
OmniScale

PC Based Weighing System

Installation and Operation Manual

For Version 6.00.00



By: Encompass Automation



Encompass Automation & Engineering Technologies,
LLC
900 W. South Boundary, Bldg. 5B
Perrysburg, Ohio 43551
Phone 419.873.0000
Fax 419.872.2612
www.eaetech.com

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1. Introduction

This manual describes the installation and operation of the OmniScale software package. The OmniScale system consists of a multi-channel high-resolution digitizer located at the load cells, and a PC based software package located remotely that is the weight indicator. Since the digitizer converts each load cell individually and sends the data back to the OmniScale PC, totalizing, calibration, individual load cell diagnostics and troubleshooting can be done remotely (there are no traditional digital weight indicators). Since the connection between the OmniScale Digitizer, and OmniScale PC is a simple serial link, concerns about reliability of running low voltage load cell cables long distances are eliminated. In addition, EAET's optional Spread Spectrum Radio Link communications is perfect for moving machinery applications, because it eliminates any cabling between the OmniScale Digitizer and the OmniScale PC.

A single OmniScale software package on the PC can support multiple digitizers and thus multiple scales. The number of scales that can be operated is limited by the processor speed. Another limiting factor is the number of serial ports available (each scale requires one serial port). During the initial startup (or any time after) each scale can easily be configured in the software package. Soft screen buttons on the OmniScale operator interface (either touchscreen or mouse) allow switching the weight display between scales. All scales are constantly active even though they may not be currently displayed.

OmniScale also includes additional functions such as: specialty screen for two-scale Rotary Caster weighing applications; three-levels of security for on-line applications with the ability to add and remove operators/permissions; PLC control and status monitoring via OmniProxy interface software with communications status monitoring.

The OmniScale System provides the following features:

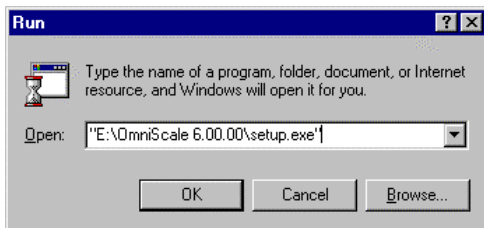
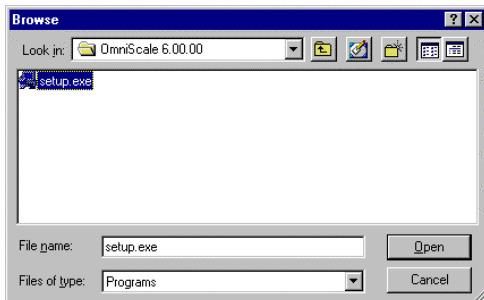
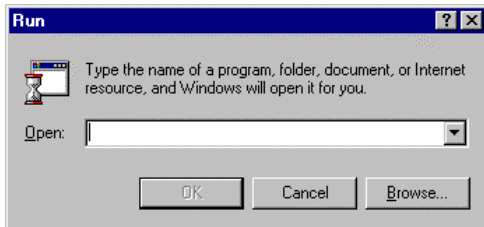
1. Accurate high resolution weighing in harsh environments.
2. Up to 4 Load Cells can be individually digitized at the scale with industrialized electronics.
3. PC based scale software allows remote calibration and individual Load Cell Diagnostics.
4. Load Cells can be individually disconnected in software for troubleshooting without having to physically go to the scale, and calibration will be retained.
5. Multiple scales can be run by a single OmniScale software package.
6. Optional wireless communications eliminate cables between the load cells and the weight indication.
7. OmniScale PC can connect to other systems via RS232 serial links, Ethernet, or a variety of PLC vendor network interfaces.

2. Installation and Setup

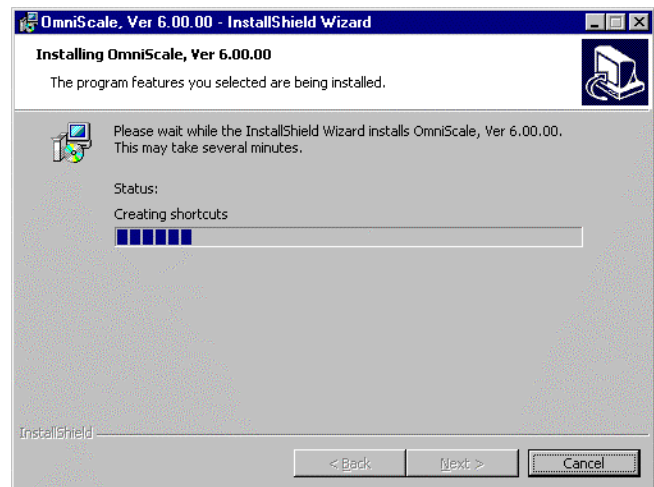
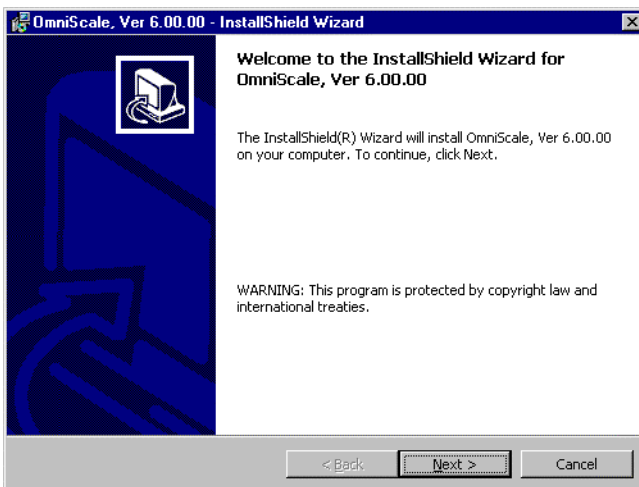
This section describes the installation of the OmniScale PC software package and the setup of Scale 1.

2.1 Installation

Follow these steps in order for a successful OmniScale installation.



1. Close any open applications.
2. Insert the CD into the CD-Rom drive.
3. Click the Start button and then the Run button.
4. Browse for the CD-Rom and select the Setup.exe file in the OmniScale folder.
5. Once the file is selected, click open.
6. The selected file will now be displayed in the Run window. Click OK to start the installation wizard.
7. Follow the on-screen instructions complete the OmniScale software installation.



2.2 Disable Detection of Devices on Serial Ports

When you start Windows NT, NTDETECT searches for the pointing device (usually a mouse). In the course of this process, data is sent to the serial (COM) ports. If a serial mouse is detected, Windows NT disables the port so a device driver for the mouse can load instead. Windows NT will recognize the OmniScale Digitizer as a mouse and then disable the communications of OmniScale. For OmniScale to operate correctly the detection of devices must be disabled.

2.2.1 Instructions for Disabling Detection

To disable the detection of devices on COM ports in Windows NT:

1. Using Windows Explorer, make a backup copy of the C:\Boot.ini file.
2. Remove the hidden, system, and read-only attributes from the Boot.ini file.
3. Using a text editor (such as Notepad) open the Boot.ini file.
4. Add the /NoSerialMice option to the end of each entry in the [operating systems] section of Boot.ini. See the example below for more information.
5. Save Boot.ini and quit Notepad.
6. Restore the hidden, system, and read-only attributes to the Boot.ini file.
7. Shutdown and restart Windows NT.

The following is a sample of the **Boot.ini** file:

```
[boot loader]
timeout=3
default=multi(0)disk(0)rdisk(0)partition(1)\WINNT35

[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT35="Windows NT Workstation Version 3.51" /NoSerialMice
multi(0)disk(0)rdisk(0)partition(1)\WINNT35="Windows NT Workstation Version 3.51 [VGA mode]"
/basevideo /sos /NoSerialMice
```

NoSerialMice Syntax

/NoSerialMice - Disables the detection of serial mice on all COM ports.

/NoSerialMice:COMx - Disables the detection of serial mice on COM x, where x is the number of the port.

