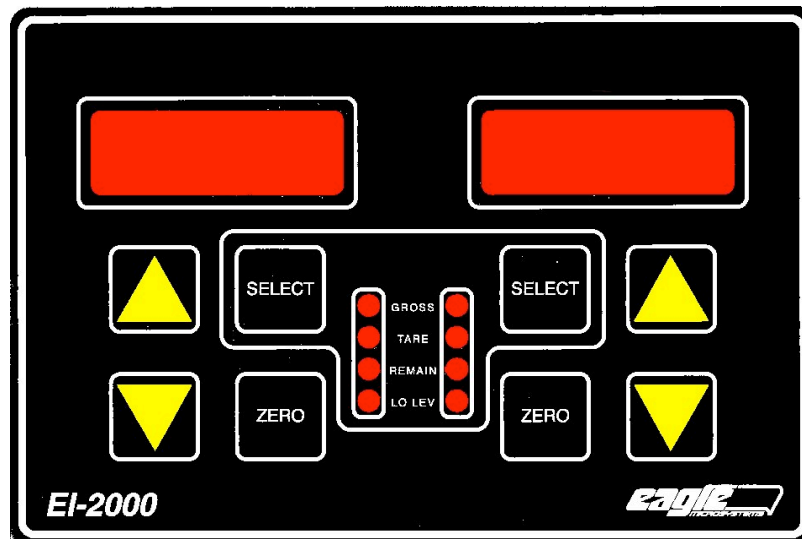
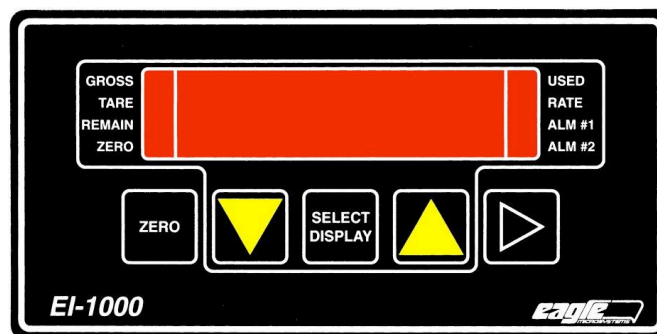


EI-1000 & 2000: Setup, Calibration and Troubleshooting.



EI-1000 & EI-2000

DIGITAL WEIGH INDICATOR/TRANSMITTER



EAGLE MICROSYSTEMS, INC.
366 CIRCLE OF PROGRESS
POTTSTOWN, PA 19464

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

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EI-1000 & 2000: Setup, Calibration and Troubleshooting.

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The "Setup, Calibration, and Troubleshooting" manual shipped with new instruments will have the Operation manual attached. It contains more in-depth information such as parameter explanations, set-point settings, diagnostic modes, and serial communications (standard RS-232, RS-485, & MODBUS available).

If you need a copies of this or any manual contact:

Eagle Microsystems at 610-323-2250.

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www.eaglemicrosystems.com

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

EI-1000 and EI-2000: Installation and wiring.

1. Chose a mounting location for the scale base and instrument. WT3600, ECS150x, LP4310, and any scale that has a hinge at one end must be bolted down before use. The DCS-302, EDS-400, C3600, C7200 and DS-750 should be bolted down for best results.
2. Mount instrument and scale base. See the instrument and scale manuals for drawings if needed.
3. Wire scale base. Use TB4 on EI1000 units. See **Scale Wiring** section for details. The EI-1000 has a shorting jumper on TB5 (+S,-S,-E). Do not remove this jumper.
4. Check S2 and set for the proper power input voltage 230 or 115 V.A.C. S2 is directly above the power terminal TB1.
5. Wire up A.C. Power on TB1. G is earth ground. N is Neutral or L2. H is Hot or L1.
6. Wire 4-20 outputs, if needed, on TB3. CH1 is the left display. CH2 is the right display. The EI-1000 uses CH1.
7. Power up unit. The instrument should show a weight reading if everything is wired properly. If the instrument shows A-OL, double check the scale wiring. See the alternate color codes table below for the 4 possible color codes.
8. When the scale is showing a weight reading, push down on the deck or disk. The gross weight should go positive. If the reading goes negative, reverse wires on the +S and -S terminals and recheck.
9. Calibrate the system. See the next page.
10. Setup and calibrate the 4-20 mA outputs if needed.

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Calibration: If you are using a permanently mounted tank, see the **Day tank setup** section and follow the calibration instructions there. To enter the calibration mode:

*EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.
EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds.*

1. The display will show “CFG” (EI1000) or “SEL CFG” (EI2000). Use the up arrow to change “CFG” to “CAL 1” (1000) or “CAL” (2000). Press SELECT (1000) or the right SELECT (2000). The display will show the gross weight with the GROSS light flashing.
2. Remove all weight from the scale. If you are using a tank that will be permanently mounted on the scale it can be left on the scale. Make sure the tank is empty or pumped out to it’s lowest point.
3. Press the ZERO pushbutton to zero the instrument. On the EI-2000 use the ZERO button on the side you are calibrating. NEVER use the arrow keys to zero the scale. If you do so by accident, unplug the power to the EI before exiting the calibration mode. This will prevent the zero from being saved.
4. Place a known weight on the scale that is 10% or more of the scale’s capacity. If you are using a scale with a stop across the back, place the weight all the way against the stop. On all other scales, roughly center the weight on the deck or disk. On bases designed for 150 pound or ton CL2 cylinders, calibrate with a full cylinder for best results. If using a day tank place a known weight in the center of the tank or fill the tank with a known amount of water or the actual chemical you are using and calibrate.
5. The instrument should show a positive reading. Use the up or down arrows to set the correct gross weight. On the EI-2000 use the arrows on the side you are calibrating.
6. On the EI-2000, repeat the calibration on the other side.
7. Press the right arrow twice on the EI-1000 to exit the menus and return to the gross weight reading. On the EI-2000 use the left SELECT.

Recommended: After correct operation is verified, use the diagnostic mode to write down the values of parameters 1.o, 1.c, 2.o, 2.c. These store the calibration information. If the calibration or zero is altered these numbers can be reentered to restore it.

	Date()	Date()	Date()	Date()
Parameter				
1.o (Channel 1 zero)				
1.c (Channel 1 span)				
2.o (Channel 2 zero)				
2.c (Channel 2 span)				

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Operation in automatic modes 3 and 4:

1. **Zeroing:** Starting with an empty scale showing the gross weight, press the zero button if the reading is not zero.

If the scale shows “n0 0” the weight exceeds the push to zero percentage (parameter P114). See the calibration section to zero the reading.

If *nothing* happens double check that the GROSS light is lit. Use the select button to show the gross weight if needed. Press zero again. You may not be in mode 3 or 4 if the instrument still won't zero. See the calibration section to zero the reading.

2. Place tank on scale. Check that the gross weight is correct. (Gross = Tare + product in tank). You may have to wait a few minutes for a stable reading while the contents of the tank to settle.
3. If the gross weight is not correct and the GROSS light is flashing, use the UP/DOWN arrows to adjust the weight.

If the GROSS light is not flashing, hold down the select button a few seconds until it does.

4. Press select.

Instrument will show the tare weight in operation mode is 4. Go to step 5.

Instrument will show the correct remaining weight if the operation mode is 3. You're done! (Partial tank see below.)

5. Use the UP/DOWN arrows to set the correct tare weight if needed.
6. Press select to save the tare and show the remaining weight.

Partial tank notes:

Assume the gross weight is correct in steps 2 and 3. If using mode, 4 continue normally. The remaining weight will be correct.

Mode 3 will show a full tank in step 4. To fix: hold down the UP arrow while the remaining weight is shown. The reading will jump to TARE after several seconds. Use the UP/DOWN arrows to set the tare weight. Press SELECT when done.

Please copy this page and post it by the EI-1000 / 2000 for quick reference.

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Scale Wiring:

Color codes vary depending on the scale type and load cells used. All four codes can be tried without damaging the scale or the instrument.

All Eagle Microsystems scales with orange and blue wires use code A.

Code A works with the LP4300, LP4320, WP1000, WT3600, C3600 & 7200, EDS400, most scales with four mounting feet, and our hydraulic conversion kits with the round load cell (HC3600 & 7200).

Code D or B works with the ECS150x/400 series scales. Try these codes with any scale with a hinge and a single load cell mounted on top of the deck. Note: If an ECS has a color code printed on the cable use it but swap the +S and -S colors!

Code C works with the LP4310, scales with a hinge and cell mounted inside of the deck, and our HC1000 hydraulic conversion kit.

If your scale or load cell was not obtained from Eagle Microsystems, try code C or A first. You may want to contact the manufacturer for the color code. You can also call us with the make and model of the scale and we may be able to find it for you.

Wiring color codes:

Terminal	A ↓	B ↓	C ↓	D ↓
+E	Red	Red	Green	Green
+S	Green	White	White	Red
-S	White	Green	Red	White
-E	Black	Black	Black	Black
SH	Yellow	Yellow	Yellow	Yellow

Orange and Blue wire usage:

	DCS 302 only. (Code "A" on TB5)	Our other scales on TB4	Our other scales on TB5
Orange	TB4 +S	+ Sense	+E or cap with wire nut
Blue	TB4 -S	- Sense	- E or cap with wire nut

If the wiring code you tried didn't work:

If code A or B gives you an "A-OL" use C or D and vice-versa.

If the instrument shows a weight but the gross reading goes *down* when weight is applied, swap the wires on the + and - S terminals.

If the instrument reading is unstable, check for loose connections.

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Troubleshooting:

Instrument doesn't power up:

- Check the ribbon cable between the display and the CPU boards. It should be plugged in all the way and have the red line next to the pin 1 markings.
- Unplug the power. Check that S2 is set for the proper input voltage. Change it if needed and plug the unit back in.
- Use a multimeter to measure voltage at the H and N terminals on TB1. There should be approximately 115 or 220 volts A.C. coming in. If not, power is not reaching the instrument.
- Unplug the power. Measure the resistance across the plug. An EI set for 115 VAC should read near 70 ohms and a 230 VAC unit should read near 275 ohms. If not check the fuse located in the black fuseholder with a slotted screwdriver top (directly below the transformer).
- Measure the + & - E terminals on TB4 or TB5 with the power on. You should have 5 volts DC across them. If 5 volts is present, double check the ribbon cable and J3 on the CPU board. If 5 volts is not present, unplug the instrument, disconnect the scale(s) and plug the unit back in. If it powers up now there is a short in the scale wiring.
- The jumper on J3 should be below the 1 (right side) for an EI-1000 and below the 2 (left side) for the EI-2000.

EI-1000 display shows gibberish:

- Check J3 as shown above. If you ordered both EI-1000's and 2000's you may have accidentally swapped displays.

EI-2000 display lights up the 8 LEDs but not the digits:

- The ribbon cable is plugged in backwards on one end.

Display is very dim:

- Unplug unit and check S2. If it is set for 230 VAC and you are running it on 115 this may happen.
- If S2 is ok, disconnect the scale(s) and plug the unit back in. If the display is now bright there is a short in the cable or scale base. Check the cable to the scale(s) for any point that may have been smashed or pinched during installation.
- Measure the AC input voltage with a meter, it may be too low.

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Display shows, “n0 0” when the zero button is pressed.

- The zero button is limited in normal operation to prevent someone from accidentally zeroing a full scale. To bypass this error if needed, go to the **Calibration** section. Enter the cal mode and do steps 1,2,3 and 7.
- **Faster way!** If the front cover is open close dip switch #4. The gross light(s) will flash. Press the zero button. Open switch #4. Done!

