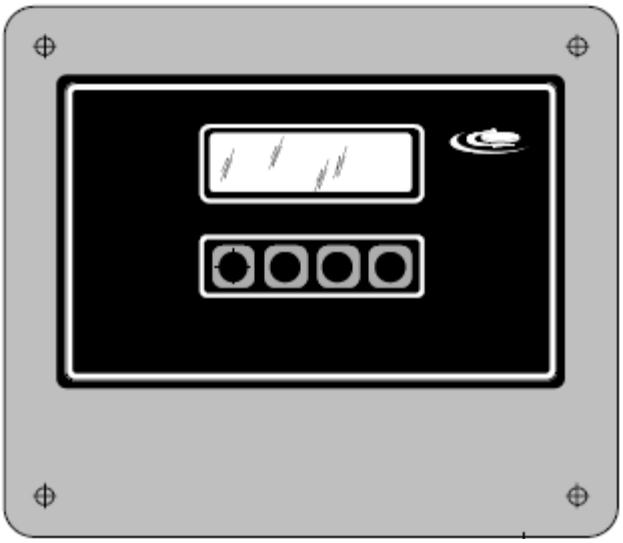
OPERATING MANUAL

EI-4000

DIGITAL WEIGH INDICATOR/TRANSMITTER



THIS MANUAL APPLIES TO EI-4000 FIRMWARE VERSION 6.31 &ABOVE

Revised: 2015-04-07

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

EI-4000 MANUAL IHPN=000000

EI-4000 FEATURES

- Up to four scale bases
- User selects scale base via front panel keypad.
- Up to four continuous 4-20mA outputs
- Backlit, 16-character by 2-line LCD
- Five-digit display for up to 99,000 lb or kg scale displays.
- 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 DC/AC, mechanical relay contact outputs
RS485	Adds a two wire RS485 interface
RTC	Adds time & date

OPTION BOARDS

EI-2000-EXP
This board mounts on the EI-2000S-CPU board. It furnishes two additional scale inputs, 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.

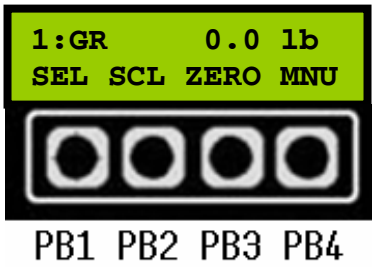
SPECIFICATIONS

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-4000 has a set of four pushbuttons. The functions are typically indicated by the bottom line on the LCD (SEL CHAN ZRO MNU). Some displays have a hidden function that is documented where applicable in this manual. The push buttons from left to right are PB1 (left-most), PB2, PB3 and PB4 (right-most).



WEIGHT DISPLAY SCREENS

When the meter is powered, the main weight screen is displayed. One can select, via the appropriate select (SEL) pushbutton, several weight values; they are shown below. However, if the meter is operating in modes two through five, the weight on the scale must be above the threshold (explained later) in order to select tare, remaining and used weight displays.

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. The “GR” text is short for gross weight. The gross weight can be zeroed if ZERO is displayed above the PB3 pushbutton (see the display at the top of this page).

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. The “REM” text is short for remaining (net) weight.

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. This value increases with decreasing weight on the scale since it represents the amount of product used so far.

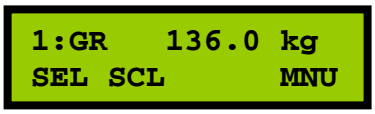
The gross, remaining and tare formula is as follows:

[REMAINING WEIGHT] = [GROSS WEIGHT] – [TARE WEIGHT]

CHANNEL SELECTION

If two or more channels are enabled, the CHAN (channel) pushbutton is available to select another channel. If less than four channels are enabled (i.e., two or three), CH4 is replaced by an ESC (escape) pushbutton so one can return to the main operating screen. If no selection is made after three seconds, the screen returns to the main weight display.

POUND (lb) AND KILOGRAM (kg) UNITS OPERATION



The EI-4000 meter 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.

OPERATING MODES

The EI-4000 meter has five operating modes to simplify user interactions with the meter. Configuration parameter P001 selects which operating mode, 1 thru 5, is enabled for all scale channels.

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 ZRO (ZERO) pushbutton. If the ZRO pushbutton is not 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 ZRO (ZERO) pushbutton. If the ZRO pushbutton is not 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 REM text.
4. Use the UP and DOWN arrow pushbuttons to adjust the remaining weight displayed.
5. Press the ENT pushbutton after making any adjustments; the user will no longer be able to adjust the remaining weight.

If you need to adjust the REMAINING weight again, press and hold PB3 for 3 seconds, the REM text will start to flash and the remaining weight will now be adjustable. Press the ENT 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 ZRO (ZERO) pushbutton. If the ZRO pushbutton is not displayed, access the calibration mode to zero the scale.
2. Place a full container on the scale; the GR text will flash.
3. Adjust gross weight to the correct value by using the UP and DOWN arrow pushbuttons.
4. Press the ENT 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.

To enter a new tare weight if the remaining value displayed is incorrect, press and hold PB3 for 3 seconds. The display will change to the TARE weight (TARE flashes). Adjust the tare weight to the correct value and then press ENT when finished (REM = GROSS – TARE). The remaining weight will again be displayed.