/NoSerialMice:COMx,y,z - Disables the detection of serial mice on COM x, y and z.

2.3 Running OmniScale

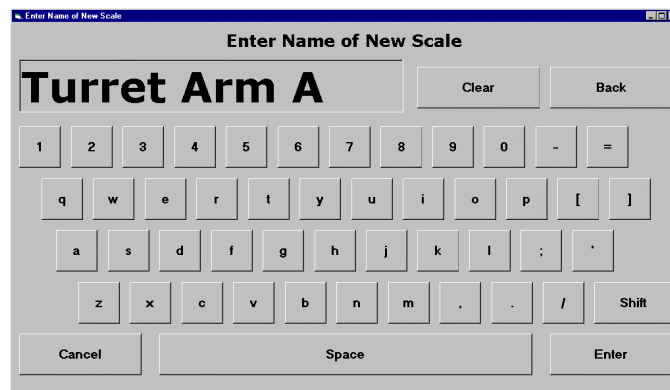
This section will describe running OmniScale for the first time and the setup of the first scale.

2.3.1 Start OmniScale

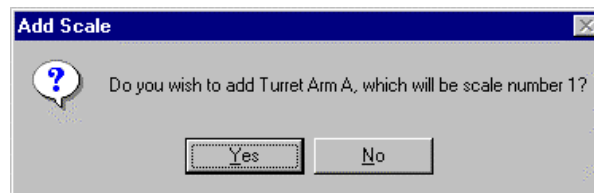
During the installation process, an OmniScale program group was created. To start the program, click the Start button, scroll up to programs, scroll to OmniScale and click the OmniScale fly-out to the right or double-click the OmniScale icon on the desktop.

2.3.2 Entering a Name

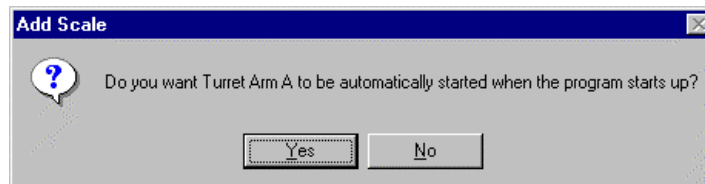
The first screen that comes up is **Enter Name of New Scale**. By using either the computer keyboard, or a mouse and the displayed keyboard, type in the desired name of the first scale. Press **Enter** when finished.



After pressing **Enter**, a confirmation screen for adding the scale will appear to verify the name selection. Press **Yes** to accept the selection.

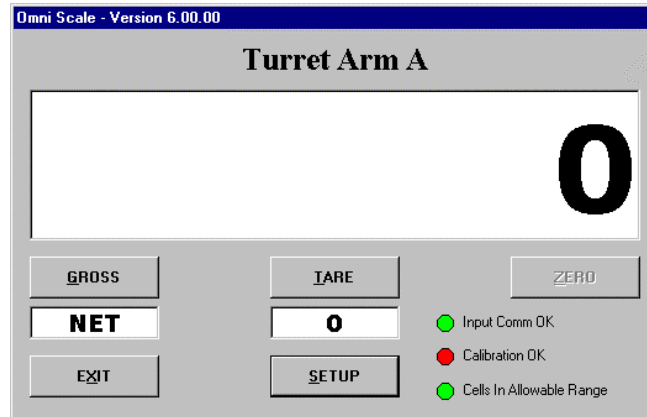


Next, a screen that sets the automatic status of the scale will appear. Answer **Yes** to this question. This can be changed later in the scale setup screen.

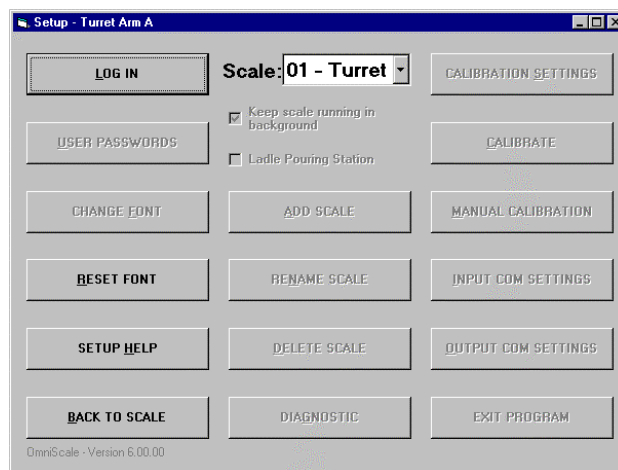


2.3.3 Setting up the Scale

The **Turret Arm A** window is now open. Press the **SETUP** button to configure **Turret Arm A**. Detailed explanation of this window will be covered in the **Operation** section of this manual.



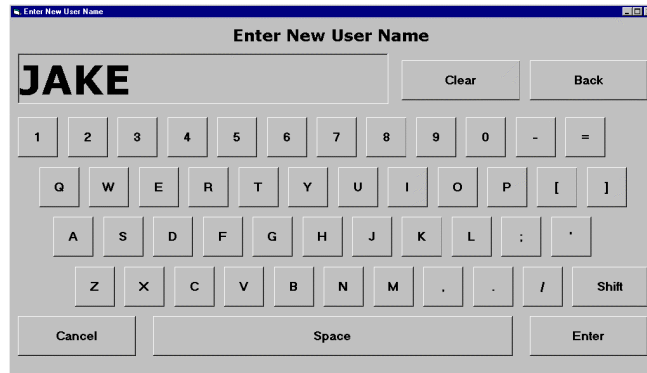
When the **Setup** window appears for the first time, the user must **LOG IN** before any changes can be made (except for font selection).



If this is the first **LOG IN** of a new installation, the operator must enter a pre-loaded user and password. The user name is **EAET**, and the password is **EAET**. Once the operator has logged in using the supplied name and password, OmniScale immediately requires the entry of a new user and password before the program will continue.

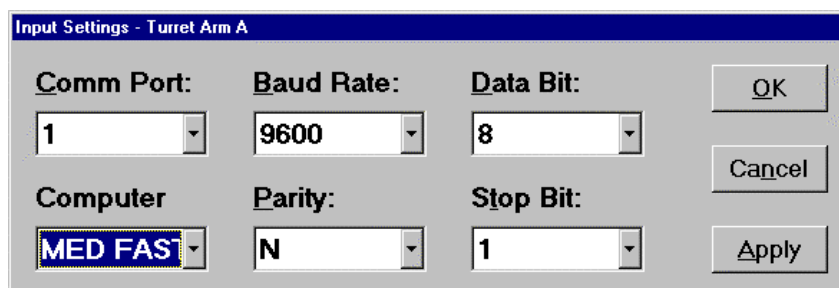


By using either the computer keyboard, or a mouse and the displayed keyboard, type in the name of the new user, and press enter. Next, type in the new user's password. To verify the password is correct, OmniScale will prompt the operator to enter the password a second time. OmniScale will then ask if this user is an Administrator; reply "Y". Once this is completed, the **Setup** window will be displayed with all function buttons active.



2.3.4 Input Comm Settings

Before the **Turret Arm A** can communicate with the appropriate OmniScale Digitizer, the **Input Settings** for communications must be set. First, choose the desired **Comm Port** from the available pull-down list. Once the **Comm Port** is selected, the settings of that port can be changed. As shown below, **9600, 8, N, 1** is the most common setting used, however, unique applications may require their change. **Note:** These settings are local to OmniScale only; they do not affect the Windows environment settings. The **Computer** field determines the sample rate calculation of OmniScale. Several factors to be considered when setting the speed are computer processor speed, display update and output communication traffic. Click **Apply** to accept the new settings. Click **OK** to exit this window.



This concludes the new scale installation and setup. **Calibration Settings** and **Scale Calibration** will be discussed in the **OmniScale Operation** section. If the scale is not communicating, go to the **Troubleshooting** section of this manual.

