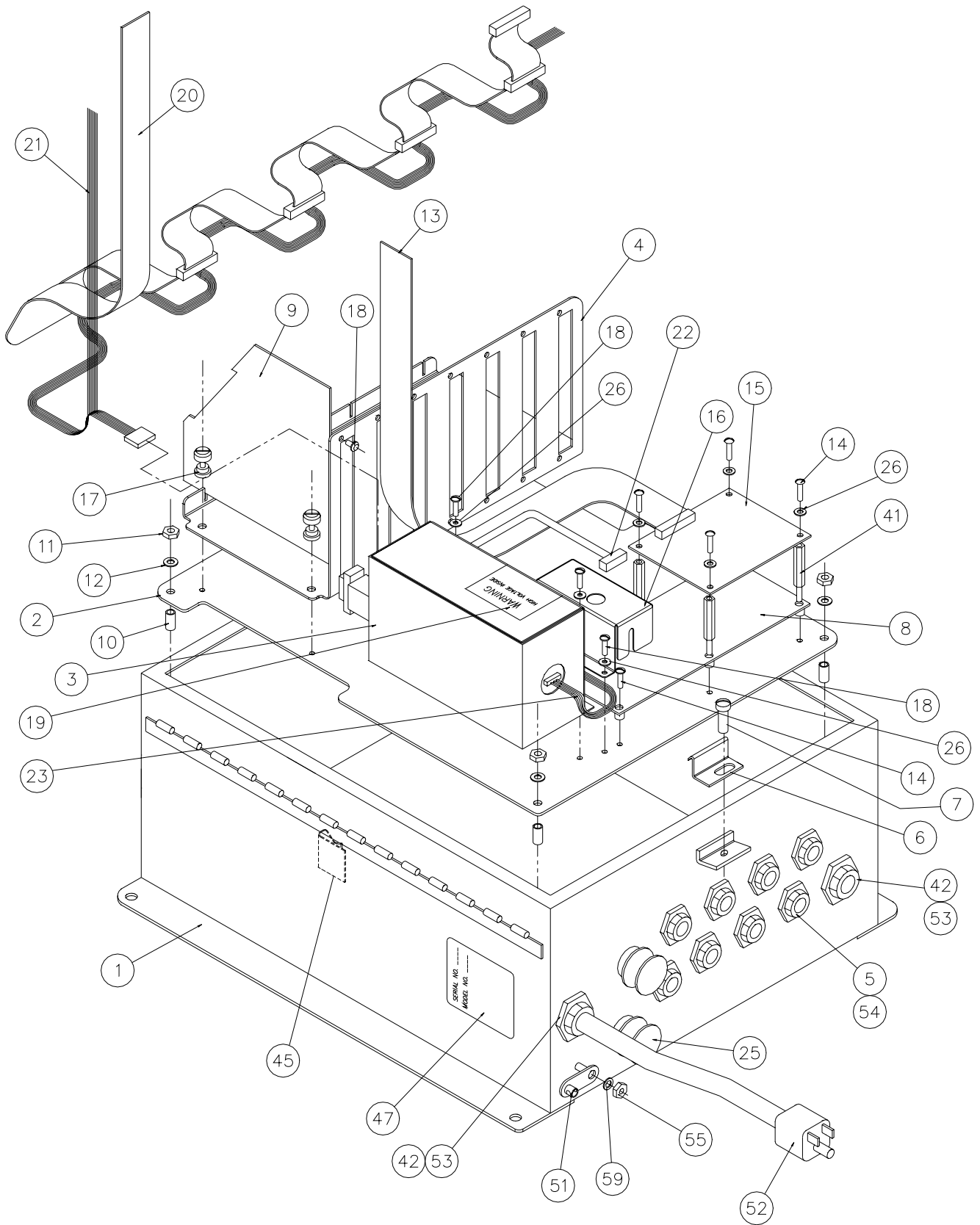
777 PART IDENTIFICATION, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	8545-D414-0A	FRONT COVER ASSY
2	1	8545-D007-08	BEZEL, REAR
3	1	8545-C015-0A	ENCLOSURE ASSY
4	4	6021-0001	SCREW, OVAL HD, 8-32 X ½ CHROME
5	4	6021-0806	SCREW, BUTTON HD, 8-32 X 1/2
6	4	8545-B021-08	SPACER
7	1	8545-C075-08	GASKET, EXTRUDED
8	1	8545-C403-0A	SUB CHASSIS ASSY
9	4	6680-0045	NYLON SPACER, #6 X .25
10	16	6013-0039	JAM NUT, #6-32
11	21	6680-0004	LOCK WASHER, #6 INTERNAL
12	1	8545-C100-0A	CABLE ASSEMBLY, COMM
13	6	6680-0002	SPACER, SNAP-IN, NYLON
14	1	8545-D402-0A	DISPLAY INTERFEACE
15	1	8545-D001-0A	MAIN CONTR BOARD
16	1	8545-B404-0A	LCD DISPLAY ASSY
17	1	8545-D400-08	KEYPAD – MAIN
18	4	6024-1000	LOCK WASHER, #8 INT
19	1	8545-B020-08	LENS – DISPLAY