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 ZRO (ZERO) pushbutton. If the ZRO pushbutton is not displayed, access the calibration mode to zero the scale.
2. Place a full container on the scale.
3. The “GR” text will flash.
4. Adjust gross weight to the correct value by using the UP and DOWN arrow pushbuttons.
5. Press the ENT pushbutton.
6. The tare will now be displayed as indicated by the flashing “TR” text.
7. Adjust tare, as required, by using the UP and DOWN arrow pushbuttons.
8. Press ENT, the remaining weight will now be displayed.

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 ZRO (ZERO) pushbutton. If the ZRO pushbutton is not 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.

!! 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 REMAINING VALUE WITH THE GROSS WEIGHT.

REMAINING_WEIGHT = GROSS_WEIGHT - CYLINDER_WEIGHT - VALVE_WEIGHT.

GROSS WEIGHT HIDDEN PUSHBUTTON FUNCTION

Scale gross weight recalibration/restart:
All modes have a hidden gross calibration screen.

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 PB3 until the "GR" starts to flash. At this time, the user may now use the UP and DOWN pushbuttons to adjust the gross scale calibration. When satisfied that the weight is correct, press the ENT pushbutton to save the new gross weight value.

EXTENDED MAIN SCREEN DISPLAYS (rate, daily use, totalizer and time until empty)

RATE
The rate is the change in weight per unit time, which is selectable by parameter P900.

DAILY
The daily usage displayed is the last 24-hours of product use. This screen as well as the daily log screens are enabled by parameter P920.

TTL
The totalizer display is the amount of product that is removed from the scale. The totalizer can be reset by pressing the RST pushbutton. The totalizer value is retained when the EI-4000 is not powered for, at least, seven days.

EMPTY
The time until empty display displays the time until the scale is empty.

HR: "dd hh:mm" format (days, hours and minutes)
DAYS: Displays a days until empty value in days to the hundredths resolution (e.g., 1.50 is 1-day & 12-hours).

MAIN MENU

Pressing the MNU (menu) pushbutton displays the main menu screen. The functions are listed below.
SET – Go to the SETUP MENU.
LOG – Selects the log menu or event screen (if the daily display is disabled).
ALL – View all enabled scale remaining or gross values on one screen.
ESC – Return to the main, single channel weight screen.
If no selection is made within three-seconds, the screen returns to the weight display screen.

Pressing the MNU (menu) pushbutton displays the main menu screen. The functions are listed below.
CFG – Configuration – Adjust Pxxx parameters…
CAL – Calibrate the scales and the 4-20mA outputs. Also, diagnostic screens are available under this menu selection.
RTC – View/set the clock (real-time clock)
ESC – Return to the main, single channel weight screen.
If no selection is made within three-seconds, the screen returns to the weight display screen.

VIEWING ALL WEIGHT VALUES ON ONE SCREEN

If more than one channel is enabled, a screen that displays all channels is available. Press the MNU pushbutton and then press the ALL pushbutton. The weight values displayed for each channel can be either gross or remaining weights. The G/R (gross/remaining) selection is made via the individual channel screens. Pressing any pushbutton exits this screen and returns to the last single channel screen that was selected. If channel four is not enabled, an ESC pushbutton label is displayed.

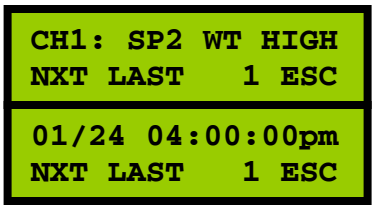
LOG MENU

If the daily option is enabled (see parameters P920, etc.), there are two log screens available, which are the event and daily logs. If the daily option is disabled, pressing the LOG pushbutton will enter the event log.

EVENT – View the date, time, and event for the last 128 events.
DAILY – View the daily usage for the last 31-days.
ESC – Return to the main, single channel weight screen.

EVENT LOG

The event log displays the last 128 events. The top line alternates between the date and time of the event and the event type including the channel (scale). The bottom line is the pushbutton legend. NXT and LAST select the event and ESC returns the operator to the main weight screen. The number of the event is displayed, but the pushbutton below serves no purpose. The number one event is the latest event and 128 is the oldest event.



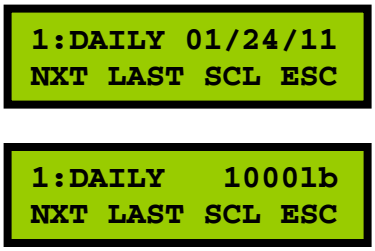
LIST OF EVENTS

CHx: SP1 WT LOW/HIGH	Set point 1 activated, which can be selected as either a high or low set point.
CHx: SP2 WT LOW/HIGH	Set point 2 activated, which can be selected as either a high or low set point.
CHx: RATE HIGH	High rate set point activated
CHx: RATE LOW	Low rate set point activated
CHx: DAILY HIGH	High daily set point activated
CHx: DAILY LOW	Low daily set point activated
CHx: SLOW REFILL	Slow refill time has expired

DAILY LOG

The daily log displays the amount of product consumed in twenty-four hours. The time of each day is from when the EI-4000 was powered to twenty-four hours later. The daily log is enabled by the P920 parameter.

The top line of the display shows the channel number (1, 2, 3 or 4) and alternates between the date and the amount of product consumed in a twenty-four hour period.



The NXT and LST pushbuttons select the date. The SCL pushbutton selects the channel (scale), and the ESC pushbutton returns the operator to the main weigh screen.

Note: Dates that do not have any valid data are displayed as 15/31/99 with -1lb/kg. As the memory fills, which is not lost when the EI-4000 doesn't have power applied, these invalid dates will no longer appear.