3. OmniScale Operation

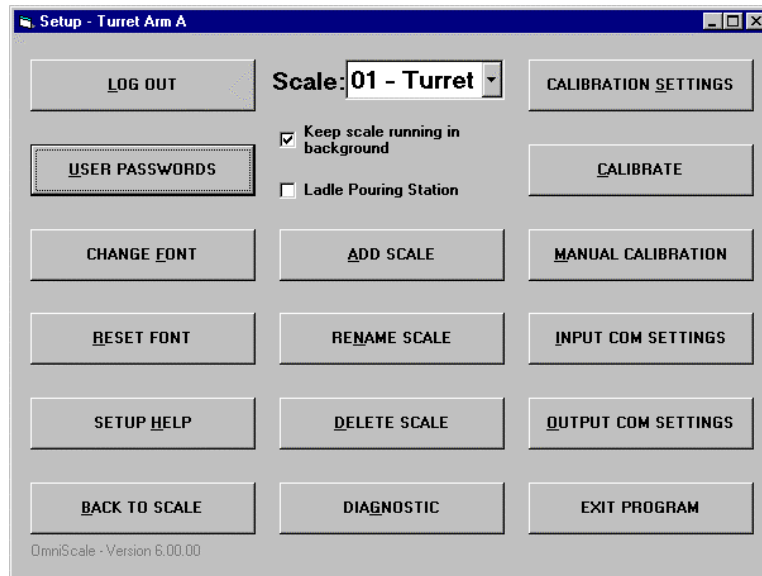
This section describes how to set-up, calibrate and operate the OmniScale software package.

3.1 Setup Screen

The **Setup** screen allows a user to change system parameters and scale settings. This screen allows the following:

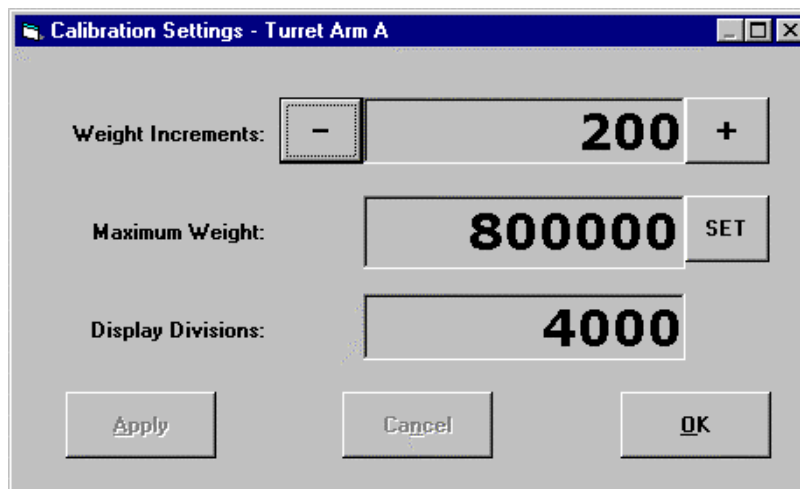
1. **LOG IN / LOG OUT:** used for logging in and out user with setup privileges.
2. **USER PASSWORDS:** for creating and administrating users, passwords, and privileges.
3. **CHANGE FONT:** used for changing the font style of the scale window.
4. **RESET FONT:** used for restoring the default font.
5. **SETUP HELP:** Opens a text window that contains notes on familiar problems that may be encountered while setting up and using the system.
6. **BACK TO SCALE:** returns to currently selected scale window.
7. **Scale:** pull down field for selecting scale to be monitored or modified.
8. **Keep scale running in background:** selectable box, determines if a scale will continue to run in the background if a different scale is selected. OmniScale program must be shut off and restarted before any changes will take effect.
9. **Ladle Pouring Station:** selectable box, determines the scale display mode.
10. **ADD SCALE:** used to create additional scales to be controlled.
11. **RENAME SCALE:** used to rename the selected scale.
12. **DELETE SCALE:** used to delete the selected scale.
13. **DIAGNOSTIC:** used for monitoring individual load cell status of the currently selected scale.
14. **CALIBRATION SETTINGS:** used for modifying calibration settings for the currently selected scale.
15. **CALIBRATE:** used for calibrating the currently selected scale.
16. **MANUAL CALIBRATION:** used for calibrating the currently selected scale.
17. **INPUT COM SETTINGS:** used for modifying communication settings for reading the OmniScale Digitizer of the currently selected scale.

18. **OUTPUT COM SETTINGS:** used for modifying communication settings when sending scale data to remote devices, such as remote displays. These settings are for the current selected scale.



3.2 Calibration Settings

This window allows the user to modify the scale calibration settings. Press **-** to decrease and **+** to increase the **Weight Increments** (divisions) of the scale. Click **SET** button to enter the **Maximum Weight** of the scale. If the measured weight of the scale exceeds the maximum weight, then an overload fault will be generated. The **Display Divisions = Maximum Weight / Weight Increments**. This is a calculated value. It is recommended that the **Display Divisions** do not exceed **10000** units. Once changes have been made, click the **Apply** to store the displayed values. Click the **OK** or **Cancel** button to return to the **Setup** window.

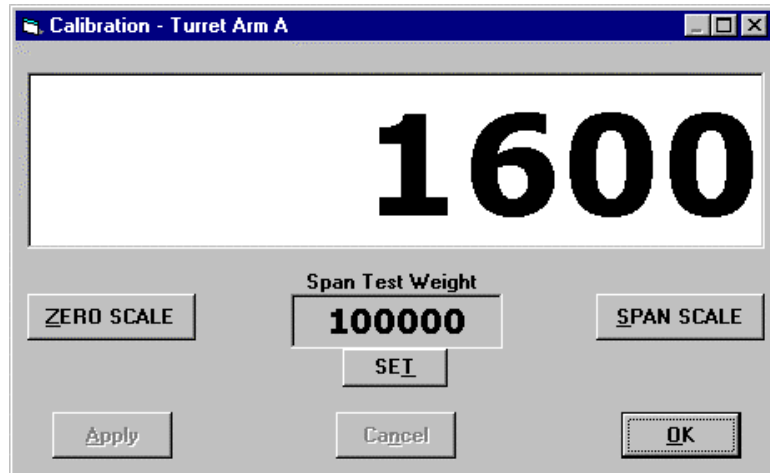


3.3 Calibrate

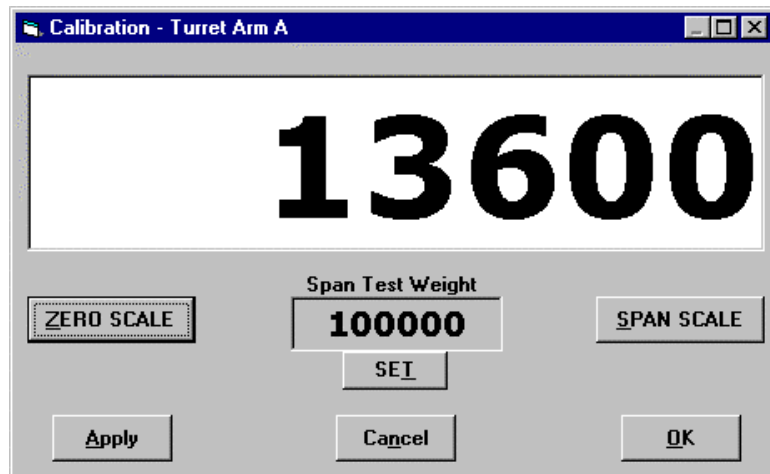
The **Calibrate** window is used for calibration of scale. **THIS WINDOW SHOULD ONLY BE USED FOR SCHEDULED CALIBRATIONS WITH TEST WEIGHTS.**

3.3.1 Calibration Procedure

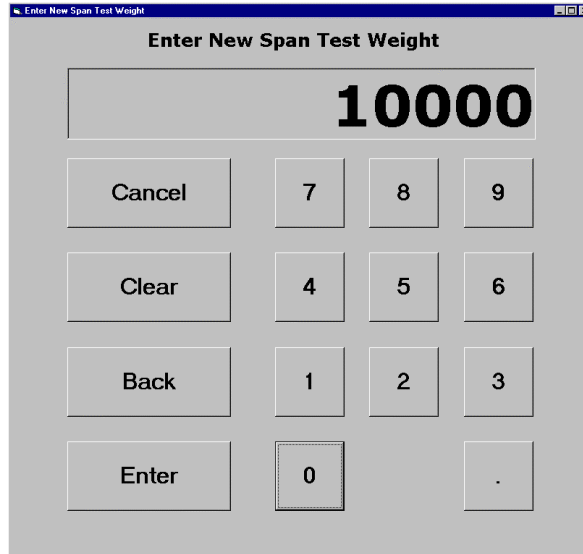
Prepare scale to be calibrated by removing all items including: ladles, containers or any other holding device. Below is a typical view of the **Calibration** window before the scale is zeroed.