20	1	8545-C018-0A	ENCLOSURE ASSY, POWER SUPPLY
21	1	6800-1028	POWER SUPPLY
22	8	6680-0003	NYLON WASHER, #6 X .062 THK
23	1	8544-B032-0A	LINE FILTER ASSY
24	2	6021-0666	SCREW, BLK ZINC, #6-32 X ½ RHMS PHIL DR
25	1	6610-2451	FUSE HOLDER
26	1	6610-4021	FUSE, ½ A
27	1	6910-5095	SWITCH - ROCKER
28	4	6610-2000	JACK SOCKET, #4-40
29	2	6021-2057	SCREW, BLK ZINC, #4-40 X ¼ RHMS PHIL DR
30	2	6024-1485	STAR WASHER, #4
31	2	6013-0245	NUT, #4-40 HEX
32	4	6540-0032	RUBBER FOOT
33	1	8545-C024-08	OVERLAY - REAR
34	1	6650-0087	LABEL, MADE IN THE USA
35	6	8545-B069-08	BLANK COVER, 1 SLOT
36	18	6021-6007	SCREW, BLK ZINC, #6-32 X ¼ RHMS PHIL DR
37	1	778A	SCALE INOUT BOARD
38	1	8542-B131-0A	CABLE ASSEMBLY, LINE FILTER TO SWITCH
39	1	8545-B026-0A	CABLE ASSY, FUSE HOLDER TO SWITCH

