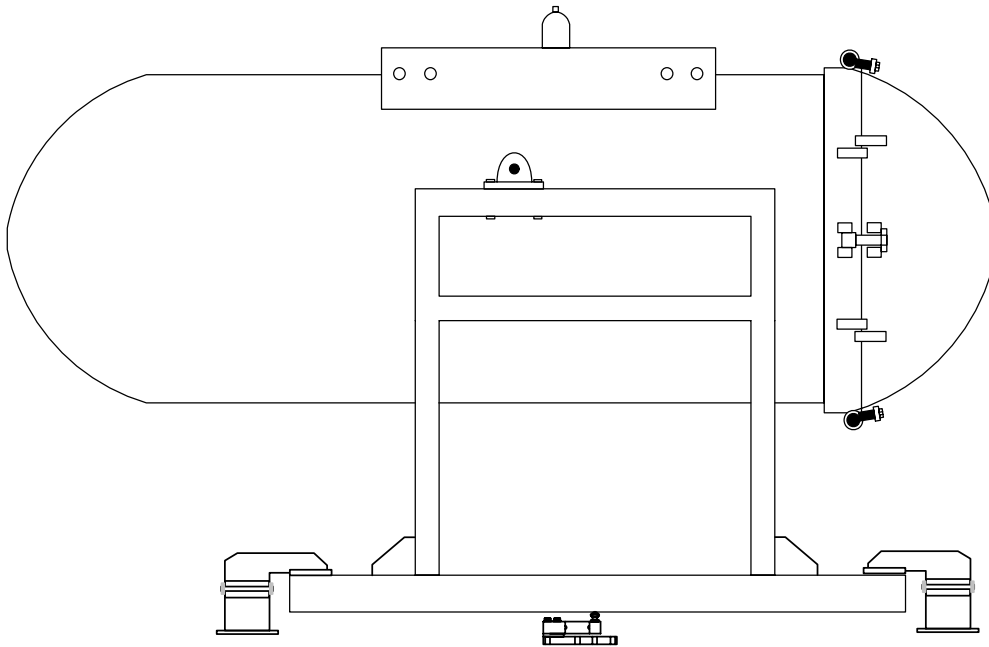


# FORCE FLOW

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## ELECTRONIC WEIGHING SYSTEM For Monitoring Chlorine Inventory and Usage



FOR USE WITH:

**CHLORTAINER**  
TGO TECHNOLOGIES

● TON CONTAINER ● SINGLE 150 ● TWIN 150 ● DUAL 150 ●

SANTA ROSA . CA 95403 PH: 1-800-543-6603

## ELECTRONIC WEIGHING SYSTEM for TGO CHLORTAINER

### SECTION I - Load Cell Installation

TGO-1 INDEX

#### TON, SINGLE & TWIN 150 LB. CYLINDER VESSELS

DRAWING NO:

TGO-2	INSTALLATION PROCEDURE	
TGO-3	LOAD CELL POSITION -- TON	31190
TGO-4	LOAD CELL POSITION -- SINGLE/TWIN 150	31189
TGO-5	LOAD CELL SPECS	29990-TGO

#### DUAL 150 LB. CYLINDER VESSEL

TGO-6	INSTALLATION PROCEDURE	
TGO-7	LOAD CELL POSITION	31188
TGO-8	INSTALLATION DETAIL	29942
TGO-9	PROCELL SPECS	29940-TGO
TGO-10	INSTALL WEIGHT INDICATOR	
TGO-11	J40 SUMMING BOX - WIRING	30549
TGO-12	J40 SUMMING BOX - SPECS	29943

### SECTION II - Digital Weight Indicator

See SECTION II - TABLE OF CONTENTS

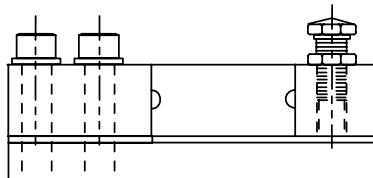
TGO-1

# Chemical Monitoring System with Digital Weight Indicator

## INSTALLATION

### ChlorTainer Models:

- Single Ton Container Vessel
- \*Single 150 lb. Cylinder Vessel
- Twin 150 lb. Cylinder Vessel



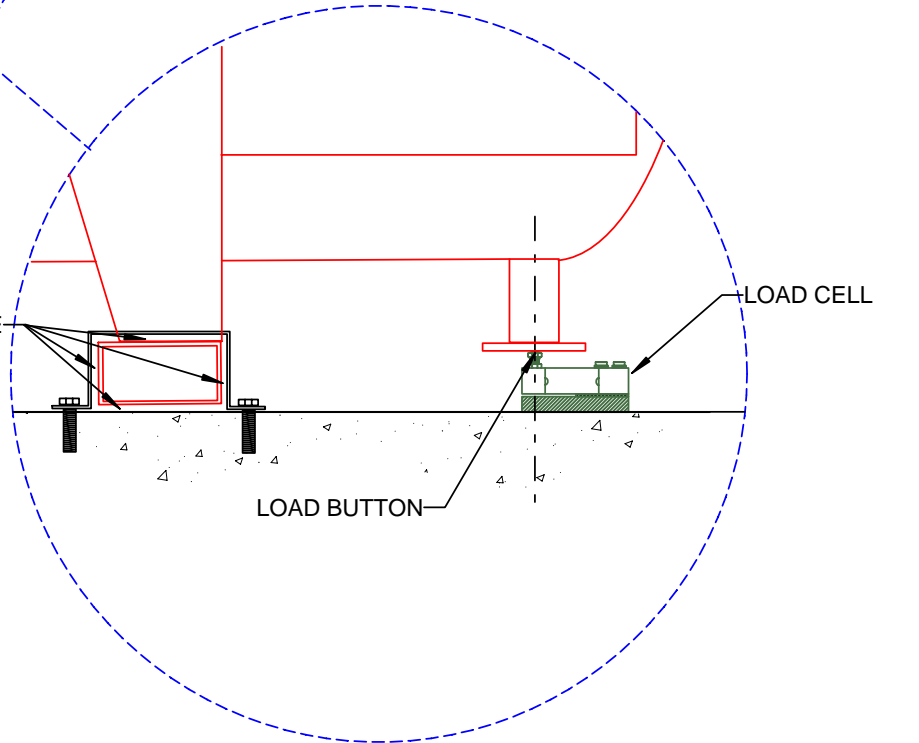
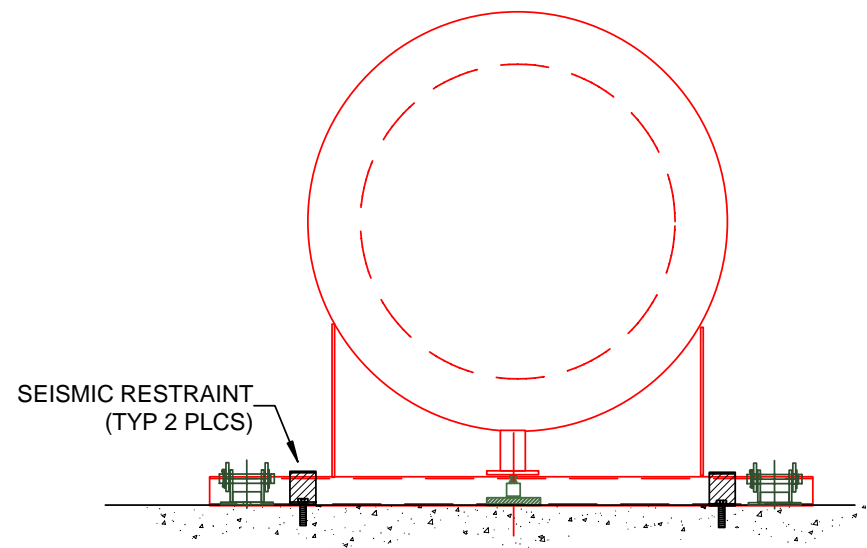
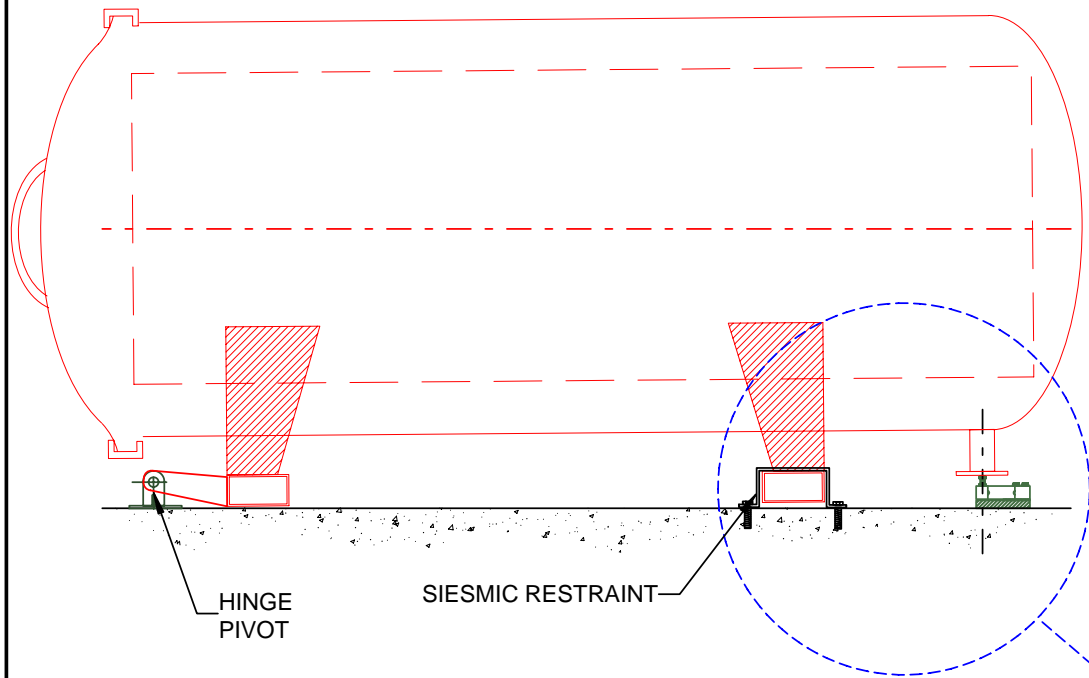
\*For Dual 150 lb. cylinder vessel, see page TGO-6

**INSTALLATION SHOULD BE PLANNED BY A QUALIFIED ENGINEER. EACH INSTALLATION IS UNIQUE. THIS MANUAL IS INTENDED TO SERVE AS A GENERAL GUIDELINE ONLY.**

## PROCEDURE

1. Locate load cell assembly in proper position as shown on page TGO-3 & -4.
2. Position load cell so that load button is centered under weight pod and so that load cell orientation matches that on drawing.
3. Using load cell base plate as template, mark anchor bolt locations, remove load cell and install anchors.
4. Reposition load cell and secure with anchor bolts.
5. Select location for indicator. System includes 20 feet of load cell cable. If additional length required, please contact factory at 1-800-893-6723 or 925-686-6700.
6. Mount digital indicator on wall or structure at eye level using four (4) integral mounting feet.
7. Route load cell cable along surface or through conduit. When routing through conduit, disconnect load cell cable from indicator, route as required, then reconnect to indicator.
  - 1-1/2" diameter conduit or greater for easy installation.
  - Use dedicated conduit for load cell cables.
8. See SECTION II - Digital Weight Indicator, to complete installation, programming and start-up of chemical monitoring system.

TGO-3



**NOTES:**

**FOR PROPER SCALE OPERATION, SEISMIC RESTRAINTS MUST NOT PHYSICALLY CONTACT ANY PART OF VESSEL STRUCTURE.**

**ADJUST HEIGHT OF LOAD BUTTON ON LOAD CELL SO THAT NEITHER FORK TUBE CONTACTS GROUND.**



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File: T4\O&M\TGO\CHLORTAINER PROCELL.tcw  
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**ELECTRONIC LOAD CELL POSITION**

**CHLORTAINER WEIGHING SYSTEM  
TON CONTAINER VESSEL**

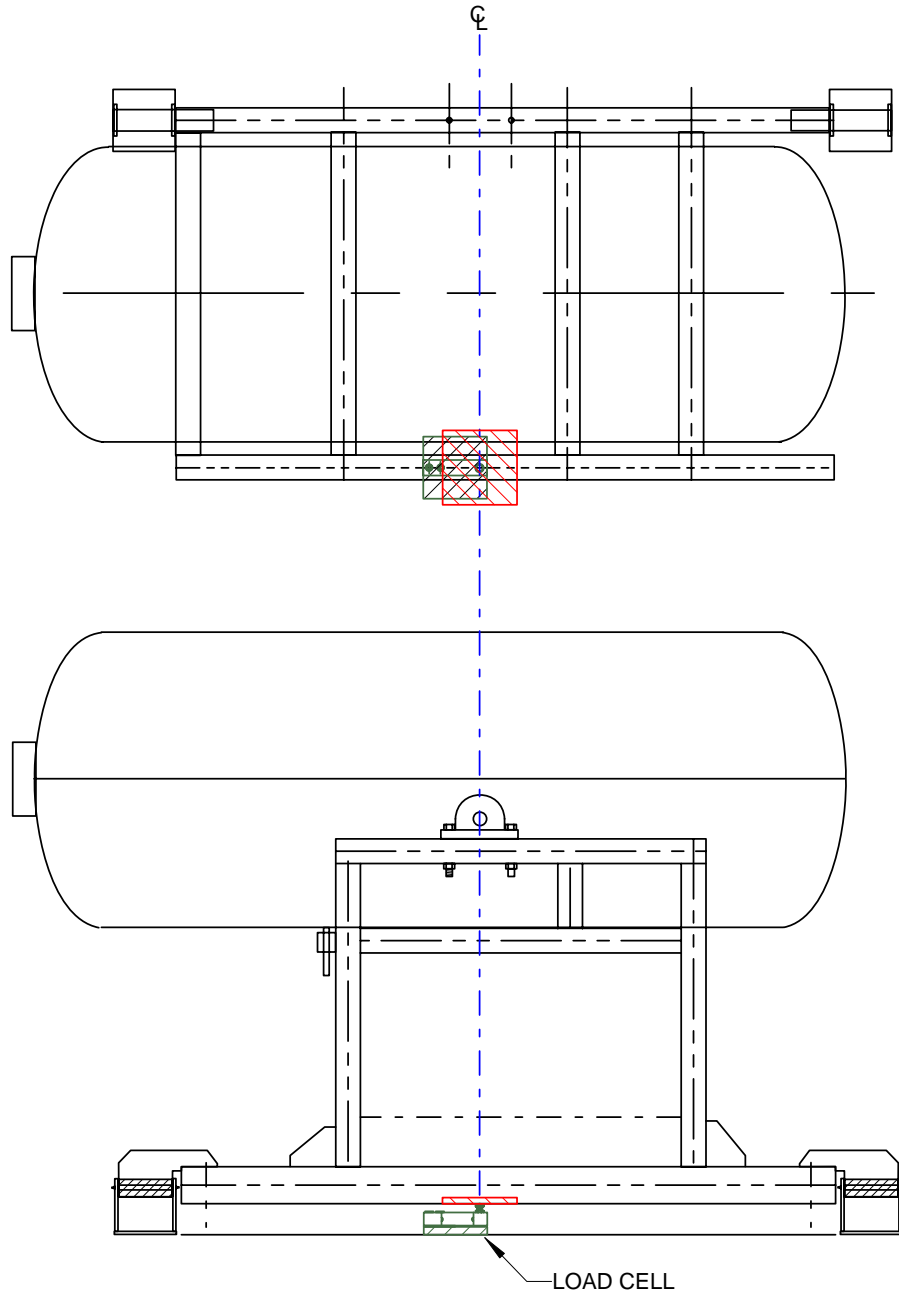
CHECKED BY: MT

Drawn by: SLJ/MT  
 Date: 01/19/07  
 Revised: 01/24/07  
 Scale: NONE

Drawing Number

**31190**

TGO-4



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File: T4\TGO\CHLORTAINER SINGLE.tcw  
EMAIL/DRAWINGS/TGO/CHLORTAINER SINGLE.pdf