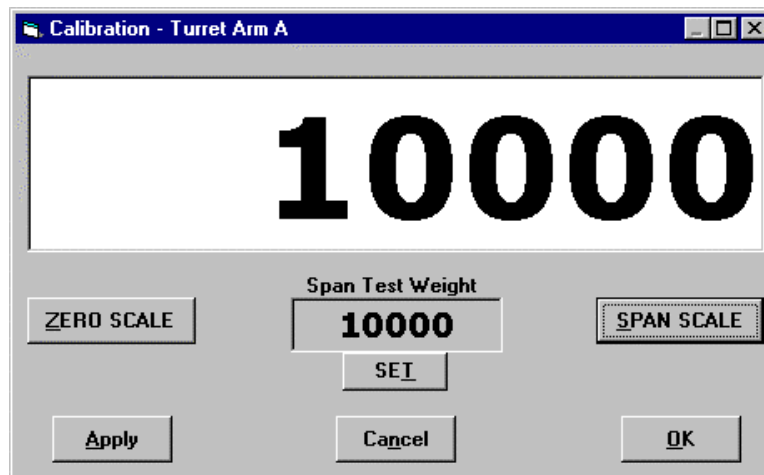
Zero the scale by clicking the **ZERO SCALE** button. Apply the test weight to the scale and click the **SET** button to set the amount of the test weight.



By using either the computer keyboard, or a mouse and the displayed keyboard, type in the value of the test weight. As the below example, a 5000 unit weight is being used. When the desired value is entered, click the **Enter** button to return to the **Calibrate** window.



When the test weight is in place on the scale and the correct value has been set in **Span Test Weight Amount**, click the **SPAN SCALE** button. The scale is now calibrated.

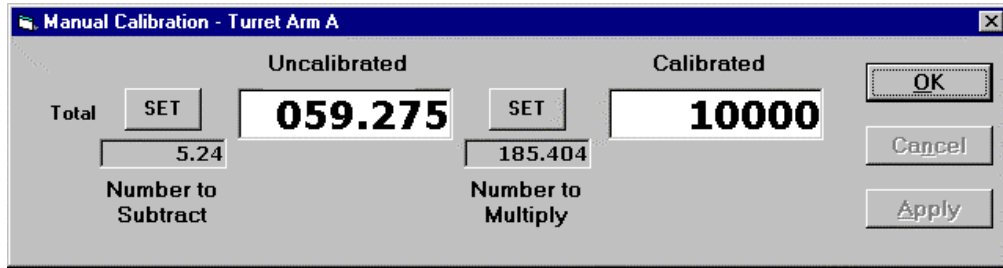


After removing the test weight the readout should return to zero. Re-apply the test weight to confirm that the span is correct. If calibration is satisfactory, click the **Apply** button to accept the calibration. Click the **OK** button to return to the **Setup** window. If calibration is not correct, click the **Cancel** button and repeat this section.

3.4 Manual Calibrate

The **Manual Calibration** window is for manually setting the calibration parameters of the selected scale. First, the **offset** is subtracted from the un-calibrated input value (in either mV or raw counts, this is determined in the OmniScale.ini file). Next, the adjusted value is multiplied by the **gain**. The result will be the calibrated value of the scale.

NOTE: Only experienced personnel should attempt using the **Manual Calibration** feature. Incorrect values will drastically affect the performance and reliability of the scale.

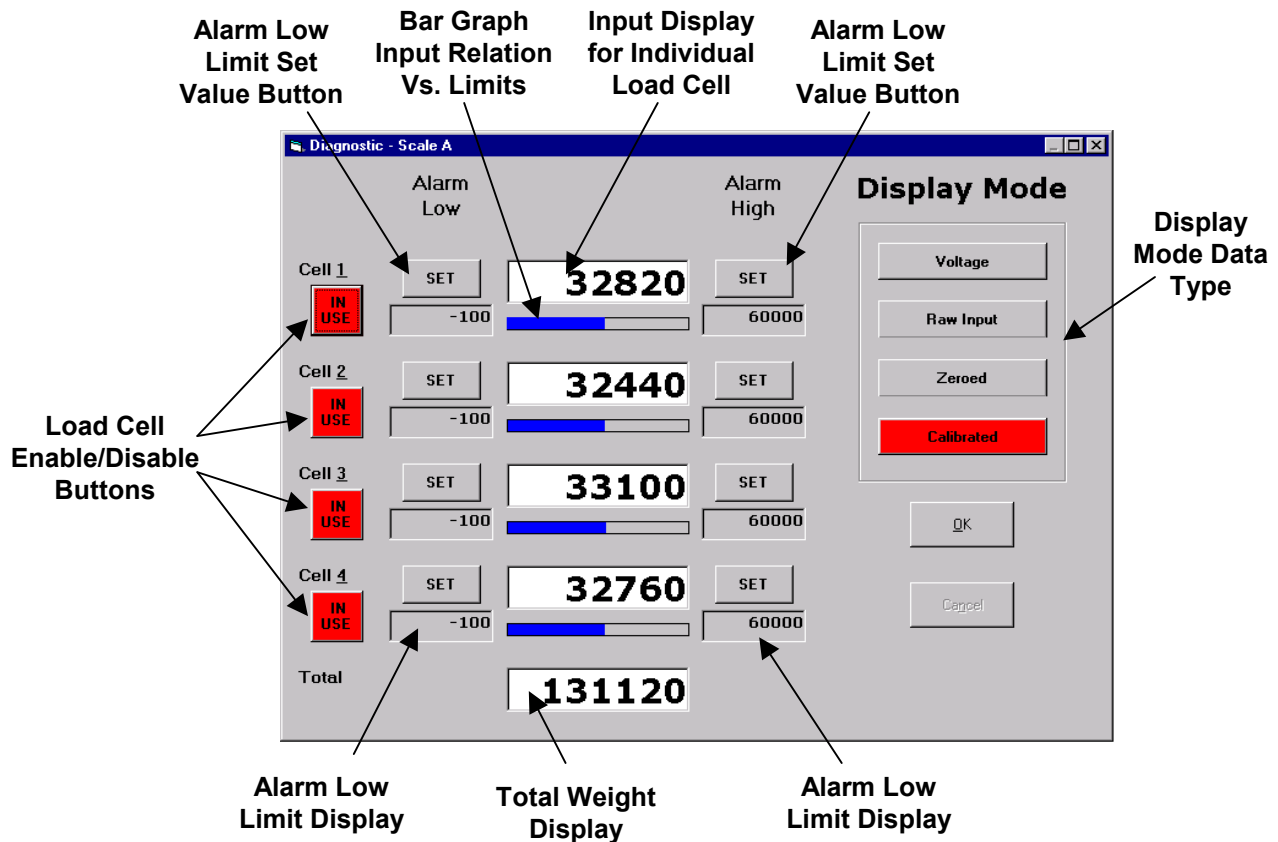


3.5 Diagnostic

The diagnostic window is used to monitor and set high and low alarm limits of the individual load cells of the selected scale. It also offers the operator the ability to disable one or more load cells from the selected scale. This feature will be discussed later in this section.

