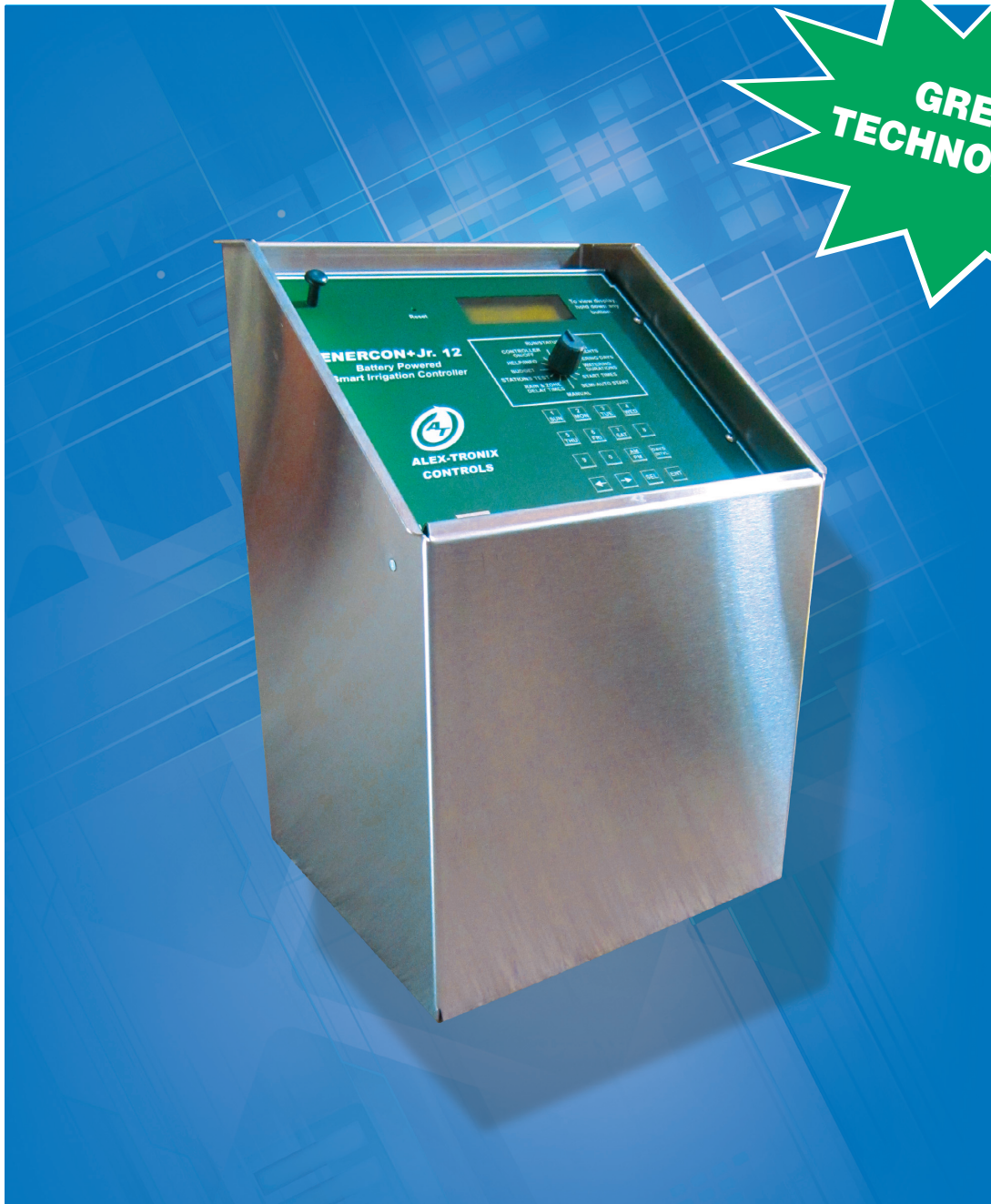


# ***ENERCON+ JR.***

**Battery Powered Smart Irrigation Controller-**

**4, 8 and 12 Stations**



## ***USER'S MANUAL***

Patents # 7,058,478, 7,266,428, 7,844,368, and 8,401,705. Other patents pending.

Please fully read all instructions prior to installation and use.  
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## INTRODUCTION:

Thank you for purchasing the Alex-Tronix Enercon+Jr. Controller. The Enercon is a commercial battery powered smart irrigation controller, housed in a stainless steel short pedestal, and can operate up to 12 stations with long battery life. Since a solar panel is not required, maintenance and vandalism are minimized, plus the controller can be installed in shade, indoors, or under cover. The Enercon+Jr., manufactured in the U.S. by Alex-Tronix, uses proprietary technology recognized by the U.S. Department of Energy. The Enercon+Jr. technology has been certified for water efficiency under the Smart Water Application Technology "S.W.A.T." program and may qualify for cash rebates by many water districts. **Please check with your local water district to apply for any rebates available.**

## INSTALLATION PROCEDURES

### MOUNTING PROCEDURE FOR EXISTING INSTALLATIONS (REFER TO FIG. 1):

#### The following cautions should be observed:

- ✓ Do Electrically "ground" controller using a grounding rod.
- ✓ Do not install the Enercon in a location that will continuously be exposed to sprinkler spray.
- ✓ Do not install the Enercon near underground high voltage or other utility wiring. Check with local agencies for cable and wire locations.
- ✓ Do not allow dirt, water, etc. to enter the controller. Keep cover locked.
- ✓ Do not spray any cleaners/lubricants into electronics or rotary controls.
- ✓ Do not attempt to disassemble the face pack- there are no user serviceable parts inside.

#### *Please read the steps below to note which tools and materials are required before beginning installation.*

For existing installations that have a concrete pad ready to use, remove old controller and any existing mounting bolts etc. After preparing the area for installation, check if large concrete cracks or divots remain after removing. If so, use a fast drying concrete patch such as "pour stone" to tidy things up; let cure.

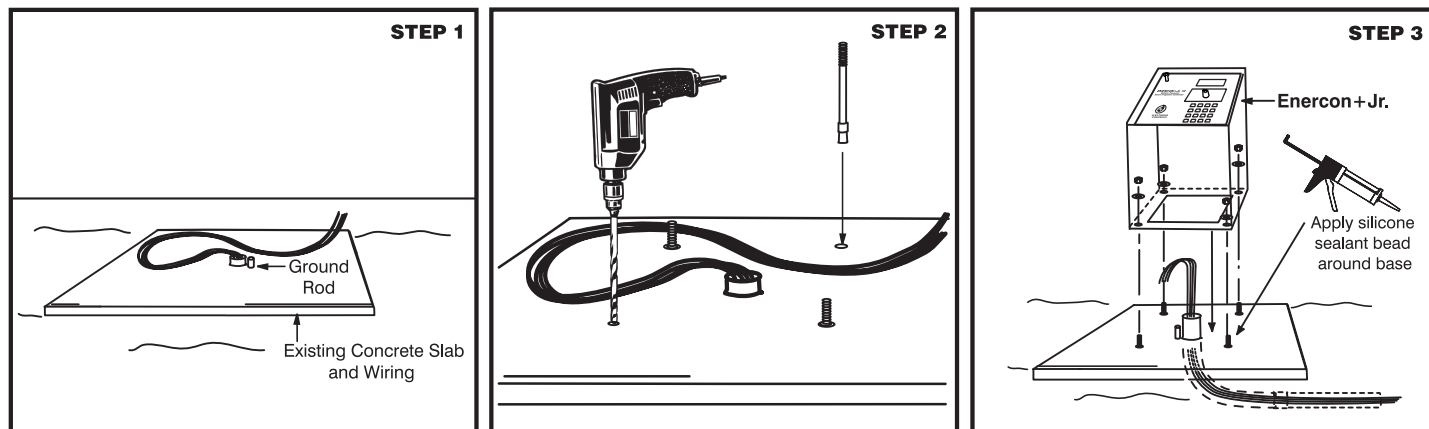
Locate the chassis lock key, and unlock the Enercon+Jr.'s cover. Remove and gently place aside face up on a clean surface. Using a phillips screwdriver, remove the four face-pack screws, and slightly lift away from the chassis by grasping the pulling knob (Do not use function knob). Once the face-pack clears the chassis, turn it to the side, and disconnect the harness connector by gently pulling on the connector only from side to side. Leave harness in chassis. Place screws and face-pack aside on the door.