**ELECTRONIC LOAD CELL POSITION**  
**CHLORTAINER WEIGHING SYSTEM**  
**SINGLE & TWIN 150 LB. CYL. VESSELS**

CHECKED BY: MT

Drawn by: SLJ/MT  
Date: 01/09/07  
Revised: 01/24/07  
Scale: NONE

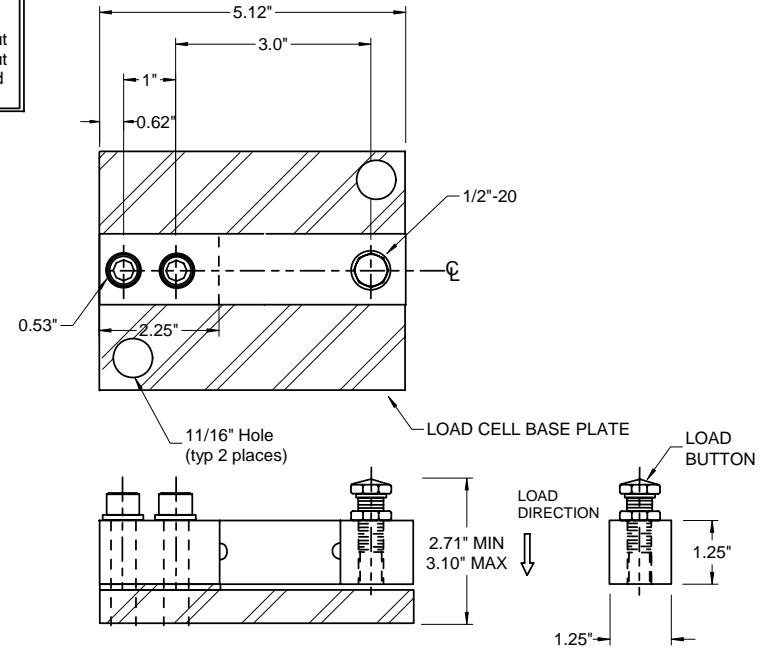
Drawing Number  
**31189**

Models:	TGO Model:	Load Cell Capacity:	System Capacity:
LCS-SB-1K	SINGLE 150	1,000 Lbs.	2,000 Lbs.
LCS-SB-2K	TWIN 150	2,000 Lbs.	3,000 Lbs.
LCS-SB-4K	TON VESSEL	4,000 Lbs.	8,000 Lbs.

For Dual 150 lb. Cylinder ChlorTainer, see ProCell drawing on Page \_\_\_\_.

WIRING	
RED	+ Input
BLACK	- Input
GREEN	+ Output
WHITE	- Output
BARE	Shield

RATED CAPACITY (lbs) --	.5K, 1K, 1.5K, 2.5K, 4K, 5K and 10K
FULL SCALE OUTPUT (mV/V) --	3.0 +/- 0.25%
BRIDGE RESISTANCE --	Input (ohms) $\frac{343}{349}$ Output (ohms) $\frac{357}{355}$
SEALING --	Environmentally Protected for NEMA 6 or IP67
MATERIAL/FINISH --	Alloy Tool Steel Electroless Nickel
CABLE --	4-Conductor, 22 AWG, Shielded and Jacketed, 20 ft. standard



ACCURACY CLASS	Standard (Class 3)	NTEP (Class III)
Combined Error (FSO)	<.03%	5,000 Divisions (Sgl or Multiple)
Non-Linearity (FSO)	<.03%	
Hysteresis (FSO)	<.02%	
Creep (FSO) in 20 minutes	<.03%	
Temperature /Compensated Range (degrees F/ degrees C)	14 to 104 degrees -10 to 40 degrees	
Temperature Effects: Zero / degrees F (FSO)	<.0015%	
Span / degrees F (of load)	<.0008%	

Temp. Operating Range (deg F/deg C)	0 to 150 degrees / -18 to 65 degrees
Non-Repeatability (FSO)	<0.01%
Zero Balance (FSO)	+/- 1.0%
Excitation Voltage (VDC)	10 (15 Max)
Safe Overload (FSO)	150%
Ultimate Overload (FSO)	300%
Safe Sideload (FSO)	100%
Sideload Rejection Ratio	500:1
Deflection (inches)	+/- 10%

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File: T4\TGO\LCS-SB TGO.pdf  
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**LOAD CELL ASSEMBLY**  
**MODELS LCS-SB-1K, -2K & -4K**  
**for TGO TON, SINGLE 150 &**  
**TWIN 150 VESSELS**

Drawn by: SLP  
Date: 11/94/96  
Revised: 08/25/99  
Scale: NONE

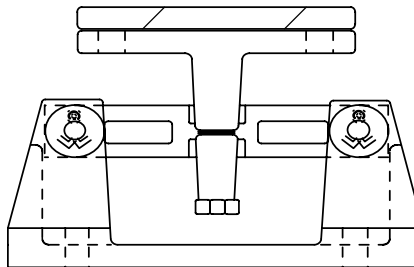
Drawing Number  
**29990-TGO**

# Chemical Monitoring System with Digital Weight Indicator

## INSTALLATION

### ChlorTainer Model:

- Dual 150 Lb. Cylinder Vessel



**INSTALLATION SHOULD BE PLANNED BY A QUALIFIED ENGINEER. EACH INSTALLATION IS UNIQUE. THIS MANUAL IS INTENDED TO SERVE AS A GENERAL GUIDELINE ONLY.**

## GENERAL GUIDELINES:

- Use care during installation not to apply excessive force to any one ProCell. This could result in permanent damage.**
- Use only Grade 8 hardware with self-locking fasteners.**
- Do not install ProCells until any required welding is completed. Heat generated from welding current can damage the electronics in the ProCell. If welding must be performed after ProCell is installed, it is preferable to temporarily replace load cell with dummy load cell or at a minimum, connect the ground from the welder to a location that insures current does not flow through ProCell. Protect ProCell from any splatter. All piping and conduit that connects to the vessel must preferably have flex sections or at a minimum, long horizontal unsupported runs to reduce friction error on weigh system. See drawing page TGO-13.**
- friction error on weigh system. See drawing page TGO-13.**

## PROCEDURE

### LOCATE, MARK AND INSTALL ANCHORS

- All mounting surfaces must be level.**
- Lift ChlorTainer vessel and block so that ProCells can be slid into place and attached to vessel.**
- Loosely using bolts, temporarily attach all three ProCells to vessel.**
- Set Vessel in desired final position.**
- Mark ProCell floor anchor locations.**
- Lift vessel and move, or remove ProCells, so that anchors can be installed in marked locations.**

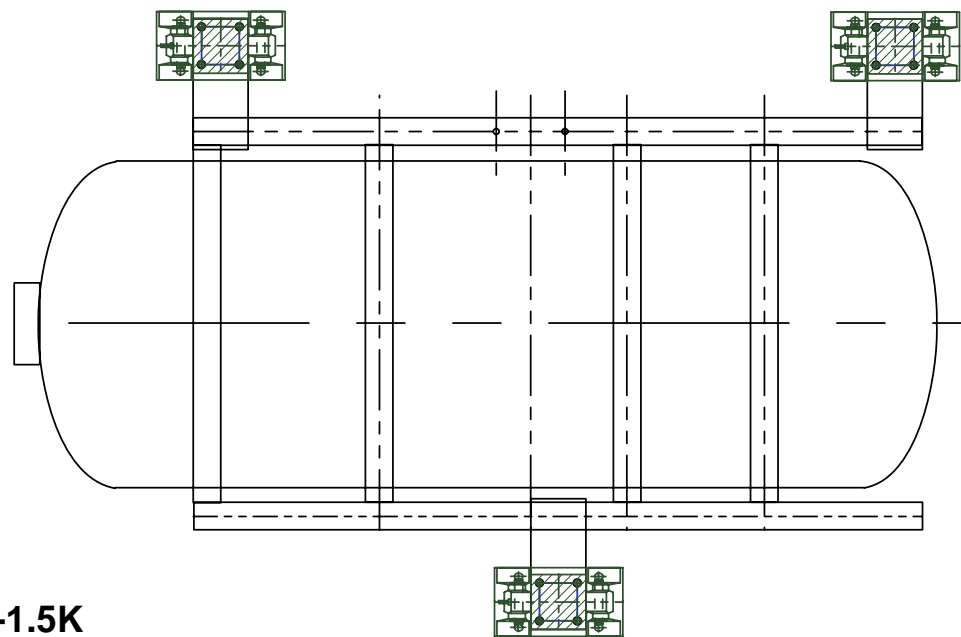
**TGO-6**

**FORCE FLOW**

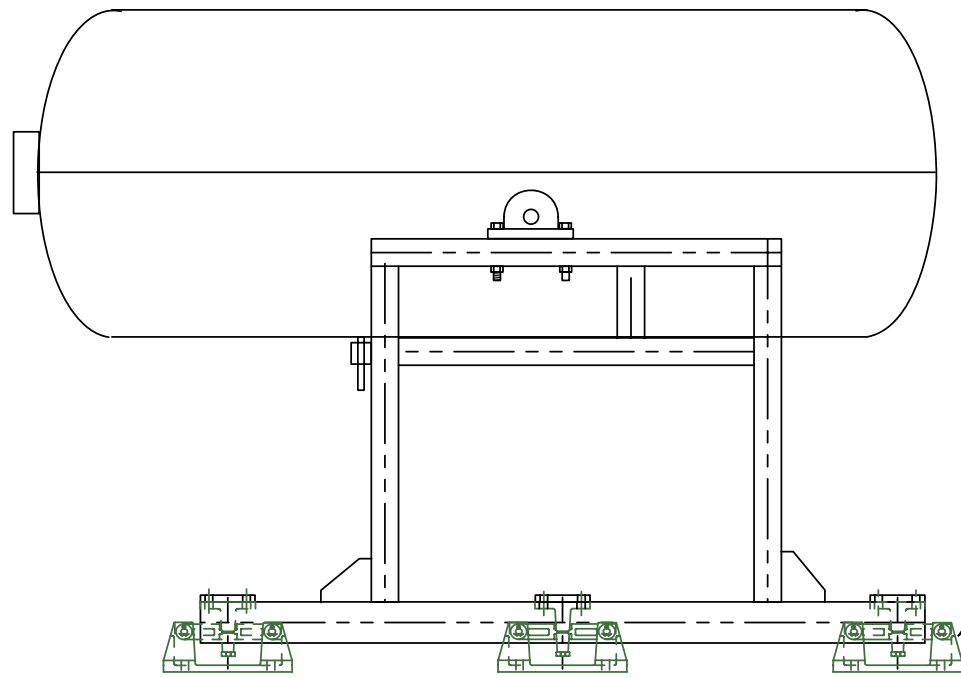
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REF: T4\TGO\TGO INSTALLATION 2.tcw

TGO-7



ProCell® Model PC160-1.5K



LOAD CELL  
(TYP 3 PLCS)



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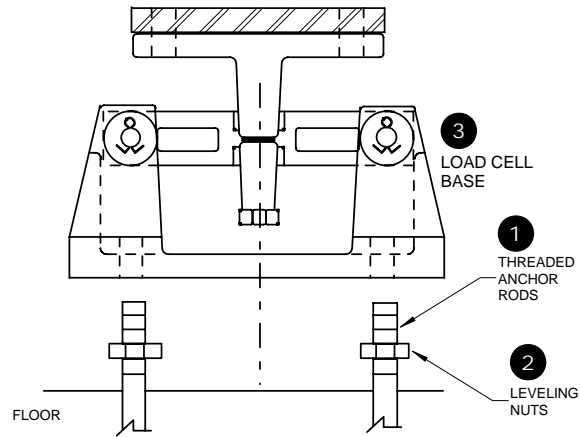
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**ELECTRONIC LOAD CELL POSITION**  
**CHLORTAINER WEIGHING SYSTEM**  
**DUAL 150 LB. CYLINDER VESSEL**

CHECKED BY: MT

Drawn by: SLJ/MT  
 Date: 01/09/07  
 Revised: 01/24/07  
 Scale: NONE

Drawing Number  
**31188**

**STEPS 1 - 3**

STEP 1: Locate and install THREADED ANCHOR ROD to align with load cell assembly base plate mounting hole locations. (Preferably, use actual load cell assembly as template or see Drawing 29940). Make sure to locate so load cell assembly top plate will accurately line up with tank legs or saddle when installed.

STEP 2: Install LEVELING NUTS onto threaded anchor rods.

STEP 3: Slide load cell assembly onto threaded anchor rods so that load cell base rests on leveling nuts.

STEP 4: Install FASTENING NUTS hand tight on anchor bolt posts. Fastening nuts may need to be adjusted up and down in Step 6.

STEP 5: Mount and secure tank leg or saddle to top of tank weighing assembly. Load equalizer pad should be located between tank leg and load cell assembly.

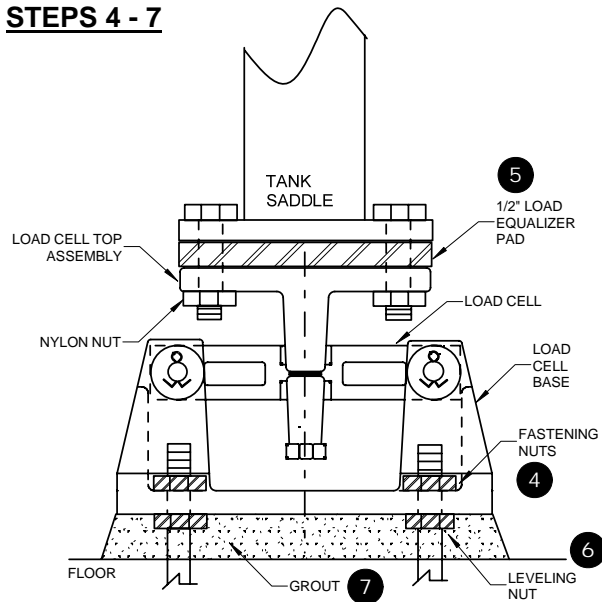
**SKIP STEP 6 IN SINGLE LOAD CELL APPLICATION**

STEP 6. When all load cells are installed and the tank is mounted on them, verify load is equally distributed by performing the following check of each load cell.

- Make sure load cells are connected to J40 Summing Box and that summing box is connected to weight indicator.
- Power up indicator.
- Open the summing box enclosure
- Measure the DC millivolt signal across the signal wires (green & white) of each load cell.
- The millivolt reading for each load cell should be within 20% of all others.
- To balance outputs, use leveling nuts to increase or decrease height of load cell assemblies. More weight on load cell = higher millivolt reading.
- When load cells are balanced, re-seal summing box.

STEP 7: Tighten all fastening nuts and then fill gap between base plate and floor with grout.

STEP 8: While tank is empty, make sure to ZERO the weight indicator (zeroing instructions located in indicator section of O&M manual)

**STEPS 4 - 7**

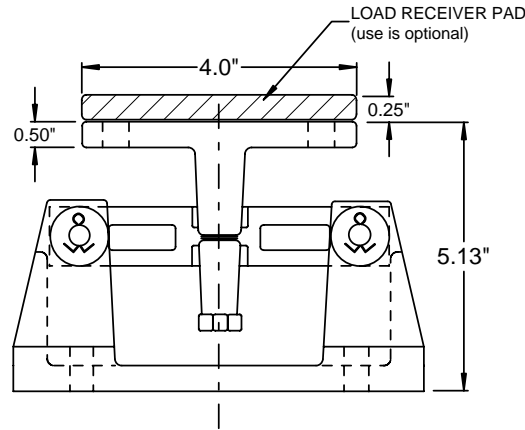
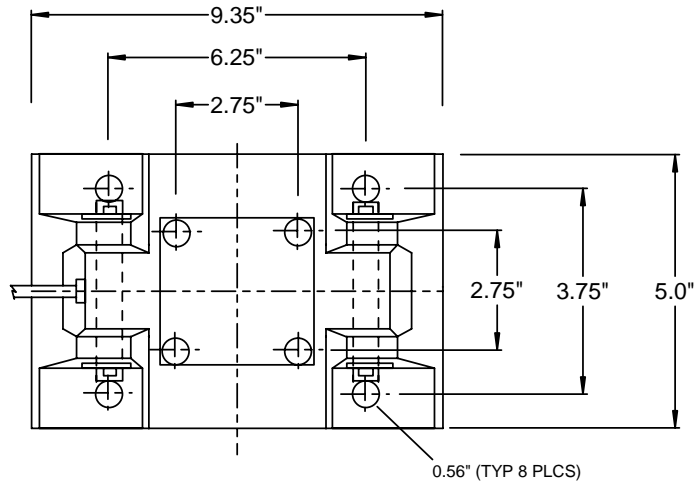
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MODEL PC160 PROCELL  
Tank Weighing Assembly  
Load Cell Installation Drawing  
(1,000 lb to 75,000 lb Capacity)

Drawn by: SLJ/MT  
Date: 11/04/96  
Revised: 10/19/05 MT  
Scale: NONE

Drawing Number  
**29942**



Total System Capacity: 3000 Lbs.