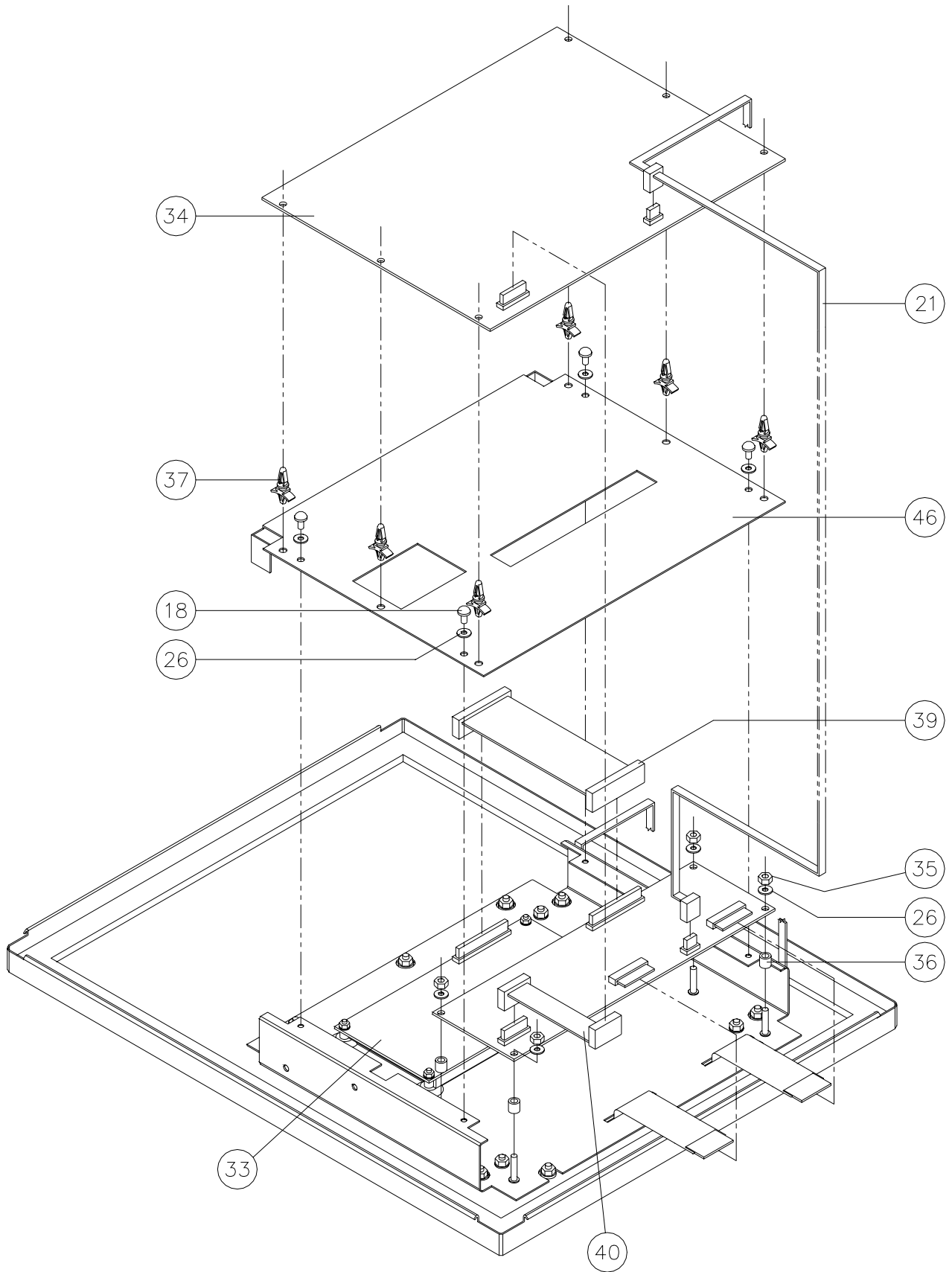
777 PART IDENTIFICATION, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
40	1	8545-B025-0A	CABLE ASSEMBLY, A/C POWER
41	1	8545-B033-08	CABLE ASSEMBLY, DISPLAY INTERFACE
42	1	8545-B405-0A	CABLE ASSEMBLY, LCD DISPLAY CABLE
43	1	8545-B035-08	CABLE ASSY, PARALLEL INTERNAL BUS
44	1	8545-C036-0A	CABLE ASSEMBLY, POWER INTERCONNECT
45	1	593GR986	SERIAL TAG
46	1	8545-B041-08	LABEL, HIGH VOLTAGE WARNING
47	4	6021-0004	SCW PAN HEAD, #2-56 X 0.500
48	4	6680-0084	LOCK WASHER, #2 HELICAL
49	1	6680-0143	SPACER, #6-32 HEX
50	1	8545-B044-0A	CABLE ASSY, POWER SUPPLY GROUND
51	1	8544-B027-08	LABEL, GROUND
52	1	8545-C411-08	SHIELD, HIGH VOLTAGE
54	1	6610-5002	GROUND LUG
55	1	6013-0296	HEX NUT, #10-24
56	1	6024-0049	LOCKWASHER, # 10, EXT TOOTH
57	4	6680-1106	SPACER #2 X 0.250
58	4	6013-0256	NUT, #2-56