Protrude all wires through the sweep ell in the existing pad and place the chassis on the concrete pad centered around field wires. Using the empty chassis as a stencil, mark at least four bolt holes on the pad - one on each side of the chassis, or two each on two sides opposite each other.

**Step 1)** Using a star drill punch, and a 3/8” sized masonry drill bit, drill the four marked holes into the pad approximately 2” deep - Use caution for not drilling crooked holes. Remove cement dust out of the holes thoroughly.

**Step 2)** Now take the stainless steel wedge anchors (provided) and tap into each hole leaving ample threading length - approx. 3/4”-1”

**FIGURE 1**



**Step 3)** Fit empty controller chassis over the field wires and route all field wires through the bottom of the pedestal and align controller over the anchors. remove and apply a liberal bead of waterproof sealant all around the bottom mounting surface area. Re-seat chassis and place a washer over each anchor stud, then fasten to concrete slab using the four nuts with a ratcheting socket or open box wrench. For ease, refer to “ELECTRICAL WIRING” prior to re-installing face pack.

## **MOUNTING PROCEDURE FOR NEW INSTALLATIONS (REFER TO FIGURE 2):**

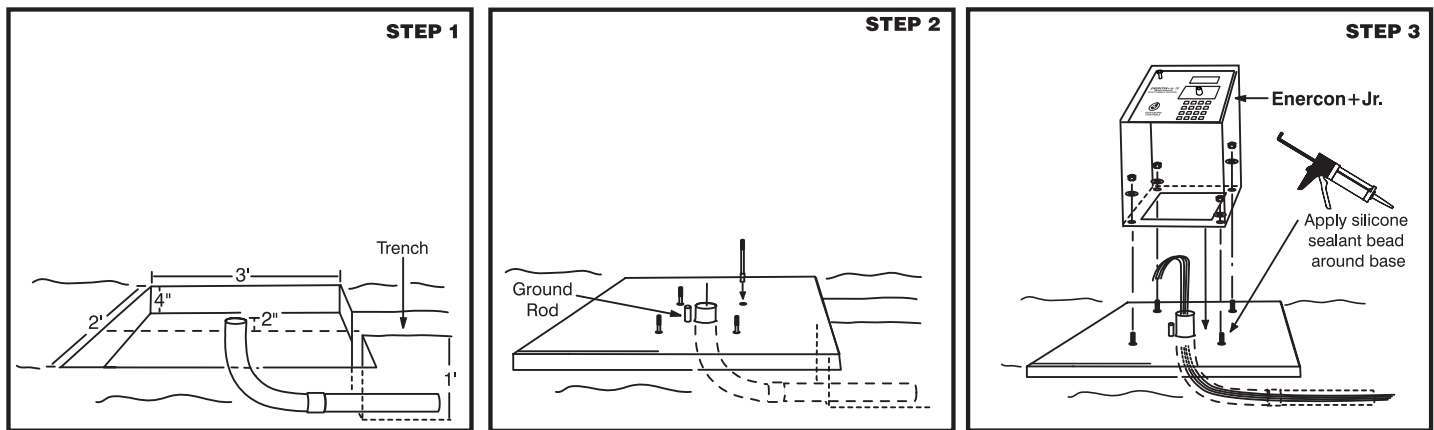
**Step 1)** After selecting a location for the controller, excavate an area in the soil to accommodate a concrete form having the dimensions of 2’ x 2’ x 4”. Depending on the number of wires, place up to a 1-1/2” diameter, long sweep ell pipe centered in the hole with about a two foot extension laying in the trench. Ensure pipe(s) are vertical with a 2 inch clearance above concrete level. If you will be installing a rain sensor (optional accessory available from other manufacturers) now is the time to make additional room for a separate underground conduit if necessary.

**Step 2)** Though the Enercon+Jr. is electrically isolated from power utility providers, it is highly recommended that a grounding rod be installed to help reduce static electricity charge build up and lightning strike damage. If your area is prone to this, then a grounding rod should be installed under or near the pad and at least a 10 AWG wire brought up through the pedestal a few feet; it must be connected to the marked green ground wire fastened within the chassis. Most building electrical codes require electrical chassis boxes be grounded.

**Step 3)** Finally, back fill the hole with soil to a depth of about 5 inches leaving the pipe extension open in the trench.

**Step 4)** Using 2” X 6” studs, build a wood form to the dimensions of 2’ X 2’. Rough in the wood form flush to the ground, and check with level. The slab should be slightly above sod/ground level so water does not collect on pad.

**FIGURE 2**



## ELECTRICAL WIRING:

**NOTE: Please observe all building codes mandated by your locality.**

### *Existing, and Pre-Existing Field Wiring Schemes.*

Before installing the Enercon+Jr. controller, you will need to evaluate the wiring plan. If the system was previously a DC latching system, connect the field common wire(s) to any of the Enercon's common "C" terminals. The majority of latching solenoids manufactured denote (+ or Red) wire connected to station terminals, and black (- or NEG) wire connected to the common terminal(s). If you are retrofitting an existing A/C system to the Enercon+ system, the same field wiring may be used, providing wiring polarity is correct.

It is imperative that all the "common" wires are truly common. This would become a problem if cross wiring were done somewhere out in the field, which would still allow an AC system to work, but may now have to be corrected for a DC system. Typically, a white wire is used as a common in AC systems.

A good way to verify polarities once the Enercon+Jr. is installed, is to run the **STATIONS TEST** (see page 10) function and observe performance. If a few valves operate erratically, or turn on when they should turn off, check connections and polarity.

For new wiring, always use a separate colored wire for the common (typically black). It is also good practice to color code station wires or at the least, mark them. This will allow you to trace wires for easier troubleshooting.

### ***Controller Wiring: (Refer to Figures 3)***

If valve field wires were not previously marked, they should be at this point. Wire marking kits are available at electrical supply distributors. Existing field wires should be inspected and re-stripped. **Good clean connections to the terminal strip are crucial.** For new installations, use 14 AWG UF (direct burial) SOLID CORE WIRE. **NOTE: WIRE RUN DISTANCE IS SHORTENED WHEN USING SMALLER GAUGES.**

Begin wiring station terminals up to 12. There are two common "C" terminals available. Strip all wires approximately 3/8". Good, clean wire routing is important for ease of troubleshooting. If a ground rod was installed, connect ground rod wire to the green ground wire ("pigtail") pre-fastened to the terminal harness.