Quantity: 3

Cable Length each: 20 Feet

TO TEST PROCELL TANK WEIGHING ASSEMBLY BALANCE:

1. Measure voltage across green (+) and white (-) wires.
2. Voltage measurement should not vary more than 20% between each Procell on vessel.

Temperature Operating Range (degrees F/degrees C): 0 to 150 degrees/ -18 to 65 degrees  
 Non-Repeatability (FSO): <0.01%  
 Zero Balance (FSO): +/- 1.0%

Excitation Voltage (VDC): 15 (25 Max)  
 Safe Overload (FSO): 150%  
 Ultimate Overload (FSO): 300%  
 Safe Sideload (FSO): 100%  
 Sideload Rejection Ratio: 500:1

WIRING	
Red:	+ Input
Black:	- Input
Green:	+ Output
White:	- Output
Bare:	Shield

SEISMIC ZONE 4 COMPLIANCE RATED

ACCURACY CLASS	Standard (Class 3)
Combined Error (FSO):	<.03%
Non-Linearity (FSO):	<.03%
Hysteresis (FSO):	<.02%
Creep (FSO) in 20 minutes:	<.03%
Temperature /Compensated Range -	
Degrees F:	14 to 104 degrees
Degrees C:	-10 to 40 degrees
TEMPERATURE EFFECTS -	
Zero / degrees F (FSO):	<.0015%
Span / degrees F (of load):	<.0008%

Rated Capacity (lbs):	1500 lbs
Full Scale Output (mV/V):	3.0 +/- 0.25%
BRIDGE RESISTANCE -	
Input (ohms):	$\frac{686}{699} \frac{714}{707}$
Output (ohms):	
Sealing:	Environmentally Protected for NEMA 6 or IP67
Material/Finish:	Alloy Tool Steel Electroless Nickel (standard), 17-4 SS (optional)
Cable:	4-Conductor, 22 AWG, Shielded and Jacketed, 20 ft. standard



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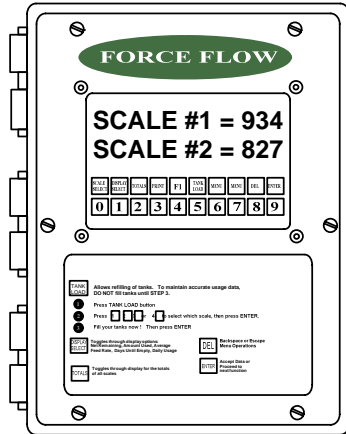
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Model PC160 PROCELL  
 TANK WEIGHING ASSEMBLY  
 TGO DUAL 150 CHLORTAINER

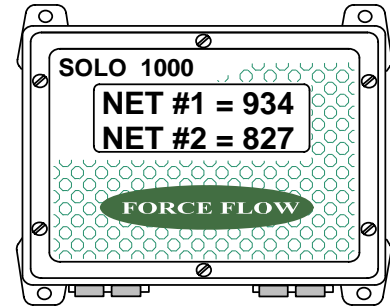
Drawn by: SLJ/MT  
 Date: 11/01/96  
 Revised: 01/02/07 MT  
 Scale: NONE

Drawing Number  
 29940-TGO

# INSTALL WEIGHT INDICATOR



WIZARD  
4000



SOLO  
1000

1. Select location for indicator. System includes 20 feet of load cell cable. If additional length required, please contact factory at 1-800-893-6723 or 925-686-6700.
2. Mount digital indicator on wall or structure at eye level using four (4) integral mounting feet.
3. Route load cell cable along surface or through conduit. When routing through conduit, disconnect load cell cable from indicator, route as required, then reconnect to indicator.
  - 1-1/2" diameter conduit or greater for easy installation.
  - Use dedicated conduit for load cell cables.
4. See SECTION II - Digital Weight Indicator, to complete installation, programming and start-up of chemical monitoring system.



TGO-10

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EMAIL/DRAWINGS/TGO INDICATORS.pdf

Questions: Call 1-800-893-6723

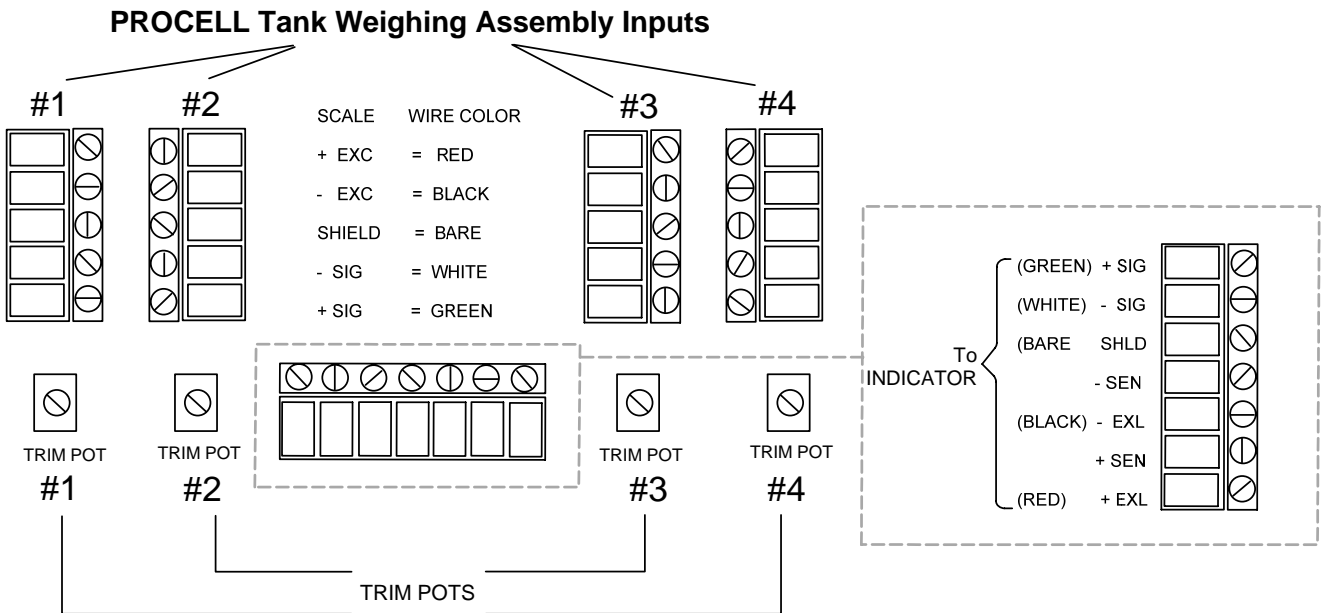
# MODEL J40 SUMMING BOX

## Connections & Adjustments

A summing box is supplied when more than one ProCell® Tank Weighing Assembly is used on a single vessel. The summing box allows multiple Procell signals to be combined into a common signal that is then sent to the weight indicator.

The summing box, Procells and weight indicator normally ship from the factory as one assembly. These components can be separated on site to facilitate installation. A 24 inch length of cable is all that is provided between the summing box and indicator since the two units are typically mounted next to each other. If a longer cable is needed, please contact factory.

### MODEL J40 SUMMING BOX WIRING DIAGRAM



#### TRIM POT ADJUSTMENT:

The trim pots on the Model J40 Summing Box have been factory adjusted and should require no field adjustment. Trim pots permit balancing of load cell signals for maximum system accuracy.

If it is necessary to reduce the cable length between the Procell and summing box, please contact factory to determine if trim pot adjustment will be needed.

**CABLE FITTINGS:** 4 nylon cable strain reliefs for load cell cable, outer diameter of 0.100" (2.5mm) to 0.275" (7.0mm)

1 nylon cable strain relief for instrumentation cable, outer diameter of 0.100" (2.5mm) to 0.275" (7.0mm).

**CONNECTORS:** WAGO 256-4XX; 14 AWG maximum wire size; Screw clamping; 45 degree interface.

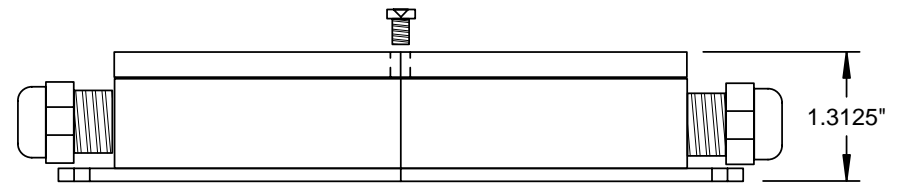
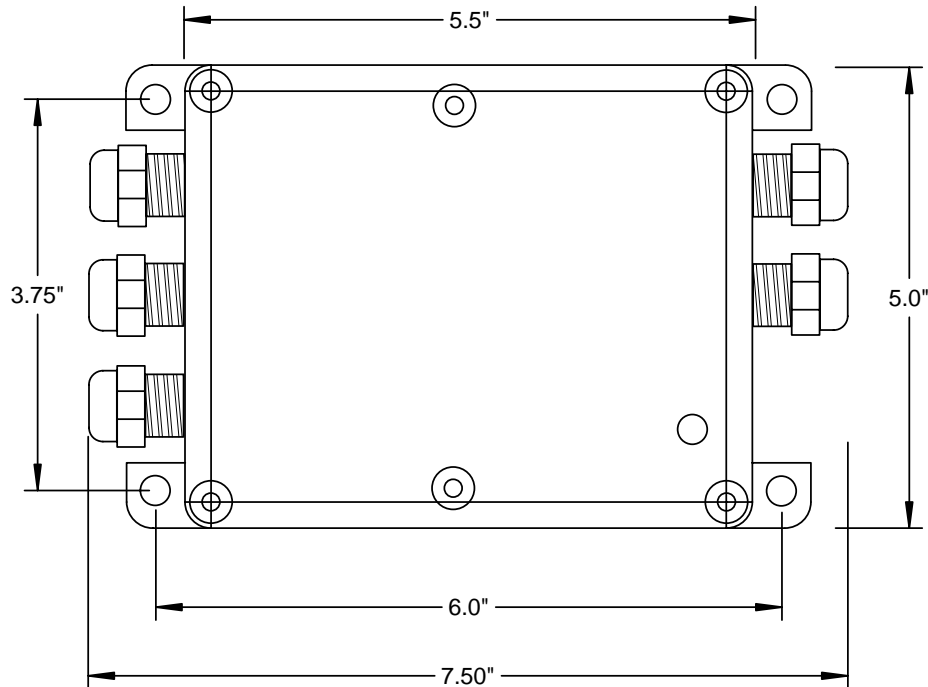
**TRIMMING:** Discrete channel signal trimming using 2.7K ohm isolation resistors with 2.7K ohm limiting resistors.

**POTENTIOMETERS:** 100K ohm; 25-Turn cermet

**ENCLOSURE:** Reinforced Fiberglass; NEMA 4/4X; Washdown

**CIRCUIT BOARD:** 4.0" x 3.0" (101.6mm x 76.2mm); anti-fungal coating

TGO-12



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File: T4\O&M\ACCESS ELEC\J40 BOX SPEC DATA.tcw (VHA06.pdf)  
EMAIL\DRAWINGS\ACCESSORY ELE\J40 BOX SPEC DATA.pdf

**J40 SUMMING BOX  
SPEC DATA**

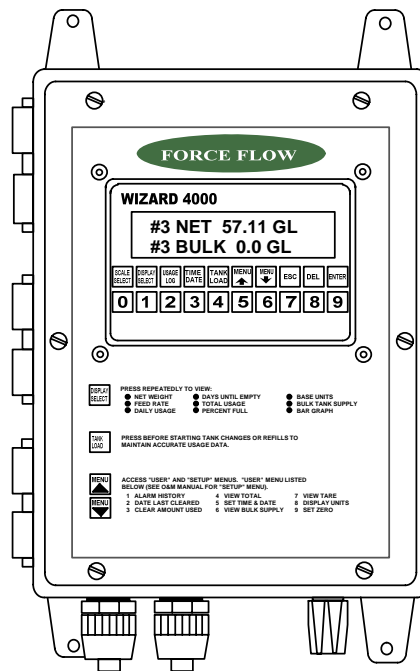
Drawn by: SLP  
Date: 10/25/03  
Revised: 12/12/06 MD  
Scale: NONE

Drawing Number

**30549**

# SECTION II

## WIZARD 4000 DIGITAL WEIGHT INDICATOR



## INSTALLATION, OPERATION & MAINTENANCE



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EMAIL\O&M\INDICATORS\WIZARD\NEW WIZ O&M COVER.pdf

# INDEX

## SECTION II - WIZARD 4000 WEIGHT INDICATOR

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W.2 INSTALLATION CHECKLIST	
W.3 START-UP CHECKLIST	
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W.5 ELECTRONIC INDICATOR SPECS	30831
W.6 KEYPAD FUNCTIONS	
W.7 TANK LOAD PROCEDURE	30774
W.8 HAZARDOUS LOCATION INSTALLATION	29893
W.9 WIRING INSTRUCTIONS	29892
W.10 MOTHERBOARD COMPONENT LAYOUT	

### INSTALLATION & WIRING

- W.11 POWER, LOAD CELL, 4-20mA SIGNALS
- W.12 MODBUS, RELAYS, DISPLAY VIEW ANGLE

### USER MENU

- W.13 1 ALARM / 2 DATE LAST CLEARED / 3 CLEAR AMOUNT USED
- W.14 4 VIEW TOTAL / 5 SET TIME & DATE / 6 BULK SUPPLY / 7 VIEW TARE
- W.15 8 DISPLAY UNIT / 9 SET ZERO

### SETUP MENU

- W.16 1 DISPLAY FORMAT / 2 CHANNEL ID / 3 100 PERCENT
- W.17 4 AUTO LAOD / 5 FILTER BAND / 6 MOTION BAND
- W.18 7 SYSTEM TIME BASE
- W.19 8 CONFIG. 4-20mA / 9 BULK SUPPLY / 10 AUTO REFILL
- W.20 10 AUTO REFILL cont. / 11 ALARMS & SETPOINTS / 12 ASSIGN RELAYS
- W.21 12 ASSIGN RELAYS cont. / 13 USER PRIVILEGES / 14 DIAGNOSTICS
- W.22 14 DIAGNOSTICS cont. / 15 FIELD CALIBRATION
- W.23 15 FIELD CALIBRATION cont. / 16 SETUP VIEW TOTAL

### AUTO REFILL CONTROL (OPTIONAL)

- W.24 QUICK START GUIDE, DESCRIPTION, WIRING
- W.25 SET VALUES, OVERFILL PROTECT, ARC CYCLE, PAUSE & PROJECT 31172
- W.26 CONTROL WIRING

### MODBUS SERIAL COMMUNICATIONS (OPTIONAL)

- W.27 CONFIGURATION, COMMUNICATION SETUP, DEVICE ADDRESS
- W.28 REGISTER MAP
- W.29 SAMPLE DATA STRINGS

### WARRANTY

- M.1 FACTORY WARRANTY & PERFORMANCE GUARANTEE

## INSTALLATION CHECKLIST

**INSTALL SCALE PLATFORM(S), PROCELL(S)<sup>®</sup> or ECHO-SCALE(S)<sup>™</sup> in accordance with supplied Operation & Maintenance Manual.**

### MOUNT INDICATOR

- Avoid direct sunlight on display and keypad
- Mount at eye-level
- Use (4) integral mounting feet to secure indicator to structure

### WIRE INDICATOR

- Disconnect circuit power
- Always follow standard OSHA Lockout/Tagout (LOTO) procedures
- Connect dedicated AC power
- Connect Load Cell(s) or Echo-Scale(s)
- Connect optional 4-20mA outputs
- Connect optional relays
- Connect optional RS232/RS485 communications
- Power up indicator
- Adjust display view angle if indicator not mounted at eye-level

### FORMAT INDICATOR (See Pages W.4 through WA-16)

- Check all current settings in USER and SETUP Menus. Make changes as needed for your specific application.