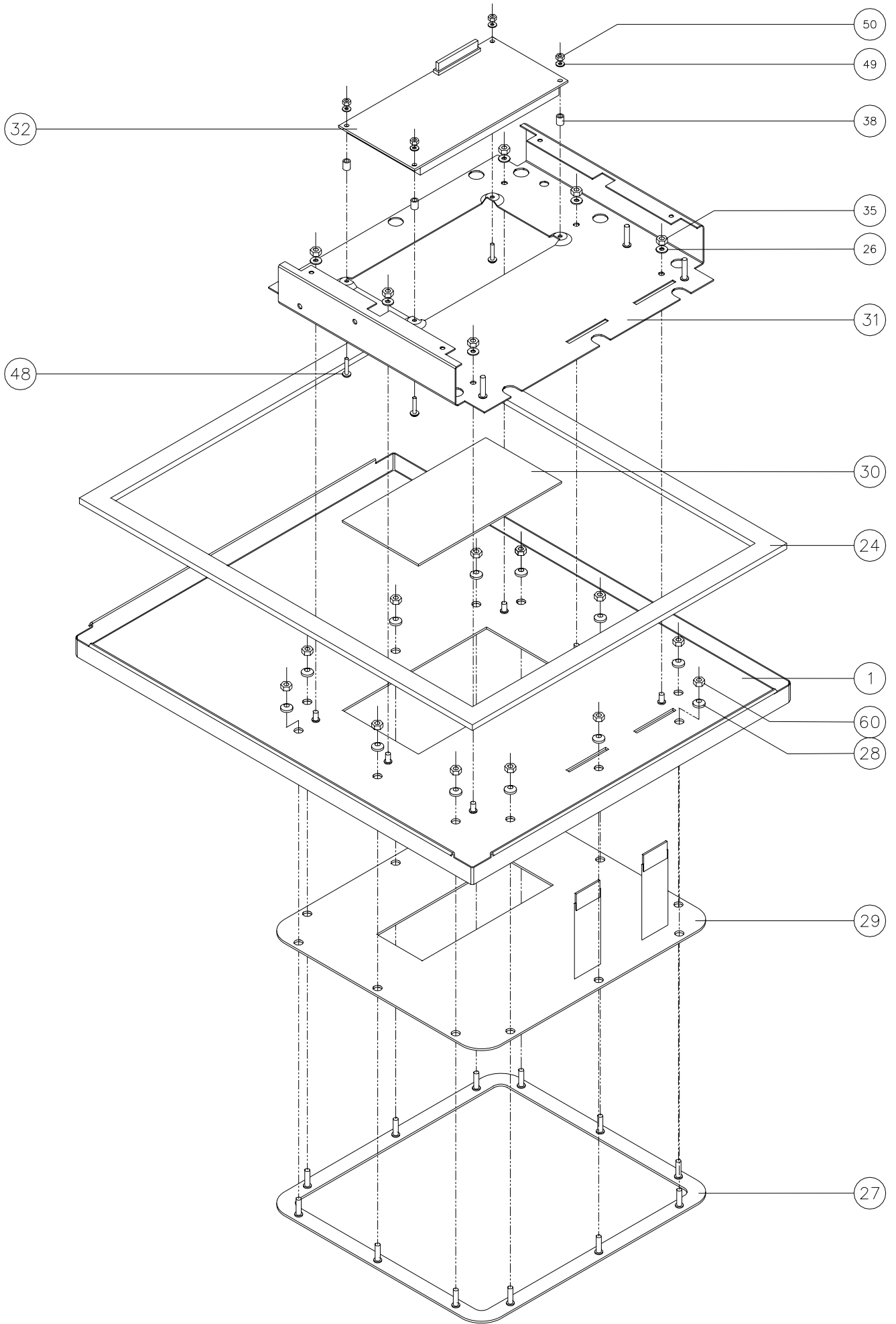
777S PART IDENTIFICATION



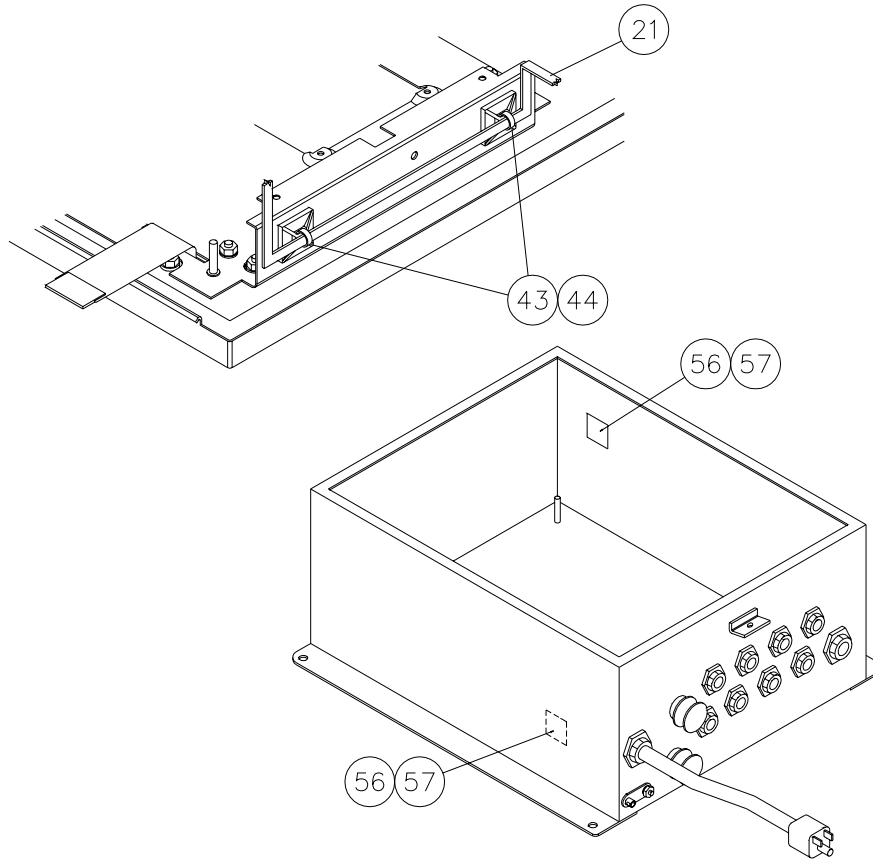
777S PART IDENTIFICATION, Cont.



777S PART IDENTIFICATION, Cont.



777S PART IDENTIFICATION, Cont.



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	8545-D418-0A	ENCLOSURE ASSY., WELDMENT
2	1	8545-C062-08	BASE PLATE
3	1	8545-B061-0A	COVER ASSY., POWER SUPPLY
4	1	8545-D059-08	MOUNTING BRACKET, SCAL INPUT
5	8	6610-2248	GLAND CONNECTOR, .187-.312 GRIP
6	4	8530-C088-08	S.S. CLAMP
7	4	6021-0699	SCREW, FILLISTER MACHINE .25-28 X .625
8	1	8545-C046-0A	PCB ASSY., TRANSITION BOARD
9	1	778A	PCB ASSY., SCALE INPUT
10	4	6680-2000	SPACER, #10 X .5 NYLON
11	4	6013-0297	HEX NUT, 10-32 S.S.
12	4	6024-1084	LOCK WASHER, DISHED, TOOTHED PERIPHERY #10
13	1	8545-B085-08	CABLE ASSY. COMM.
14	6	6021-0695	SCREW, PAN HEAD MACH #6-30 X .500 ZPL
15	1	8545-C081-0A	PCB ASSY., SERIAL TRANSITION
16	1	8545-B082-08	SHIELD, TRANSITION BOARD
17	4	6680-1088	FASTENER, LOW PROFILE
18	10	6021-0654	SCREW, PAN HEAD MACH. #6-32 X .250
19	1	8545-B041-08	LABEL, HIGH VOLTAGE WARNING

777S PART IDENTIFICATION, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
20	1	8545-B086-08	CABLE ASSY., PARALLEL INTERFACE BUS
21	1	8545-C079-0A	CABLE ASSY., POWER INTERCONNECT
22	1	8545-B071-0A	CABLE ASSY., ANALOG