3.5.1 Overview of Features of the Diagnostic Window

The following is a list of features of the **Diagnostic** window available to the operator.



3.5.1.1 Display Mode

Offers the operator four modes of viewing individual load cell and total input data as well as the high / low alarm limits. Data will be displayed in the five display fields. The four modes of data are:

1. **Voltage:** Generally millivolt output of load cell. The conversion factor from raw counts to millivolts is in the OmniScale.ini file under 'VOLTMULT'.
2. **Raw Input:** Raw A/D counts. Depends on gain setting on digitizer, but is normally 30mV = 122,000 counts.
3. **Zeroed:** Raw counts with the calibrated zero subtracted.
4. **Calibrated:** Weight in engineering units per latest calibration.

3.5.1.2 Alarm High

Allows the operator to individually set the high alarm limit for each load cell. The field below the **SET** button displays the current limit for that particular load cell. The value in the field will convert automatically when choosing between the four display modes.

3.5.1.3 Alarm Low

Allows the operator to individually set the low alarm limit for each load cell. The field below the **SET** button displays the current limit for that particular load cell. The value in the field will convert automatically when choosing between the four display modes.

3.5.1.4 Bar Graph

Below each load cell display field is a linear bar graph. This graph indicates the load cell input in relation to the **High / Low Alarm** limits. Blue indicates that the load cell is within limits, while red indicates that the load cell is outside of limits.

3.5.1.5 Total / Calculated Total

Total: if all load cells are in use, this field displays the sum of the four load cells. The type of value in the field is determined by the **Display Mode** selection. **Calculated Total:** if one or more load cells are disabled, this field displays the calculated total of the scale. The value in the field will convert automatically when choosing between the four display modes.

3.5.1.6 Cell 1 – 4 In Use

The **In Use** button for **Cell 1** through **Cell 4** is a toggle switch that allows the operator to disable / enable one or more load cells of the selected scale. If a problem occurs during scale operation with a load cell, the operator can remove the input data of the damaged load cell from the scale's total weight output. OmniScale, from the data of the remaining **In Use** load cells, will calculate the approximate value of the missing load cell(s) data and will produce a **Calculated Total** for the scale. When a load cell is disabled, the input data display field will turn from white to gray, however, the input data will still be displayed. When one or more load cells are disabled, the **Calibration OK** light on the **Scale** window will turn red. Depending on the scale application, the operator may choose to either continue to operate the scale in its current status, or to exercise a calibration procedure.

3.5.1.7 Display Fields

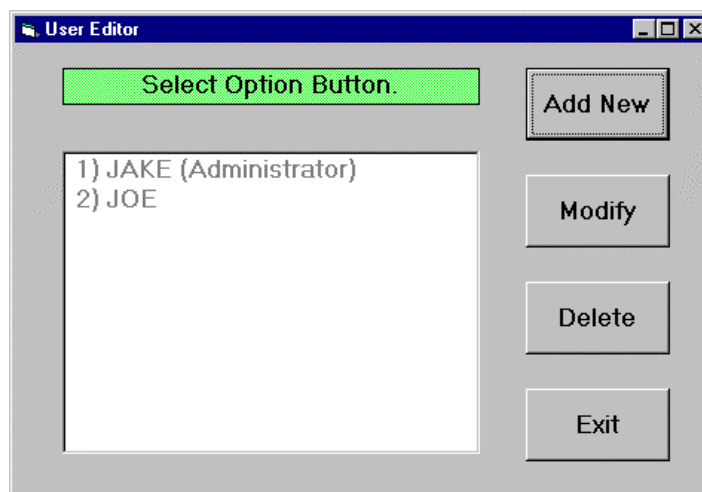
If the scale is not communicating with the OmniScale PC, all white fields in the window will turn gray.

3.6 User Passwords

Adding and deleting users and passwords are fairly self-explanatory, so this section will highlight the different screens. **Note:** Only a logged-in user with administrative rights can make any changes.

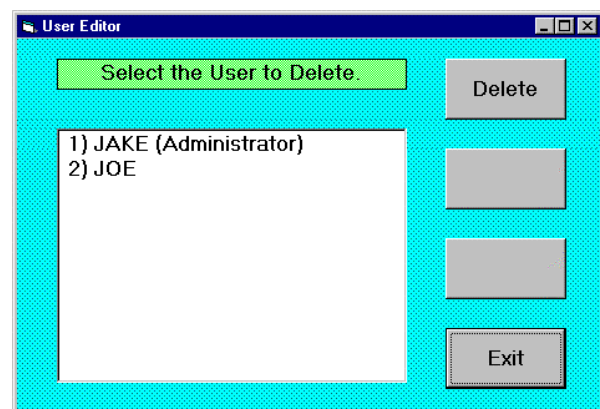
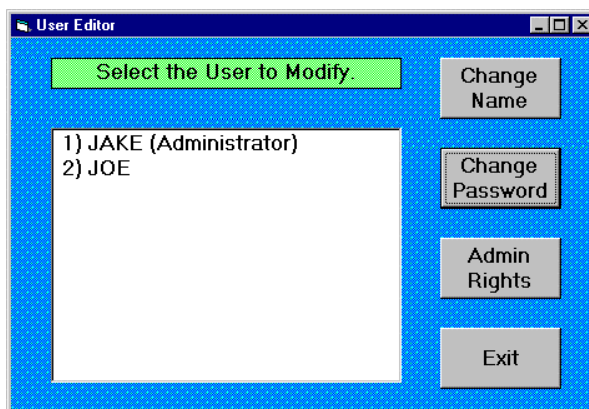
3.6.1 Current Users

The **User Editor** screen displays all configured users and which users have administrator privileges.



3.6.2 Modify / Delete User

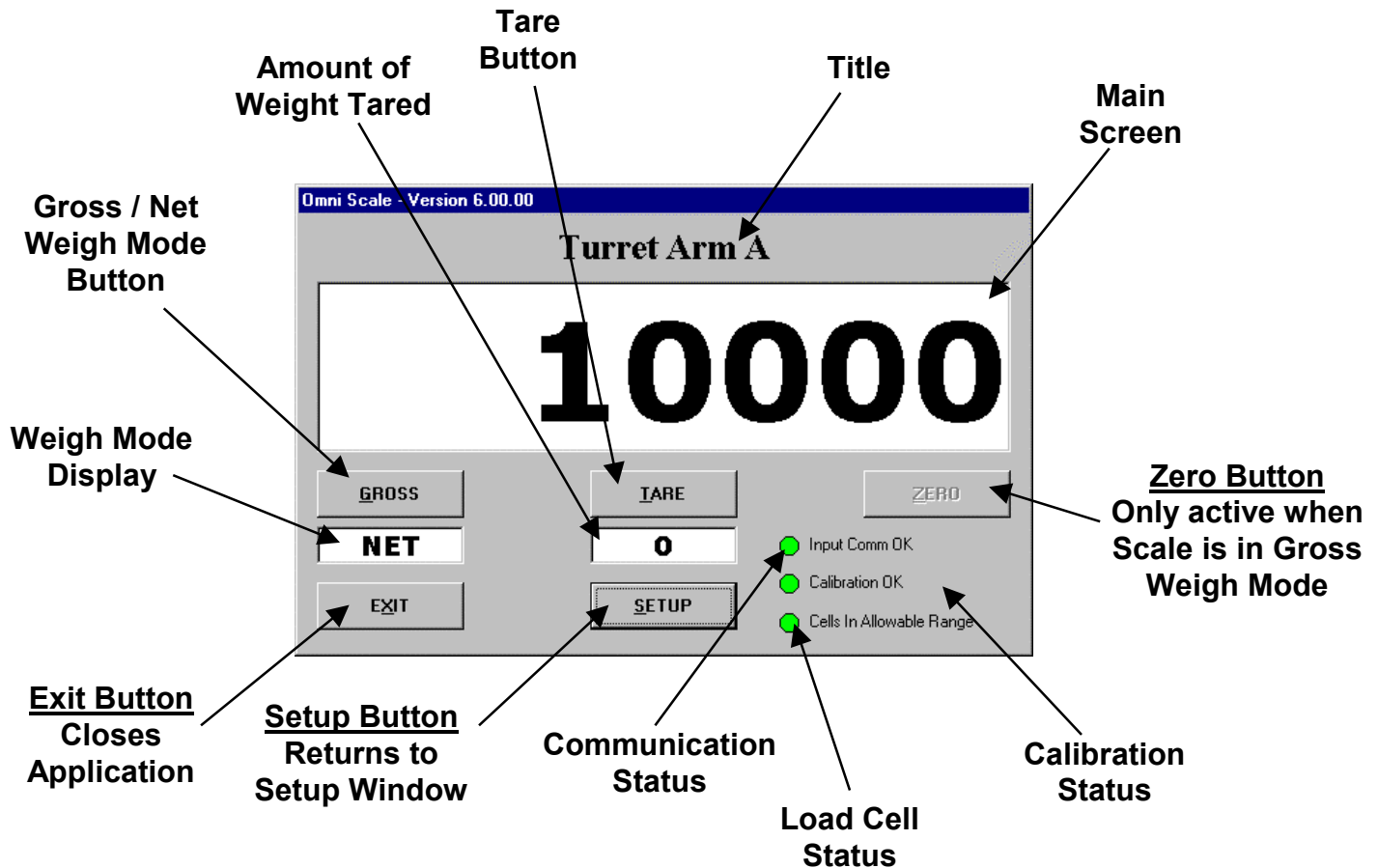
When **Modify** is selected, the selected user properties can be modified. These include Change name, change password and administrative rights. When Delete is selected, the selected user can be deleted.