Display stays at zero or goes up slightly when placing a know weight on the scale

and/or

Unstable weight readings:

- On the DCS-302 or DS-750 the shipping nut or bracket may not have been removed. Flip the deck over. The nut or bracket is located under the square box and holds the long lever(s) up against the deck.
- The EDS-400 uses foam to hold the long lever up against the deck for shipping. Flip the deck over and remove the foam if it's still there.
- On any scale with a hinge and a load cell mounted on top of the deck, make sure the foot is sitting on the floor and the bolts mounting the load cell are not touching the floor.
- On the EI-1000 with a single scale the scale should be wired to TB4 (seven position terminal).
- The EI-1000 comes with a jumper shorting the +S,-S, and -E terminals on TB5. If it was moved to TB4, replace it on TB5
- The LP4310 and LP4300 have adjustable feet. Make sure the foot has not been backed out so far during leveling that the threaded rod is hitting the underside of the deck.
- Recheck the wiring. If the +E wire comes loose or is broken it can cause the instrument to stay at zero. Check the load cell and instrument cables for any damage.
- Measure the + & - E terminals on TB4 or TB5 with the power on. You should have 5 volts DC across them. If 5 volts is not present, kill the power. Disconnect the scale(s). Apply power and measure the + & - E terminals on the CPU board. If 5 VDC is present the scale or wiring has a short. Note: If you measure 10 Volts, that's OK. Older indicators had 10 VDC excitation.
- Make sure there isn't anything stuck under the scale and the sides of the scale are not rubbing against anything.
- Check the corner readings on any scale with four load cells or four feet (Ex. LP4300, WP1000, C3600, C7200). Place a weight on one corner at a time. The corner with the lowest reading most likely has a mechanical or electrical problem. A corner that reads high may also have electrical problems such as a wrong load cell or bad summing box.

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Display stays at zero when chemical is pumped into the tank but increases if the scale is stepped on or a test weight is applied:

- Turn off the automatic zero function. (Set parameter P113 off.) See the **Changing Configuration Parameters** and **day tank setup** section for more info.

If the weight reading starts drifting wildly or shows OL, UL, or A-OL:

- Check the cable from the scale to the instrument for damage.
- Check the wiring in the instrument for broken or loose connections.
- The LP4320, LP4300, and most multiple load cell scales have a summing box mounted under the deck. This box will need to be opened and inspected for moisture or corrosion if the cable looks good.
- On all scales with a summing box, inspect the connections inside the box for loose or broken wires. Also check the cables from the load cells to the summing box for damage.

If the weight reading doesn't track properly:

- Inspect the scale and tank to make sure they are not rubbing against anything.
- Check that all piping to the tank has a flexible section to allow the tank to move.
- Check under the scale to see if anything is stuck there.
- Check that the adjustable feet have not been backed out so far that they are hitting the underside of the deck.

Remaining weight is wrong but the gross weight is correct:

- Press SELECT several times. If you can select the tare weight use the UP/DOWN arrows to change it.
- If you cannot get the tare weight to show, select the remaining weight. Hold down the UP arrow. After about three seconds the unit will jump to the tare weight and start scrolling. Release the button and use the UP/DOWN arrows to set the tare. Press SELECT when finished.
- If that doesn't work you have an older indicator. Enter the configuration mode by closing dip switch S1 position 1. Set parameter P001 to "1". This selects the manual mode. Open the switch and you will be able to select the tare. Note: On old style EI-1000's hold down SELECT until "nOnE" flashes. Press UP to get to "CFG" and press SELECT to get to "P001". Hold down "SELECT" until "DONE" appears to exit.

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Changing configuration parameters:

EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.

EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds.

The display will show “CFG” (EI1000) or “SEL CFG” (EI2000). Press SELECT (1000) or the right SELECT (2000). The display will alternate showing P001 and a number.

Faster! If the cover is open close dip switch #1 to enter the configuration mode. Open it when done to save any changes and return to the weight reading.

EI-1000 only:

- Use the UP/DOWN arrows to select the parameter. When you stop using the arrows the display will alternate between the parameter and its value.
- Press SELECT. The value will flash. Use the UP/DOWN arrows to change it to the new value.
- Press SELECT to save the change. The display will go back to alternating between the parameter and its' value.
- Use the UP/DOWN arrows to go to another parameter if needed.
- When done press the arrow that points to the right twice. The display will return to the weight reading.

EI-2000 only:

- Use the left UP/DOWN arrows to select the parameter number in the left display.
- Use the right UP/DOWN arrows to change the value in the right display.
- When done, press the left SELECT twice to return to the weigh readings.

Turning off auto zeroing:

- Enter the configuration as shown above.
- Use the UP arrow to get to P113.
- EI-1000 - Press SELECT and use the down arrow to change the value to OFF. Press SELECT again.
- EI-2000 - Use the right DOWN arrow to change the value to OFF.
- Exit the configuration as shown above.

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4-20 mA parameter setup:

- Enter the configuration as shown on page 9.
- Use the UP arrow to get to P600. This sets what the 4-20 output follows.
- The selections are: Gr - gross weight, rE - remaining weight, GT - gross total, rT - remaining total. "Total" modes transmit the sum of both sides of the display on channel 1.
- EI-1000 - Press SELECT and use the arrows to change the value if needed. Press SELECT again.
- EI-2000 - Use the right arrows to change the value if needed.
- Now go to parameter P610. This set the weight value that equals 20 mA.
- Change the value if needed as shown above.
- See "4-20 mA output testing" for calibrating or testing if needed.

4-20 mA output testing:

EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.

EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds.

- Use the arrows to get to "AOUT". Press SELECT.
- "Ao.test" (EI-1000) or "Ao T 4.00" (EI-2000) will be displayed.
- If using an EI-1000 press SELECT and "4.00" will start to flash.
- The output is now forced to 4 mA. Connect a current meter or check the remote readout to check the output.
- Using the arrows (right side on EI-2000) will force the output to the value shown.
- Go up to 20.0. Check the output is 20mA or full scale on the remote readout.
- Go to 12.00 mA. Check the output is 12mA or half scale on the remote readout.
- On the EI-1000 press SELECT when done to return to Ao.TEST.

Calibrating the 4-20mA outputs:

Enter the configuration as shown above and select "AOUT" as shown in the first step.

1. Go up to "Ao.1 4" ("Ao.1 4.0" on EI-2000, use the left arrows.)
2. Connect an mA/current meter capable of displaying 20.00mA to 0.01 mA to CH1 output.
3. On the EI-1000 press SELECT. The "4" will flash.
4. Use the up/down arrows to set the output to 4.00 mA on your meter. The readout on the indicator will not change. (Use right arrows on EI-2000)
5. On the EI-1000 press SELECT. The "4" will stop flashing.
6. Use the up arrows (left on EI-2000) to get to "A.o 1 20"
7. Press select on the EI-1000.

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8. Use the arrows to set the output to 20.00 mA on your meter.
9. Press select on the EI-1000 to stop the flashing and save the value.
10. If needed, now hook your meter to CH2 output.
11. Go up to "Ao.2 4"
12. Repeat steps 3 through 9 using the Ao.2 parameters to set the channel 2 output.
13. Use the left SELECT button or the right pointing arrow on the EI-1000 to exit all the way back to the weight reading to save the new calibration.

Setting the zero and full scale on your remote readout:

Enter the configuration as shown on page 9.

- Use the arrows to get to "AOUT". Press SELECT.
- "Ao.test" (EI-1000) or "Ao T 4.00" (EI-2000) will be displayed.
- If using an EI-1000 press SELECT and "4.00" will start to flash.
- Go to 4.00 mA. Zero your remote readout if needed.
- Go to 20.00 mA. Set your remote readout to full scale.
- On the EI-1000 press SELECT when done to return to Ao.TEST.

4-20 mA troubleshooting:

Go through the output testing as shown above.

- If you find any trouble when using a DMM, check your meter against a known good 4-20 output to verify it is functioning properly. Worn test leads may not make a good connection and cause low readings. We've also found some low cost digital meters do not read low DC currents properly.
- If there is no current output, set your meter to volts DC. Measure the output. If you have a reading of 10 VDC or higher the current fuse in your meter may be bad.

Remote readout isn't working:

- The EI1000/2000 is an active or sourcing output. Check that your remote is set as a passive input.
- Disconnect the loop and hook a meter up to the output directly. Check the 4, 12, and 20 mA points again. If the output works now any problems are in the remote readout or the wiring.

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Remote readout shows proper values in test mode but doesn't track the weight shown by on the indicator's display:

- Check the P600 and P610 settings as shown in the "4-20 mA parameter setup" section. P600 selects gross or remaining weight tracking and P610 sets the weight that will be 20mA.

Note: The reading displayed on the remote will be within 1% of the reading on the EI1000 or EI2000.

Remote readout changes during testing but doesn't track properly.

- Check that your remote is set as a passive input. If it's sourcing current it may be "fighting" the EI's analog output.
- Calibrate the 4-20 mA outputs as shown above.
- Go through the output test again and check the output values with a meter.
- If this tests ok then set the zero and full scale on your remote readout as shown above.

Remote readout doesn't change or no current output.

- If there is any current from the output but it is "stuck" and won't follow the test readout, the output is bad. The chips are socketed and can be replaced in the field. U7 drives the CH1 output and U8 drives CH2. It may be best to send the EI1000/2000 in for repair as there may be other failed components.
- If there is no current output, set your meter to volts DC. Measure the output. If you have a reading of 10 VDC or higher check the current fuse in your meter. It may be bad.
- If your meter doesn't show any voltage in the above step, the output is blown. It may be The U7 or U8 chips as in the first step above.
- If the 4-20 output doesn't change when reading weight but works in the test mode there is a setup problem. Check the P600 and P610 settings. Also check the tare and remaining weights if P600 is set to rE or rT.

Output current is stuck over 21 mA or under 3.4 mA but not zero.

- The output chip is blown. The chips are socketed and can be replaced in the field. U7 drives the CH1 output and U8 drives CH2. It may be best to send the EI1000/2000 in for repair as there may be other failed components.

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Day tank use – Instrument setup:

If you are using a day tank you must set parameter 113 to off. This is the auto zero. If this parameter is not turned off the instrument will zero out the reading as the chemical is pumped in. If the instrument skips over P113 set P100 to USER and P113 will appear in the menu. If parameter 213 is available set it to off as well. See the **Changing Configuration Parameters** page for an example.

The operating mode of the EI1000 or 2000 should be set to fully manual (P001 set to 1).

Set the tare weight to 0. On a day tank application the gross and remaining will show the same value.

All piping to the tank must have a flexible section to allow the scale and tank to move. If any pipes are rigidly attached it will affect the accuracy of the scale. Install a flexible section if needed. Do not allow the tank or scale to bear the weight of any piping.

Unless the pumps can completely empty the tank, there will be some product left in the bottom. This residual can be ignored. The weight will show how much usable product is left in the tank.

The instrument can be calibrated to read in gallons instead of pounds if desired. Make sure to clearly mark “Gallons” on the instrument face to avoid any confusion if you do this.

On the LP4300 or any scale with four load cells you can place known weights on the top of the tank to calibrate they system instead of adding product. Use weights totaling at least 10% of the tanks capacity. This won't work with the LP4310 and LP4320.

If the display stays at zero when chemicals are pumped into the tank, double check parameter P113 (auto zero) is OFF. A quick test is to put a weight between 2 to 5 pounds on the scale. If the instrument goes to zero within 20 seconds this parameter is *on*. See the *Turn off Auto Zero* section.

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Calibrating an empty day tank.

Any auto zeroing (parameter 113 on EI series) must be set to off when using a day tank! Check this before continuing.

If the tank can be emptied or is empty, use this procedure. If it can't, follow the next procedure.

1. Enter the calibration mode.

EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.

EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds.