### SEAL ENCLOSURE

- Tighten all six (6) door screws to seal and maintain NEMA 4X rating. Check all cord connectors and conduit connectors for tight seal.

## WIZARD 4000® DIGITAL INDICATOR

### START-UP CHECKLIST

- POWER-UP:** Scale display should read NET WT or NET REMAINING. Press DISPLAY SELECT key as needed until display reads NET WT or NET REMAINING.
- SCALE APPLICATIONS:** Apply weight (press on platform or tank) and verify indicator NET WT responds.
- ULTRASONIC SENSOR (ECHO-SCALE) APPLICATIONS ONLY:**  
Enter tank diameter in USER MENU 8 “DISPLAY UNITS”. See page W.15 for details.
- VERIFY TIME/DATE:** Press TIME/DATE key. If time or date is incorrect, enter USER MENU 5 “SET TIME & DATE” and adjust. See page W.14 for details.
- SET ZERO:** Enter USER MENU 9, “SET ZERO” and follow prompts. See page W.15 for details.  
*(Indicator typically zero'd with empty tank and all other appurtenances installed. For gas cylinders and ton containers, zero scale with empty platform.)*
- CLEAR AMOUNT USED:** Enter USER MENU 3, “CLEAR AMOUNT USED” and follow prompts. See page W.13 for details.
- REVIEW TANK LOAD PROCEDURE:** See page W.7
- AUTO REFILL WARNING!** If using **AUTO REFILL OPTION (ARC)**, thoroughly review pages W.24 through W.26 to protect against chemical spills!
- REVIEW ALL USER and SETUP MENU ITEMS** and change as required for your application.



# KEYBOARD QUICK REFERENCE GUIDE

These are the functions that are used on a day-to-day basis.

**SCALE SELECT** Scrolls forward through individual scales.

**DISPLAY SELECT** Toggles through a multi-function display for each scale in the following descending order:

- 1 **NET REMAINING**..... Chemical remaining in tank or cylinder (default screen)
- 2 **BAR GRAPH** Analog bar graph. 0-100%
- 3 **AVERAGE FEED RATE..** Current chemical feed rate in lbs. or gallons per day
- 4 **DAILY USAGE**..... Previous day's total chemical usage.
- 5 **DAYS UNTIL EMPTY**.... Days until empty at the current feed rate
- 6 **AMOUNT USED** ..... A running total of net chemical used since last reset.
- 7 **PERCENT FULL** ..... Numeric Display of 0-100%.
- 8 **BASE UNITS** ..... Units of measure that Wizard was calibrated in.

**USAGE LOG:** Daily usages of most recent 31 days.

**TIME DATE** Time and Date

**TANK LOAD** Loading new tanks or chemicals and entering tank tare weights.

**MENU UP/DOWN** Access to USER and SETUP Menus. Allows you to scroll through each of these Menus from beginning to end.

**ESC** ESCAPE key returns you to main default display

**DEL** DELETE key backspaces or previous screen.

**ENTER** Data Entry or Advance to Next Screen.



**\*TO USE RESET BUTTON**

1. Push and hold "DEL" key.
2. While holding "DEL" key, push and hold "RESET" button for 2 seconds.
3. After 2 seconds release ONLY the "RESET" button, but continue to hold down the "DEL" key until the display reads one of the following:

"NET WEIGHT" Release "DEL" key.  
 "YES \*NO" Press "MENU" arrow keys to choose "NO"  
 ENTER SCALE # Press "MENU" arrow keys to choose different number than you did before.

**USAGE LOG**

Displays Daily Usage for past 31 days

**TIME DATE**

Time and Date

**TANK LOAD**

Loading New Tanks or Chemicals

\*Reset Button & Displays Software Version

Single or Dual Display (16 Characters per Line Screen)

Toggles Between Individual Scales

**SCALE SELECT**

**ENTER**

Data Entry and Advance to Next Screen

Toggles through a multi-function display for each scale.

**DISPLAY SELECT**

Net Weight  
 Bar Graph  
 Feed Rate  
 Daly Use  
 Days Until Empty  
 Total Use  
 % Full  
 Base Units

**DEL**

Backspace or Back to Previous Screen

Numeric Data Entry Key Pad

**MENU**  

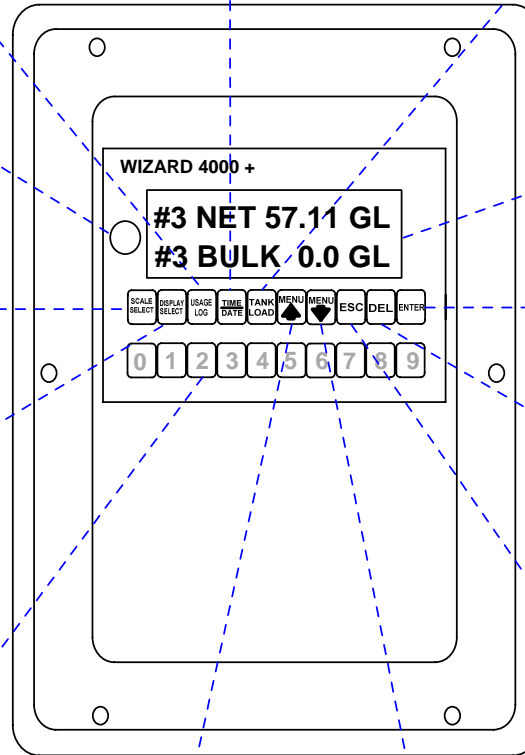

Scrolls Forward Through the Menu

**MENU**  


Scrolls Backward Through the Menu

**ESC**

Return to Main Default Screen



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File: T4NEW O&M 2007W6 WIZ NEW PRO328 BUTTONS.tcw

**WIZARD 4000®  
 KEYPAD FUNCTIONS**

Drawn by: SLP/MN  
 Date: 11/03/05 MN  
 Revised:  
 Scale: NONE

Drawing Number  
**30831**

Checked by: MN

# WIZARD 4000<sup>®</sup> TANK LOAD PROCEDURE:

## TANK LOAD MODE

"TANK LOAD" key allows you to load new tanks without adversely affecting the "AMOUNT USED" and "DAILY USAGE" displays.

It also allows you to enter the tare weight(s) of your tanks if you choose "Manual" tank load mode, or load the net weight of a cylinder if you chose the "Auto" tank load mode.

**WARNING ! DO NOT UNLOAD or LOAD tanks until "CHANGE TANKS NOW, THEN PRESS ENTER" appears on the display. If you load or unload tanks before reaching this step, the "AMOUNT USED" and "DAILY USAGE" displays will be incorrect.**

Digital Display

Action Required - Press "ENTER" after completing each step.

Step 1

#1 NET = 0 LB  
#2 NET = 1950 LB

Press "TANK LOAD" key to enter the tank load mode.

Step 2

SELECT CHANNEL  
▼ ▲ , enter CH# 1

Use "MENU" arrow keys, to choose channel, press "ENTER" to accept the channel you want to load/unload tanks. This "freezes" or "holds" the AMOUNT USED and DAILY USAGE displays until tank load procedure finishes.

Step 2

ARE YOU SURE  
NO \*YES

Verify you would like to continue tank load procedure.

Skip to STEP 7 in "PERMANENT" Tank Applications.

**"PORTABLE" Tank Applications (follow Steps 1 thru 6 only), such as Ton Containers, Drums and Cylinders.**

Step 3

TANK TARE  
\*AUTO MANUAL



Press "MENU" arrow keys to select which method, then press "ENTER".

**Use "MANUAL" for PARTIALLY FULL containers.**

....If you chose "MANUAL" you will manually enter tank tare weight in Step 6.

**Use "AUTO" for FULL containers.**

....If you chose "AUTO" the WIZARD automatically loads the net weight and goes into the weighing mode (skip Step 6).

Step 4

CHANGE TANKS NOW  
THEN PRESS ENTER

Remove empty tanks and place new tank(s) onto the scale then press "ENTER" key to continue.

Step 5

WAIT

Wait until this clears to continue.

....If MANUAL chosen above in Step 3...

Step 6

#2 TANK #1 TARE  
LBS = 1234

MANUAL Mode: Requires that you enter tare weight of EACH tank on EACH scale. (Example: Scale #2, tare weight of TANK #1 is 1234 lbs., then TANK #2, etc). After entering the tare weights of all your tanks, the WIZARD 4000 automatically adds them up and subtracts them from the gross weight.

**"PERMANENT" Tank Applications (follow Steps 1, 2 and 7 only), such as Chem-Scale, Hoppers, Procels and Ultrasonic**

Step 7

FILL TANK NOW  
THEN PRESS ENTER

Fill your tank with chemicals, then press "ENTER" key to continue.

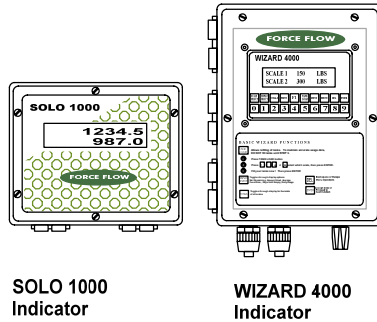
FORCE FLOW

W.7

## NON-HAZARDOUS LOCATION

INDICATOR IS NOT APPROVED FOR USE IN HAZARDOUS LOCATIONS.  
IF YOUR INSTALLATION CONSTITUTES AN EXPLOSIVE OR COMBUSTIBLE ENVIRONMENT, PLEASE CONSULT FACTORY FOR SAFETY PRECAUTIONS.

FOR FURTHER TECHNICAL INFORMATION OR FOR APPLICATIONS ENGINEERING ASSISTANCE, PLEASE CONTACT FORCE FLOW AT FORCE FLOW AT 925-686-6700; info@forceflow.com OR 1-800-893-6723.



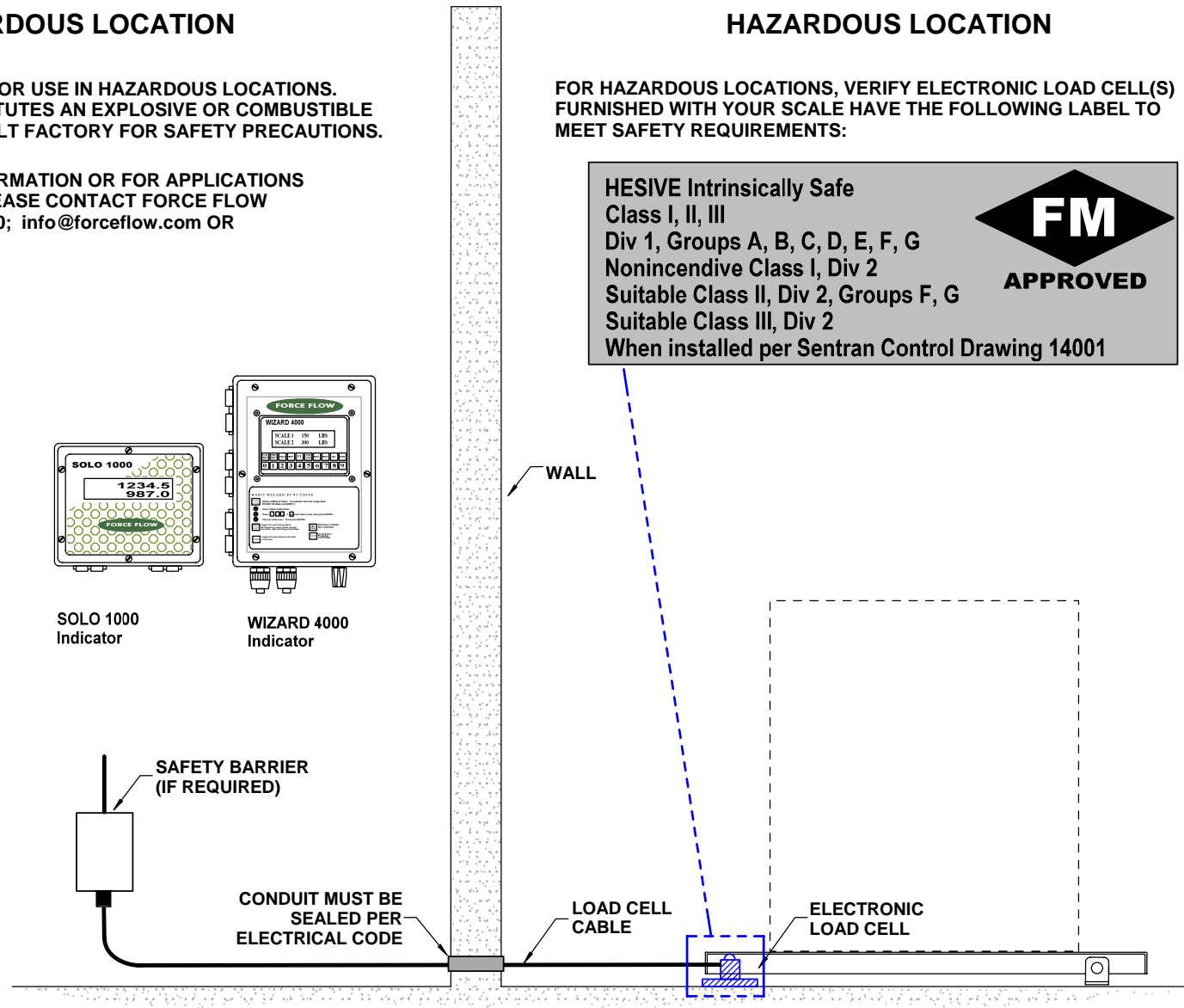
SOLO 1000 Indicator

WIZARD 4000 Indicator

## HAZARDOUS LOCATION

FOR HAZARDOUS LOCATIONS, VERIFY ELECTRONIC LOAD CELL(S) FURNISHED WITH YOUR SCALE HAVE THE FOLLOWING LABEL TO MEET SAFETY REQUIREMENTS:

HESIVE Intrinsically Safe  
Class I, II, III  
Div 1, Groups A, B, C, D, E, F, G  
Nonincendive Class I, Div 2  
Suitable Class II, Div 2, Groups F, G  
Suitable Class III, Div 2  
When installed per Sentran Control Drawing 14001



W.8



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File: T4\NEW O&M 2007\W8 WIZ NEW INTRINSIC WIZ SOLO.tcw