4. Scale Windows

4.1 Scale window (Standard)

The **Scale** window is the main interface for the selected scale. The operational features of this window are as follows:



4.1.1 Title

The title displays the selected scale.

4.1.2 Main Display

This display is the weight indicator. It will display the current gross or net weight of the selected scale.

4.1.3 Gross/Net Toggle Button

This button allows the main display to be toggled between **Gross Weigh Mode** and **Net Weigh Mode**. The field below the button displays what mode the scale is currently in.

4.1.4 Tare Button

This button will **Tare** the selected scale. Tare is the offset weight of a holding container, such as a ladle, bin or possibly a pallet. When the tare button is clicked, the mode will toggle to **Net Weigh** and will display '0' units. The field below the button displays the tare weight.

4.1.5 Zero Button

This button will **Zero** the selected scale. The scale must be in **Gross Weigh Mode** for the button to be active.

4.1.6 Input Comm OK

This light indicates the status of the selected scale's communication with the OmniScale PC. If the light is green, communication is working. If the scale is not communicating with the OmniScale PC, all white fields in the window will turn gray and the indicator light will be red.

4.1.7 NEED CALIBRATION

This light indicates the calibration status of the scale. If the light is green, calibration is **OK**. If the light is red, the scale needs calibrated. Please see section **3.3** for the calibration procedure. **Note:** this light will turn red if a load cell has been disabled since the last calibration. Please see section **3.4 Diagnostic** for more information about disabling load cells.

4.1.8 Cells in Allowable Range

This indicates the status of the individual load cells of the selected scale. If the light is green, all load cells are within their set range. If the light is red, then one of the load cells is exceeding either the low or high limit. Please see section **3.4 Diagnostic** for setting the limits.

4.1.9 Setup Button

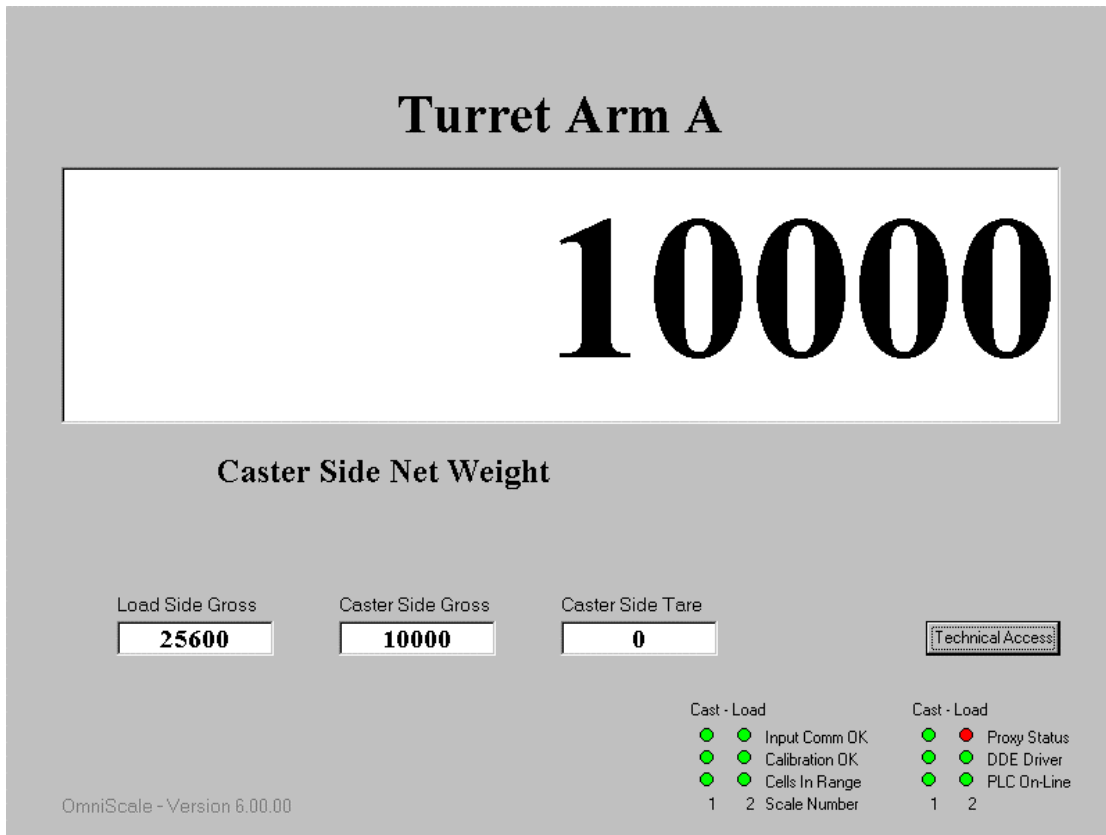
Clicking this button will return the operator to the **Setup** window.

4.1.10 Exit Button

Clicking this button will close the OmniScale application. All scales will be deactivated.

4.2 Scale window (Casting Station)

The **Scale** window is the main interface for a caster pouring station. It displays the outputs of two scales, the **Pouring** side and the **Loading** side. The operational features of this window are as follows:



4.2.1 Title

The title displays the scale name currently at the pouring side.

4.2.2 Main Display

This display is the Net weight indicator for the Caster pouring side. It will display the current net weight of the selected scale.

4.2.3 Load Side Gross Display

This display is the Gross weight indicator for the Load side of the caster. It will display the current gross weight of the load side scale.

4.2.4 Caster Side Gross Display

This display is the gross weight indicator for the caster pouring side. It will display the current gross weight of the selected scale.

4.2.5 Caster Side Tare Display

This display is the Tare weight indicator. It will display the tare weight of the pouring side scale. This weight comes from the PLC that controls the casting system.

4.2.6 Input COMM OK

This light indicates the status of the selected scale's communication with the OmniScale PC. If the light is green, communication is working. If the scale is not communicating with the OmniScale PC, all white fields in the window will turn gray and the indicator light will be red.

4.2.7 NEED CALIBRATION

This light indicates the calibration status of the scale. If the light is green, calibration is **OK**. If the light is red, the scale needs calibrated. Please see section **3.3** for the calibration procedure. **Note:** this light will turn red if a load cell has been disabled since the last calibration. Please see section **3.5 Diagnostic** for more information about disabling load cells.