23	1	8545-B072-0A	CABLE ASSY., AC POWER
24	1	8545-B077-08	GASKET
25	2	3502-B217-0A	HOLE PLUG ASSY.
26	22	6680-0004	LOCK WASHER, INTERNAL TOOTH #6-32
27	1	8545-C417-0A	BEZEL
28	12	6024-1078	WASHER #6 NEOPRENE
29	1	8545-D410-08	KEYPAD
30	1	8545-B020-08	LENS DISPLAY
31	1	8545-C403-0A	CHASSIS, SUB ASSEMBLY
32	1	8545-B404-0A	DISPLAY
33	1	8545-D402-0A	PCB ASSY., DISPLAY INTERFACE
34	1	8545-D001-0A	PCB ASSY., CONTROLLER
35	10	6013-0039	JAM NUT, #6-32
36	4	6680-0045	NYLON SPACER, #6 X .250
37	6	6680-0002	SPACER, NYLON, SNAP IN
38	4	6680-1106	NYLON SPACER, #2 X .250
39	1	8545-B405-0A	CABLE, PLASMA DISPLAY – XBD
40	1	8545-B033-08	CABLE, DISPLAY INTERFACE
41	4	6680-0163	SPACER, #6-32 X 1.875
42	2	6610-2081	GLAND CONNECTOR
43	2	6980-0014	WIRE TIE, 4 INCH
44	2	6680-0028	CRADLE MOUNT
45	1	6610-5007	CABLE CLIP
46	1	8545-C411-08	HIGH VOLTAGE GUARD
47	1	593GR986	SERIAL TAG
48	4	6021-0004	SCREW, #2-56 X .500 PHMS
49	4	6680-0084	LOCK WASHER, #2 HELICAL
50	4	6013-0256	HEX NUT, #2-56
51	1	6610-5002	GROUND LUG
52	1	6980-0001	LINE CORD, 18-3 S.S.
53	2	6680-0015	CONDUIT NUT
54	8	6540-1104	HOLE PLUG
55	1	6013-0296	JAM NUT, #10-24
56	2	6560-0064	DESCICCANT
57	1	6560-0025	ADHESIVE TAPE, 2 PIECES CUT 1" LONG
59	1	6024-0037	LOCK WASHER, #10 HELICAL SPRING
60	12	6013-0388	JAM NUT, #6-32 ELASTIC STOP