NOTE: The commons marked "C" on output terminal strip are electrically "tied" together. Using all "C" terminals is not necessary. An extra "C" terminal is provided for convenience and ease of wiring.



**FIGURE 3 Terminal connections - shown with temperature sensor connected**



***Rain Switch:***

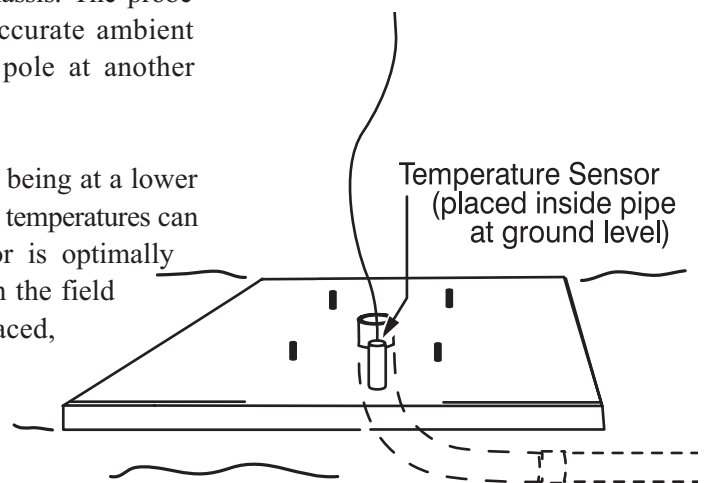
If you are planning to install a rain switch, install according to the manufacturers instructions --note, however; the wiring will be different at the controller. FOR THE ENERCON+Jr. CONTROLLER, DO NOT BREAK OR JUMPER ANY COMMON WIRES FOR RAIN SWITCH INSTALLATION. The Enercon+Jr. has two dedicated input terminals marked "RS" on the terminal strip. You must use the N.C. (normally closed) connections from the rain switch. The rain switch must also be activated through the HELP/INFO function (See HELP/INFO function sub menu -- Rain Switch Enable).

***Temperature Sensor Location (refer to fig. 4):***

The Enercon+ Jr. is supplied with a temperature sensor designed to be partially placed into the field wire conduit (sweep ell) entering the chassis. The probe placed within an inch of ground level yields a relatively accurate ambient temperature reading without having to install an external pole at another location, reducing installation labor.

With the temperature higher within the chassis and the ground being at a lower temperature during the warm season, the balance between the two temperatures can yield a relatively accurate measurement provided the sensor is optimally placed within the conduit. The sensor should be tucked within the field wires in the conduit at ground level. Once the sensor is placed, connect both wires to the special terminals marked "TS". The sensor is used when temperature budgeting (smart mode) is activated on the controller, and optimum water saving benefits are achieved.

**FIGURE 4**



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### ***Solenoids:***

The Enercon+Jr. only operates 12V DC LATCHING type solenoids. **DO NOT CONNECT A/C OR NONLATCHING DC SOLENOIDS TO THE CONTROLLER.** It is highly recommended that the *latching solenoid* made or recommended by the valve manufacturer remain with their valve in order to avoid any solenoid/valve compatibility issues. If no factory made latching solenoid is available for use with the valve specified on the job, then using the Alex-Tronix LS solenoid is the second option. If using the Alex-Tronix LS, fasten to valve using procedures stipulated by the "Valve Compatibility Chart" available from Alex-Tronix.

All latching solenoids have a polarity. Typically, black wires are all connected to the common "C" terminal. The remaining red wires are connected to stations "1 through 12." (Fig 3) If there is doubt about the polarity, a solenoid can be directly connected to a station on the Enercon's terminal strip, then tested in **MANUAL**.

Correct operation is --on "latch"-- the plunger will pull in (water flows through valve); on "release"--plunger will pop out. (valve shuts off). You will not always be able observe plunger action depending on who manufactures the solenoid; in this case, it is suggested the manufacturer of the solenoid be contacted for correct polarity and color coding.

When connecting field wires to solenoid wires, make sure the connection is **GOOD, CLEAN and TIGHT**. **Only use gel filled wire nuts**. Mark the field wires at the solenoid to denote polarity. If junction boxes are used in the field, make sure that the wires are not "crossed" in the box. Correct polarity must be observed, otherwise the solenoid will not operate properly and the valve will actuate in reverse -It may open, when it should be closed.

Note: If you have an application requiring a *normally closed valve*, such as a master valve to remain closed when there is no irrigation, a *latching solenoid may be wired in reverse*. The valve should be marked so as to not confuse anyone for future servicing.

### ***Operating Characteristics:***

The Enercon+ series controllers are energy efficient battery powered controllers; if several valves are programmed to come on at the same time, they will actually activate sequentially, several seconds apart from one another. Activation times can be from 3-8 seconds depending on the condition of the battery. Whenever a station or program is activated by **MANUAL, SEMI-AUTO, AUTOMATIC, or TEST CYCLE**, there is always at least a 3 second delay before any solenoid is activated. The solenoid activation order is as follows: station solenoid output comes on first, then master valve. When valves are to be turned off, the reverse order occurs with the master, and station solenoid shutting off, each 3-8 seconds apart. If more than one program is scheduled to start at the same time, the first station assigned to program A will come on first, then the first station in Program B, then C, then D.

### ***Master/Pump Connections:***

When controlling a pump (or other auxiliary device), an optional pump interface kit (P.I.K.-S) available from Alex-Tronix, must be used. It is connected between a common "C" and master "M" output terminals. The relay can then "make" or "break" a circuit to control a pump or other device. For this option, contact factory for part availability and connection details.