2. The display will show "CFG" (EI1000) or "SEL CFG" (EI2000) Use the up arrow to change "CFG" to "CAL 1" (1000) or "CAL" (2000). Press SELECT (1000) or the right SELECT (2000). The display will show the gross weight with the GROSS light flashing.
3. Pump the tank out as far as possible. Do not run any pumps dry if this will cause damage.
4. Press the ZERO pushbutton to zero the instrument. On the EI-2000 use the ZERO button on the side you are calibrating. NEVER use the arrow keys to zero the scale. If you do so by accident, unplug the power to the EI before exiting the calibration mode. This will prevent the zero from being saved.
5. Add a known amount of product (at least 10% of the tank's capacity) to calibrate. The weight reading should rise while the product is being added. If it doesn't, stop! Further troubleshooting is needed.
6. The instrument should show a positive reading. Use the up or down arrows to set the correct gross weight. On the EI-2000 use the arrows on the side you are calibrating.
7. To verify the calibration, add another known amount of product. The weight reading should increase to match.
8. Press the right arrow twice on the EI-1000 to exit the menus and return to the gross weight reading. On the EI-2000 use the left SELECT.

An example using water in a 200 gallon tank:

Enter cal mode. Pump as much water out as possible. Note the gross weight should be dropping. For this example five gallons were left in the tank.

Zero the scale. Add 20 gallons. The weight reading should rise.

Water is 8.3454 pounds per gallon, so 20 Gallons x 8.3454 = 166.9 pounds.

Set the instrument to read as close to 166.9 as possible. Then exit the cal mode.

After adding 10 more gallons there reading would be 205.4 if there are no mechanical problems.

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If the tank can't be emptied now use this procedure. The tank must be pumped down later to set the true zero.

1. Enter the calibration mode.

EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.

EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds.

2. The display will show "CFG" (EI1000) or "SEL CFG" (EI2000) Use the up arrow to change "CFG" to "CAL 1" (1000) or "CAL" (2000). Press SELECT (1000) or the right SELECT (2000). The display will show the gross weight with the GROSS light flashing.
3. Press the ZERO pushbutton to zero the instrument. On the EI-2000 use the ZERO button on the side you are calibrating. NEVER use the arrow keys to zero the scale. If you do so by accident, unplug the power to the EI before exiting the calibration mode. This will prevent the zero from being saved.
4. Check the level in the tank to make sure it won't overflow when the desired amount of product is added.
5. Add a known amount of product (at least 10% of the tank's capacity) to calibrate. The weight reading should rise while the product is being added. If it doesn't, stop! Further troubleshooting is needed.
6. The instrument should show a positive reading. Use the up or down arrows to set the correct gross weight. On the EI-2000 use the arrows on the side you are calibrating.
7. To verify the calibration, add another known amount of product. The weight reading should increase to match.
8. Press the right arrow twice on the EI-1000 to exit the menus and return to the gross weight reading. On the EI-2000 use the left SELECT.
9. The scale is calibrated at this point but the zero is not correct. Let the tank drain as low as possible through normal usage. It doesn't matter if this takes a few days. The weight reading will go negative but still track properly. Don't let any pumps run dry if this will cause damage!
10. When the product in the tank is at it's lowest point, repeat steps 1,2,3 and 7 above to set the zero.

Another example using water in a 200 gallon tank that can't be emptied:

Enter cal mode and zero the scale. Add 20 gallons. The weight reading should rise.

20 Gallons x 8.3454 lbs/gal = 166.9 pounds.

Set the instrument to read as close to 166.9 as possible. Then exit the cal mode.

After adding 10 more gallons there reading would be 205.4 if there are no mechanical problems.

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Note that the total amount in the tank is unknown at this point. As the 30 gallons that were added are used the weight reading will drop to zero, then go negative. When the water is at it's lowest level, zero the scale.

Recommended: After correct operation is verified, use the diagnostic mode to write down the values of parameters 1.o, 1.c, 2.o, 2.c. These store the calibration information. If the calibration or zero is altered these numbers can be reentered to restore it.

	Date()	Date()	Date()	Date()
Parameter				
1.o (Channel 1 zero)				
1.c (Channel 1 span)				
2.o (Channel 2 zero)				
2.c (Channel 2 span)				

See the EI-1000 and EI-2000 Operating manual for more in depth information on these instruments. We'll be glad to email it to you if needed.

Contact Eagle Microsystems with any questions at 610-323-2250.
Email: info@eaglemicrosystems.com
www.eaglemicrosystems.com

EI-1000 & 2000: Setup, Calibration and Troubleshooting.

Notes:

EI-1000 FEATURES

- Up to four scale bases
- User selects scale base via front panel keypad.
- Up to four continuous 4-20mA outputs
- Six-digit display for up to 999,000 lb or kg scale displays.
- Up to ten relay outputs

EI-2000 FEATURES

- Up to two scale bases
- Simultaneous display of both channels via the dual four-digit display.
- Two 4-20mA outputs
- Up to ten relay outputs

EI-2000S BOARD OPTIONS

The following options must be specified at the time of ordering.

Set point relays	Adds two, 3A, 250V AC, 32V DC, mechanical relay contact outputs
RS485	Adds a two wire RS485 interface with MODBUS-RTU support.
RTC	Adds time & date

OPTION BOARDS

EI-2000-EXP

This board mounts on the EI-2000S-CPU board. It furnishes two additional scale inputs (channels 3 & 4), two additional relay contacts, and two 4-20mA analog outputs.

EI-2000-IO

This board mounts on the EI-2000S-CPU board. It furnishes eight additional relay contacts and four remote switch inputs.

Note: If both option boards are needed, they are mounted off-board and connect to the EI-2000S-CPU via ribbon cables.

SPECIFICATIONS

Power Supply

A.C. Voltage (switch selectable): 115V/230V
Power: 12W

Relays

Type: Form-A (N/O)
Current capacity: 3A
Maximum V. AC: 250V
Maximum V D.C. 250V
Mechanical: Yes

Environmental

Temperature range: -10C to 40C
Humidity (non-condensing): 2%

Loadcell

Current Capacity 240mA
Excitation Voltage 5V +/- 0.25V
Remote Sense Scale 1 only

Analog outputs

Compliance: 10V
Load: <510ohms
Current range: 0 – 22mA

Real Time Clock Optional

Serial I/O

RS232 Standard
RS485 Optional

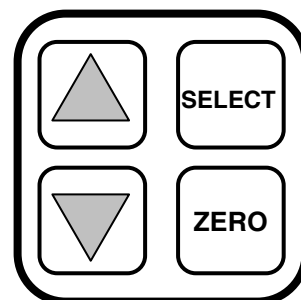
PUSHBUTTONS

The EI-2000 has a set of pushbuttons for each of the two channels, and the EI-1000 has one set of pushbuttons that control up to four channels (scale bases). The pushbutton functions listed below describe their typical uses. However, when applicable, the pushbutton(s) may be used for other functions, which is documented in this manual.



EI-1000 PUSBUTTONS

ZERO	Press to zero the gross or used weight.
DOWN ARROW	Press to decrement (decrease) the value displayed if it's adjustable.
SELECT	Select gross, tare, remaining, etc. This pushbutton is used for many other functions, as well.
UP ARROW	Press to increment (increase) the value displayed if it's adjustable.
RIGHT ARROW	EI-1000 only: Selects a channel or exits from front panel configuration/calibration access.



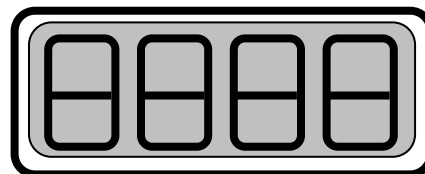
**EI-2000
PUSHBUTTONS**

DISPLAYS

The main operating mode of the meter is, of course, viewing the weight on the scale(s) connected to each channel. One can select, via the appropriate SELECT pushbutton, several weight values; they are as follows:

Gross weight

This is the total weight on the scale, which includes the weight of the container (e.g., cylinder, tank, or barrel) and the weight of the product.

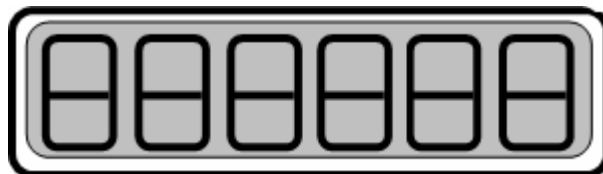


Tare weight

This is the weight of the container (e.g., cylinder, tank, or barrel).

Remaining weight (a.k.a. net weight)

This is the weight of the product (e.g., Chlorine) that the container holds.



Used weight

This is the weight of the amount used since the scale was last zeroed, which is done by either "starting" the channel (operating modes 2, 3, and 4) or pressing the ZERO pushbutton while viewing this display. The EI-2000 display will alternate between a "USEd" message and the actual used weight value. This value increases with decreasing weight on the scale since it represents the amount of product used so far.

LED INDICATORS

LED	EI-1000	EI-2000	SOLID	FLASHES
GROSS	√	√	Gross weight is being displayed	Gross weight is adjustable (CAL)
TARE	√	√	Tare weight is being displayed	Flashes when the TARE has the lock enabled indicating that the tare is adjustable.
REMAIN	√	√	Remaining weight is being displayed.	The <u>tare</u> LED flashes when the remaining weight is adjustable.
LO LEV		√	The weight on the scale is below the low-level set point.	Never
ZERO	√		Not used at this time.	Never
USED	√		Used weight is being displayed.	Never
RATE	√		Not used at this time.	Never
ALM #1	√		Same function as the LO LEV that is described above (set point A).	Never
ALM #2	√		Same function as the LO LEV that is described above (set point B).	Never

POUND (lb) AND KILOGRAM (kg) UNITS OPERATION

The EI-1000 and EI-2000 meters may operate using lb or kg units. DIP switch S1-3 selects the desired unit. If one wishes to switch to the other unit, simply flip the switch to the opposite setting; no recalibration is necessary. It is necessary to select the proper S1-3 switch setting so the unit selection works properly (i.e., do not calibrate the scale in kg if the S1-3 switch is set to lbs). Also, all parameters that were set using the previous units are converted to the equivalent value of the newly selected unit.

EI-1000 CHANNEL/SCALE BASE SELECTION

If more than one channel is enabled, the RIGHT ARROW pushbutton selects which channel currently being displayed. Note: The first press of the RIGHT ARROW pushbutton displays, for one-second, the selected channel (CH x), and the subsequent presses change the channel.

OPERATING MODES

The EI-1000 & EI-2000 meters have five operating modes to simplify user interactions with the meter. The descriptions below will reference the set of pushbuttons for the left or right (CH1 or CH2) channel on the EI-2000 or the set of pushbuttons on the EI-1000 that control all, up to four, scales. Configuration parameter P001 selects which operating mode, 1 thru 5, is enabled for all scales.

MODE 1: FULLY MANUAL MODE

Typical application: drum scales, bin and hopper scales - Remaining, tare, & gross weights are displayable.

1. An empty scale should read zero. If it does not, press the ZERO pushbutton. If “no 0” is displayed, access the calibration mode to zero the scale.
2. Place container on the scale.
3. Press the SELECT pushbutton to go to the tare weight.
4. If necessary, adjust the tare weight value via the arrow pushbuttons.
5. Press the SELECT pushbutton to go to the remaining weight.

MODE 2: ADJUSTABLE REMAINING

Typical application: drum scales - Remaining & gross weights are displayable.

1. An empty scale should read zero. If it does not, press the ZERO pushbutton. If “no 0” is displayed, access the calibration mode to zero the scale.
2. Place container with product on the scale.
3. Instrument will show the REMAINING weight and will flash the tare LED.
4. Use the UP and DOWN arrow pushbuttons to adjust the remaining weight displayed.
5. Press the SELECT pushbutton, the tare LED will stop flashing.

If you need to adjust the REMAINING weight again, press and hold either the UP or DOWN arrow pushbutton for 3 seconds, the tare LED will start to flash and the remaining weight will now be adjustable. Press the SELECT pushbutton when finished.

MODE 3: AUTOMATIC OPERATION

Typical application: full cylinders/tanks - Remaining and gross weights are displayable.

1. An empty scale should read zero. If it does not, press the ZERO pushbutton. If “no 0” is displayed, access the calibration mode to zero the scale.
2. Place a full container on the scale; the Gross LED will flash.
3. Adjust gross weight by using the UP and DOWN arrow pushbuttons.
4. Press the SELECT pushbutton; the tare weight will be automatically calculated and stored in memory. The preset “START” value (configuration parameter Px17) of remaining chlorine weight will now be displayed, and the REMAIN LED is illuminated.