4.2.8 Cells in Allowable Range

This indicates the status of the individual load cells of the selected scale. If the light is green, all load cells are within their set range. If the light is red, then one of the load cells is exceeding either the low or high limit. Please see section **3.5 Diagnostic** for setting the limits.

4.2.9 Proxy Status

Indicator shows if the proxy server is communicating with Omniscale program.

4.2.10 DDE Driver

Indicator shows if the PLC driver software is communicating with the Proxy Server.

4.2.11 PLC On-Line

Indicator shows if the PLC is communicating with the PLC driver software.

Note: The Left column of status lights is for the scale at the caster pouring side, and the Right column is for the scale at the load side.

4.2.12 Technical Assistance Button

Clicking this button will return the operator to the **Setup** window.

The Casting Station Scale window is designed to fill the entire screen and is generally for monitoring purposes only. The window cannot be altered in size and the program cannot be ended without logging in.

5. OmniScale.ini File

This section describes locating, detailed description and modifying the OmniScale.ini file.

5.1 About OmniScale.ini

When the OmniScale software is first installed, a default OmniScale.ini file is created. This file is stored in the SetupFiles\Accessories folder. When a new scale is added, a new folder is created in the Accessories folder. ***A copy of the default OmniScale.ini file needs to be created and placed in this new folder.*** The name of this new folder is the name of the new scale created.

5.2 Locating the OmniScale.ini

When the OmniScale software is first installed, the installation loads the software package in a default location. The path of the .ini file is:

C:\Program Files\OmniScale\OmniScale\SetupFiles\Accessories\OmniScale.ini

After a new scale or additional scales are created, make a copy of the default OmniScale.ini file in the new scale directory. The path the scales .ini file is:

C:\Program Files\OmniScale\OmniScale\Accessories*(scale name)*\OmniScale.ini

Where *(scale name)* is the name of the scale to be modified.

5.3 Editing the OmniScale.ini

To edit a particular scale's OmniScale.ini file, follow the below procedure:

1. Right click on the Windows **Start** command in the lower-left corner of your desktop.
2. Click on **E**xplore.
3. Locate the OmniScale.ini file by following the above path.
4. Once the correct OmniScale.ini is found, double click the file.

Notepad will open with the OmniScale.ini file ready to be edited. Once editing is complete, pull down the **F**ile menu and click **S**ave to save the new edits. Once the file is saved, close the Notepad application. If you wish **not** to save the changes, exit the application and select **N**o when you are prompted "**Do you want to save the changes?**".

5.4 The OmniScale.ini

Below is what the default OmniScale.ini file looks like.

```
4:50 PM 12/12/01; Start of record
```

```
; Note: Serial input form "A+000000B+000000C+000000+D+000000Exxxxxxxxxx" (x is any  
other trailing data) is defined below.
```

```
STARTCHAR = "A"
```

```
; End of record  
ENDCHAR = "E"
```

```
; Lowest (ASCII#) character to read in as scale value data  
; - others will be thrown out or changed to a space depending on CHGTOSPACE setting  
FILTERMIN = "+"
```

```
; Highest (ASCII#) character to read in as scale value data  
; - others will be thrown out or changed to a space depending on CHGTOSPACE setting  
FILTERMAX = "9"
```

```
; Maximum allowable length of entire record - rest will be ignored (Length does not include  
STARTCHAR)  
MAXLENGTH = 31
```

```
; Minimum length of string of each weight  
MINWGTLLENGTH = 7
```

```
; Maximum length of string of each weight  
MAXWGTLLENGTH = 7
```

```
; Should program replace all characters not within the filter  
; - min and max with a space?  
CHGTOSPACE = True
```

```
; Should program trim input to 7-bit?  
TRIMTO7BIT = False
```

```
; Number of weight channels being fed in  
NBROFLOADCELLS = 4
```

```
; How often should the timer check for new scale input?  
; - (in seconds)  
COMMINTERVAL = 4
```

```
; Scale control variables - currently ineffective  
; MODEMTYPE --> PassThru = 0, LAWNII = 1  
; SCALETYPE --> Accm = 0, MSI = 1  
MODEMTYPE = 0  
SCALETYPE = 0
```

```

; Voltage conversion settings
; - Input is first multiplied by VOLTMULT, then VOLTADD is added.
VOLTMULT = 0.0002
VOLTADD = 0.0

; Base mode for manual calibration
; Should the calibration factor work from the voltage readings or
; from the raw scale input?
; Type VOLTS or RAW
MANCALBASEMODE = RAW
; Scale output format - use the following to represent values...
; (NET/GRS) -- Net/Gross Mode Indication (will either be a 0(Gross) or 1(Net))
; (GRSWGWT) -- Total Gross Weight (will be seven digits preceded by a +/-, will include
; a decimal point, either among the digits or afterward)
; (NETWGT) -- Net Weight (will be seven digits preceded by a +/-, will include a decimal
; point, either among the digits or afterward)
; (TAREWGT) -- Tare Weight (will be seven digits preceded by a +/-, will include a decimal
; point, either among the digits or afterward)
; (MOTIND) -- Motion Indication (will be ????????)
; (RAWDATA(*)) -- Individual Load Cell Raw Input Data ( * represents which
; character to separate them with.) (each load cell value will
; be SIX digits preceded by a +/-, no decimals included)
; <N1>...<N9> <S1>...<S9> <ND1>...<ND9> <SD1>...<SD9>
; FORMATS PRECEEDING NUMBER WITHOUT OR WITH SIGN & DP.
; <n5> = -9999 to -0001 to 00000 to 99999
; <s5> = -99999 to -00001 to +00000 to +99999
; <nd5> = -9999. to -0001. to 00000. to 99999.
; <sd5> = -99999. to -00001. to +00000. to +99999. Default = <SD6>.
; Accepts <SOH> <STX> <ETX> <EOI> <ENQ> <ACK> <BEL> <BS> <LF> <VT> <FF>
<CR> <LT> <GT> <NAK> <ESC> <SPC> <> <1>...<255> <\a> <\b> <\t> <\n> <\v> <\f>
<\r> <(> <)>. Note: letter case is ignored.

; Any other characters except spaces, equal signs, semicolons, quotation marks, tabs
; and returns will be interpreted as actual characters to insert in the
; data stream. Use quotation marks to delimit the stream.
; Note NET/GRS and MOTIND cannot be length formatted. These are fixed at 1.
; OUTPUTSTRING = "A(NET/GRS)B(GRSWGWT)C(NETWGT)D(TAREWGT) E(MOTIND)
F(RAWDATA(,))G<cr><lf>"
OUTPUTSTRING = "A<>(NETWGT)<s4><CR><lf>B<32>(NETWGT)<sd4><CR><LF>
C<32>(NETWGT)<n4><CR><lf>D<32>(NETWGT)<nd4><CR><LF><CR><LF>"

```

Only personnel experienced with computer operation should attempt to modify the OmniScale.ini file. If the file is incorrectly modified, the scale will not work properly. **The default system .ini file should not be modified unless instructed to by Encompass Automation & Engineering Technologies, LLC.**

Note: Definition of common output control characters:

<SOH>	= 1	(Start of Heading)
<STX>	= 2	(Start of Text)
<ETX>	= 3	(End of Text)
<EOI>	= 4	(End of Information)
<ENQ>	= 5	(Enquire)
<ACK>	= 6	(Acknowledge)
<BEL>	= <\a> = 7	(Bell)
<BS>	= <\b> = 8	(Back Space)
<HT>	= <\t> = 9	(Horizontal Tab)
<LF>	= <\n> = 10	(Line Feed)
<VT>	= <\v> = 11	(Vertical Tab)
<FF>	= <\f> = 12	(Form Feed)
<CR>	= <\r> = 13	(Carriage Return)
<NAK>	= 21	(Not Acknowledge)
<ESC>	= 27	(Escape)
<SPC>	= <> = 32	(Space)
<(>	= 40	(Left Parentheses)
<)>	= 41	(Right Parentheses)
<LT>	= 60	(Less Than)
<GT>	= 62	(Greater Than)
<1>...<255>	= 1...255	(Any ASCII character)

Note: Any ASCII character may be added to the output string by using <nnn> where nnn is a number from 1 to 255. Null <0> is not supported and the ASCII character set does not support numbers above 255. Any unsupported number will be translated to a Space <SPC>.