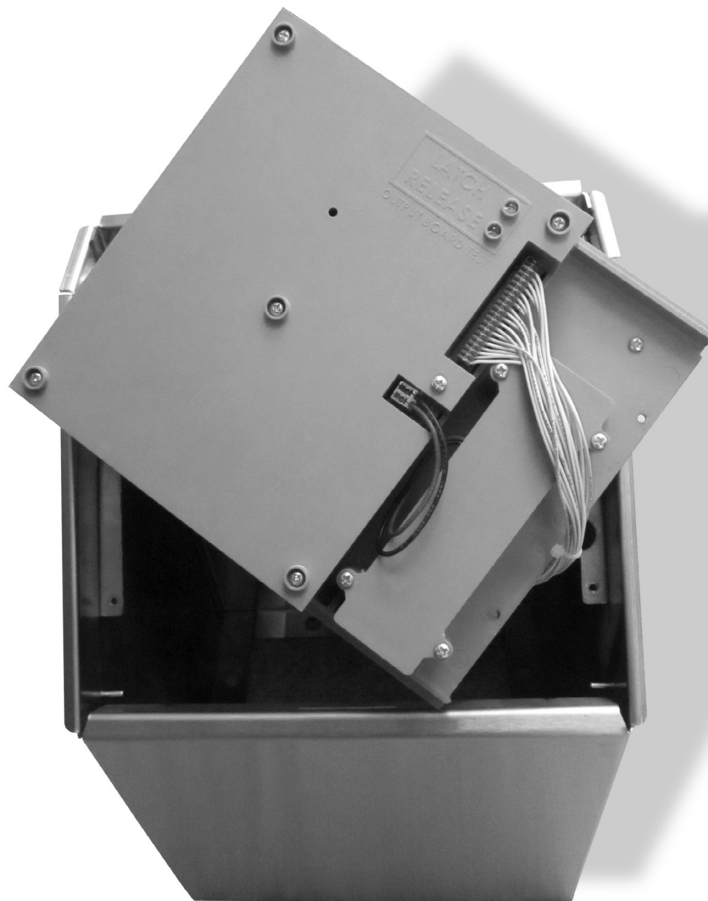
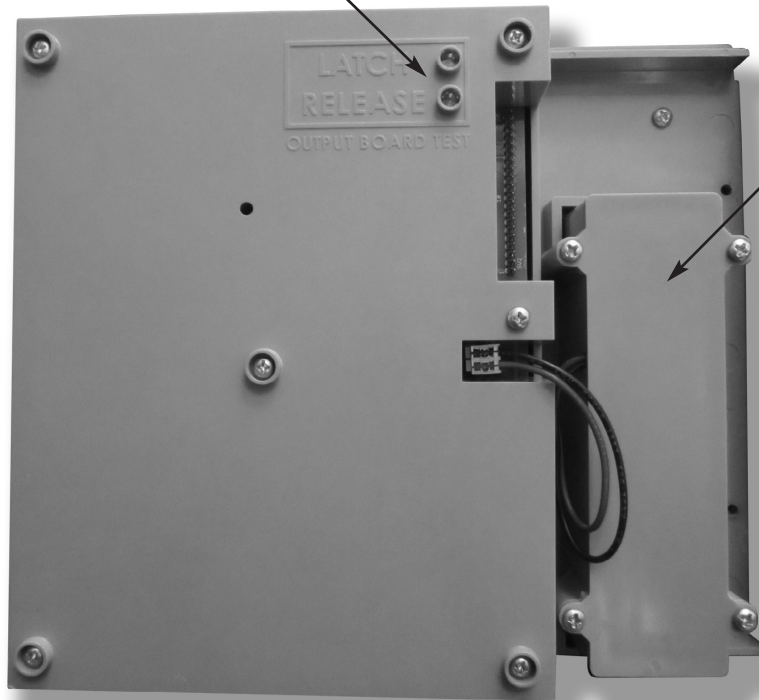
### ***Output Board Test (OBT) Terminal:***

The terminal marked OBT is used to self-test the outputs of the Enercon+Jr. using the **OUTPUT BOARD TEST (OBT)** function located under the **HELP/INFO** menu. Use a short piece of irrigation wire as a probe to test each output by viewing the L.E.D. status on the back of the face-pack while troubleshooting. (See **HELP/INFO -- OUTPUT BOARD TEST**).

**FIGURE 4a - Back view of control panel**

**Latch and release test  
lights for output board  
test "OBT"**

**Solenoid Power  
Battery Pack**



**FIGURE 4b**

**Panel shown in  
position for field  
testing**



# ENERCON+ JR. PANEL CONTROLS AND PROGRAMMING:

Programming capabilities:

- Program up to 12 stations-based on the how many stations were specified when ordered.
- 4 programs with four start times per program.
- Watering Days or Days Interval.
- Water Durations up to 23 hours and 59 minutes per stations.
- Up to four independent Automatic or Semi-Auto starts can be initiated and overlapped.
- Manual Starting of any station.
- Rain Delay & Station delay.
- Automatic Valve Testing Feature.
- Smart Temperature, Monthly, and Manual budgeting.
- Minimum Temperature (Freeze) Shutdown.
- Help and Configuration Menu.
- In-field Output Board Station Controller Test (OBT).

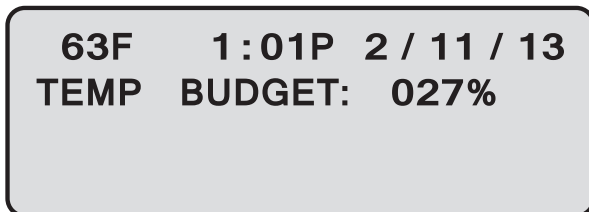
The Enercon+Jr. uses a rotary knob and keypad for easy programming. The keypad allows fast data entry, while the function selector knob gives the feel of user friendly mechanical controllers. The function knob is where all the program information is viewed and entered. The keypad is used to input program data. Any entry that can be selected or adjusted on the display has an asterisk symbol "\*" next to it. Using the SEL key advances the cursor within the selected function. Please note that during programming, if you turn the rotary knob off of that position before pressing enter, the entered data will be lost. Let's proceed with each function:

***To view the display, hold any button down until display appears.***

## ***Run/Status: (See display A)***

This function displays the controller's status. In idle, the controller is waiting for the next start time and the current temperature in degrees Fahrenheit is displayed at the top left. The time of day and current date are on the top line. On the second line, the day's water budget percentage is also shown when the unit is in temperature budgeting mode.

### **Display A - No Active Stations, Temperature Budgeting Selected (recommended)**



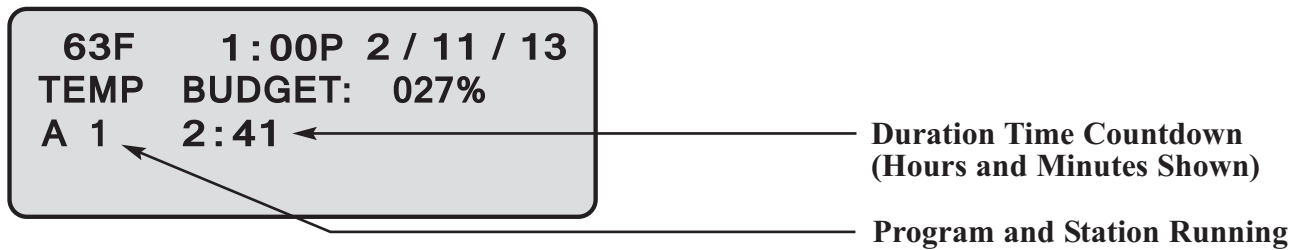
With display shown above, the controller is idle, and awaiting the next start time. Change the time and date on this display as follows:

**TIME OF DAY AND DATE:** To enter, change, or correct time of day, press **SEL** on keypad. You will see a blinking cursor on the display where the time is located. Using the keypad, enter in the correct time of day and press the key marked **AM/PM**. Times that are less than 10 hours must have zero entered in before the next number...For example: 09:23AM.

Press **SEL** again. The cursor will now move to where the date is located. Enter the date in the following format: **MM/DD/YY**. After pressing **ENT**, the actual day displayed (**Su**, **Mo**, etc.) will set itself, because the Enercon has a built in calendar. The Enercon's calendar accounts for leap year but not daylight savings time. You must reprogram the correct time if your locale follows DST.