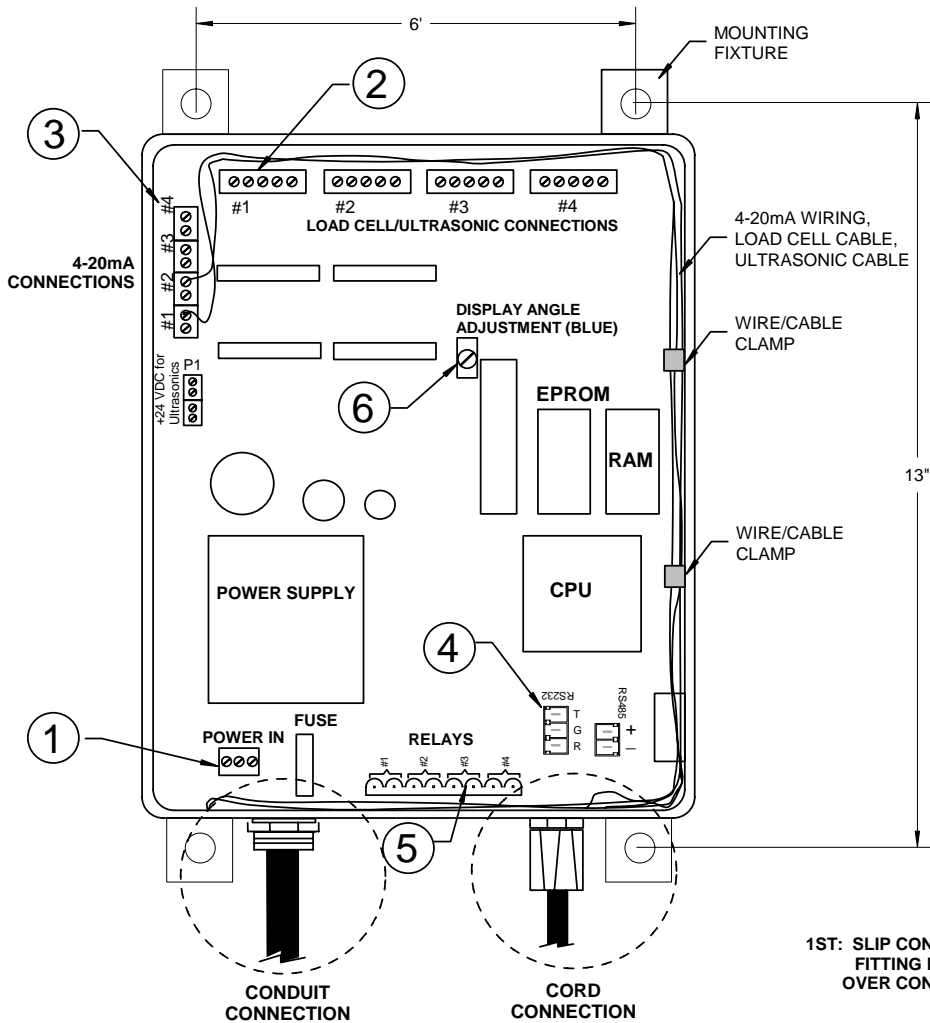
## HAZARDOUS LOCATIONS

Drawn by: SLJ/JGMNMD  
Date: 07/22/98  
Revised: 03/03/05  
Scale: NONE

Drawing Number

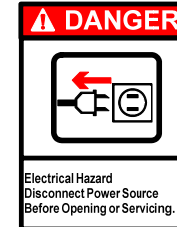
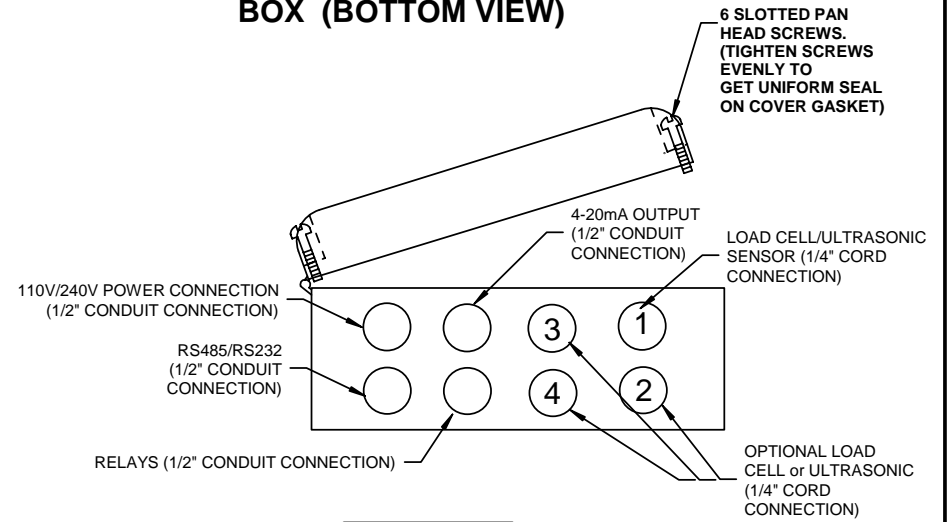
30774

## BOX (FRONT VIEW)

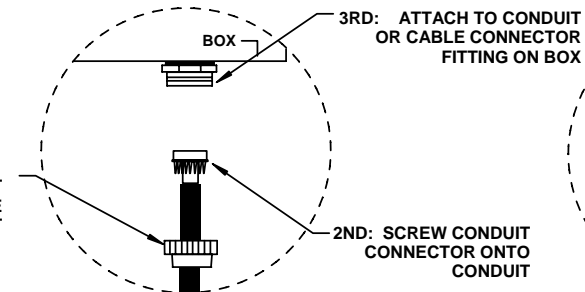


**NOTE:**  
Mount Indicator at "EYE LEVEL"  
for easy viewing.

## BOX (BOTTOM VIEW)



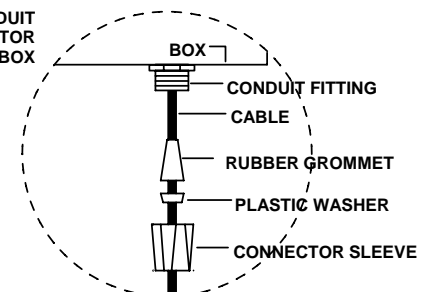
### CONDUIT CONNECTION



1/2" CONDUIT CONNECTOR, USED FOR:

POWER  
4-20 MA SIGNAL  
RELAY WIRING  
COMMUNICATIONS

### CORD CONNECTION



1/4" CORD CONNECTOR, USED FOR:

LOAD CELL CABLE  
ULTRASONIC CABLE

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File: T4\NEW O&M 2007\W9 WIZ NEW PR328 INDI.tcw

**WIZARD 4000® INDICATOR  
WIRING INSTRUCTIONS**

Drawn by: SLP/MD

Date: 09/01/95

Revised: 12/05/06 PR328

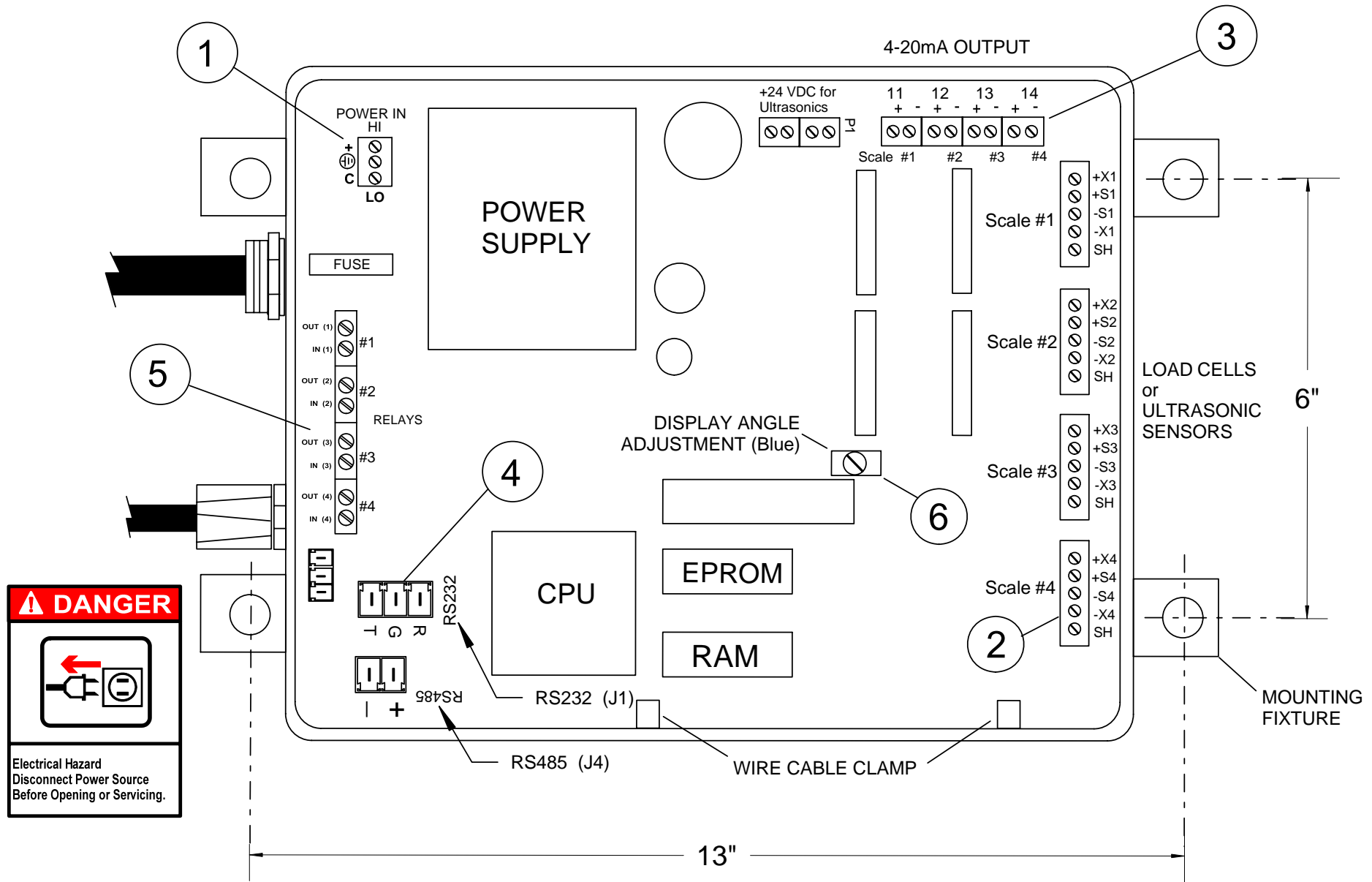
Scale: NONE

Drawing Number

**29893**

NOTE: For best viewing, mount indicator at "eye level".

W.10



**⚠ DANGER**

Electrical Hazard  
Disconnect Power Source  
Before Opening or Servicing.



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File: T4NEW O&M 2007W10 WIZ NEW PR328 INDIA.tcw

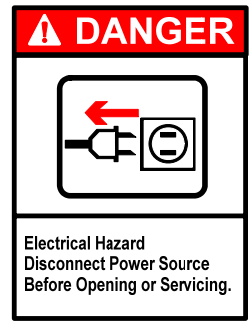
**WIZARD 4000<sup>®</sup> INDICATOR  
COMPONENT LAYOUT**

Drawn by: SLP  
Date: 09/01/95  
Revised: 12/08/06 Mt  
Scale: NONE

Drawing Number  
**29892**

# WIZARD 4000<sup>®</sup> INDICATOR INSTALLATION & WIRING

- ALWAYS SHUT OFF MAIN POWER, AS WELL AS POWER TO ANY AUXILIARY EQUIPMENT THAT WILL BE INSTALLED IN THIS UNIT, BEFORE OPENING FRONT OF CASE !!
- INDICATOR IS NOT APPROVED FOR USE IN HAZARDOUS LOCATIONS. IF YOUR INSTALLATION CONSTITUTES AN EXPLOSIVE OR COMBUSTIBLE ENVIRONMENT, PLEASE CONSULT FACTORY FOR SAFETY PRECAUTIONS.
- ALL CONNECTORS HAVE A "PLUG-IN" FEATURE TO ASSIST IN CONNECTING WIRES. REMOVE THE CONNECTOR FROM THE BOARD BEFORE ATTACHING WIRES.



## 1 POWER HOOK-UP

TURN OFF MAIN POWER BEFORE CONNECTING !! Use a dedicated 110/220 VAC (using 220 VAC requires changing the voltage selector switch position to 220 VAC. This switch is located between the incoming power connector and the power transformer) power line, connected directly to the main power panel at the facility. DO NOT connect any other inductive loads, relays, etc. to this power line ! Resulting power surges can damage the electronics !!! Use far left bottom port and connect per following: (NOTE: Use 1/2" conduit connector)



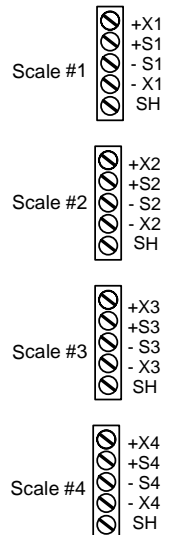
CHOOSE THE 2ND STEP THAT RELATES TO THE EQUIPMENT PURCHASED:

## 2 IF "LOAD CELL" CONNECTION

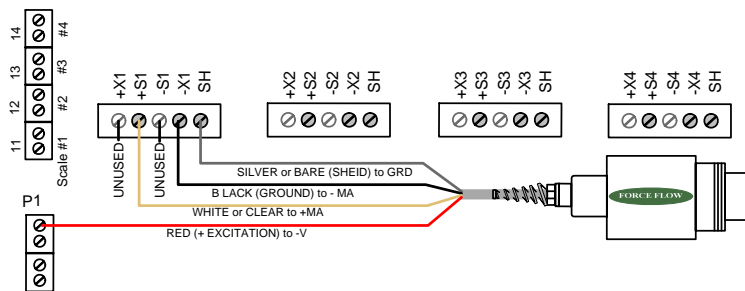
DO NOT CUT LOAD CELL CABLE !! This may void your warranty!! Your WIZARD 4000 Indicator is shipped with the load cells connected and ready to power up. Should you need to run the load cell cable through conduit, first unplug the connector from the board, then disconnect wires, by unscrewing cord connectors.

When routing load cell cable into box, use a separate 1/4" cord connector per cable. DO NOT run load cell cable with any other inductive load or power cables !! Run load cell cable up right hand side of enclosure and use the cable clamps provided to keep cables from laying on the PC board. Connect load cell wires per following:

PC BOARD	WIRE COLOR	DESCRIPTION
+ X	RED	+ EXCITATION
+ S	GREEN	+ SIGNAL
- S	WHITE	- SIGNAL
- X	BLACK	- EXCITATION
SH	BRAIDED WIRE	SHIELD



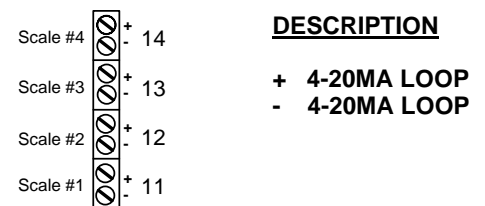
## 2 IF "ULTRASONIC SENSOR" CONNECTION



BOARD	WIRE COLOR	DESCRIPTION
P1	RED	+ EXCITATION
+S1	WHITE	+ SIGNAL
-X1	BLACK	GROUND
SH	SILVER	SHIELD

## 3 4-20 MA SIGNALS

Your 4-20 MA signals are internally powered for up to 900 OHMS each. DO NOT use external loop power. Run 4-20 MA wiring up the right hand side of enclosure using the cableclamps to keep wires off of PC Board. (NOTE: Use 1/2" conduit connector). If more than one (1) 4-20 MA signal is used, you may use the same conduit and connector, but DO NOT run 4-20 MA signals with any other power lines, which carry an inductive load.



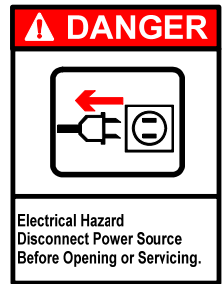
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W.11

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## 4 MODBUS SERIAL COMMUNICATION OPTION

Use a separate conduit connector for your serial port communication. DO NOT RUN ANY OTHER CONDUCTIVE LOAD or power lines with your communication wiring. Wire your communications per the following: (NOTE: Use 1/2" conduit connector).



## 5 RELAYS OPTION

SOLID STATE relays for external apparatus (pumps, valves, alarms, etc) may be ordered either Normally Open (NO) or Normally Closed (NC).

SOLID STATE relays are rated at: 3amp Max. (fused @ 4amp) 1.5amp motorload.

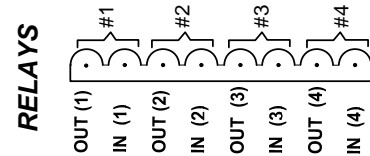
DRY CONTACT relays (SCADA, PLC, etc) inputs may be ordered either Normally Open (NO) or Normally Closed (NC).