SETUP MENU/CONFIGURATION

To enter configuration, press the MNU pushbutton and then press the CFG pushbutton. If the password is enabled, enter the correct password and then the first parameter (P001) is displayed. The password screen is explained later in this manual.

Each screen (except for P010) has pushbutton functions are as follows:
NXT – Selects the next parameter.
LAST – Selects the last parameter.
ADJ – Make an adjustment to the selected parameter.
ESC – Return to the

The top line of the display shows the parameter number (Pxxx), parameter name (abbreviated), and the parameter value.

When the ADJ (adjust) pushbutton is pressed, the user can make adjustments to the parameter value using the UP or DOWN pushbuttons. Press the ENT (enter) pushbutton when the value displayed is correct.

P001 Operation (1 – 5)
This selects the operating mode for the meter. See the "operating modes" 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 in the main weight screens.

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. Select “user” if the scale is made by a different manufacturer.

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 - Px14) 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
		lb/kg	*lb/kg*	*%*	*%*	*lb/kg*	*lb/kg*
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
14	WP1024	1000/454	1/0.5	1%	2%	50/23	150/68.0
15	SC1001B	1000/454	1/0.5	1%	2%	50/23	150/68.0

***Australian typical load settings.**

To load default scale calibration for the scale selected above, press the LOAD pushbutton. This also must be done for channels two through four if enabled and not set to “CY-1.”

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. This parameter is available only when the scale selection parameter, P100, is set to "user."

P111 Resolution (0.0001 to 500)

This sets the weight division for the unit selected by the lb/kg switch. The choices are 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, and 5.

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 (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 ZRO (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 ZRO pushbutton. Note: If the threshold (Px16) weight is exceeded (operating modes 2-5), 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.

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 or greater for 3-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.

P502 SPevent

Enables/disables event logging for set points one and two.

P503 RLY

This parameter is active when a EI-2000-IO board is installed.

K1-K8: Set point relays for each channel are separate

SHARE: Relays K1 & K2 on the EI-2000-IO board are assigned to SP1 and SP2, respectively.

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 below shows an example of the EI-2000S-CPU (EI-4000) 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.
- The relays on the EI-2000-CPU (TB2, CH1 & CH2) and EI-2000-EXP (TB10, CH3 & CH4) are not used for the SP1 and SP2 set points when the EI-2000-IO is installed.
- The LCD1602-EI board furnishes two, ½A, 115VAC/30VDC relays (K11 & K12).

RELAY ASSIGNMENTS ON-BOARD (EI-2000S-CPU) & EI-2000-EXP w/o EI-2000-IO

METER	K1 (CH1) TB2	K2 (CH2) TB2	K3 (CH3) TB10	K4 (CH4) TB10
EI-4000 (1-ch)	SP-A (P510)	SP-A (P511)		
EI-4000 (2, 3, 4-ch)	SP-A (P510)	SP-A (P520)	SP-A (P530)	SP-A (P540)

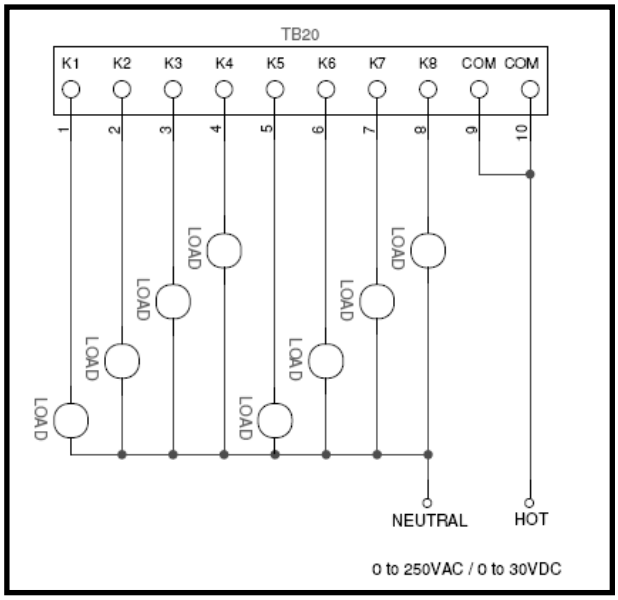
RELAY ASSIGNMENTS EI-2000-IO

METER	K1 (CH1)	K2 (CH2)	K3 (CH1)	K4 (CH2)
EI-4000	SP-A (P510)	SP-A (P520)	SP-B (P511)	SP-B (P521)

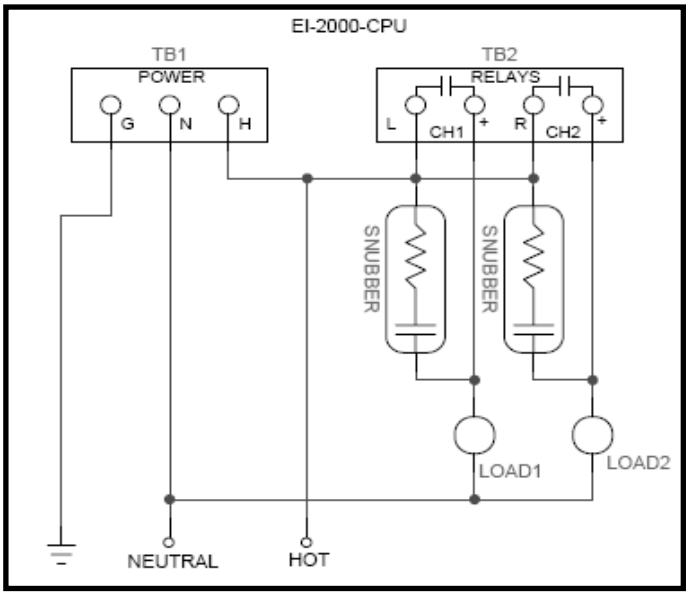
METER	K5 (CH3)	K6 (CH4)	K7 (CH3)	K8 (CH4)
EI-4000	SP-A (P530)	SP-A (P540)	SP-B (P531)	SP-B (P541)

See the wiring diagram to the right.