When program is running, the display will appear as shown below:

### Display B - Active Station(s) With Temperature Budgeting



The **RUN/STATUS** display also provides additional information. When operating automatically, the screen above still indicates the current temperature, current time, and date and today's budget on the first two lines, but now shows which program is active, the station number, and the time remaining in minutes and seconds, or hours, minutes and seconds. In this case, there is 2 minutes and 41 seconds left of irrigation time on station 1. This is the budgeted remaining watering time. This screen may also provide additional information depending how it is operating. The display may show up to 4 programs/stations running at the same time. The display may show up to 4 programs/stations running at the same time. Other information that could be displayed may be: UNIT IN MANUAL, UNIT IN TEST, CHANGE BATTERIES, RAIN DROP ICON, CONTROLLER OFF, RAIN DELAY, STATION DELAY, CHECK TEMP SENSOR, TEMPERATURE BUDGET, MANUAL BUDGET, MONTHLY BUDGET, THIS PANEL NEEDS REPAIR and a % sign indicating duration times are budgeted.

When all programs have finished, the display will show the time, date, and day. It is not necessary for the function knob to be left on the **RUN/STATUS** position for automatic operation.

NOTE: When TEMPERATURE BUDGETING is activated, the **RUN/STATUS** function will display the current temperature after 1 hour on the top left corner of the display, along with the budget method and daily calculated percentage on the second line.

### Station Assignments:

For a station to operate a valve in Automatic, Semi-automatic, or Test mode, stations must be assigned to at least one program. To assign stations, press the **SEL** key. The cursor is now located on program **A**. If you continue to press and release **SEL**, the cursor will scroll through programs **B**, **C**, **D**, and back to **A** again. After selecting the program letter, press **ENT** to go into the station assignments display for the related program. You are now in the station assignment area for the selected program. In the lower right hand corner, you will notice a cursor. This is where the station numbers are initially entered. For example, to assign station number 3, press 03.

To assign stations, key in two numerical digits in succession (up to 12). If you key in stations any higher than the controller is capable of, you will see **##** (pound sign) in the lower right corner of the display. If the station entered is valid, the station will illuminate on the display at its designated location. You may continue to add additional stations as needed. When finished entering stations, press **ENT** to go back to the **SELECT PROGRAM** display. From this point you can either select another program to assign stations to, or go to another function. If **ENT** is not pressed after any function screen programming is completed, the display will hold the previous screen settings.

NOTE: If you cannot program stations any higher than expected, or more than 12 stations is available, check the **OUTPUT BOARD STNS.** configuration setting under the **HELP/INFO** menu which dictates how many stations are available for use.

### Watering Days:

When rotary knob is set to **WATERING DAYS**, you will have two choices; actual watering days or days interval on any program. If **WATERING DAYS** or **DAYS INTERVAL** are not programmed, **the controller will not operate in automatic mode.**  
**SETTING WATER DAYS:** To set **WATER DAYS**, press the **SEL** key. You will notice the cursor flashing on program **A**, indicating the selected program. Press **SEL** repeatedly to advance to the other programs. Once you have selected the program, press the keys marked with the day names on them; **Sun**, **Mon**, **Tues**, etc. Pressing each one of these keys illuminates the

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watering days on the display. Pressing the same key removes that day. Once all the watering day selections have been made, press **ENT** on the keypad to enter in all the days on all programs.

**SETTING DAYS INTERVAL:** Days interval, also located under the **WATERING DAYS** function sets the number of days to skip watering. To set **DAYS INTERVAL**, press the **SEL** key. You will notice the cursor flashing on program **A**, displaying which program you are in. Press **SEL** repeatedly to advance to any the other program. Once you have selected the program, press the key marked: **DAYS ITVL**. When the days interval option is displayed, you can change the number of skipped days-- entered on the keypad from 1 to 99 days. When finished, press **ENT** to enter all four programs on the display. Watering begins with the same day the interval is programmed as long as the start time(s) have not yet occurred. If you make any change to any of the four programs (A-D), the programs assigned to the interval of days will reset and a new starting day begins when you press enter.

### ***Watering Durations:***

To set watering duration for all stations, select either bank 1-6 or 7-12 by pressing **SEL**, then **ENT**. Once you are in the desired bank, Press **SEL**, then **SEL** again or **LEFT/RIGHT** (← →) arrows to navigate between stations. Once you select the desired station(s), key in the water time anywhere from 1 minute to 23 hours-- 59 minutes. After setting all the station watering durations, press **ENT** to enter in the complete display. The display will return to the bank selection menu where you can either select another bank or go to another function using the function selector knob. All watering durations must be set with 4 digits. For example, 15 minutes is entered as 00:15 or one hour and 20 minutes would be 01:20.

Budgeting information "%" and method is also shown in the center of the **WATERING DURATION** display. This is informational only, and displays calculated durations. Any budgeted durations can be modified "on the fly" without having to change the budget setting back to 100%. To do this --while in **WATERING DURATIONS**, press **SEL** and the 'base duration' times appear. Use **SEL** or **ARROWS** to move from station to station, then key in the modified time. When you are finished, press **ENT** to lock in the durations. The display will revert back to the actual budgeted run times.

**NOTE:** If you expect to advance to the next station and cannot, check the **OUTPUT BOARD STNS.** configuration under the **HELP/INFO** menu, and make sure it is set correctly.

As budget settings are changed (manually or automatically), duration times change accordingly. For more on this, see "budgeting" below.

### ***Start Times (Automatic):***

For automatic operation, at least one station with a watering duration, a watering day, a start time, and assigned to at least one program must be entered into the Enercon. If any of these parameters are missing, automatic starts will not occur.

The Enercon+Jr. has four programs with four starts per program. A total of sixteen starts for each station are possible per day. To set start times for programs, select programs **A&B** or **C&D** by pressing **SEL**, then **ENT**. Now repeatedly press **SEL** to select (or right-left arrows) to select any program letter. Once you have selected a letter, use the keypad to enter in the start time, then press **AM/PM** for the time of day. Continue to enter in desired start times, then press **ENT** to enter the display and revert back to the **SELECT PROGRAM** menu. If you do not want any start times-- Enter **0000**. 4 dashes ( - - : - - ) will appear indicating no start time is entered. All **START TIMES** are entered in as four digits. For example, a start at 8:30AM is entered as 08:30, then press **AM/PM** button until **AM** appears.

### ***Semi-Auto:***

**SEMI-AUTOMATIC** - To use Semi-Automatic, at least one station within its program must be assigned under **STATION ASSIGNMENTS**, and have some **WATERING DURATIONS** programmed in as well. Semi-Automatic "starts" are all independent. To put the Enercon+Jr. in the semi-automatic mode, press **SEL** to select any of four programs **A** through **D**. Now press **ENT** to start the selected program. Any running program will be shown on the display when the rotary knob is set to the **RUN/STATUS** position. All stations assigned to the selected program will turn on sequentially-- for one cycle only.

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If a Semi-Auto program is currently running, you can not restart semi-auto again over itself. A command to restart the same semi-auto program while it is already running will be canceled. You can however start other programs in Semi-Automatic.

If a Semi-Auto is started over a previously running automatic schedule of the same program, it will only cancel that program, and not affect any other programs concurrently running.

For example: if programs **A, B, C, & D** are currently running automatic schedules, and you activate Semi-Automatic program **A**, the Enercon+Jr. will immediately cancel program A's automatic schedule, and begin semi-automatic within program **A** only. Programs **B, C, & D** will remain unaffected and will continue with their automatic schedules. Up to four semi-auto programs can be activated at the same time.