DRY CONTACT relays are rated at: 0.5amp @ 12VDC maximum (fused @ 1amp).

To format your relays, go to Set Up Menu "12 ASSIGN RELAYS".  
If more than one relay is being used, you may use the same conduit, but DO NOT run any other wiring with your relays. (NOTE: Use 1/2" conduit connector).

NC: Circuit is NOT complete until the relay is activated. (i.e.turning ON a warning light).

NO: Circuit IS complete until relay is activated. (i.e. turning OFF a pump)



## 6 DISPLAY VIEW ANGLE ADJUSTMENTS

Before adjusting the Display View Angle, make sure that the display view angle is factory set for "eye level".

If it is not possible to mount the indicator at eye level, you may adjust the angle of display by turning the screw potentiometer clockwise (for down) or counterclockwise (for up). Rotate 1/2 turn at a time until display is clear. (See Pg W.1.201, Item 6)

## LIGHTNING ~ SURGE PROTECTION:

Be sure that indicator power circuit is sufficiently protected against transient lighting strikes and power surges. Improper protection may void your warranty.

## STATIC ELECTRICITY PROTECTION

CAUTION should be observed whenever box is open to avoid damage or memory loss by static electricity. DO NOT touch any of the circuit board, other than the intended contact noted in these instructions. Carpets, especially can build up static electricity.



# USER MENU (WIZARD 4000)

MENU Arrow Keys: There are 2 menus that may be accessed via the "MENU" keys. The "USER" Menu and "SETUP" Menu. The "USER" Menu has 9 menu items, and these are functions that are used for day-to-day operations. The "SETUP" Menu has 16 menu items, and these are functions that are used during equipment start-up, or if your chemical feed operation has been changed.

You may scroll through these items with the "MENU" arrow keys, or simply enter the Menu Item Number to jump straight to that menu item.

<b>MENU</b>	
* <b>USER</b>	<b>SETUP</b>

DIGITAL DISPLAY:

ACTION REQUIRED:

## 1 ALARM HISTORY

Allows the user to retrieve the time, date, and type of alarm for the most recent 10 alarm conditions.

Step 1

USER MENU	↑↓	1
ALARM HISTORY		

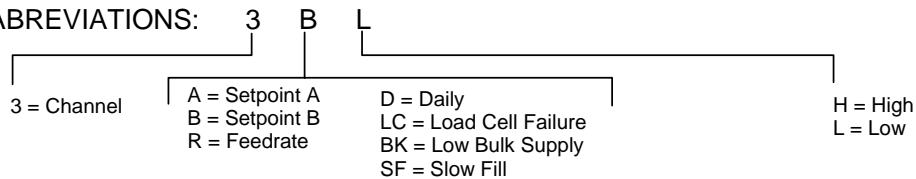
Press "ENTER" key to continue.

Step 2

ALARM HISTORY		
3 BL	9/25	9:10

Channel 3 had a SETPOINT B LOW LEVEL condition on 9/25 at 09:10 hours (9:10 am). Press "ENTER" key to continue. "DEL" key to return to "USER" menu.

ALARM CODE ABBREVIATIONS:



## 2 DATE LAST CLEARED

This function allows the user to find out the last time and date the "Amount Used" display was cleared or reset for each scale.

Step 1

USER MENU	↑↓	2
DATE LAST CLRD		

Press "ENTER" key to continue.

Step 2

CH# 1	CLEARED
8/19/ 5	14:15

Displays DATE and TIME the "AMOUNT USED" function was last cleared (for approximately 1 minute). Use the "MENU" arrow keys to toggle through other channels. Example: Channel 1 was last cleared on 8/19/05 at 14:15 hours (2:15 pm).

## 3 CLEAR AMOUNT USED

Clears or resets the "AMOUNT USED" and "DAILY USAGE" displays to zero.

Step 1

USER MENU	↑↓	3
CLR AMOUNT USED		

Press "ENTER" key to continue.

Step 2

CLEAR ALL CHAN ?	
* NO	YES

Use "MENU" arrow keys to choose "NO" or "YES". Press "ENTER" key to accept. Choosing NO takes you to Step 3 to choose which channels. Choosing YES asks "ARE YOU SURE?" and clears ALL channels

Step 3

SELECT CHANNEL	
↑↓	, enter CH# 1

Use "MENU" arrow keys to choose which channel to clear. Press "ENTER" key to accept.

Step 4

ARE YOU SURE	
* NO	YES

Use "MENU" arrow keys to choose "NO" or "YES". Press "ENTER" key to accept.



DIGITAL DISPLAY:

**4 VIEW TOTAL**

Step 1 USER MENU    ↑↓ 4  
VIEW TOTAL

Step 2 CHAN 1, 2  
tNET 26.0 LB

**5 SET TIME & DATE**

Step 1 USER MENU    ↑↓ 5  
SET TIME & DATE

Step 2 SET TIME & DATE  
YEAR= 5  
MONTH= 9  
DAY= 27  
HOURS= 14  
MINUTES= 15

**6 BULK SUPPLY**

Step 1 USER MENU    ↑↓ 6  
BULK SUPPLY

Step 2 #2 BULK SUPPLY  
LBS = 2900

**7 VIEW TARE**

Step 1 USER MENU    ↑↓ 7  
VIEW TARE

Step 2 #3 VIEW TARE  
LBS = 25.0

ACTION REQUIRED:

Allows user to view the combined Net, Rate and Usage for more than 1 channel. This function must be configured under the **SETUP VIEW TOTAL** selection in the **SET UP MENU**. Allows you to choose which channels to total.

Press "ENTER" key to continue.

This display shows that the total Net weight of channels 1 and 2 is 26.0 lbs. Press enter again for total feed rate of channels 1 & 2, and again for total usage on channels 1 & 2.

tNET = Net Weight  
tRATE = Feed Rate  
tUSED = Total Usage

Sets time and date.

Press "ENTER" key to continue.

Press "ENTER" key to continue.

Example: YEAR 2005 = "5", YEAR 2010 = "10"

Press "ENTER" key after each enter to get MONTH, DAY, HOUR and MINUTES.

Note: Use Military time for HOURS (1 to 24).

Allows user to view the remaining inventory in their bulk supply tank even though they have no level sensor hooked up to the bulk tank. Before filling your day tank, press the "TANK LOAD" key & follow the menu prompts. The Wizard will then subtract how much is added to the day tank from the remaining bulk supply number. This function must be turned on under the **BULK SUPPLY** selection in the **SET UP MENU**. Press "ENTER" key to continue.

This display shows that Channel #2 has a bulk supply tank that contains 2900 lbs of chemical

Allows users to view the tare weight of their tank. This function is only active when the system is configured for "portable tanks" like chlorine, drum, carboy and tote scales.

Press "ENTER" key to continue.

Tare weight will be displayed. Example: Channel #3 tare weight is 25.0 lbs.

DIGITAL DISPLAY:

ACTION REQUIRED:

## 8 DISPLAY UNITS

This function allows you to select how your chemical will be displayed. Weight (lbs or kgs) or Volume (Gallons or Litres).

Step 1

USER MENU    ↑↓ 8  
 DISPLAY UNITS

Press "ENTER" key to continue.

Step 2

#1 DISPLAY UNITS  
 \* WT            VOL

Use arrow key to choose WT for weight, VOL for volume and press "ENTER" key to continue.

Step 3

#1 SPECIFIC GRAV  
 NUMBER =    1.132

If "VOL" (volume) is chosen for a scale, or if "WT" (weight) is chosen when using a level sensor, the specific gravity of your chemical must be entered into this field. Be sure to carry to three decimals for best accuracy (i.e. 1.142).

Step 4

#1 TANK DIA.  
 INCHES =    64.0

If a level sensor is being used with the Wizard, diameter of your tank must be entered into this field in order to convert distance into a volume or weight measurement. Be sure to carry to 1 decimal place (i.e. 64.2)

## 9 SET ZERO

Allows user to "zero" the scale or sensor when tank or scale is empty. If tank is not empty but weight of chemical in tank is known, SET ZERO allows user to adjust display to read this known weight.

Step 1

USER MENU    ↑↓ 9  
 SET ZERO

Press "ENTER" key to continue.

Step 2

SET ZERO  
 \* NO            YES

Use MENU keys (UP/DOWN ARROWS) to select NO or YES.

Step 3

SELECT CHANEL  
 ↑↓ , enter CH# 1

Select channel (scale or sensor number) using arrow keys.

Step 4

#1 APPLY MINIMUM  
 THEN PRESS ENTER

Instead of displaying "REMOVE ALL WEIGHT" the Wizard 4000 displays "APPLY MINIMUM" in order to give you two options for setting zero. "Minimum" may be either an empty tank (preferred) or a tank with a known amount of chemical currently in it, calculated for example on a vertical cylindrical tank using the formula:

$$[ (\pi R^2 H / 231) (\text{CHEMICAL WT per GALLON}) ]$$

Step 5

WAIT . . . .

**NOTE: TANK DOES NOT HAVE TO BE EMPTY in order to accurately set zero. If tank is not empty, weight of chemical currently in tank (scale) or height of chemical currently in tank (ultrasonic sensor) must be known.**

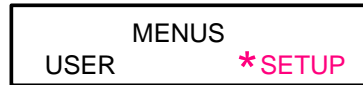
Step 6

ENTER MIN VALUE  
 LBS =            0.0

Using keypad, enter "0" if tank is empty. If tank is NOT empty, for scale enter current weight of chemical in tank or for ultrasonic sensor, enter current height of chemical in tank.

# SETUP MENU

**MENU Arrow Keys:** There are 2 menus that may be accessed via the "MENU" keys: The "USER" Menu & "SETUP" Menu. The "USER" Menu has 9 menu items, and these are functions that are used for day-to-day operations. The "SETUP" Menu has 16 menu items, and these are functions that are used during equipment start-up, or if your chemical feed operation has been changed.



You may scroll through these items with the "MENU" arrow keys, or simply enter the Menu Item Number to jump straight to that menu item.

## DIGITAL DISPLAY:

## ACTION REQUIRED:

### 1 DISPLAY FORMAT

Configures how many channels are displayed simultaneously, and whether the auto scan is engaged.

Step 1

SETUP MENU    ↑↓ 1  
DISPL FORMAT

Press "ENTER" key to continue.

Step 2

SELECT FORMAT    ↑↓  
\* SINGL            DUAL

Choose a single channel to be displayed, or 2 channels to be displayed if a multichannel indicator is being used.

Step 3

AUTO SCAN ?  
\* NO                YES

Use "MENU" arrow keys to select. If "YES" is selected, the Wizard will automatically scan all the channels in the Wizard without the operator having to touch any keys. Display Format menu is exited if "NO" is selected.

Step 4

ALTERNATING TIME  
SECONDS =            6

Allows you to set the scan time period in seconds from one channel to the next.

### 2 CHANNEL ID

If there are multiple Wizard controllers on a single site, this function allows you to assign an Identification Number from 1-99 for each channel.

Step 1

SETUP MENU    ↑↓ 2  
#    CHANNEL ID #

Press "ENTER" key to continue.

Step 2

#1    CHANNEL    ID#  
NUMBER =            1

Use the numeric keypad to enter any number from 1 to 99.

Step 3

SYSTEM ADDRESS  
NUMBER =            XXX

Set MODBUS device address (1 to 247)

\*Only visible if OPTIONAL MODBUS Serial Communication enabled.

### 3 100 PERCENT

Allows you to tell the Wizard what value you consider 100% full. This will calibrate the BAR GRAPH and PERCENT function for the "Display Select" key.

Step 1

SETUP MENU    ↑↓ 3  
100 PERCENT

Press "ENTER" key to continue.

Step 2

#1    100    PERCENT  
GAL =                400.00

Enter value that you consider 100% full.



**DIGITAL DISPLAY:****4 AUTO LOAD****Step 1**

SETUP MENU	↑↓ 4
AUTO LOAD	

**Step 2**

#1 TANK NET
LBS = 2000

**ACTION REQUIRED:**

For portable tank (load on/ load off) applications, this allows you to set the net weight of the container so that when using the "TANK LOAD" key, the Wizard will automatically load the net weight of the containers that you are loading.

Press "ENTER" key to continue.

Enter the value of the net weight that your containers are filled with: Examples  
 2000 lbs = Ton Containers USA  
 150 lbs = 150 lb cylinders USA  
 907 kgs = Canadian ton containers  
 1000 kgs= Metric ton containers

**5 FILTER BAND****Step 1**

SETUP MENU	↑↓ 5
FILTER BAND	

**Step 2**

#1 FILTER BAND
GAL = 0.70

Allows you to steady a fluctuating display. This function will only help smooth out fairly rapid fluctuations. Slow, long term fluctuations (over minutes or hours) will likely not be corrected by changing the filter value. Contact factory for assistance in correcting slow, long term display fluctuations.

Press "ENTER" key to continue.

Allows you to steady a fluctuating display. This function will only help smooth out fairly rapid fluctuations. Slow, long term fluctuations (over minutes or hours) will likely not be corrected by changing the filter value. Contact factory for assistance in correcting slow, long term display fluctuations.

**6 MOTION BAND****Step 1**

SETUP MENU	↑↓ 6
MOTION BAND	

**Step 2**

#2 MOTION BAND
GAL = .02

Menu operations such as TANK LOAD, ZERO and FIELD CALIBRATION require the Wizard in certain steps to store a weight value before moving to the next step. MOTION BAND determines how steady the weight reading is required to be before the Wizard accepts the value and continues on. The greater the value, the greater the fluctuation allowed.

Press "ENTER" key to continue.

Changing this value will rarely be required. If a menu operation will not advance from the "Wait ..." screen, you may ESC from the operation then increase this value and try the function again. The "WAIT ..." screen indicates the Wizard is waiting for the weight to stabilize (sloshing chemical in tank) to a value within the MOTION BAND value. This value can be set to any number greater than 0.



**DIGITAL DISPLAY:**

**ACTION REQUIRED:**

**7 SYSTEM TIME BASE**

Allows configuring of feed rate update periods, daily usage update periods, and whether the pause and project function is used.

Allows you to choose between "Lbs (or Gallons) per day" and "Lbs. (or gallons) per hour" and allows you to set your sample time or "update period" for your feed rate function.

**IMPORTANT NOTE FOR SETTING UP YOUR "UPDATE PERIOD":**  
 In general, if your feed rates are fairly constant on a daily basis, the longer you set your update period for, the more accurate your feed rate function will be. However, if your feed rate varies from hour to hour or minute to minute, choose a shorter update period to give you a more accurate feed rate at a point in time. You may have to experiment with different update periods to get the desired result for your application.

	HIGH FEED	LOW FEED (less than 2% capacity/day)
<b>FLUCTUATING</b>	Use a Short Update Period	N/A (Not Accurate)
<b>CONSTANT</b>	Use a Short or Long Update Period	Use a Longer Update Period

For certain applications with very low feed rates (less than 2% of full scale capacity per day), low sample times will not give you accurate readings.

**Step 1** 
 SETUP MENU ↑↓ 7  
 SYSTEM TIME BASE

Press "ENTER" key to continue.

**Step 2** 
 RATE TIME BASE  
 \* HOUR            DAY

Use "MENU" arrow keys to choose time base of HOUR or DAY. Press "ENTER" key to continue.

**Step 3** 
 PERIOD BASE  
 \* MIN            HOUR

Use "MENU" arrow keys to choose MINUTES or HOURS. Press "ENTER" key to accept.

**Step 4** 
 UPDATE PERIOD ↑↓  
 MINUTES =            1

Use "MENU" arrow keys to update increment. Press "ENTER" key to accept.  
 MIN Choices: 1, 2, 5, 10, 20, 30, 60  
 HOUR Choices: 1, 2, 4, 6, 8, 12, 24

**Step 5** 
 SHIFT START HOUR  
 0 - 23                    0

Enter the hour at which you want the daily usage accumulator to begin (in military time). "0" is midnight; 8 is 8am, 13 is 1pm, etc.