EI-2000-IO WIRING



EI-2000-CPU WIRING



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 parameters. A current of 4mA is transmitted when the weight, selected by P600, is equal to 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 4mA to 20mA range.

SERIAL INTERFACE PARAMETERS

RS232 and RS485 serial interface control parameter(s):
Note: See the section labeled SERIAL COMMANDS for more information.

P700 serial mode (basic/RTU)

BAS: BASIC serial protocol: RS-232 only

RTU: MODBUS 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), 38400 (38.4k) baud.

P702 data size
Set the number of data bits transmitted. Note: MODBUS requires this parameter to be set to eight. Choices are 7 data bits & 8 data bits.

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.

P900 RATE ENABLE
This parameter enables the rate display & set points.
Settings are off, seconds (sec), minutes (min), hours (hr), or day

P901 R-UD (Rate update interval)
This parameter sets the time between rate display updates.
Settings are 1s, 5s, 15s, 1m, 2m, 3m, 5m, 10m, 15m, and 30m.

P902 R-AVG (rate average)
This parameter sets the amount of rate samples that are averaged to produce the displayed rate value. Settings are 1 through 5.

P903 R-GAT (rate noise gate)
This parameter sets the minimum rate in lbs/sec. This setting is used to reduce the occurrence of a non-zero rate display when the scale is idle.

P904 R-DIR (rate direction)
This parameter sets the typical direction of the rate. The settings are as follows:

BOTH	The rate is displayed during fill and empty operations.
FILL	The rate is displayed during fill operations and is zero during empty operations.
EMPTY	The rate is displayed during empty operations and is zero during fill operations.

P905 R-DP (rate decimal point)
This parameter sets the decimal point for the rate. When the number cannot fit on the display, the decimal point is shifted to accommodate the rate value and can be shifted to where no decimal point is displayed.

P910 R-EVNT (rate event enable)
This parameter enables/disables the rate high/low set point event logging.

P911 R-LOW (rate low-level set point)
Entering a zero disables this set point. The rate low-level event occurs when the rate is/rises above the R-LOW set point and then falls below or equal to the R-LOW set point.

P912 K-LOW (rate low-level relay assignment)
Assign a relay to the rate low-level set point. The relay assigned can be shared with other set point relays. Choices are OFF, CH1, CH2, CH3, CH4, K1 through K8, K11, and K12.

P913 R-HIGH (rate high-level set point)
Entering a zero disables this set point. The rate high-level event occurs when the rate is/falls below the R-HIGH set point and then falls below or equal to the R-HIGH set point.

P914 K-HI (rate high-level relay assignment)
Assign a relay to the rate high-level set point. The relay assigned can be shared with other set point relays. Choices are OFF, CH1, CH2, CH3, CH4, K1 through K8, K11, and K12.

P920 DLY EN (DAILY (usage) ENABLE)
On/off
View the last 24-hours of product usage.
The daily usage for the last 31-days is available when this parameter is enabled.

P921 DLY C/HR (daily calculations per hour)
This parameter sets the number of daily calculations and totalizer updates per hour. The typical setting is 6 (the totalizer is updated every 10 minutes).

P930 D-EVENT (daily event enable)
This parameter enables/disables the daily high/low set point event logging.

P931 D-LOW (daily low-level set point)
Entering a zero disables this set point. The daily weight low-level event occurs when the daily weight is/rises above the D-LOW set point and then falls below or equal to the D-LOW set point.

P932 K-LOW (daily low-level relay assignment)
Assign a relay to the daily low-level set point. The relay assigned can be shared with other set point relays. Choices are OFF, CH1, CH2, CH3, CH4, K1 through K8, K11, and K12.

P933 D-HIGH (daily high-level set point)
Entering a zero disables this set point. The daily weight high-level event occurs when the daily weight is/falls below the D-LOW set point and then rises above or is equal to the D-HIGH set point.

P934 K-HI (daily high-level relay assignment)
Assign a relay to the daily high-level set point. The relay assigned can be shared with other set point relays. Choices are OFF, CH1, CH2, CH3, CH4, K1 through K8, K11, and K12.

P940 TTL EN (totalizer enable)
ON or OFF
This parameter enables the totalizer, which is selectable when the main weigh screen is being displayed.

P950 EMP EN (Days until empty)
OFF, HR, and DAYS
This parameter selects the time until empty display mode, which is selectable when the main weigh screen is being displayed. See the EXTENDED MAIN SCREEN DISPLAYS for more information about the HR and DAYS format.

SUMMATION FUNCTION

The EI-4000 has the ability to sum all of the scales connected to the meter (up to four) as well as four additional scales, which are connected to another EI-4000.

NOTE: The parameters below are only set on the master indicator. The slave indicator must have P990 set to NO. The sum cannot be viewed on the slave indicator.