APPENDIX A - SCALE TOTALIZER

The scale totalizer will sum the weights of two or more scales and make the total available to the application program. The totalizer can be referenced as if it were another scale. The totalizer's scale number will be one plus the actual number of scales attached to the indicator.

NOTE! The indicator firmware must be version 02.2 or greater to support this function.

Setup

To setup the totalizer, remove the calibration sealing screws from all scale cards and press the **SETUP** key on the indicator's main menu. If the scale cards have not been setup, continue with the scale card setup. Otherwise, at the **SCALE ID** prompt, bypass the scale card setup screens by pressing the **FNCT** key. The display will change to show:

```
TOTALIZE  
(YES OR NO)  
CURRENT=??
```

Selecting **NO** (and pressing the **ENTER** key) will disable the scale totalizer. Selecting **YES** (and pressing the **ENTER** key) will enable the scale totalizer. Pressing the **FNCT** key will leave the selection as is and proceed to the next setup function or back to the main menu. If **YES** is selected (and the **ENTER** key pressed), the display will show:

```
INCLUDE  
SCALE 1  
CURRENT=??
```

Selecting **YES** (and pressing the **ENTER** key) means that weight from scale 1 will be used by the scale totalizer. Selecting **NO** (and pressing the **ENTER** key) means that scale 1 will not be a part of the totalizer. Note, that all the scales to be included in the totalizer must have the same scale division value (interval and decimal point precision), sample rate, and weight units. If this is not true, the error message:

```
INVALID  
SETUP FOR TOTALIZE
```

will be displayed. Press the **FNCT** key to return to the **INCLUDE SCALE** prompt and select **NO**, then press the **ENTER** key to proceed to the next setup function.

In addition, the firmware for the 778A card must be version 00.4 or higher, and the firmware for the 778K card must be version 00.2 or higher. If this is not true, the error message:

```
INVALID  
REV FOR TOTALIZE
```

will be displayed. Press the **FNCT** key to return to the **INCLUDE SCALE** prompt and select **NO**, then press the **ENTER** key to proceed to the next setup function.

After the appropriate selection for including scale 1 has been entered, the display will ask if scale 2 should be included in the totalizer. The question will be repeated for each scale attached to the indicator. The display will then change to show:

```
CAPACITY  
(1 TO 9,999,999)  
CURRENT=??
```

The value entered, in primary weight units, will be used in determining when the totalizer's overcapacity status will become true. The totalizer's overcapacity status will be true if any scale is overcapacity or if the total gross weight exceeds the totalizer capacity by more than 9 scale divisions. After the totalizer capacity has been entered, the display will show:

APPENDIX A - SCALE TOTALIZER, Cont.

```
MOTION
(0 TO 9)
CURRENT=??
```

The value entered, in scale divisions, will be used in determining when the totalizer's motion status will become true. The totalizer's motion status will be true if any of the totalized scales is in motion or if the total gross weight changes by more than totalizer's motion range. This completes totalizer setup.