Several of the output numbers may be user formatted to length and sign characteristics.

NET/GRS & MOTIND cannot be user formatted.

GRSWG, NETWGT, TAREWGT, and RAWDATA(,) can be formatted to any length between one and 9 characters.

The control <N5> will format the number to a range of -9999 to -00001 to 00000 to 99999. <ND5> will force the number to have a decimal point even if it is a whole integer. So the <N5D> format would be -9999. to -0001. to 00000. to 99999.

The controls <S5> and <SD5> do the same except there is always a sign character external to the number. <S5> yields the result -99999 to -000001 to +00000 to +99999, and <SD5> yields the result -99999. to -000001. to +00000. to +99999.

The format is: "(NETWGT) <SD5>". Default is <SD6>. Over/under range is indicated by nines (-99999 +99999).

6. OmniScale DDE Interface

The OmniScale package can communicate with other systems either by serial interface, PLC busses, or Windows DDE. This section describes the Windows DDE interface.

6.1 Configuration

The OmniScale package is setup as a DDE Server, and data is read (pulled) from the OmniScale package by the user's application. The user may also write (push) values to OmniScale for certain commands.

The OmniScale software runs in a Windows NT environment, and is a single program that supports multiple scales. Thus all DDE communications go to a single OmniScale program, with the DDE topic defining which scale the data is coming from. In general, the DDE inquiry will take the following form:

OMNISCAL|SCALEx|ITEM

Where:

- **OMNISCAL** is the application name.
- **SCALEx** is the topic, with the x being replaced by the scale number (1-n).
- **ITEM** is the particular data point.

The Picture here is borrowed from the OmniProxy program to illustrate the data that can be passed between the OmniScale program and the Client PLC.

The Items on the left side are passed to the PLC and the items on the right are passed to the OmniScale program.

	From OmniScale	From PLC		To OmniScale
GROSSI	52	1	DoTare	1
TAREI	56	0	ToggleGN	0
NETI	-4	0	DoZero	0
STATUS	30720	0	ViewMe	1
RAWC1	13	0	ManTare	0
RAWC2	13	0	ProxySts	0
RAWC3	13	0	---	0
RAWC4	13	0	---	0
		0	---	0

OMNISCAL|Scale1
RSLINX|ABPLC

To PLC
52|56|-6|30720|12|13|13|12

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The following section (**DDE Items**) describes the individual items available.

DDE Items

6.1.1 DDE Read Items

This section describes the individual DDE items of data available to be read from the OmniScale. The Integer Word data is limited to the range –32768 to 32767. If a number must be larger, it must be scaled according to the rules in **Setup** under **Calibration Settings**.

6.1.1.1 GROSSF

This returns the gross weight on the scale as a floating-point number. This is the actual weight on the scale with the calibrated zero, and push button zero applied.

6.1.1.2 GROSSI

Returns the gross weight on the scale in a format that will fit into a 16-bit signed number, with scaling (implied decimal point/fixed zero) done by the client. This number represents the number of displayed divisions of weight on the scale. The division size is established during calibration, and represents the smallest amount that the weight can change by. A division is either 1,2, or 5 with the decimal point placed some number of places to the left or right. As an example, .02, .2, 2, 20 and 200 are all valid displayed divisions. To convert from displayed divisions to engineering units, multiply the number of divisions by the division size. As an example, if the current displayed divisions was 1000, and the division size is 20, then there are 20,000 Lbs on the scale (assuming the units are pounds).

6.1.1.3 TAREF

Returns the current Tare weight that was acquired by the OmniScale the last time the Tare button was pressed. This returned as a floating-point number.

6.1.1.4 TAREI

Returns the current Tare weight that was acquired by the OmniScale the last time the Tare button was pressed. This is returned as a 16-bit number with scaling done by the client.

6.1.1.5 NETF

Returns the current net weight, which is the Gross minus the Tare as a floating-point number.

6.1.1.6 NETI

Returns the current net weight, which is the Gross minus the Tare as a 16-bit number, with scaling provided by the client.

6.1.1.7 STATUS1

Returns a bit wise 16 bit number, with each bit representing a status of the scale:

- Bit 0 : 1 = Communications error with OmniScale digitizer.
- Bit 1 : 1 = Scale is over capacity.
- Bit 2 : 1 = Scale requires calibration (results from change in number of load cells enabled).
- Bit 3 : 1 = Cell 1 is out of range high.
- Bit 4 : 1 = Cell 2 is out of range high.
- Bit 5 : 1 = Cell 3 is out of range high.
- Bit 6 : 1 = Cell 4 is out of range high.
- Bit 7 : 1 = Cell 1 is out of range low.
- Bit 8 : 1 = Cell 2 is out of range low.
- Bit 9 : 1 = Cell 3 is out of range low.
- Bit 10 : 1 = Cell 4 is out of range low.
- Bit 11 : 1 = Cell 1 is enabled.
- Bit 12 : 1 = Cell 2 is enabled.
- Bit 13 : 1 = Cell 3 is enabled.
- Bit 14 : 1 = Cell 4 is enabled.
- Bit 15 : 1 = Scale display in Net Weigh Mode.

6.1.1.8 RAWCn

Returns the calibrated output of load cell n, where n is 1-4. This is returned as a 16-bit number with scaling done by the client.

6.1.2 DDE Write Items

This section describes the individual DDE items of data available to be written to in the OmniScale. This is data sent from the PLC to the OmniScale scales.

- The BIT values must be in the **True** or **False** state for more than one second each to be properly detected.
- The action is edge-triggered. Action takes place the moment the bit turns True. The bit may remain in either state for as long as desired without consequence.
- OmniScale never modifies the value of the Bits; it only monitors them.
- The Word data is limited to the range -32768 to 32767. If a number must be larger, it must be scaled according to the rules in **Setup** under **Calibration Settings**.

6.1.2.1 DOTARE (Bit)

When client application sets the DOTARE = 1, a Tare command is executed for the scale. This bit must be set back to 0 by the client application before the next DOTARE command is executed. OmniScale never modifies the value of this DOTARE; it only monitors its status.

6.1.2.2 TOGGLEGN (Bit)

When client application sets the TOGGLEGN = 1, the scale display is switched from Gross Weigh Mode to Net Weigh Mode. This bit must be set back to 0 by the client application before the next TOGGLEGN command is executed. When client application sets the TOGGLEGN = 1 a second time, the scale display is switched from Net Weigh Mode back to Gross Weigh Mode. The client application can monitor the status of the toggle by reading BIT 15 of the status word. OmniScale never modifies the value of TOGGLEGN; it only monitors its status.

6.1.2.3 DOZERO (Bit)

When client application sets the DOZERO = 1, the scale is zeroed. This action is the same as the operator pressing the Zero button on the screen.

6.1.2.4 VIEWME (Bit)

When client application sets the VIEWME = 1, the scale display is switched from the current scale to display this scale. The operator will now see this scale as his primary scale.

6.1.2.5 MANTARE (Word)

When client application sets the MANTARE value to new value, the scale will use this new value as the tare weight for this scale. The value must change by, at least one pound, to be accepted by the scale.

6.1.2.6 PROXYSTS (Word)

This word is used to receive status information from the OmniProxy program, its interface to the PLC driver software, and to the PLC.

- **Bit 0** is a Heartbeat bit, which must change 12 or more times in a minute.
- **Bit 1** is the status of the PLC driver program. Zero = loaded and running.
- **Bit 2** is the PLC On-Line status. Zero = On-Line.

Finish.