P990 SUM CH (sum all channels)
YES: Sum all active scale inputs.
NO: Scale inputs are not summed.

P991 SUM SEL (sum selection)
RE: Remaining weights are summed.
Gr: Gross weights are summed.

P992 SUM EXT (sum external EI-4000).
YES: Sum all active scales. Up to eight scales are summed and displayed.
NO: External (slave) EI-4000 is not present.

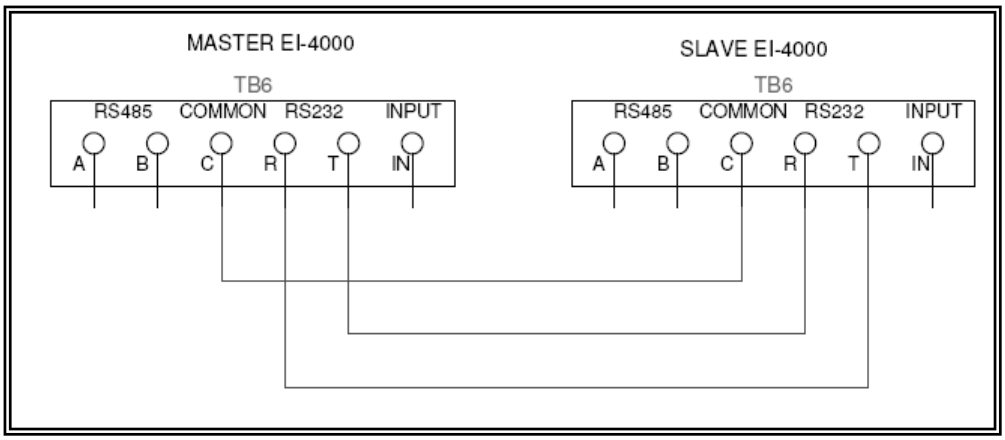
VIEWING THE SUMMED WEIGHT

To view the summed weight, from the main weight screens, press MNU, NEXT, and then SUM.

MASTER/SLAVE EI-4000 CONNECTIONS & CONFIGURATION

Master indicator: P990 = YES, P991 = don't care, P992 = YES, and P701 = 9600.
Slave indicator: P990 = NO and P701 = 9600.

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



CALIBRATION MENU

The calibration menu is accessed by pressing the MNU pushbutton (main screen), pressing CAL, and then entering the correct password (if the password is enabled). The calibration menu choices are as follows:

SCL – Calibrate the scale
OUT – Calibrate/test the analog outputs
DIAG – View the raw mV/V scale values and view/enter the zero and span values.
ESC – Exit to then main menu.

CALIBRATING THE SCALES (CALIBRATION MENU: SCL)

The user can calibrate the scale using the set of screens shown below. All operational modes (one through five) can calibrate the scale using the hidden gross adjustment function, but these set of screens allow the user to zero any amount of weight; the main-screen gross zero pushbutton (ZRO) has a limit on the amount of weight that can be zeroed.

While in the calibration menu, press SCL. If more than one channel is enabled, the calibrate scale select screen is displayed. If the user doesn't select a scale within five seconds, the display returns to the calibration menu. If scale four is not enabled, the CH4 pushbutton (PB4) is reassigned as an escape (ESC) back to the calibration menu.

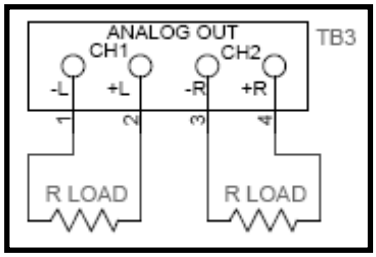
After a channel is selected for calibration, the zero/span calibration screen is displayed. The "GR" text flashes to indicate that the user can adjust the displayed weight. The user can zero any weight on the scale by pressing the ZERO pushbutton.

The user should remove all weight from the scale before zeroing the scale.

The user should now place a known weight on the scale, allow some time for the weight reading to stabilize, and then press the SPAN pushbutton. The weight adjustment (span) screen will be displayed. Use the UP and DOWN arrow pushbuttons to set to correct weight. Note: The weight display is dynamic, so adding or removing weight from the scale will change the displayed value and this includes a user-adjusted weight value. After the correct weight has been set, press the ENT pushbutton to enter the new weight value.

The new scale calibration values are stored in EEPROM permanently when the user presses the ESC pushbutton in the ZERO/SPAN scale calibration screen.

ANALOG OUTPUTS (CALIBRATION MENU: OUT)

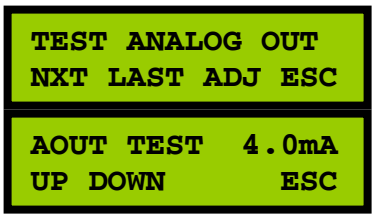


The EI' series furnishes an analog 4-20mA (milliamp) signal for transmission to a remote system such as a SCADA or RTU for each channel (up to four). From the factory, the calibration is within 0.5% of 4mA and 0.5% of 20mA or better. Therefore, it is recommended that one performs a 4-20mA calibration 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, press MNU, CAL, enter password (see password section) if enabled, and then press the OUT pushbutton.

ANALOG OUTPUT TEST

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-4000 (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.

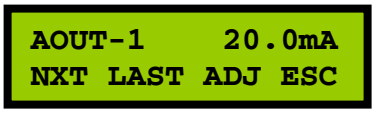
ANALOG 4mA and 20mA POINT ADJUSTMENT PARAMETERS

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:

ANALOG OUTPUT 4.00 mA (ZERO) ADJUSTMENT

Press the ADJ pushbutton, and then set the left 4.00 mA analog output point using the UP and DOWN 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. Press ENT when finished adjusting the 4 mA output point.