Operation

When operating in STD mode, the totalizer will be identified by a \bar{T} . The **TARE** key will not be active when the display is showing the totalizer weight. If the **ZERO** key is pressed while displaying the totalizer weight, all of the scales included in the totalizer will be zeroed. If the **ZERO** key is pressed while displaying a scale weight, only that scale will be zeroed. If pounds-kilograms conversion is enabled, pressing the **UNITS** key, when displaying the totalizer or any of the scales included in the totalizer, will switch the weight units of the totalizer and the weight units of all the scales included in the totalizer.

Program Commands

The application program can use the standard scale commands and functions to access the totalizer. The totalizer may be accessed by using the totalizer's scale number in the command or function, or by using the CURSCALE command to make the totalizer the default scale. The function CURSCALE will return the totalizer's scale number if the totalizer is the default scale.

The function CARDS(17) will return one if the totalizer is enabled, zero if it is not. The SCALES function will return the total number of actual scales, not including the totalizer.

The GROSS, TARE, NET functions will return the totals of the gross, tare, and net weights, respectively, for all of the scales included in the totalizer. The CZERO function will return a nonzero value if and only if all of the scales included in the totalizer are at center of zero. The MOTION function will return a nonzero value if any of the scales included in the totalizer is in motion, or if the totalizer gross weight changes by more than the totalizer motion range. The OVERCAP function will return a nonzero value if any of the scales included in the totalizer is overcapacity, or if the totalizer gross weight is overcapacity. An error condition for the totalizer or any of the scales included in the totalizer will also cause OVERCAP to return a nonzero value. The BLOZERO function will return a nonzero value if the gross weight of any of the scales included in the totalizer is below zero, or if the totalizer gross weight is below zero.

The CAPACITY function will return the capacity of the totalizer. The INTERVAL function will return the scale division value for the totalizer. The totalizer and all of the scales included in the totalizer must have the same scale division value. The WTMODE function will return 1 if the totalizer displays weight in pounds only, 2 if the totalizer displays weight in kilograms only, and 3 if the totalizer displays weight in pounds and kilograms. The totalizer and all of the scales included in the totalizer must have the same weighing mode.

The CURUNIT function will return 0 if the totalizer is weighing in pounds, 1 if it is weighing in kilograms. The UNIT\$ function will return "LB" if the totalizer is weighing in pounds, "KG" if it is weighing in kilograms.

The TARETYPE function will return 0 if no tare is stored, 1 if a tare was stored for at least one of the scales included in the totalizer using the DOTARE command, and 2 if a tare was stored for at least one of the scales included in the totalizer using the TARE command. All tare weights stored for the scales included in the totalizer must be of the same type.

APPENDIX A - SCALE TOTALIZER, Cont.

The SCLSTAT function will return information about the scale's status. The information is encoded in the bits of the return value and can be determined by AND'ing the return value with the appropriate mask value:

SCLSTAT AND 2 = 1 = One or more of the scales included in the totalizer had some sort of failure or the total weight could not be calculated because the scales were incompatible.

SCLSTAT AND 8 = 1 = Analog failure of one or more of the scales included in the totalizer.

SCLSTAT AND 32 = 1 = This scale is included in the totalizer.

SCLSTAT AND 64 = 1 = This scale is the totalizer.

The CURUNIT command can be used to set the weight units for totalizer and its associated scales if pounds-kilograms conversion is enabled. The totalizer and all of its associated scales will be set to the same units when the command is executed.

The DOZERO command can be used to individually zero any of the scales associated with the totalizer. If the totalizer is specified as the target of the command, all of the scales included in the totalizer will be zeroed.

The DOTARE command can be used to individually tare any of the scales associated with the totalizer. If the totalizer is specified as the target of the command, it is as if the command were repeated once for each scale included in the totalizer. If a keypad tare has already been stored for one or more of the scales included in the totalizer, the DOTARE command can only be used to clear the tare (that is, the gross weight is 0). It cannot store a new tare since that could result in more than one type of tare being stored.

The TARE command can be used to individually tare any of the scales associated with the totalizer. The command cannot be used with the totalizer. If a pushbutton tare has already been stored for one or more of the scales included in the totalizer, the TARE command can only be used to clear the tare (that is, set the tare to 0). It cannot store a new tare since that could result in more than one type of tare being stored.