**Step 6** 
 #2 PAUSE/PROJ  
 \* NO                    YES

Use the "MENU" arrow key to choose NO or YES. Choosing YES turns on the "PAUSE & PROJECT" feature which allows the Wizard to keep track of chemical usage while your tank is getting refilled. By pressing the "TANK LOAD" key before and after your tank fill is done, the Wizard calculates how much was used during the fill process based on total time and most recent feed rate. The Wizard then adds this amount back to your usage data.



**SETUP MENU continued...**

DIGITAL DISPLAY:

**8 CONFIG 4-20mA OUT**

Step 1    SETUP MENU    ↑↓ 8  
              CONFIG 4-20 OUT

Step 2    # OF 4-20 PORTS  
              2 ACTIVE

Step 3    P1 USED FOR CH #  
              ↑↓ , enter        1

Step 4    PORT 1 CHAN 1  
              ↑↓ , enter        NET

Step 5    PORT 1 RANGE FS  
              GAL =            XXXX.X

**9 BULK SUPPLY**

Step 1    SETUP MENU    ↑↓ 9  
              BULK SUPPLY

Step 2    #2 MONITOR BULK  
              \* NO                YES

**10 AUTO REFILL**

Step 1    SETUP MENU    ↑↓ 10  
              AUTO REFILL

Step 2    #1 AUTO REFILL  
              \* SEMI            AUTO

Continued...

ACTION REQUIRED:

If you have 4-20 mA output hardware installed on your motherboard, this allows you to configure your 4-20 outputs to send either: NET; RATE; DAILY USAGE or BULK TANK data, and set full scale value ( 20 mA = full scale).

Press "ENTER" key to continue.

Momentarily displays number of active 4-20mA ports, then automatically advances to Step 3.

Designate which channel (1-4) you would like Port 1 (P1) output to be on. Use "MENU" arrow keys to select then press "ENTER" key to continue. Repeat process for additional ports.

Designate whether you would like NET, RATE, DAILY USAGE or BULK data to be sent out on this port. Use the the "MENU" arrow key to select then press "ENTER" key to continue

Use the numerical keypad to input what full scale output you would like 20 mA to be equal to. 4 mA is always equal to 0.

FIXED TANK APPLICATIONS ONLY:

This option is used for stationary day tanks that refill their Chemical from a bulk supply tank. By turning this function on, it allows you to inferentially track remaining chemical in the bulk supply tank.

Press "ENTER" key to continue.

Use "MENU" arrow keys to choose NO or YES, then press "ENTER" key to continue.

This item is only available if you have purchased the Automatic Refill Control (ARC) option. This item allows you to set the refill mode to "full" or "semi" automatic and allows you to set the beginning and ending point for the refill event.

Press "ENTER" key to continue.

SEMI - Requires operator to initiate each refill event by pressing TANK LOAD key. Refill ends automatically.

AUTO - Refill begins and ends automatically.



*DIGITAL DISPLAY:**ACTION REQUIRED:***10 AUTO REFILL continued...**Step 3

#1 PUMP ON VAL
GAL = 15.00

(Screen only visible if mode set to AUTO in previous step)

Enter value where refill event is to begin (ARC relay activates) **IMPORTANT:** Value must be greater than minimum outflow level value.)Step 4

#1 PUMP OFF VAL
GAL = 200.00

Enter value where refill event is to end (ARC relay deactivates).

**CAUTION:** Value must be less than the value at which the tank will overflow !**11 ALARMS/SETPOINTS**Step 1

SETUP MENU    ↑↓ 11
ALARMS/SET PTS

Press "ENTER" key to continue.

Step 2

SELECT CHANNEL
↑↓ , enter CH# 1

Select which channel you would like to work on.

Step 3

#1 SP A HIGH
GAL = 250.0

Enter values at which you want your alarms or setpoints to trigger. Each channel has two low (descending) alarm or control setpoints available (A and B) and two high (ascending) setpoints. As you press ENTER to advance through the different alarms you will also see HIGH FEED RATE, LOW FEED RATE, HIGH DAILY and LOW DAILY alarms. We recommend setting the alarm value to 0 if you do not intend to use it.

**12 ASSIGN RELAYS**Step 1

SETUP MENU    ↑↓ 12
ASSIGN RELAYS

If you have relay contact outputs installed on your motherboard, this allows you to designate which relay port you would like a particular alarm to go to. You may send multiple alarms to the same relay contact if so desired.

Press "ENTER" key to continue.

Step 2

SELECT CHANNEL
↑↓ , enter CH# 1

Use "MENU" arrow keys to select which channel you would like to work on. Press "ENTER" key to accept.

Step 3

#1 SP A HIGH
RLY, 2- 4      2

Designate a relay number for this alarm. Choose "0" if you do not want this alarm to go to a relay. For example, this screen indicates: On Channel #1 High Setpoint A, choose which relay (choices are 2-4) that you would like this alarm to go to.

Continued...

DIGITAL DISPLAY:

ACTION REQUIRED:

**12 ASSIGN RELAYS continued...**

Step 4

#1 SP A HIGH  
DISPLAY \* NO YES

Choose YES if you would like your alarm condition to be displayed on the LCD screen. Choose NO if you don't.

**13 USER PRIVILEGES**

This function allows you to establish or change your password, and to password various keys and menu items to prevent unauthorized use.

Step 1

SETUP MENU    ↑↓ 13  
USER PRIVILEGES

Press "ENTER" key to continue.

Step 2

CHANGE PASSWORD  
\* NO YES

Choose YES if you would like to change the Password (or see what it currently is).

Step 3

USER PASSWORD  
NUMBER =        1234

Establish new 4 digit password and press enter.

Step 4

TANK LOAD  
PASSWRD \*NO YES

Choose YES if you would like to password this item. Press "ENTER" key to continue to scroll through menu choices. "DEL" key to get back to the Setup Menu.

**14 DIAGNOSTICS**

This function is used for trouble shooting, and is usually used by a factory trained technician. Contact a Force Flow technician at 800-893-6723 (or fax 925-686-6713) to interpret this information.,

Step 1

SETUP MENU    ↑↓ 13  
DIAGNOSTICS

Press "ENTER" key to continue.

Step 2

VIEW/SET FACTORS  
\* NO YES

Choose "YES" to view calibration data.

Step 3

SELECT CHANNEL  
↑↓ , enter CH #1

Use "MENU" arrow keys to select channel.

Continued...



DIGITAL DISPLAY:

ACTION REQUIRED:

**14 DIAGNOSTICS continued...**

Step 4

#1 ZERO COUNTS  
NUMBER= 23281

Zero factor for Channel #1.

Step 5

#1 MIN CAL VALUE  
LBS= 0.0

Value at which zero was set for Channel #1.

Step 6

#1 SPAN FTR  
NUMBER = 2.32423

Span factor for Channel #1 .

Step 7

RAW A/D  
\* NO YES

if YES:

3282 5970  
201019 350447

Raw A/D Signal.

Press "DEL" to quit.

**15 FIELD CAL**

Your indicator has been factory calibrated. This function allows you to field calibrate your indicator by setting the zero and span with known weights or values.

Step 1

SETUP MENU **↑↓** 15  
FIELD CAL

Press "ENTER" key to continue.

Step 2:

SELECT CHANNEL  
**↑↓** , enter CH# 1

Enter which channel to calibrate.

Step 3

#1 ZERO ONLY ?  
\* NO YES

Choose "YES" if you only want to re-zero. If you want to do a full calibration, choose "NO".

Step 4

#1 FULL CAL ?  
\* NO YES

Choose "YES" for full calibration procedure.

Step 5

#1 APPLY MINIMUM  
THEN PRESS ENTER

Remove or empty tank in order to apply the minimum value.

Step 6

WAIT . . . .

Wait for instructions.

Continued....

**FORCE FLOW**

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**SETUP MENU continued...**

*DIGITAL DISPLAY:*

*ACTION REQUIRED:*

**15 FIELD CAL continued...**

**Step 7** ENTER MIN. VAL  
LBS = 0.0

Enter minimum value. If tank or scale is empty, enter "0". If tank is partially full, enter value of contents.

**Step 8** #1 APPLY MAXIMUM  
THEN PRESS ENTER

Apply maximum value to scale or tank. If using a known weight, place on scale. If using chemical fill, fill tank now.

**Step 9** WAIT .....

Wait for instructions.

**Step 10** ENTER MAX. VAL  
LBS = 100.0

Enter the "known weight" or "chemical fill".

**Step 11** CALIBRATE MORE ?  
\* NO YES

"NO" to exit. "YES" to calibrate other channels.

**16 SET UP VIEW TOTAL**

Allows you to select which channels are to be displayed in the total.

**Step 1** SETUP MENU ↑↓ 16  
SET UP VIEW TOTAL

Press "ENTER" key to continue.

**Step 2** #1 IN TOTAL ?  
\* NO YES

Choose "YES" to include this channel in totals. Options will include only channels with the same units of measure. See "USER MENU", "8 DISPLAY UNITS".



## AUTO REFILL CONTROL (ARC) OPTION

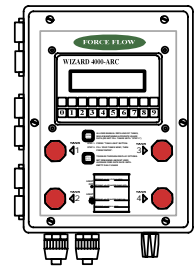
### WARNING



**INJURY OR DEATH CAN RESULT FROM CHEMICAL SPILLS OR IMPROPER OPERATION !**

**CAREFULLY DETERMINE & SET REFILL START AND STOP VALUES.**

**VISUALLY OBSERVE ONE COMPLETE REFILL CYCLE BEFORE UNMANNED OPERATION. READ COMPLETE OPERATION MANUAL.**



## ARC QUICK START GUIDE

(See below for complete ARC information)

1. Connect transfer device (solenoid valve, transfer pump, secondary relay) to 2-pin connector plug located below relay module on Wizard motherboard slot J7. If more than one channel has ARC option: RELAY 1 = Ch. 1, RELAY 2 = Ch. 2, etc.
2. Set refill begin and end values (SETUP Menu "10 AUTO REFILL", Page C.2.205).
3. **Emergency Stop Button** (located on Wizard door): Press in to STOP refill. Rotate button clockwise to reset.
4. Insure tank has some form of secondary overfill protection such as high level float switch or sealed day tank with vent line leading back into bulk tank.

## DESCRIPTION

The Wizard can be purchased with up to four (4) Auto Refill Control options (one per channel). The ARC option consists of an Emergency Stop Button located on the front of the enclosure, pre-installed software and a control relay.

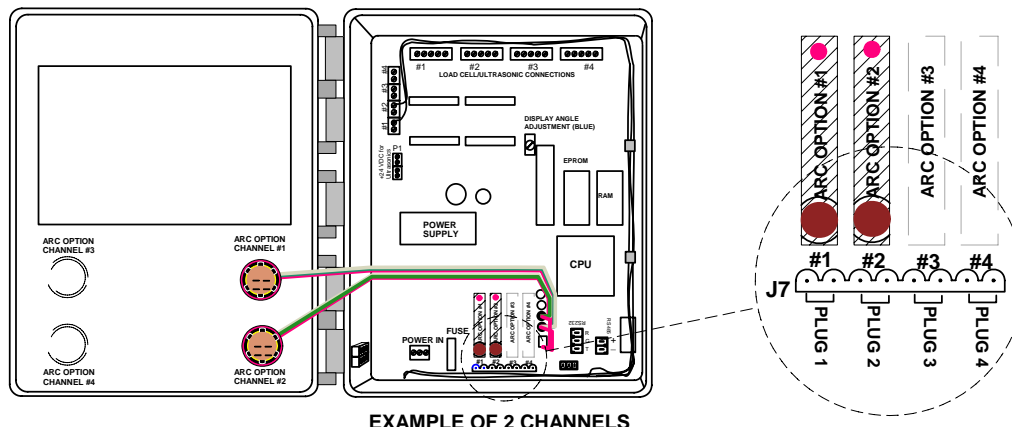
The standard ARC relay provided is a solid state, normally open relay. This relay requires a minimum loop current of 20mA with a maximum motor load of 1.5 amps. The relay typically activates a transfer pump, solenoid valve or other device provided by others which allows the transfer of chemical from bulk storage to day tank.

If the relay signal is to be taken directly into a PLC, a dry contact relay is available. Please contact factory for dry contact relay. Solid state relay modules are BLACK, dry contact modules are RED.

## WIRING

Connect the two wires from your transfer device to the 2-pin plug connector located in socket J7 as marked on the motherboard. This socket is located along the lower edge of the motherboard directly below the relay module(s).

NOTE: FULL DRAWING ON PAGE W.1.207



EXAMPLE OF 2 CHANNELS

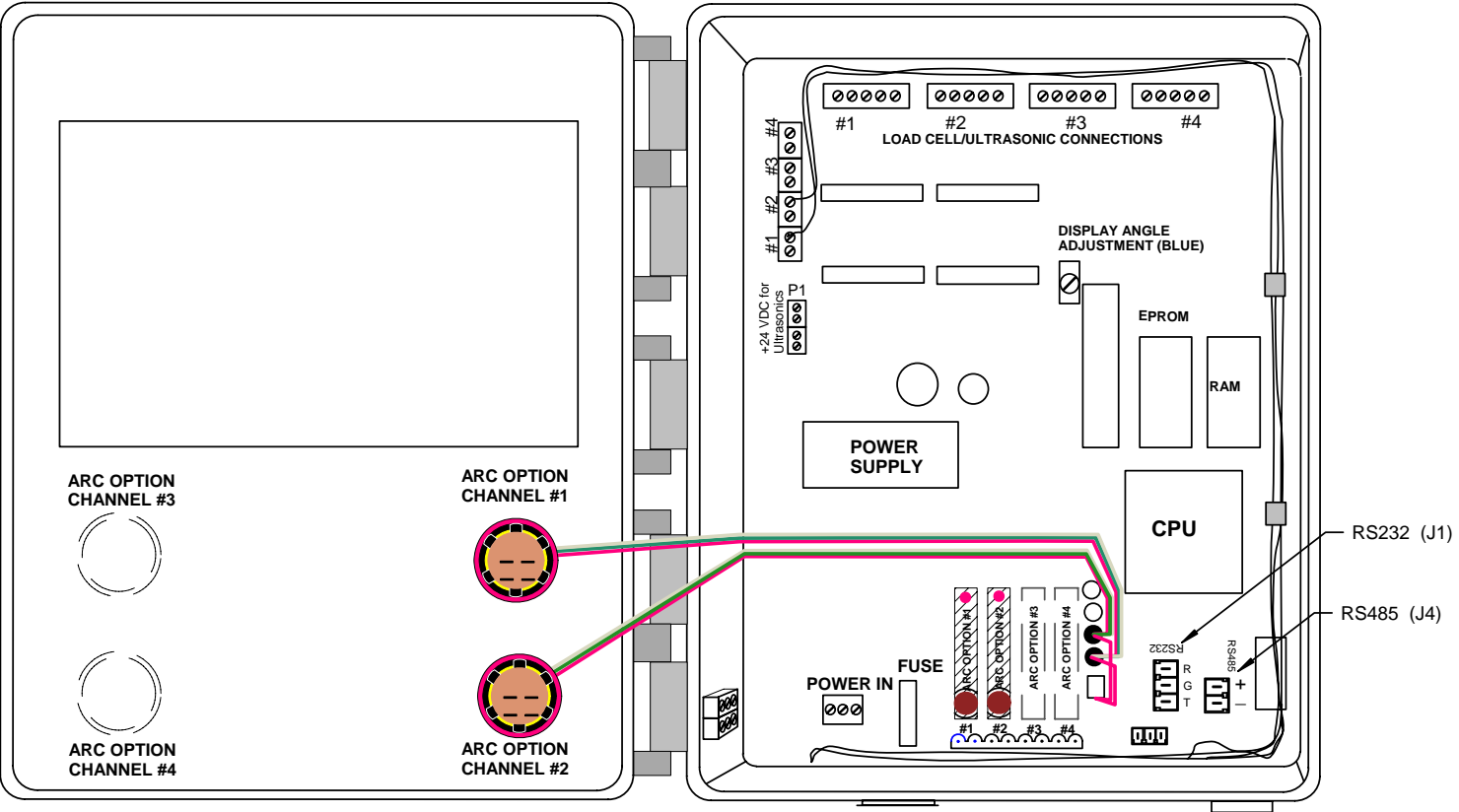


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**WIZARD 4000 with  
AUTO REFILL CONTROL  
(ARC) OPTION**

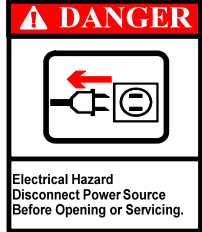
**WIRING DIAGRAM**



EXAMPLE OF 2 CHANNELS

**ARC RELAY SPECIFICATION**

	TYPE	FUNCTION	LOAD RATING (MIN/MAX AMPS)
STANDARD	SOLID STATE (Black Module)	Standard: NORMALLY OPEN Optional: NORMALLY CLOSED	0.020A min. / 3.00A (1.5A motor load) max., 240VAC
OPTIONAL	DRY CONTACT (Red Module)	Optional: NORMALLY OPEN Optional: NORMALLY CLOSED	0 min. / 0.5A @ 12V, 0.416A @ 24V, 0.083A @ 120V max.