If the REMAINING weight must be adjusted again, one should press and hold either the UP or DOWN arrow pushbutton for 3 seconds. The tare LED will start to flash and the remaining weight will now be adjustable. Press the SELECT pushbutton when finished.

MODE 4: ADJUSTABLE TARE

Typical application: partially used chlorine cylinders - Remaining, tare, & gross weights are displayable.

1. An empty scale should read zero. If it does not, press the ZERO pushbutton. If “no 0” is displayed, access the calibration mode to zero the scale.
2. Place a full container on the scale.
3. The Gross LED will flash.
4. Adjust gross weight by using the UP and DOWN arrow pushbuttons.
5. Press SELECT, tare will now be displayed (tare LED should be illuminated).
6. Adjust tare, as required, by using the UP and DOWN arrow pushbuttons.
7. Press SELECT, the remaining weight will now be displayed (REMAIN LED should be illuminated).

MODE 5: USER-ADJUSTABLE REMAINING

Typical application: chlorine gas cylinders. - Remaining and gross weights are displayable.

1. An empty scale should read zero. If it does not, press the ZERO pushbutton. If “no 0” is displayed, access the calibration mode to zero the scale.
2. Place a full container on the scale.
3. “REMAIN” LED will light.
4. Use the UP and DOWN ARROW pushbuttons to adjust the remaining weight displayed.
5. The SELECT pushbutton will toggle display between gross and remaining weights.

Note: This operating mode mimics the standard modes of other manufacturer’s scales. The ability to display the true “Gross” weight value allows the operator to verify the remaining value displayed; overfilled cylinders can be detected.

$$\text{REMAINING_WEIGHT} = \text{GROSS_WEIGHT} - \text{CYLINDER_WEIGHT} - \text{VALVE_WEIGHT.}$$

!! CAUTION !!

IN MODES 2 & 5, THE DISPLAYED “REMAINING” VALUE CAN BE EASILY CHANGED TO GIVE AN ERRONEOUS READING. BEFORE REMOVING THE VALVE FROM AN “EMPTY” CYLINDER OR OPENING THE VALVE ON A FULL CYLINDER, ALWAYS VERIFY THE REMAINING VALUE WITH THE GROSS WEIGHT.

MODE 6: GROSS ONLY MODE

Typical application: Varies

The only weight displayed is gross. One calibrates by manually enabling this calibration mode.

HIDDEN PUSHBUTTON FUNCTIONS

Scale gross weight recalibration/restart:

When a cylinder or tank is on the scale (above the weight threshold in modes 2-5, see parameters P116, P216, etc.), press and hold the SELECT pushbutton until the gross LED is starts to flash. At this time, the user may now use the UP and DOWN arrow pushbuttons to adjust the gross scale calibration. When satisfied that the weight is correct, press the SELECT pushbutton to restart the scale. Depending on the operating mode, a new start remaining weight will be calculated and the used display will be zeroed.

Tare lock:

If this function is enabled (parameter P030), operating modes that display the tare weight (modes 1 and 4), will not allow adjustment of the tare weight without first holding the UP or DOWN arrow pushbutton for three seconds. To store the new tare, press the SELECT pushbutton to display the remaining weight.

Front Panel Configuration/Calibration/Diagnostic Access (FPA)

The user has the option of accessing ALL configuration, calibration and diagnostic functions without opening the enclosure. Parameter P999 selects whether or not this is enabled (it is set to no or yes).

EI-1000: Press and hold [SELECT] + [RIGHT ARROW] for greater than three seconds.

*EI-2000: Press and hold [LEFT SELECT] + [RIGHT SELECT] for greater than three seconds. When the **FPA menu** is first displayed, the CFG option is shown. The selections are configuration (CFG), calibration (EI-2000 has CAL and the EI-1000 has CAL1 through 4), analog output (AOUt), and diagnostic (dIAG). Press the UP or DOWN ARROW pushbutton below to select another mode, and press the “enter” pushbutton to select the function:*

Menu choice selection:

EI-1000: [DOWN ARROW] or [UP ARROW]

EI-2000: [RIGHT UP ARROW] + [RIGHT DOWN ARROW]

To make a selection, press...

EI-1000: [SELECT]

EI-2000: [RIGHT SELECT]

To exit the calibration/configuration/diagnostic mode, press...

EI-1000: [RIGHT ARROW]

EI-2000: [LEFT SELECT]

The user will be returned to the FPA menu. The user can either select another menu choice using the UP ARROW or DOWN ARROW (plus SELECT) pushbuttons or exit back to the weigh mode by pressing the pushbutton stated above.

CONFIGURATION

To enter configuration, either set the DIP switches to S1-1=ON, S1-2=OFF, and S1-4=OFF or use the front panel access method.

EI-1000 PUSHBUTTONS

To select a parameter, press the UP ARROW or DOWN ARROW pushbutton; the parameter label (Pxxx) is displayed and then its value is displayed (alternates the two).

To adjust a parameter, press the SELECT pushbutton; the current parameter value will flash. Using the UP ARROW and DOWN ARROW pushbuttons, adjust the value to the desired setting. Finally, press the SELECT pushbutton again to enter the new value.

EI-2000 PUSHBUTTONS

Select a parameter by the LEFT UP and DOWN ARROW pushbuttons, and adjust the value by the RIGHT UP and DOWN ARROW pushbuttons.

P001 Operation (1 – 5)

This selects the operating mode for the meter. See the “operating mode” section of this manual for a detailed description of each one.

P010 lb/kg (display only)

This displays the engineering unit, lb or kg, selected by S1-3. The user can change the units DIP switch at any time; all values that were entered in pounds are automatically converted to kilograms and vice versa.

P020 Used display enable/disable (ON/OFF)

If set to on, the used display is available to be selected via the select pushbutton.

P030 Tare lock enable (Y) or disable (N).

This applies to operational modes 1 & 4. While viewing the tare value, press and hold the up or down arrow pushbutton. After three seconds, the tare value will be adjustable. Also, the tare LED will flash. Press the select pushbutton to view the remaining weight and to store the tare value permanently.

SCALE PARAMETERS

P100 through P400 set needed parameters for the attached scale bases. If a scale base is set to OFF, this applies to channels 2, 3 and 4; all of its parameters are hidden except for the scale selection.

- P100-P199 Scale 1 parameters
- P200-P299 Scale 2 parameters
- P300-P399 Scale 3 parameters (EI-2000-EXP must be installed)
- P400-P499 Scale 4 parameters (EI-2000-EXP must be installed)

P100 Scale selection (auto-configuration)

This parameter selects the Eagle Microsystems scale connected to the scale channel input

Px00	Function
OFF	This turns the channel off if it's not needed (2, 3 and 4).
CY-1	Copy the channel 1 setup; this is available for channels 2, 3, and 4. The parameters and set points are hidden since they are identical to channel 1.
USER	All scale parameters are available.
1 & up	This selects a scale, see scale selection table below. All parameters are automatically setup. The resolution and average parameters (Px11 & Px12) can be changed.

SCALE SELECTION TABLE

	Px00	Px10	Px11	Px12	Px13	Px16	Px17
Select	Scale type	F.S.	Res.	AZ	PTZ/AZ range	Threshold weight	Start weight
		<i>lb/kg</i>	<i>lb/kg</i>	<i>%</i>	<i>%</i>	<i>lb/kg</i>	<i>lb/kg</i>
1	DCS302	300/140	0.5/0.2	1%	2%	60/27.2	150/136
2	EDS400	400/180	0.5/0.2	1%	2%	60/27.2	150/136
3	DS750	750/340	0.5/0.2	1%	2%	60/27.2	150/136
4	WT3600 (1/ch)	4000/1810	5/2	1%	10%	1000/454	2000/907
5	WT3600 (2/ch)	8000/3630	5/2	1%	10%	1000/454	4000/1816
6	LP4300 /4000lb.	2000/910	1/0.5	1%	2%	50/23	2000/910
7	LP4300/12000lb.	6000/2720	1/0.5	1%	2%	50/23	6000/2720
8	ECS150x	300/140	0.5/0.2	1%	2%	60/27.2	150.0/68.0
9	WP1000 (300lb)	300/140	0.5/0.2	1%	2%	60/27.2	150.0/68.0
10	*WT3600 (1/ch)	4190/1900	5/2	1%	10%	1000/454	2030/920
11	*WT3600 (2/ch)	8380/3800	5/2	1%	10%	1000/454	4060/1840
12	WP1000 (600lb)	600/280	0.5/0.2	1%	2%	120/54.4	150.0/68.0
13	WP1000 (1200lb)	1200/560	0.5/0.2	1%	2%	240/108.8	150.0/68.0

*Australian typical load settings.

Scale Selection (cont.)

To load default scale calibration for the scale selected above, press and hold the RIGHT SELECT (EI-2000)/SELECT (EI-1000) pushbutton until LOAD YES/NO (Y/n) appears. Press the (RIGHT) UP ARROW to select yes or no (Y/n) and then press the (RIGHT) SELECT again to enter your choice. This also must be done for channels two through four (if enabled).

P110 Full-scale (10 to 9900)

This sets the full-scale in the units selected by the lb/kg switch, S1-3. This is used to limit set points and other parameters that are entered using lb or kg weighing units.

P111 Resolution (0.0001 to 500)

This sets the weight division for the unit selected by the lb/kg switch. The choices for the EI-2000 are 0.1, 0.2, 0.5, 1, 2, and 5. The choices for the EI-1000, since it has a six digit display, are extended to the range of 0.0001 to 500.

P112 Average (1, 2, 4, 8, 12, 16, or 20)

This parameter sets the number of scale weight acquisitions before the display is updated to the weight on the scale. Higher numbers yield a more stable less responsive meter reading.

P113 Auto-zero (off, 0.01, 0.02, 0.03, 0.05, 0.1, 0.2, 0.3, 0.5, 1, 2)

Auto zero is used to automatically zero the meter (same as pressing the zero pushbutton). This setting controls how much of scale range in percentage will automatically be zeroed when the load (e.g., container, tank or cylinder) is removed from the scale. All negative values are zeroed regardless of this setting unless it is set to off.

Example: If full-scale is 300lbs and auto-zero is set to 0.5 (%), the weight must be below 1.5lbs for the meter to automatically zero the scale.

P114 Push to Zero/Auto-zero PTZ/AZ maximum range (OFF, 2, 5, 10, 20, 50, or ALL).

When the load is removed from the scale, in an ideal world, the weight returns to zero. However, usually the meter reading is above zero. If the auto-zero is enabled (Px13) and the weight is within its range, the meter will automatically zero the weight. If it's not, the user should press the zero pushbutton for the selected channel.

The PTZ/AZ parameter, set in percentage of full-scale, selects the maximum amount of weight that is permitted to be zeroed either automatically or by pressing the zero pushbutton.

Example: If full-scale is 300lbs and **PTZ/AZ** is set to 2 (%), the weight must be below 6 lbs for the meter to allow the automatic zero (AZ), if enabled, to zero the scale or the ability to zero the scale via the ZERO pushbutton. Note: If the threshold (Px16) weight is exceeded, the automatic zero and pushbutton zero are inhibited.

Note: The "ALL" setting allows unlimited zeroing ability, which is not a recommended setting since the scale load-cell may be shifting too much.

The off setting was added to firmware version 6.21. The user must enable calibration to zero the scale.

P116 Threshold (0 to full-scale)

This applies to operating modes 2 through 5. This sets the point (in lbs or kgs) that the meter will enable, depending on the operating mode, switching to remaining or enabling adjustment of the gross weight calibration or remaining weight.

P117 Start (0 to full-scale)

This parameter applies to operating modes 3 & 4. This is the value of the remaining weight (in lbs or kgs) when the scale channel is “started.” See the “operating modes” section of this manual.