### ***Manual:***

**MANUAL START:** Begin a manual start by pressing **SEL** to activate station entry. Key in the two digit station number (i.e. 04 for station 4), then press **SEL** to set running time in hours and minutes (i.e. 0012 for 12 minutes). Press **ENT** to begin manual start. To stop manual, press **ENT** again. Note that only one station at a time may be operated.

### ***Rain & Station Delay Times:***

**RAIN DELAY:** Press **SEL** to select **RAIN DELAY**, then press **ENT**. Now press **SEL** and key in the two digit number of days you wish the Enercon+Jr. to delay automatic water scheduling then **ENT** to initiate the rain delay. At midnight of each day, the rain delay count is subtracted by one day. When the count reaches zero, automatic cycling resumes. The current day is considered the first day for rain delay. When in "Rain Delay"-Automatic, Semi-Automatic, and Test are inoperable, except for **MANUAL** start.

**STATION DELAY:** Station delay sets the "dead" time in between valves used to help valves close and open without losing main water line pressure. To set **STATION DELAY**, press **SEL** twice to select **STATION DELAY** then **ENT**. Now press **SEL** and key in the number of seconds (up to 99) you wish the Enercon+Jr. to delay valve actuation, then press **ENT** to enter.

### ***Stations Test:***

The stations test sequentially runs through all assigned stations, on all programs, for a set amount of time. You can use this feature to maintain the irrigation system by observing valve operation while away from the Enercon+Jr. controller. To use **STATIONS TEST:** press **SEL** and then **ENT**, then **SEL** again and enter in how long each valve will stay on --up to 99 minutes. Now press **ENT**. The first assigned valve in order will start, and the Enercon will remember this setting so that you will not have to enter it in every time you want to run the **STATIONS TEST**. If the bottom line on the display states: "[NO STATIONS ASSIGNED]" then you must program at least one station in the **STATION ASSIGNMENT** function setting.

### ***Budgeting:***

The Enercon has three water budgeting methods. The first two are **MANUAL BUDGET**, and **MONTHLY BUDGET**. Manual budgeting allows you to change watering times for all stations by percentage for all programs at once. Monthly budgeting works similarly, except with the ability to automatically change the percentage on a per month basis. When a new month is encountered, the budget will automatically readjust itself to the new settings. **TEMPERATURE BUDGET** is the third type of budgeting available, and is a proprietary "smart" method developed by Alex-Tronix. Watering durations are automatically increased or decreased daily, based on tracking the temperature of your locale. The result is more efficient water savings over other budgeting methods.

Note: The **WATERING DURATIONS** display will indicate the current budget setting and whether it is in **MANUAL**, **MONTHLY**, or **TEMPERATURE (TEMP)** budgeting.

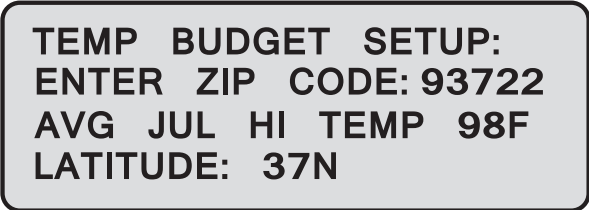
**MANUAL BUDGET:** To set **MANUAL BUDGET**, press **SEL**, then **ENT**. Press the **SEL** key again and enter in the percent you wish to change the budget to, then press **ENT**. You can increase watering duration by passing 100%. You can reduce watering duration by setting the budget less than 100%. Budgeting is adjustable from 1-399%, in 1% increments. Use 3 digits to enter the percentage desired i.e. 030 for 30%.

Example: Say **MANUAL BUDGET** is set at 100% (by default) and water duration was originally set at 00:10 minutes. If you were to reprogram the **MANUAL BUDGET** to 200%, the duration would double and recalculate for 00:20 minutes. If it were changed to 50%, the new watering duration would be 00:05 minutes. Budgets are calculated to the nearest minute, with a 1 minute minimum. Baseline budgeting calculations are always assumed at the controllers default entry of **MANUAL BUDGET** at 100%. At least 1 station in **WATERING DURATIONS** must be entered before budgeting can be changed.

**MONTHLY BUDGET:** To set **MONTHLY BUDGET**, press **SEL**, twice, then **ENT**. Press **SEL** again. On the keypad, use the **RIGHT/LEFT Arrow** (**SEL** can be used as **RIGHT ARROW**) to move the cursor around the display. Place the cursor on each of the months and key in the budget percentages as a 3 digit number-- i.e. 30% is 030. When complete, press **ENT** to accept all monthly budget percentages.

**TEMPERATURE BUDGET:** To set **TEMPERATURE BUDGET**, press **SEL** three times and press **ENT**. Display "C" will appear seen below. You will see the temperature budget screen prompting for the zip code of the controllers locale. Key in your 5 digit zip code and press **ENT**. If zip code is found in the Enercon's database, the bottom two lines will display peak summer temperature, and latitude of your controllers location. If the zip code entered does not exist, "DATA NOT AVAILABLE-CONTACT FACTORY" will be displayed. Press **SEL** to try again. **OPTIONAL:** If the peak summer temperature, and latitude do not appear to be correct, these two parameters may be individually entered for better accuracy. Contact Alex-Tronix to obtain the parameters, then press **SEL**, down to the **PEAK SUMMER TEMPERATURE**, and then **LATITUDE**; key in the parameters. It is important to note that when any of these two budgeting parameters are changed, an exclamation mark will appear next to the modified parameter showing that it differs from the controller's own data base. Press **ENT** to complete calibration. The Enercon Jr. is now ready to calculate water budgeting via temperature.

### Display C - Temperature Budgeting Function Display



TEMP BUDGET SETUP:  
ENTER ZIP CODE: 93722  
AVG JUL HI TEMP 98F  
LATITUDE: 37N

**NOTE:** While in the budgeting function, you can switch between budgeting modes anytime by pressing **SEL** to the mode, then **ENT**, pressing **SEL** again, then **ENT** again; the display then reverts back out to the main function display. You will notice which budget is active depending on where "(ON)" is next to. The remaining budgets that are not active retain their previous settings for future use.

### *Help/Info:*

The **HELP/INFO** function provides information as well as the ability to adjust global configuration settings. Use **SEL** and **\*NEXT** to scroll through information and functions. The following features are available from the **HELP/INFO** function:

- Alex-Tronix technical support telephone number.
- The controllers firmware version.
- Valve cycle count -- The number of times the Enercon+Jr. has activated any station or other outputs.
- Enabling rain switch.
- Clearing program memory.
- Number of stations your Enercon+Jr. controller supports.
- Output board test (OBT).
- Minimum auto-start temperature setting.



### **Rain Switch Enable:**

If you are using a rain switch, you will need to activate this feature. Scroll down to **RAIN SWITCH=OFF**, and press **SEL** then **ENT** and **SEL** again to change the setting to yes (**Y**). You will see the display change from **OFF** to **ON**, then press **ENT**. The controller will now acknowledge any rain switch activity, and a rain drop icon will appear (switch opens) on the **RUN/STATUS** display when it rains. Only **MANUAL START** is available when the rain switch is active. Note that if the rain switch activates when the controller is in any other cycle, all valves will turn off.