ANALOG OUTPUT 20.00 mA (SPAN) ADJUSTMENT



Press the ADJ pushbutton, set the left 20.00 mA analog output point using the UP and DOWN 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 20.0 mA +/- 1.0 mA. Press ENT when finished adjusting the 20 mA output point.

DIAGNOSTICS (CALIBRATION MENU: DIAG)

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).

Scale mV/V signal (one for each active channel)

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 0.5mV/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 SCL1 screen 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 an 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.

Scale calibration dead-zero (one for each active channel)

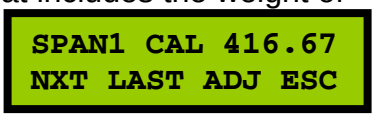
The scale mV/V dead-zero value represents the weight of the platform and, possibly, a fixed tank. NOTE: This value does not include the weight a <u>removable</u> cylinder or tank. Any PTZ/AZ values are not added to the zero value displayed. Press ADJ to adjust this value.

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

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.

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 DP pushbutton.



$$\textbf{CAL} = \frac{\text{[FS WT (}\textbf{lb only!}\text{)]}}{\text{[FS mV/V]}} = \frac{\text{[FS WT (kg) X 2.2046]}}{\text{[FS mV/V]}}$$

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.

PASSWORD

Calibration and configuration parameters can be password protected if S1-1 is open. Closing S1-1 will disable the password protection.

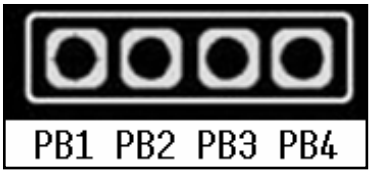
When the user selects either CFG or CAL from the main menu, the user is prompted with a password screen. Press UP or DOWN to select a digit from 0 through 9. Press the right-arrow "-->" to select the next digit. When the fourth digit is selected, the right arrow changes to ENT, which indicates that the user can enter the password. The default password is 0000.

The user is prompted to enter a new password when the main menu is exited via the ESC pushbutton. The user must answer YES to enter a new password.

Entering a new password is identical to entering the existing password. If the password is valid (all four digits have been entered), the message, "NEW PW ACCEPTED" is displayed.

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: PB3 and PB4

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.**

Load typical settings for the selected scales: PB2 and PB4

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.**

I/O Test mode: PB1 and PB2

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.

RS-232 BASIC SERIAL COMMANDS

Parameter P700 (MODE) is set to “BAS” for this command set.

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.

```
00000000001111111111222222222233333333334444 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.

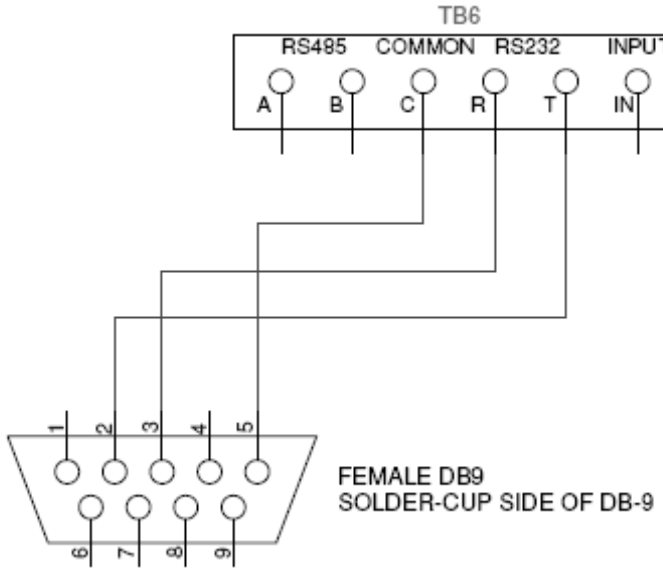
```
00000000001111111111222222222233333333334444 4   4
01234567890123456789012345678901234567890123 4   5
Remain   62.5,    45.0,       0,       0 lb<CR><LF>

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.