P2xx, P3xx & P4xx

Parameters P2xx, P3xx and P4xx are identical to the P1xx set but control scale bases two through four, respectively. Inactive channel parameters are hidden. If the EI-2000-EXP is not installed, P3xx and P4xx parameters are not available.

P500 Set point A mode selection

Off	Set points are disabled
Lo(w)-level	Low-level, remaining weight set point
Hi level	High-level, remaining weight set-point

The set points have a 1% hysteresis (based on the full-scale) and an activation delay of three seconds. For example, if the full-scale is 300lbs, the set point is 10lbs, and the low-level set point mode is selected, the relay is energized when the remaining weight is equal to or below 10lbs for three seconds. The relay is de-energized when the remaining weight goes above 13lbs. If the high-level set point is enabled, the relay is also energized at 10lbs after three seconds, but it’s de-energized at 7lbs.

P501 Set point B mode selection

This parameter is used if either the EI-2000-EXP or EI-2000-I/O board is installed or if the EI-1000 meter has only one channel enabled. The selections are identical to the P500 parameter.

P510 Set point A value for channel 1**P511 Set point B value for channel 1****P520 Set point A value for channel 2****P521 Set point B value for channel 2****P530 Set point A value for channel 3****P531 Set point B value for channel 3****P540 Set point A value for channel 4****P541 Set point B value for channel 4**

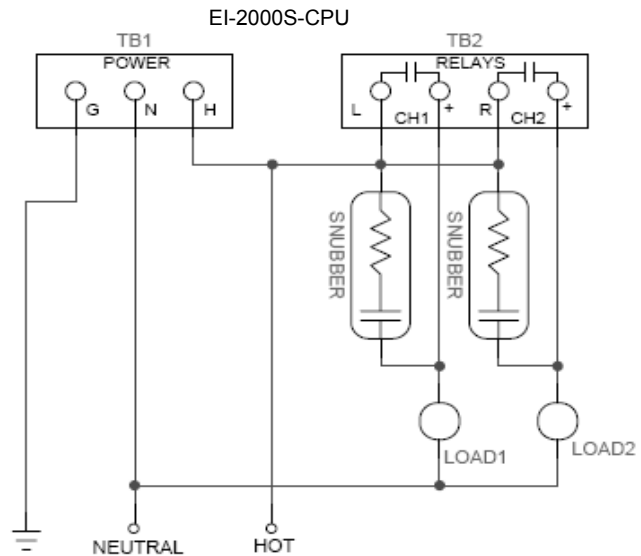
These are the set point values for each channel; they are set in lb or kg units, depending on the unit selection switch, S1-3.

The diagram to the right shows an example of relay contact wiring.

The relay specifications are mechanical, 3A, & 250VAC/250VDC maximum.

TB2 contacts are “dry” (potential free), so the load power supply is external, see the example circuit to the right.

If the load is inductive, add a **snubber** (RC) circuit across the relay contact terminals to greatly extend the life of the relay contacts. One can also connect the snubber across the load in lieu of the contacts.



RELAY ASSIGNMENTS ON-BOARD (EI-2000S-CPU) & *EI-2000-EXP

METER	K1 (CH1)	K2 (CH2)	*K3 (CH3)	*K4 (CH4)
EI-1000 (1-ch)	SP-A (P510)	SP-B (P511)	N/A	N/A
EI-1000 (2-ch)	SP-A (P510)	SP-A (P520)	N/A	N/A
EI-1000 (3 or 4-ch)	SP-A (P510)	SP-A (P520)	*SP-A (P530)	*SP-A (P540)
EI-2000 (1 or 2-ch)	SP-A (P510)	SP-A (P520)	N/A	N/A

*K3 and K4 are available on the EI-2000-EXP board and are used by channel 3 and 4, respectively. N/A = Not available

RELAY ASSIGNMENTS EI-2000-IO

METER	K1 (CH1)	K2 (CH2)	K3 (CH1)	K4 (CH2)
EI-1000 (1 or 2-ch) EI-2000	SP-A (P510)	SP-A (P520)	SP-B (P511)	SP-B (P521)

METER	K5 (CH3)	K6 (CH4)	K7 (CH3)	K8 (CH4)
EI-1000 (3 or 4-ch)	SP-A (P530)	SP-A (P540)	SP-B (P531)	SP-B (P541)

Note: Both the EI-2000-EXP and the EI-2000-IO are both installed in an expanded enclosure.

P600 Analog output type selection

Analog output: rE (remaining weight), Gr (gross weight), Gt (gross total – sum of all active channels), and nt (remaining total – sum of all active channels). This selects the weight that is transmitted via the 4-20mA analog outputs.

P610 Analog output 20mA (full-scale) weight for channel 1

P620 Analog output 20mA (full-scale) weight for channel 2

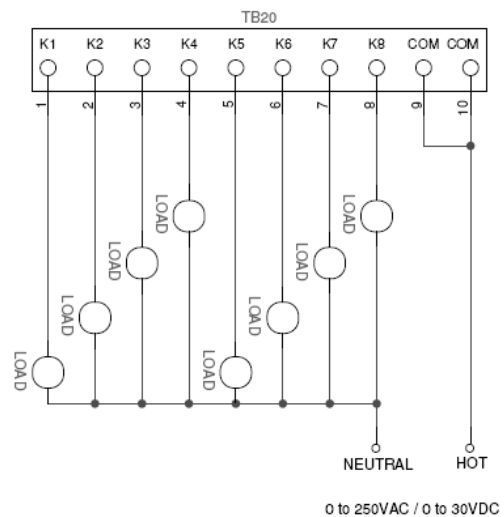
P630 Analog output 20mA (full-scale) weight for channel 3

P640 Analog output 20mA (full-scale) weight for channel 4

A 20mA analog signal is transmitted when the weight is equal to the value set by the above parameter. A current of 4mA is transmitted when the weight, selected by P600, is equal or less than zero. The analog outputs do not go below 4mA or above 20mA under normal operation.

P650: 4-20mA clip: NO will allow the mA output to proportionally fall below 4mA (0 lb/kg) or rise above 20mA until hardware limits are reached. YES will limit the analog output to the 4-20mA range.

EI-2000-IO WIRING



SERIAL INTERFACE PARAMETERS

RS232 and RS485 serial interface control parameter(s):

P700 serial mode (basic/RTU)

BAS: BASIC serial protocol: RS-232 only

RTU: MODBUS-RTU serial protocol: RS-485 or RS-232 (see end of manual for register list)

P701 Baud Rate

Select the serial port baud rate (default = 9600).

The selections are 300, 600, 1200, 2400, 4800, 9600 & 19200 (19.2K) baud.

P702 data size

Set the number of data bits transmitted. Choices are 7 data bits & 8 data bits.

Note: MODBUS requires this parameter to be set to eight.

P703 stop bits

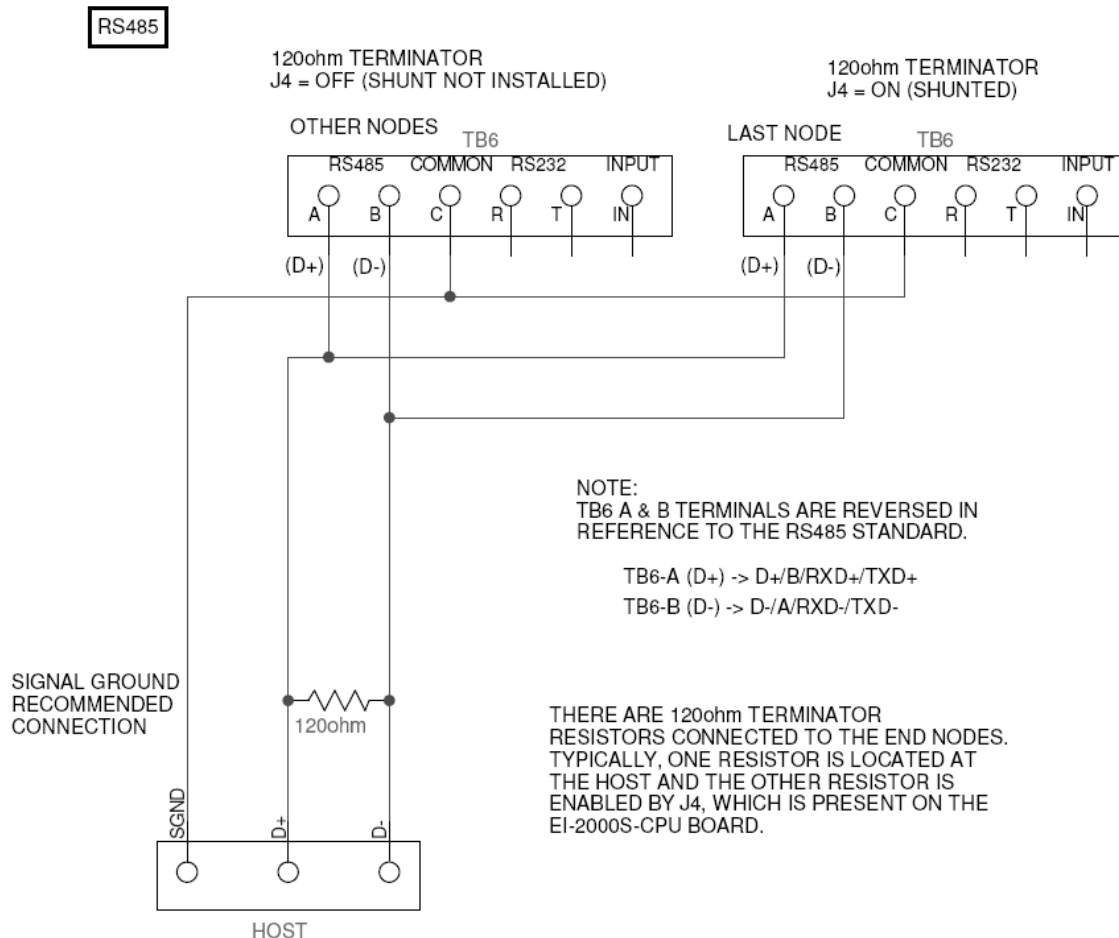
Set the number of stop bits transmitted. Choices are 1 and 2.

P704 parity

Set the parity bit type, if any. Choices are none, even or odd.

P705 RTU node

Set the MODBUS RTU node. The range is from 2 to 32.



BASIC MODE (P700=BAS) SERIAL COMMANDS

Send gross weight

SGW **x**<CR>

Where **x** selects the channel (1, 2, 3, or 4); if **x** is not specified, all four channels are transmitted. The box to the right shows the response to this command.

```

00000000001111111112222222222333333333334444 4 4
01234567890123456789012345678901234567890123 4 5
Gross 162.5, 195.0, 0, 0 lb<CR><LF>

00000000001111111 1 1
01234567890123456 7 8
Gross 195.0 lb<CR><LF>
Gross 73.6 kg<CR><LF>
```

Send remaining weight

SRW **x**<CR>

Where **x** selects the channel (1, 2, 3, or 4); if **x** is not specified, all four channels are transmitted. The box to the right shows the response to this command.

```

00000000001111111112222222222333333333334444 4 4
01234567890123456789012345678901234567890123 4 5
Remain 62.5, 45.0, 0, 0 lb<CR><LF>

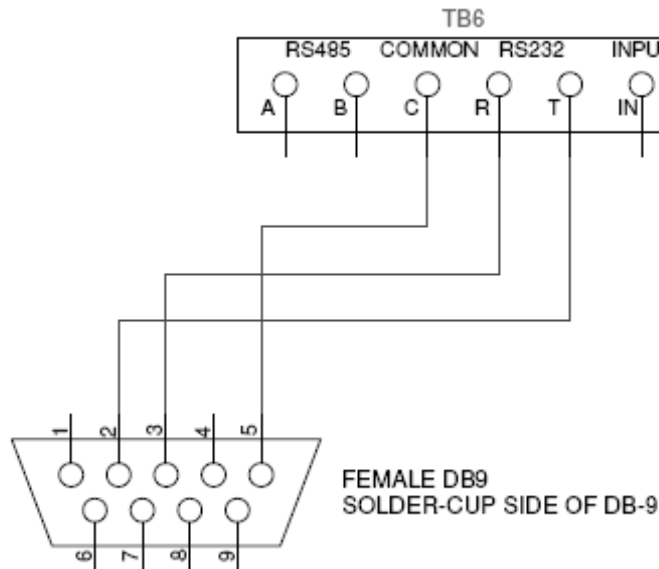
00000000001111111 1 1
01234567890123456 7 8
Remain 62.5 lb<CR><LF>
```

Notes:

- <CR> is a carriage-return control character (0dH).
- <LF> is a line-feed control character (0aH).
- The numbers shown in the text boxes (in blue if printed in color) are character indexes for programming purposes.