### **Clear Memory:**

**WARNING:** CLEAR MEMORY WILL ERASE ALL DATA IN THE CONTROLLER, except for number of stations configuration. You will need to completely re-program the controller. There are two ways to clear memory - hardware and software.

**SOFTWARE:** To start from a “clean slate” and clear all irrigation schedules, select this option and press “YES”. The Enercon+Jr.’s display will go to sleep. Awake the unit again by holding down any button, and reprogram time, date, irrigation schedules, etc.

**HARDWARE:** If the unit does wake up after pressing any push buttons, insert a small screwdriver through the hole on the front panel of the face-pack marked “CLEAR MEMORY”, and gently press the internal pushbutton, then let off. You should feel a slight detent then release. Now wake the controller and reprogram time, date, irrigation schedules, etc.

### **Output Board STNS:**

**For the Enercon+Jr. -this setting must not be changed.**

The Enercon+Jr. hardware is designed for operating 4, 8 and 12 stations. The number of stations are set from the factory. The main circuit board is directly compatible to the Enercon+, and the Enercon+Jr., therefore it is possible to accidentally program more than 12 stations under the **OUTPUT BOARD STNS.** setting located in this help function. If more than 12 stations are programmed, and operated, it will appear as if it is running additional stations, but can not. If you notice the Enercon+Jr. accepts settings beyond 12 stations, please ensure the **OUTPUT BOARD STNS.** setting is re-programmed for 12 stations to avoid any confusion.

### **Output Board Test (OBT):**

The Enercon+Jr. has a unique self-test feature known as the OBT. This differs from **STATIONS TEST**. The OBT allows you to troubleshoot the controller itself for proper operation using a piece of irrigation wire as a test probe. This test should be performed before systemic troubleshooting is done in order to eliminate the controller as the source of the problem.

**CAUTION: DISCONNECT ALL COMMON "C" FIELD WIRES ONLY  
FROM TERMINALS BEFORE PROCEEDING!**

**TEST PROBE:** Cut about a 1 foot piece of solid core irrigation wire, strip both ends ½", and insert one end into the terminal marked OBT, and cinch down. Now that the test probe is ready, Turn the FUNCTION SELECTOR knob to **HELP/INFO** and press **SEL** to **\*NEXT** and keep going until you reach "**\*OUTPUT BOARD TEST**". Now press **ENT**. You will need to have the wire probe ready and touching the "M" station. When prompted on the display, press the right arrow key (>), then turn the panel to observe the “**LATCH**” and “**RELEASE**” LED’s on the back, and within 3-8 seconds the Enercon+Jr. will pulse the "M" station first, followed by the remaining stations in numeric order.

You will see the "green" L.E.D. light flash on “latch” followed by the "red" L.E.D. flash on release. Follow through the rest of the station outputs making sure you move the probe to the next station immediately after it releases (within 3 seconds), otherwise you will miss the event. Once the test has been completed, the output board test will stop and re-prompt you if

you want to run the test again. If you just want to test a particular station, hold or fasten the probe on the suspected station terminal, and operate a manual start and stop.

TEST RESULTS: If every station pulses "green", then "red" (latch and release), the controller is working properly. If there are "green" flashes and no "red" flashes, or vice versa, the Enercon+Jr. should be suspected. Call factory for assistance.

### MIN AUTO START TEMP

**NOTE:** Use of the minimum auto start temperature feature requires installation of the temperature probe. This feature inhibits automatic starts when the surrounding temperature around the probe falls below the entered set point. This feature can be used for freeze protection of lawn, plants, and plumbing while irrigating in severely cold temperatures. Temperature is read on the hour; the controller then decides to irrigate or not, depending on what the set point has been programmed to. If the surrounding temperature is at or below the set point, the controller will not automatically start. **MANUAL**, **TEST**, and **SEMI-AUTO** are not affected by this feature.

To set the minimum auto start temperature, scroll down to the last display, then press **SEL**, and **ENT**. Press **SEL** and select over to "Y". The display drops down to the numerical entry. The default setting is **OFF**. Key in the temperature at the point you would like the controller to stop irrigating. Press **ENT** to accept the set point and revert to \***NEXT**. The third line displays what the days high temperature was within the last 24 hours.

On the **RUN/STATUS** display, when minimum auto start is enabled, you will additionally notice the ambient temperature being displayed. When the ambient temperature falls to the set point where all automatic starts are disabled, a thermometer icon will also appear. When the ambient temperature rises above the set point, the thermometer icon will disappear, and automatic starts will resume. Note that any cycle(s) already in progress will be allowed to finish its schedule.

### **Controller On/Off:**

To turn controller **ON** or **OFF**, press **SEL** to toggle between the two, then press **ENT**. "CONTROLLER IS OFF" will now be displayed, and is also indicated on the **RUN/STATUS** display. To turn the controller back on, press **SEL** twice again and **ENT**. On turn off only, the Enercon+Jr. will immediately initiate a solenoid release routine that will turn off any valves that are currently on. When the controller is in the OFF mode, pressing any button to "wake up the display" does not "Turn on" the controller. You must go to the **CONTROLLER ON/OFF** function to turn the controller back on. When controller is off, all functions are disabled.

## GENERAL TROUBLESHOOTING:

Q1) **Is this a new system? If no move on to Q2; if yes then:**

- a) **Are you using the BCS-SOL's?** This is an electronic module connected to our latching solenoid (LS). **YOU SHOULD NOT BE...**BCS-SOL's are only used for the BCS system. For all Enercon controllers, only *latching* type solenoids are used. Do not use AC solenoids.
  
- b) **Have you checked for shorts or opens on the outputs?** Using a digital multimeter... Do the following:
  - 1) Set your multi-meter to "ohms" (omega symbol, or upside down horseshoe)
  
  - 2) With the field wires still connected to the terminal strip, put one probe on the common and the other on each station.
  
  - 3) Read the multi-meter in ohms ... You should read a resistance from 8 to 25 ohms depending on the solenoid manufacturer. If you are using the Alex-tronix LS solenoid provided by us, the resistance will be approximately 9 ohms per solenoid, not counting wire resistance. With 14 gauge wire, add 2.5 OHMS per 1000' of wire.

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If any or all stations read "open" (infinite resistance), then you either have the wrong common wire selected or the field wiring is broken somewhere. You'll need to trouble shoot your field wiring further in depth. You can also verify the controller and solenoid are working properly by removing the solenoid from the valve and wiring it directly on to the Enercon's terminal strip. To do this, connect the black (or NEG) wire to a common and the red (or POS) to any station. Operate it using the "Manual" function. If it operates there, there is a wiring problem.

- c) **Are any of the latching solenoids wired in reverse?** All black wires must go to "C" (common) on controller terminals. Remaining red wires connect to each individual "Station" terminals. If valves do opposite of what is expected, the solenoids are wired in reverse. Note that when turning on a station, the solenoid latches and the plunger "snaps" into the body of the solenoid; turning off a station allows the solenoid to release and the plunger pops out.
- d) **Is the solenoid compatible to your valve?** Check the Alex-Tronix compatibility chart (enclosed with unit or available online) on how to make The Alex-Tronix LS solenoid compatible to your valve.
- e) **Is the RAIN SWITCH ENABLE on?** If you are not using a rain switch, the setting should be set to "OFF" under the "HELP/INFO" function menu. If you are using the rain switch, then the switch should be wired to the normally closed when dry (N.C.), and the setting should be set to "ON" under the HELP/INFO menu.