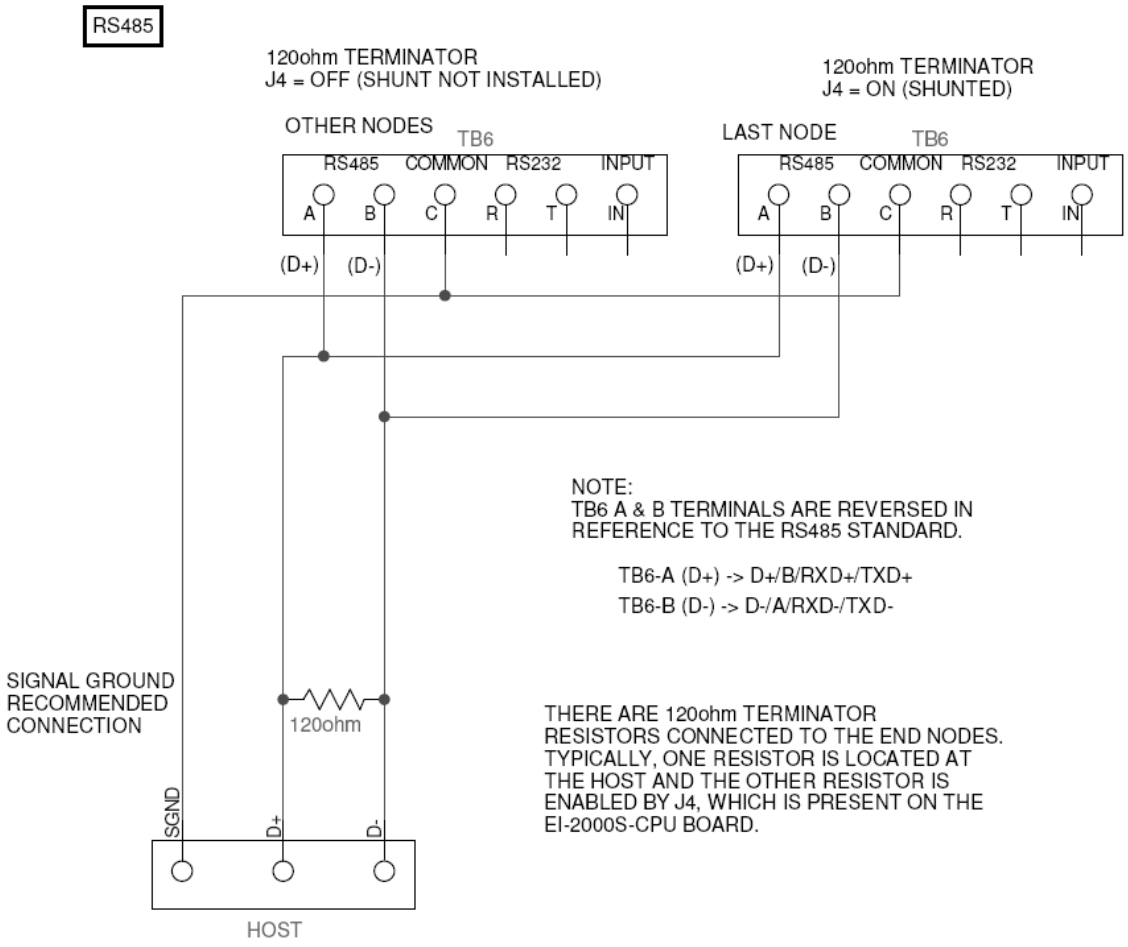
RS232 Wiring to PC DB9 Connector

EI-2000S-CPU	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.



RS-485 Wiring

This is the wiring typical of an RS-485 interface.



PORTS & JUMPERS (EI-2000S-CPU BOARD)

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 is the LCD1602-EI.
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-4000 METER SELECTION HEADER SHUNT (J3)

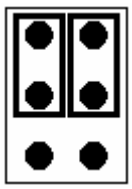
Connect J3-4 and J3-2 to select an EI-4000 meter; the display is the LCD1602-EI. This shunt, located on the EI-2000S-CPU board, is set by the factory and should not be altered for any reason.

Invalid shunt positions:

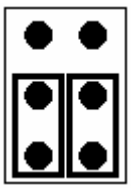
J1/J2 REMOTE SCALE SENSE (EI-2000S-CPU)

Single channel EI-4000 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 for EI-4000 multi-channel applications.

Disabled (local sense)



Enabled (remote sense)



DIP SWITCH FUNCTION SUMMARY

S1-1	PASSWORD DISABLE
OFF	Configuration/calibration password is enabled (normal setting)
ON	Password is disabled.

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

S1-2 and S1-4 do not have any functions and should be set to off.

MESSAGES

DISPLAY EI-4000	DESCRIPTION
TYPICAL LOAD	Loading factory (typical) default. This can be also performed by pressing the LOAD pushbutton in the scale full-scale parameters (P110).
FACTORY DEFAULT	Automatically loading default configuration & calibration
Add Lb Add KG	Add more weight to the scale before trying to adjust gross weight
A OL	Scale input positive overload
-A OL	Scale input negative overload
A2D FAIL	*Channel 1 & 2 A/D hardware failure.
EE.Err	*EEPROM device was not found
IIC.Err	*IIC bus error

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

HARDWARE (EI-2000S-CPU TERMINAL BLOCKS)

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 power supply is powered externally (dry).

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.

HARDWARE (EI-2000-EXP TERMINAL BLOCKS)

TB10 – RELAYS – Set point relay contacts
The relays, which are mechanical, can switch 3A, 250V A/C or D/C loads. The power supply is powered externally (dry).

1 2	CH3 contact	Channel 3 low-level or high-level relay contact.
3 4	CH4 contact	Channel 4 low-level or high-level relay contact.

TB11 – ANALOG OUT – 4-20mA analog outputs

1	+	CH3 positive signal	Channel 3, active 4-20mA analog output.
2	-	CH3 negative signal	
3	+	CH4 positive signal	Channel 4, active 4-20mA analog output.
4	-	CH4 negative signal	

TB12 – CH3 Scale input 3
TB13 – CH4 Scale input 4

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

TB30 – RELAYS – Set point relay contacts
The relays, which are mechanical, can switch 0.5A, 125V A/C or D/C loads. The power supply is powered externally (dry). These contacts are located on the LCD1602-EI revision 1013. Board revision 0947 does not have these contacts.