RS232 Wiring to PC DB9 Connector

EI-1000/2000	DB9 (PC)	
TB6-3 (C)	5 (SG)	Signal ground
TB6-4 (R)	3 (Tx)	EI' Receive connects to the PC Transmit signal.
TB6-5 (T)	2 (Rx)	EI' Transmit connects to the PC Receive signal.



WEIGHT SUMMATION FUNCTION (FIRMWARE VERSION 6.40 AND ABOVE)

The EI-2000 has the ability to sum all of the scales connected to the meter (up to two) as well as two additional scales, which are connected to another EI-2000 (secondary) meter.

P990 SUM CH (sum all channels)

YES: Sum all active scale inputs. Net or gross total is selectable from the front panel.

NO: Scale inputs are not summed.

P991 SUM SEL (sum selection)

rE: Remaining weights are summed (most applications).

Gr: Gross weights are summed.

P992 SUM EXT (sum external EI-2000).

YES: Sum all active scales. Up to four scales are summed and displayed.

NO: External (secondary) EI-2000 is not present.

P993 SUM 4-20mA ANALOG OUTPUT FULL-SCALE (ADDED TO FIRMWARE VERSION 6.50 & ABOVE)

This parameter sets the summation 4-20mA output full-scale value.

TB3-CH2 (+R/-R) is the 4-20mA output used as the signal output.

Note: The sum cannot be viewed on the secondary meter.

VIEWING THE SUMMED WEIGHT

To view the summed weight, press SELECT until “Gr t” or “rE t” is displayed. The display will alternate between the label (Gr t/nE t) and the weight. In some scale modes, the total display is only viewable when there is a load on the scale.

PRIMARY/SECONDARY EI-2000 CONNECTIONS & CONFIGURATION

Primary meter: **P990=YES, P991=don't care, P992=YES, P993=don't care**

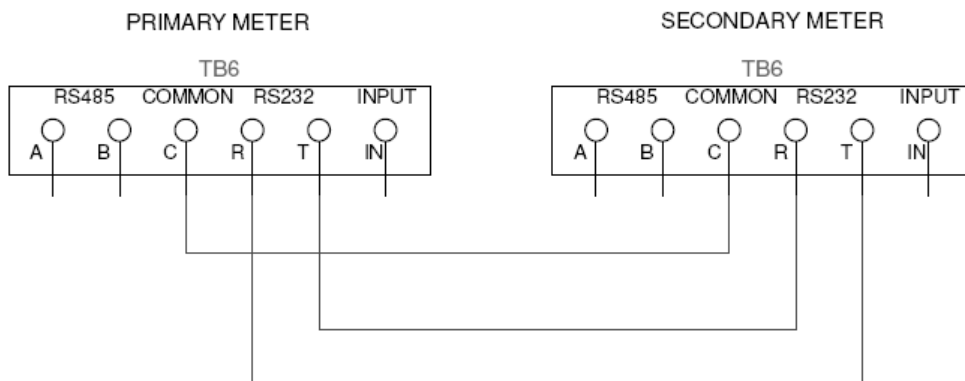
Secondary meter: **P990=NO**

The following parameters must be set the same in both meters:

P700=BAS, P701=9600, P702=8, P703=1, P704=NONE, P705=don't care

Note: If only one channel is enabled on the primary meter, the total weight is always displayed on the right display of the primary meter. This is useful when three channels are enabled (one on the primary meter and two on the secondary meter).

Connections are below (connect C to C, R to T, & T to R):



MISCELLANEOUS PARAMETERS

P999 Front panel cal/cfg access (FPA)

Enable or disable (ON or OFF) this function; see the “Front Panel Configuration/Calibration/Diagnostic Access (FPA)” section of this manual.

ANALOG OUTPUTS

The EI' series furnishes an analog 4-20mA (milliamp) signal for transmission to a remote system such as a SCADA or RTU for each channel (up to four). From the factory, the calibration is within 1.5% of 4mA and 1.5% of 20mA or better. Therefore, it is recommended that one performs a 4-20mA calibration adjustment for each channel if a more accurate matching between the meter and user system is required.

To access the analog output calibration/test mode, close S1-2 (S1-1 & S1-4 are open) or use the FPA sequence. These parameters are used to calibrate the 4 - 20mA analog output points for each channel. See the table below for push-button functionality. NOTE: Left zero, left select, right zero & right select have no function in Analog Output Configuration.

EI-2000

Left, up and down arrow pushbuttons *Select a parameter*
Right, up and down arrow pushbuttons *Alter the value of the parameter*

EI-1000

UP/DOWN arrows select a parameter.
To alter the value of a parameter, press the SELECT pushbutton. Use the UP/DOWN ARROWS pushbuttons to set the desired value and then press the SELECT pushbutton when finished.

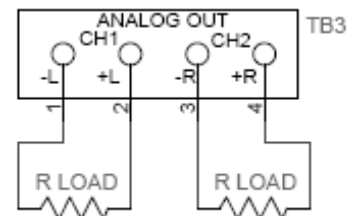
PARAMETER EI-1000: Ao.tES t

PARAMETER EI-2000: Ao t xx.xx

This parameter tests both Digital to Analog Converters using ten, linear 1.6mA steps from 4.00 mA to 20.00 mA.

The analog outputs are active (self powered). Therefore, the load must be passive (voltage/potential free) so no damage occurs to the EI-2000S-CPU or the user's system. The “R LOAD” resistance can range from 0 to 510 ohms. When one is calibrating the analog outputs, the “R LOAD” represents the DMM or 4-20mA calibrator device.

Note: The -L & -R (terminals 1 & 3) are connected and this must be taken into consideration when connecting the load to the analog outputs. Refer to schematic above.



ANALOG 4mA and 20mA POINT ADJUSTMENT PARAMETERS

Each analog output is calibrated to 4mA and 20mA points, so each of the up to four analog outputs has a 4mA and 20mA point setting – see the parameters below:

EI-1000

ANALOG OUTPUT 4.00 mA (ZERO) ADJUSTMENT: EI-1000

PARAMETER EI-1000: Ao.x (x = 1,2,3, or 4) Press

Set the left 4.00 mA analog output point using the up & down arrow pushbuttons. The display will not show any indication that the left analog output is changing which is why one should have a "mA" meter (i.e., DMM) connected to the appropriate output. The mA output range is approximately 4.0 mA +/- 1.0 mA.

ANALOG OUTPUT 20.00 mA (SPAN) ADJUSTMENT: EI-1000

PARAMETER EI-1000: Ao.x (x = 1,2,3, or 4)

Set the left 20.00 mA analog output point using the right up & down arrow pushbuttons. The display will not show any indication that the left analog output is changing which is why one should have a "mA" meter (i.e. DMM) connected to J3-1 & J3-2. The mA output range is approximately 20.0 mA +/- 1.0 mA.

EI-2000

ANALOG OUTPUT 4.00 mA (ZERO) ADJUSTMENT: EI-2000

PARAMETER EI-2000: "AO x" "4.00" (x = 1,2,3, or 4)

Set the left 4.00 mA analog output point using the right up & down arrow pushbuttons. The display will not show any indication that the left analog output is changing which is why one should have a "mA" meter (i.e., DMM) connected to the appropriate output. The mA output range is approximately 4.0 mA +/- 1.0 mA.

ANALOG OUTPUT 20.00 mA (SPAN) ADJUSTMENT: EI-2000

PARAMETER EI-2000: "AO x" "20.00" (x = 1,2,3, or 4)

Set the left 20.00 mA analog output point using the right up & down arrow pushbuttons. The display will not show any indication that the left analog output is changing which is why one should have a "mA" meter (i.e. DMM) connected to J3-1 & J3-2. The mA output range is approximately 20.0 mA +/- 1.0 mA.

DIAGNOSTICS

The diagnostic mode is an advanced mode that one can use to restore scale calibration and read the raw scale output in mV/V (millivolt per volt). One enters the diagnostic mode by either the DIP switches (S1-1 & 2 = ON & S1-4=OFF) or by the front panel access method.

1.U, 2.U, 3.U, or 4.U: Scale mV/V signal

This displays the scale mV/V signal (terminals +S & -S) for each channel. The normal range for an empty scale is from -0.1mV/V to 0.1mV/V. However, if there is a vessel, tank, etc. (with no product) attached or sitting on the scale, this value can be higher than 0.1mV/V. The nominal range with product on the scale is from 0.2mV/V to 3mV/V.

A DMM measuring the actual mV at the signal terminals would read about five times the value read here (e.g., a 1mV/V “1.U” display would show as 5mV on a DMM).

DIAGNOSTIC CALIBRATION READ/ENTRY

The following parameters allow one to read and re-enter calibration zero and span. These parameters are used for approximate calibration if one does not have test weights or the ability to remove the weight from the scale. Entering these values, if calculated and entered correctly, will yield a 0.25% or better calibration for each channel.

In order to use these parameters, the scale mV/V at a specific lb/kg weight (e.g., 3mV/V at 4000lbs) must be known - this is the “(scale) FULL SCALE” entry that’s written on the EI’ routing sheet.

1.o, 2.o, 3.o, & 4.o: Scale calibration dead-zero (one for each active channel)

The scale mV/V dead-zero value represents the weight of the platform and, possibly, a fixed tank. NOTE: This value does not include the weight a removable cylinder or tank. Any PTZ/AZ values are not added to the zero value displayed.

$$\text{DEAD ZERO} = \frac{[\text{FS mV/V}]}{[\text{FS WT (lb/kg)}]} \times [\text{Assumed dead weight WT (lb/kg)}]$$

Example: If the scale full-scale is 3mV/V @ 4000lbs and the assumed dead weight is 500lbs, the value one would enter into the dead zero value parameter is 0.3750.

1.c, 2.c, 3.c, & 4.c: Scale calibration span (one for each active channel)

Scale calibration value: This is the load that is typically removable that includes the weight of the product and container combined. Use the formula below to calculate an approximate calibration factor that’s entered into this parameter. To shift the decimal point, press the RIGHT ARROW pushbutton on the EI-1000 or the RIGHT SELECT pushbutton on the EI-2000.

$$\text{CAL} = \frac{[\text{FS WT (lb only!)}]}{[\text{FS mV/V}]}$$

Example: If the scale full-scale is 3mV/V @ 4000lbs, the CAL value entered is 1333.3.

Note: If the full scale weight is in kilograms (kg), multiply the weight by 2.2046 and then divide it by the full scale mV/V value.

POWER-UP FUNCTIONS

Power-up functions are activated by, first, powering down the meter, pressing the desired pushbutton combination, and restoring power to the meter.

Restore all parameters and calibration to factory default settings.

This function erases all non-volatile memory and restores the instrument to a factory default setup. The 4-20mA analog outputs, scale inputs and ALL parameters must be checked and changed to proper values to match the scale. **Recalibration of the scale is required.**

EI-1000: [DOWN ARROW] + [SELECT] + [UP ARROW]

EI-2000: [LEFT UP ARROW] + [LEFT SELECT] + [RIGHT SELECT]

Load typical settings for the selected scales.