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**WIZARD 4000®  
ARC OPTION WIRING**

Drawn by: SLJ/MT  
Date: 11/21/06  
Revised: 12/05/06 MT  
Scale: NONE

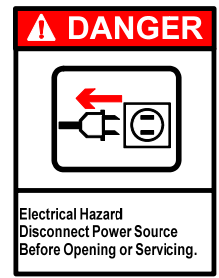
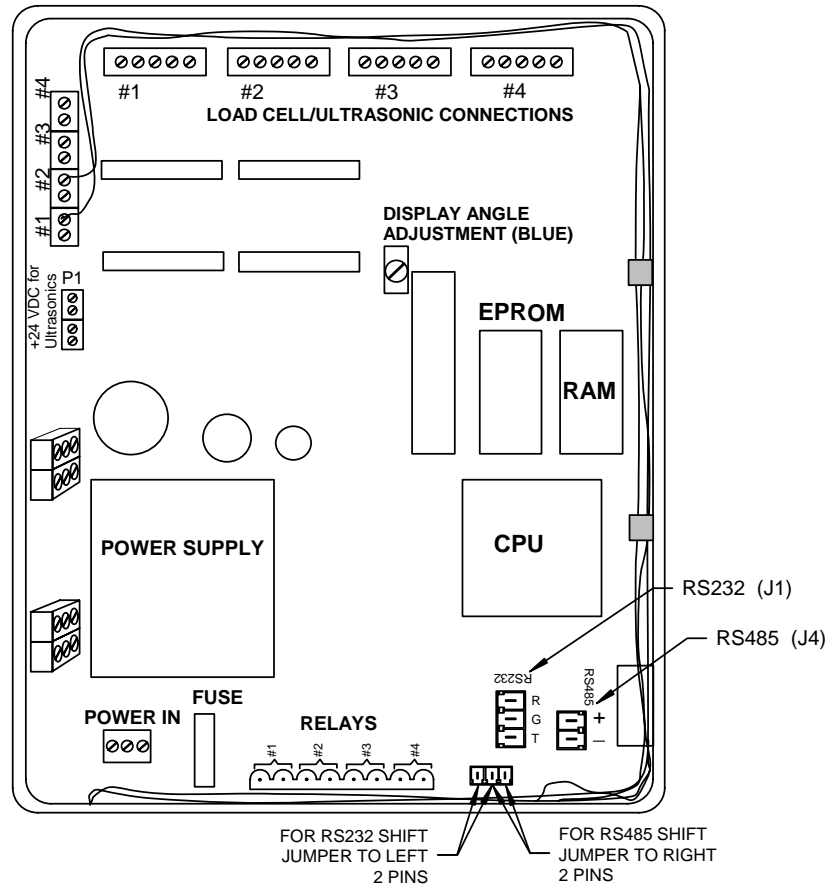
Drawing Number  
**31172**

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# MODBUS ASCII SERIAL COMMUNICATION

## CONFIGURATION

The Wizard 4000 Digital Weight Indicator has the ability to independently monitor up to four separate scales or sensors (four channels). The MODBUS ASCII Serial Communication option allows all of the standard data functions to be sent to the receiving instrument via the RS232 / RS485 serial outputs.



## COMMUNICATION SETUP

DATA BITS 8  
STOP BIT 1  
PARITY NO  
BAUD RATE 9600

## DEVICE ADDRESS

Device address is factory preset to "1".  
To assign a different address (1-247), see CHANNEL ID (Item #2) in SETUP menu.

**MODBUS REGISTER MAP**

**CHANNEL 1:** Starting Register Address: ALWAYS 40101 (addressed as 100 in data string) Number of Registers: MINIMUM: 6 (units, decimals and NET WT only) MAXIMUM: 13 (all data for channel)

REGISTER #	CH #	DATA	UNITS / DECIMAL
40101	1	BASE UNITS	0=LB, 1=KG, 2=INCHES, 3=CM
40102	1	BASE DECIMAL	0=0, 1=0.1, 2=0.01
40103	1	DISPLAY UNITS	0=LB, 1=KG, 2=GAL, 3=LITERS
40104	1	DISPLAY DECIMAL	0=0, 1=0.1, 2=0.01
40105	1	FEED RATE BASIS	0=PER HOUR, 1=PER DAY
40106	1	NET WT.	REF. 40103, 40104
40107	1	FEED RATE	REF. 40103, 40104, 40105
40108	1	DAILY USAGE	REF: 40103, 40104
40109	1	DAYS TIL EMPTY	DAYS, Always 0.1 decimal
40110	1	AMOUNT USED	REF. 40103, 40104
40111	1	% FULL	%, NO DECIMAL
40112	1	BULK WT.	REF. 40103, 40104
40113	1	BASE WT.	REF. 40101, 40102

**CHANNEL 2:** Starting Register Address: ALWAYS 40201 (addressed as 200 in data string) Number of Registers: MINIMUM: 6 (units, decimals and NET WT only) MAXIMUM: 13 (all data for channel)

REGISTER #	CH #	DATA	UNITS / DECIMAL
40201	2	BASE UNITS	0=LB, 1=KG, 2=INCHES, 3=CM
40202	2	BASE DECIMAL	0=0, 1=0.1, 2=0.01
40203	2	DISPLAY UNITS	0=LB, 1=KG, 2=GAL, 3=LITERS
40204	2	DISPLAY DECIMAL	0=0, 1=0.1, 2=0.01
40205	2	FEED RATE BASIS	0=PER HOUR, 1=PER DAY
40206	2	NET WT.	REF. 40203, 40204
40207	2	FEED RATE	REF. 40203, 40204, 40105
40208	2	DAILY USAGE	REF: 40203, 40204
40209	2	DAYS TIL EMPTY	DAYS, Always 0.1 decimal
40210	2	AMOUNT USED	REF. 40203, 40204
40211	2	% FULL	%, NO DECIMAL
40212	2	BULK WT.	REF. 40203, 40204
40213	2	BASE WT.	REF. 40201, 40202

**CHANNEL 3:** Starting Register Address: ALWAYS 40301 (addressed as 300 in data string) Number of Registers: MINIMUM: 6 (units, decimals and NET WT only) MAXIMUM: 13 (all data for channel)

REGISTER #	CH #	DATA	UNITS / DECIMAL
40301	3	BASE UNITS	0=LB, 1=KG, 2=INCHES, 3=CM
40302	3	BASE DECIMAL	0=0, 1=0.1, 2=0.01
40303	3	DISPLAY UNITS	0=LB, 1=KG, 2=GAL, 3=LITERS
40304	3	DISPLAY DECIMAL	0=0, 1=0.1, 2=0.01
40305	3	FEED RATE BASIS	0=PER HOUR, 1=PER DAY
40306	3	NET WT.	REF. 40303, 40304
40307	3	FEED RATE	REF. 40303, 40304, 40305
40308	3	DAILY USAGE	REF: 40303, 40304
40309	3	DAYS TIL EMPTY	DAYS, Always 0.1 decimal
40310	3	AMOUNT USED	REF. 40303, 40304
40311	3	% FULL	%, NO DECIMAL
40312	3	BULK WT.	REF. 40303, 40304
40313	3	BASE WT.	REF. 40301, 40302

**CHANNEL 4:** Starting Register Address: ALWAYS 40401 (addressed as 400 in data string) Number of Registers: MINIMUM: 6 (units, decimals and NET WT only) MAXIMUM: 13 (all data for channel)

REGISTER #	CH #	DATA	UNITS / DECIMAL
40401	4	BASE UNITS	0=LB, 1=KG, 2=INCHES, 3=CM
40402	4	BASE DECIMAL	0=0, 1=0.1, 2=0.01
40403	4	DISPLAY UNITS	0=LB, 1=KG, 2=GAL, 3=LITERS
40404	4	DISPLAY DECIMAL	0=0, 1=0.1, 2=0.01
40405	4	FEED RATE BASIS	0=PER HOUR, 1=PER DAY
40406	4	NET WT.	REF. 40403, 40404
40407	4	FEED RATE	REF. 40403, 40404, 40405
40408	4	DAILY USAGE	REF: 40403, 40404
40409	4	DAYS TIL EMPTY	DAYS, Always 0.1 decimal
40410	4	AMOUNT USED	REF. 40403, 40404
40411	4	% FULL	%, NO DECIMAL
40412	4	BULK WT.	REF. 40403, 40404
40413	4	BASE WT.	REF. 40401, 40402

# MODBUS SAMPLE DATA STRINGS

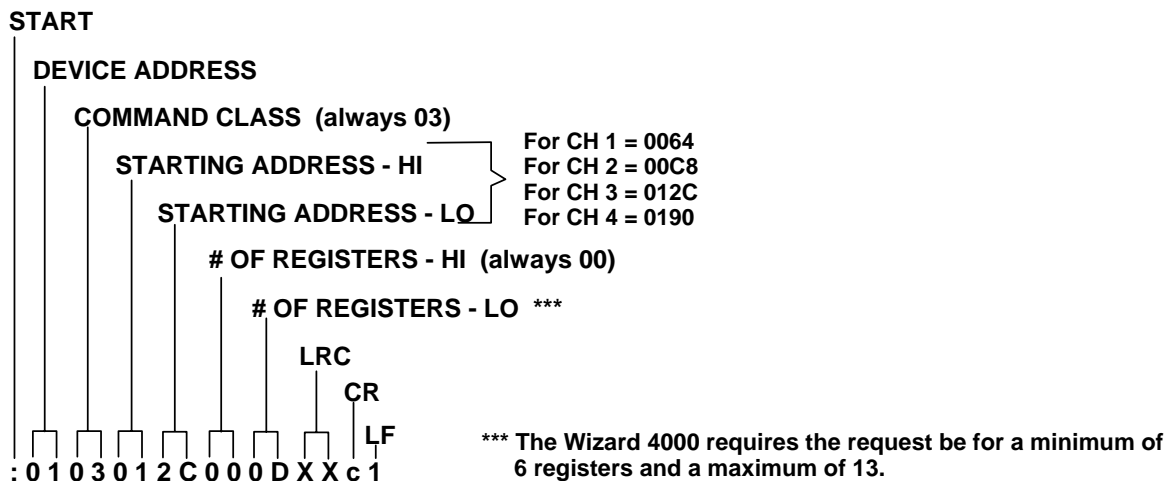
READ ALL DATA FROM CHANNEL 3

ALL NUMBERS MUST BE IN HEXIDECIMAL (ASCII FORMATTED).

To call the data from a specific MODBUS REGISTER, you must subtract 1 from the register address then convert to hexadecimal.

EXAMPLE OF MASTER REQUEST  
(ALL HEX, ASCII FORMAT)

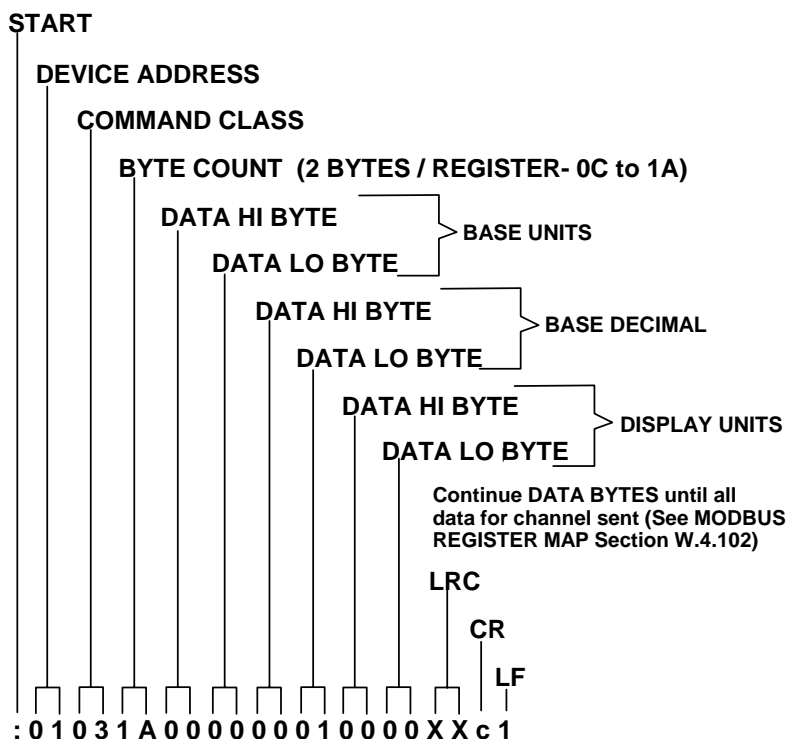
REQUESTING ALL AVAILABLE DATA from WIZARD CH3



RESPONSE from WIZARD 4000 (SLAVE):

WIZARD RETURNS 26 BYTES OF DATA (HEX) (See Register Map)

- 1ST 2 BYTES = BASE UNITS
- 2ND 2 BYTES = BASE DECIMAL
- 3RD 2 BYTES = DISPLAY UNITS
- etc... (See Modbus Register Map, Section W.4.102)



# **FACTORY WARRANTY**



SERIAL NUMBERS:  
(found on side of indicator)

S/N \_\_\_\_\_  
S/N \_\_\_\_\_  
S/N \_\_\_\_\_  
S/N \_\_\_\_\_  
S/N \_\_\_\_\_

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From the initial writing of a specification through the installation and operation of the equipment, 100% satisfaction is our goal. At Force Flow, we know that a superior customer service and support team is crucial to the success of our company.

## **PERFORMANCE GUARANTEE**

With the purchase of every Force Flow product comes our performance guarantee. If you are unhappy about the performance of one of our products in your chlorination or chemical feed application, you may request a performance guarantee from the selling distributor. Under the performance guarantee, if within 30 days of the original installation you are not completely satisfied with the performance of the Force Flow product, you may return or exchange it for the full purchase price. To qualify, all performance guarantees must be pre-approved by the factory service manager before returning the equipment to the factory.

## **WARRANTY**

Force Flow warrants its hydraulic and electronic scales (including accessories), for a period of Five (5) Years. If a failure occurs within said period, the warranty extends from the date of Force Flow's shipment, and liability is limited to repayment of the purchase price, repair or replacement of the equipment. All warranty work must be returned to the factory or a warehouse designated by Force Flow.



**WARRANTY**

## **TECHNICAL & APPLICATION SUPPORT**

Force Flow factory engineers have strong technical backgrounds with many years of process weighing experience in both chlorine and chemical feed applications. If you require technical information, application support or help with a custom project, please contact an application engineer on our HELP HOTLINE 1-800-893-6723 USA/Canada or email info@forceflow.com. Also, see our website at www.forceflow.com

## **SERVICE**

Our policy is to get all repairs, warranty work and retrofits completed and shipped within 48 hours of their arrival at the factory. Trained technicians and a large parts inventory make this happen. We understand that there is nothing more frustrating than sending something back to the manufacturer and wondering when you will see it again. 2-Day turnaround on repairs -- that is our policy! For prompt service, call our TOLL FREE HELP HOTLINE at 1-800-893-6723.