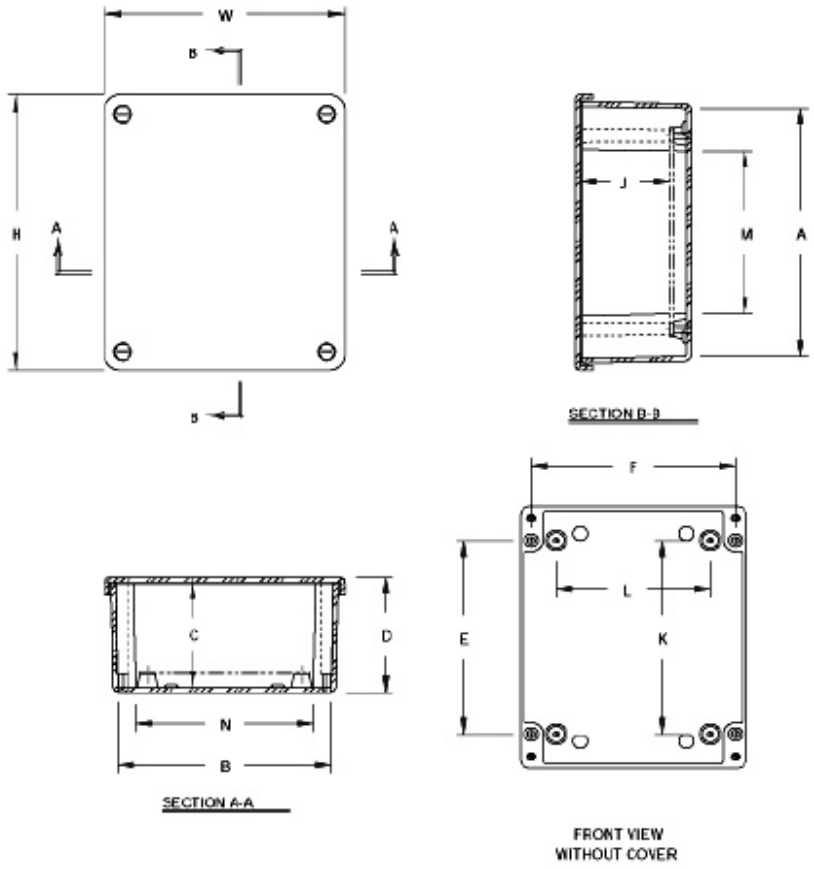
1 2	K11 contact	
3 4	K12 contact	

TB31 – 5V – This five-volt power supply is utilized for supplying power to devices inside the box. Do not connect this supply to anything outside the enclosure. The device should not require more than 100mA.

1	+	Positive 5V
2	-	Signal common

INSTALLATION

"Small Junction" F Series Enclosures Techincal Chart And Drawings



"Small Junction" F Series Enclosures Sizes

Size ID Number	Overall	Inside	Mounting						Enclosure	Panel Number*
	H X W X D	A X B X C	E X F	J	K	L	M	N	Weight	
F 763	7.63 x 6.63 x 3.19	6.90 x 5.90 x 2.88	5.37 x 5.63	2.48	5.37	4.25	4.52	4.9	3 lbs.	BP76
	(194 x 168 x 81)	(175 x 150 x 73)	(137 x 143)	(63)	(137)	(108)	(115)	(124)		

SPARE PARTS

LCD1602-EI = 110392
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	WHT	BLK	YEL			500317	TB5 (RIGHT CHANNEL)
							OR	BLU					x2	TB4 (LEFT CHANNEL)
EDS-400	400	180	1.1	1	N	RED	GRN	WHT	BLK	YEL			500317	
LP-4310		0		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_1b.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 do not store to EEPROM. 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 store to EEPROM. 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, cylindar, 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 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 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, cylindar, 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 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	
0x1102/0x2102	set point 1	2	lb/kg	R/W	float	2	Set point one values
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	
0x110a/0x210a	set point 2	2	lb/kg	R/W	float	2	Set point two values
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	
0x1181	set point 1 state	2	N/A	R	uint16	1	
0x1182	set point 1 state	3	N/A	R	uint16	1	Set point one state (1=ACTIVE and 0=INACTIVE)
0x1183	set point 1 state	4	N/A	R	uint16	1	
0x1184	set point 2 state	1	N/A	R	uint16	1	
0x1185	set point 2 state	2	N/A	R	uint16	1	
0x1186	set point 2 state	3	N/A	R	uint16	1	Set point two state (1=ACTIVE and 0=INACTIVE)
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.

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)

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

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: _____

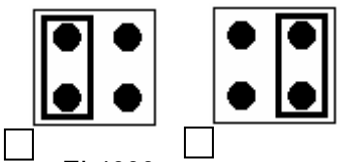
SETUP

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

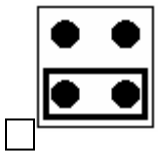
CHANNEL SETUP

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.o*		*2.o*		*3.o*		*4.o*	
SPAN CAL	*1.c*		*2.c*		*3.c*		*4.c*	

EI-2000 **J3** EI-1000

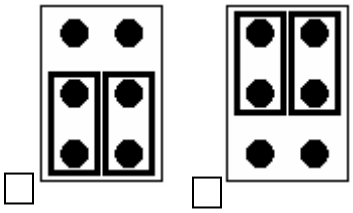


EI-4000



SENSE

ENABLE **J1/J2** DISABLE



S1 DIP SWTICH

-1	-2	-3	-4

S2 V. SEL.

115V ☐

230V ☐

OPTIONS

- ☐ RTC
- ☐ EI-2000-I/O
- ☐ EI-2000-EXP
- ☐ RELAYS
- ☐ RS-485

TECH_____