This function will load a default scale calibration and setup scale parameters depending on the P100, P200, P300 and P400 selections. The 4-20mA analog output calibration (not full scale) is not altered, but one should check the P6xx parameters to insure that they are set to their proper settings. **Recalibration of the scale is required.**

EI-1000: [DOWN ARROW] + [UP ARROW]

EI-2000: [LEFT SELECT] + [RIGHT SELECT]

Display test

This function illuminates all 7-segment LED displays and indicator (e.g., gross & remaining) LEDs.

EI-1000: [ZERO] + [DOWN ARROW]

EI-2000: [LEFT ZERO] + [RIGHT ZERO]

Exit: [RIGHT ARROW]

Exit: [LEFT UP ARROW]

I/O Test mode

This function cycles the 4-20mA outputs and relays. Also, the keypad pushbuttons, DIP switches and remote input (TB6, IN) functionality can be verified, as well.

EI-1000: [DOWN ARROW] + [RIGHT ARROW]

EI-2000: [RIGHT SELECT] + [RIGHT UP ARROW]

Exit: [ZERO] + [DOWN ARROW]

Exit: [RIGHT ZERO] + [RIGHT DOWN ARROW]

HARDWARE

TB1 – POWER - A.C. power connections

1	G	Ground	Earth ground line
2	N	Neutral	Non-fused neutral line
3	H	Hot	Fused line

TB2 – RELAYS – Set point relay contacts

The relays, which are mechanical, can switch 3A, 250V A/C or D/C loads. The contacts are “dry;” they do not have any potential.

1	L	CH1 contact	Channel 1 low-level or high-level relay contact.
2	+		
3	R	CH2 contact	Channel 2 low-level or high-level relay contact.
4	+		

TB3 – ANALOG OUT – 4-20mA analog outputs

1	+L	CH1 positive signal	Channel 1, active 4-20mA analog output.
2	-L	CH1 negative signal	
3	+R	CH2 positive signal	Channel 2, active 4-20mA analog output.
4	-R	CH2 negative signal	

TB4 – CH1 (EI2000-LEFT) Scale input 1

TB5 – CH2 (EI2000-RIGHT) Scale input 2 (Note: Connections 6 & 7 are not present on TB5)

1	+E	Positive excitation	Positive power supply for the scale base, which is 5V +/- 5%.
2	+S	Positive signal	Positive scale signal input
3	-S	Negative signal	Negative scale signal input
4	-E	Negative excitation	Negative power supply voltage (return) for the scale base, which is 0 volts referenced to signal ground.
5	SH	Shield	Connected to earth ground
6	+	Positive sense	TB4 only: Connected to the negative sense (or negative excitation if the negative sense terminal is not present) at the scale summing board to allow the voltage drop of the cable to be compensated for.
7	-	Negative sense	TB4 only: Connected to the positive sense (or positive excitation if the positive sense terminal is not present) at the scale summing board to allow the voltage drop of the cable to be compensated for.

TB6 – Serial I/O and SWITCH INPUT

1	A	RS485 – A line	Half-duplex RS485 interface.
2	B	RS485 – B line	
3	C	Common	This is signal ground for the RS232, RS485 and switch input, IN.
4	R	RS232 – Rx line	RS232 receive
5	T	RS232 – Tx line	RS232 transmit
6	IN	Switch input	The external, potential free (dry) switch connects to IN and C terminals.

PORTS & JUMPERS

P1	BDM interface	Factory use only – Do not connect anything to this header.
P2 (J7)	Display interface	This connects, via ribbon cable, to the display, which are the DSP1000 (EI-1000) and EI-2000-DSP.
P3 & P4	Expansion board interface	Both headers are used to connect to expansion boards, which are the EI-2000-IO and EI-2000-EXP.
J1 & J2	Sense connections	Local or remote sense selection shunts.
J3	Instrument selection	This selects an EI-1000, EI-2000 or EI-4000 instrument, see below. This is set at the factory, and if this jumper is not set properly, the meter will not function.
J4	RS485 terminator resistor	Install a shunt to connect the 120 ohm terminator resistor to the RS485 A & B lines.

FUSE

The fuse is a ½ ampere, 250VAC, 5x20mm, time-lag fuse. **Do not use any other rating.**

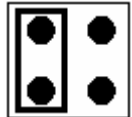
VOLTAGE SELECT SWITCH (S2)

The voltage selection switch, located on the EI-2000S-CPU, selects the 115V or 230V range.

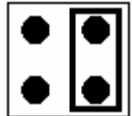
NOTE: DO NOT SELECT THE VOLTAGE WHILE THE METER IS POWERED! !

EI-1000 & EI-2000 METER SELECTION HEADER SHUNT (J3)

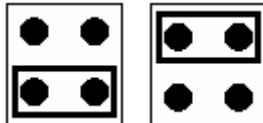
Connect J3-3 and J3-4 to select an EI-2000 meter; the display is the EI-2000-DSP.



Connect J3-1 and J3-2 to select an EI-1000 meter; the display is the DSP1000.



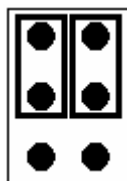
Invalid shunt positions:



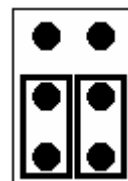
REMOTE SCALE SENSE

Single channel EI-1000 meters can utilize the remote sense connections. This minimizes the error of the cable voltage drop, minute thermal errors of the connections and wire temperature coefficients. The remote sense must be used if intrinsically-safe barriers are being used. Do not use remote sense on the EI-2000 meter or EI-1000 multi-channel applications.

Disabled (local sense)



Enabled (remote sense)



DIP SWITCH FUNCTION SUMMARY

S1-1	S1-2	OPERATION/SETUP
OFF	OFF	Normal operation (this is the normal setting of these switches)
ON	OFF	Access configuration mode
OFF	ON	Access analog output (4-20mA) test and calibration
ON	ON	Access scale diagnostic and advanced calibration parameters

Note: The calibration DIP switch will override the OPERATION/SETUP switches.

S1-3	WEIGH UNITS
OFF	Pound (lb) scaling
ON	Kilogram (kg) scaling

S1-4	CALIBRATION
OFF	Normal operation (this is the normal setting for this switch)
ON	Calibrate scale w/ dead zero

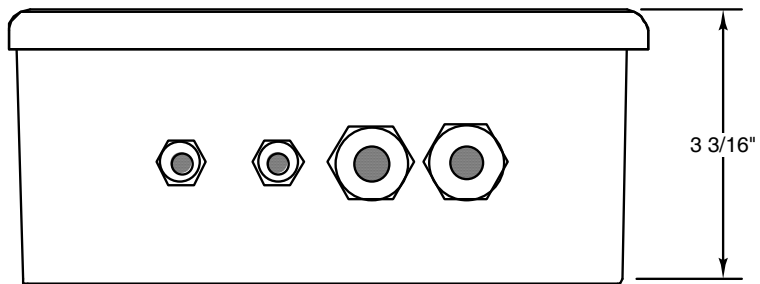
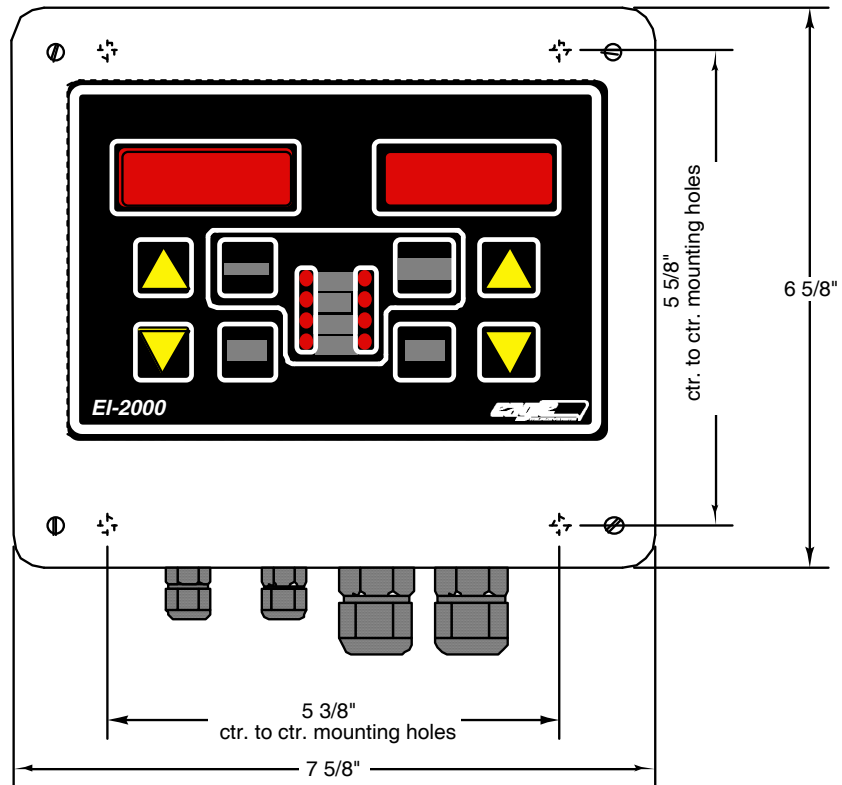
MESSAGES

DISPLAY EI-1000	DISPLAY EI-2000	DESCRIPTION
nO O	nO O	No zero – The scale cannot be zeroed since the weight exceeds the value set by the “Push to Zero/Auto-zero PTZ/AZ maximum range” parameter (Px14).
FACTRY	FACTORY	Loading factory default, which is initiated by the user
AUto.Ld	AUto.LOAd	Automatically loading default configuration & calibration
Add Lb Add KG	Add	Add more weight to the scale before trying to adjust gross weight
A OL	A OL	Scale input positive overload
-A OL	-A OL	Scale input negative overload
FAIL.AD	FAIL.AD	*Channel 1 & 2 A/D hardware failure.
IIC.Err	IIC.Err	*IIC bus error
EE.Err	EE.Err	*EEPROM device was not found

* Hardware failure: Return the EI-1000/EI-2000 to factory for service.

INSTALLATION

Wall Mounting Dimensions



Enclosure conforms to: NEMA 4X

SPARE PARTS

EI-2000-DSP P/N = 110266
DSP1000 (EI-1000) = 110271
CPU P/N = 110394
EI-2000-IO = 110396
EI-2000-EXP = 110395
Interconnecting ribbon cable (8") = 111026

SCALE	FULL-SCALE lb	FULL-SCALE kg	FULL-SCALE mV/V	# LOAD CELLS	HINGED	+EX	+SI	-SI	-EX	+SH	EX Ω	SI Ω	LOAD CELL IHPN	NOTE
WT-3600	4000	1820	0.5	2	Y	RED	GRN	WHT	BLK	YEL			500680	
DCS-302	300	140	0.9	1/side	N	RED	GRN OR	WHT BLU	BLK	YEL			500317 x2	TB5 (RIGHT CHANNEL) TB4 (LEFT CHANNEL)
EDS-400	400	180	1.1	1	N	RED	GRN	WHT	BLK	YEL			500317	
LP-4310				1	Y									
LP-4320				2	Y									
LP-4300 #1	4410	2000	2	4	N	RED	GRN	WHT	BLK	YEL			500711	
LP-4300 #2	8820	4000	2	4	N	RED	GRN	WHT	BLK	YEL			500785	
LP-4300 #3	17640	8000	2	4	N	RED	GRN	WHT	BLK	YEL			500680	
LP-4300 HD	20000	9072	2	4	N	RED	GRN	WHT	BLK	YEL				
ECS150x	300	140	3	1	Y	GRN	RED	WHT	BLK	YEL			500645	
WP1000 #1	330	150	1	4	N	RED	GRN	WHT	BLK	YEL			500736	or 500737
WP1000 #2	661.5	300	1	4	N	RED	GRN	WHT	BLK	YEL			500725	
WP1000 #3	1323	550	1	4	N	RED	GRN	WHT	BLK	YEL			500722	
DS750	750	340	2	1	N	RED	GRN	WHT	BLK	YEL			500639	
ECS400	400	181		1	Y	GRN	RED	WHT	BLK	YEL			500645	1K CELL
ECS402	400	181		1	Y	GRN	RED	WHT	BLK	YEL			500747	
HC1000	2000	907		1	Y	GRN	WHT	RED	BLK	YEL			500680	
C3600	4000	1814		4	N	RED	GRN	WHT	BLK	YEL			500680	
C7200	8000	3629		4	N	RED	GRN	WHT	BLK	YEL			500680	
CONTAINMENT SCALE						RED	GRN	WHT	BLK	YEL				
Older revisions														
WT3600	4000	1814	0.5	2	Y	RED	GRN	WHT	BLK	YEL			500123	
HC3600	4000	1814		1	Y	RED	GRN	WHT	BLK	YEL			500123	500535 30' CABLE
HC7200	8000	3629		1	Y	RED	GRN	WHT	BLK	YEL			500113	
ECS150x	300	140	3	1	Y	RED	WHT	GRN	BLK	YEL			N/A	OBS LOADCELL

MODBUS REGISTER LIST (FIRMWARE VERSION 6.60)			SEE Modbus_Application_Protocol_V1_lb.pdf FOR PROTOCOL FORMAT				REVISED: 2018-10-04
ADDRESS	NAME	CHANNEL	UNITS	DIR	TYPE	#REG	
0x0000	TEST VALUE			R	uint16	1	This reads a 66.6ms/tick counter, which has the range from 0 to 0xffff.
0x0800	Zero used weight	1	N/A	W	uint16	1	Zero the used weight value but <u>do not store to EEPROM</u> . The response is much faster using this register. The value written does not matter and has the range from 0x0000 to 0xffff. This option is recommended if frequent zeroing of the used register is performed.
0x0801	Zero used weight	2	N/A	W	uint16	1	
0x0802	Zero used weight	3	N/A	W	uint16	1	
0x0803	Zero used weight	4	N/A	W	uint16	1	
0x0810	Zero used weight	1	N/A	W	uint16	1	Zero the used weight value and <u>store to EEPROM</u> . The response is much slower using this register. The value written does not matter and has the range from 0x0000 to 0xffff.
0x0811	Zero used weight	2	N/A	W	uint16	1	
0x0812	Zero used weight	3	N/A	W	uint16	1	
0x0813	Zero used weight	4	N/A	W	uint16	1	
0x0900-0x0903	Device name			R	char x 8	4	
0x0904-0x090b	firmware name			R	char x 16	8	
0x090c-0x090e	firmware version			R	char x 6	3	" V6.60"
0x090f-0x0910	primary unit			R	char x 4	2	" lb"
0x0911-0x0912	secondary unit			R	char x 4	2	" kg"
0x0913	active channels			R	uint16	1	Value is from 1 to 4, which is the number of channels that are enabled.
0x0F00	Store data to EEPROM	all		W	command	1	Write 0x0001 to this reg to store data in the EEPROM
0x1000/0x2000	gross weight	1	lb/kg	R	float	2	Gross weight on the scale using float-32 format
0x1002/0x2002	gross weight	2	lb/kg	R	float	2	
0x1004/0x2004	gross weight	3	lb/kg	R	float	2	
0x1006/0x2006	gross weight	4	lb/kg	R	float	2	
0x1008/0x2008	net weight	1	lb/kg	R	float	2	Net weight on the scale, which is gross weight minus the tare weight using float-32 format
0x100a/0x200a	net weight	2	lb/kg	R	float	2	
0x100c/0x200c	net weight	3	lb/kg	R	float	2	
0x100e/0x200e	net weight	4	lb/kg	R	float	2	
0x1010/0x2010	tare weight	1	lb/kg	R/W	float	2	*Tare weight, which is the tank, cylinder, etc. Uses float-32 format.
0x1012/0x2012	tare weight	2	lb/kg	R/W	float	2	
0x1014/0x2014	tare weight	3	lb/kg	R/W	float	2	
0x1016/0x2016	tare weight	4	lb/kg	R/W	float	2	
0x1018/0x2018	used weight	1	lb/kg	R	float	2	Used weight, which is the starting weight minus the gross weight. However, it is a positive number (the sign is flipped) and uses float-32 format.
0x101a/0x201a	used weight	2	lb/kg	R	float	2	
0x101c/0x201c	used weight	3	lb/kg	R	float	2	
0x101e/0x201e	used weight	4	lb/kg	R	float	2	
0x1018/0x2018	rate	1	dwt/dt	R	float	2	Change in weight dwt over time. Parameter 900 (P900 WT-PER) sets the time-base, which is either seconds, minutes, hours, or days. The value uses float-32 format.
0x101a/0x201a	rate	2	dwt/dt	R	float	2	
0x101c/0x201c	rate	3	dwt/dt	R	float	2	
0x101e/0x201e	rate	4	dwt/dt	R	float	2	
0x1080/0x2080	gross weight	1	lb/kg	R	int32	2	Gross weight on the scale using signed integer 32-bit format
0x1082/0x2082	gross weight	2	lb/kg	R	int32	2	
0x1084/0x2084	gross weight	3	lb/kg	R	int32	2	
0x1086/0x2086	gross weight	4	lb/kg	R	int32	2	
0x1088/0x2088	net weight	1	lb/kg	R	int32	2	Net weight on the scale, which is gross weight minus the tare weight using signed integer 32-bit format
0x108a/0x208a	net weight	2	lb/kg	R	int32	2	
0x108c/0x208c	net weight	3	lb/kg	R	int32	2	
0x108e/0x208e	net weight	4	lb/kg	R	int32	2	
0x1090/0x2090	tare weight	1	lb/kg	R	int32	2	*Tare weight, which is the tank, cylinder, etc. This register is read only and uses signed integer 32-bit format.
0x1092/0x2092	tare weight	2	lb/kg	R	int32	2	
0x1094/0x2094	tare weight	3	lb/kg	R	int32	2	
0x1096/0x2096	tare weight	4	lb/kg	R	int32	2	
0x1098/0x2098	used weight	1	lb/kg	R	int32	2	Used weight, which is the starting weight minus the gross weight. However, it is a positive number (the sign is flipped) and uses signed integer 32-bit format.
0x109a/0x209a	used weight	2	lb/kg	R	int32	2	
0x109c/0x209c	used weight	3	lb/kg	R	int32	2	
0x109e/0x209e	used weight	4	lb/kg	R	int32	2	

ADDRESS	NAME	CHANNEL	UNITS	DIR	TYPE	#REG	
0x1100/0x2100	set point 1	1	lb/kg	R/W	float	2	Set point one values
0x1102/0x2102	set point 1	2	lb/kg	R/W	float	2	
0x1104/0x2104	set point 1	3	lb/kg	R/W	float	2	
0x1106/0x2106	set point 1	4	lb/kg	R/W	float	2	
0x1108/0x2108	set point 2	1	lb/kg	R/W	float	2	Set point two values
0x110a/0x210a	set point 2	2	lb/kg	R/W	float	2	
0x110c/0x210c	set point 2	3	lb/kg	R/W	float	2	
0x110e/0x210e	set point 2	4	lb/kg	R/W	float	2	
0x1180	set point 1 state	1	N/A	R	uint16	1	Set point one state (1=ACTIVE and 0=INACTIVE)
0x1181	set point 1 state	2	N/A	R	uint16	1	
0x1182	set point 1 state	3	N/A	R	uint16	1	
0x1183	set point 1 state	4	N/A	R	uint16	1	
0x1184	set point 2 state	1	N/A	R	uint16	1	Set point two state (1=ACTIVE and 0=INACTIVE)
0x1185	set point 2 state	2	N/A	R	uint16	1	
0x1186	set point 2 state	3	N/A	R	uint16	1	
0x1187	set point 2 state	4	N/A	R	uint16	1	

Read one or more registers using command 0x03

Write one register using command 0x06.

Write one or more registers using command 0x10.

To calculate the REGISTER **4xxxx** address, add **40001** to the decimal value of the ADDRESS (e.g., Address 0x1000 (4096 decimal) is register 44097).

Registers (0x900-0x917, 24 registers) can also be read by the report slave ID command (0x11).

***Note: To store the new value in EEPROM (non-volatile), send the 0x0f00 command.**

Registers are big-endian formatted (that is, the MSB is the lower address)

Notes:

EI-1000/EI-2000/EI-4000 ROUTING TICKET

SO # _____

DATE: _____

PROGRAM: _____

SERIAL NUM: _____

VER: _____

BOARD REVISION: _____

CH1 (LEFT) SCALE: _____

CH2 (RIGHT) SCALE: _____

CH1 (LEFT) FULL SCALE: _____

CH2 (RIGHT) FULL SCALE: _____

CH1 (LEFT) SCALE SN: _____

CH2 (RIGHT) SCALE SN: _____

CH3 SCALE: _____

CH4 SCALE: _____

CH3 FULL SCALE: _____

CH4 FULL SCALE: _____

CH3 SCALE SN: _____

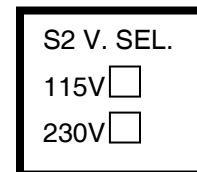
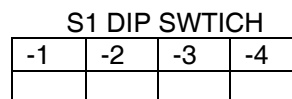
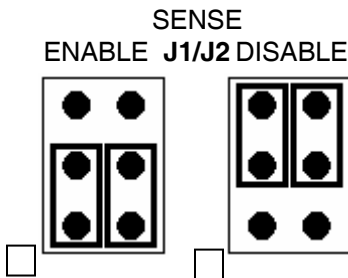
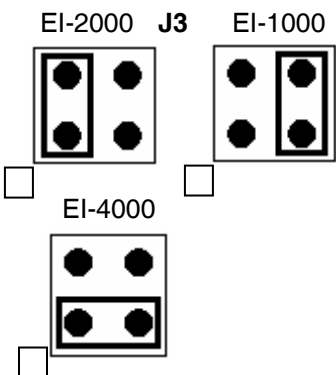
CH4 SCALE SN: _____

SETUP

OPERATION	P001		SERIAL MODE (BAS/RTU)	P700	
lb/kg	P010	_____	BAUD RATE	P701	_____
USED	P020	_____	DATA SIZE (7 OR 8)	P702	_____
TARE LOCK	P030	_____	STOP BITS (1 OR 2)	P703	_____
FRONT PANEL ACCESS	P999	_____	PARITY (EVEN, ODD, NONE)	P704	_____
SET POINT MODE #1	P500	_____	MODBUS RTU NODE (2-32)	P705	_____
SET POINT MODE #2	P501	_____	SUM CHANNELS	P990	_____
ANALOG OUTPUT SEL	P600	_____	SUM SELECTION	P991	_____
4-20mA CLIP	P650	_____	SUM EXTERNAL EI-2000	P992	_____
		_____	SUM ANALOG OUT FS	P993	_____

CHANNEL SETUP

SCALE SEL	P100		P200		P300		P400	
FULL-SCALE	P110	_____	P210	_____	P310	_____	P410	_____
RESOLUTION	P111	_____	P211	_____	P311	_____	P411	_____
AVERAGE	P112	_____	P212	_____	P312	_____	P412	_____
AUTO-ZERO	P113	_____	P213	_____	P313	_____	P413	_____
PUSH TO ZERO	P114	_____	P214	_____	P314	_____	P414	_____
THRESHOLD	P116	_____	P216	_____	P316	_____	P416	_____
START	P117	_____	P217	_____	P317	_____	P417	_____
SET POINT #1	P510	_____	P520	_____	P530	_____	P540	_____
SET POINT #2	P511	_____	P521	_____	P531	_____	P541	_____
ANALOG F.S.	P610	_____	P620	_____	P630	_____	P640	_____
ZERO CAL	1.0	_____	2.0	_____	3.0	_____	4.0	_____
SPAN CAL	1.c	_____	2.c	_____	3.c	_____	4.c	_____



OPTIONS

RTC

EI-2000-I/O

EI-2000-EXP

RELAYS

RS-485

TECH _____