**Q2) System has been operating fine, but now not working.**

- a) **Are the batteries run down?** If the display shows: "THIS PANEL NEEDS REPAIR", then the panel must be sent in for service due to the internal battery being depleted. When this happens, the controller will either be off or will be running its last cycle(s), and will not start again. If "CHANGE BATTERIES" are displayed, replace battery pack.
- b) **Main water line okay?** Check this by manually operating valve (at valve not controller). Loosening solenoid will achieve this. If main water pressured up okay-- Suspect valve.
- c) **All valves not working? or some?** If any wires are suspected broken, run test Q1-B. You can also trade station wires with each other to see if the valve in question begins to operate. If so, send in controller/output board for service.

**Q3) The controller won't assign stations, durations, manual, etc. past a certain point.**

- a) Check the **OUTPUT BOARD STS=XX** under the HELP/INFO menu. It must be set for 12 stations?

**Q4) The controller has a problem reading temperature.**

- a) If the display reads: **CHECK TEMPERATURE SENSOR** Check for an open wiring problem within the temperature sensor wires.
- b) If the controller reads 120F temperature and never changes or is obviously off from the ambient temperature, check for a short within the temperature probe wires.
- c) If temperature seems incorrect, check placement of temperature sensor (See Temperature Sensor)

**Q5) System worked fine, but now the solenoids latch but don't release.**

- a) Send in face-pack for service.

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## PANEL REPLACEMENT:

**For service or upgrades follow the instructions below:**

- 1) Unlock and remove cover. Remove four screws on the right and left side of the face-pack.
- 2) Remove panel by holding the grip knob and pull up; disconnect harness connector by gently rocking back and fourth.
- 3) Discharge your body from static electricity by placing your hand flat somewhere on pedestal chassis for a second or two.
- 4) Unpack the new panel from its static sensitive bag. **DO NOT TOUCH EXPOSED PINS WHERE CONNECTORS PLUG IN.** Static from your body may damage unit. Plug harness connectors onto face pack. Connector with one missing wire is positioned towards the top end of the face pack.
- 5) Place new panel within chassis and align holes to mounting brackets; cinch down with existing screws.
- 6) Finally, test unit by running the **OBT** or a **MANUAL** start. Re-program watering schedules.

## BATTERY REPLACEMENT:

**CAUTION: NO FIELD SERVICEABLE PARTS IN FACE PACK PANEL--DO NOT DISASSEMBLE.**

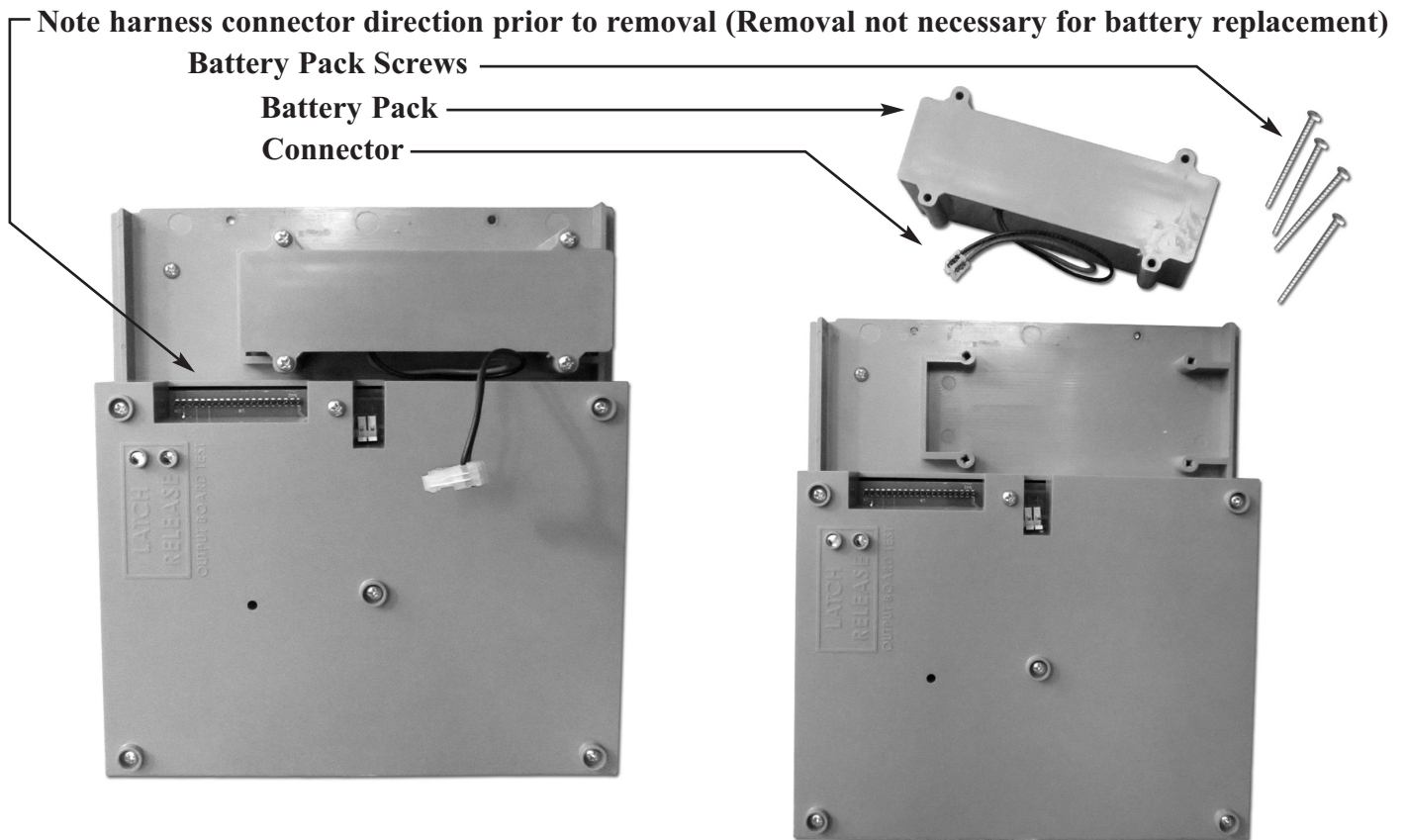
INTERNAL BATTERIES: The Enercon+Jr. uses two sets of batteries to operate. An internal battery powers the electronics and display, but not the solenoids. This battery is permanent, and was designed to last the life of the unit. Should this battery ever deplete, or there is a problem with the main panel, “THIS PANEL NEEDS SERVICE” will be displayed, and the panel must be returned to the factory. Do not disassemble.

BATTERY PACK: An external, field replaceable, battery pack (part # BATT-PK ECN II) is included with all Enercon+ series controllers. This battery pack is *only used to power the solenoids*. About 40,000 valve actuations can be expected before depletion. Given an average irrigation schedule --the battery pack should last about 4 years. and may be ordered through a distributor and is user and field replaceable. See fig. 6

After a period of time, when the battery pack reaches depletion (dependent on the number of valve actuations), the Enercon’s display will remind you to replace it by displaying “CHANGE BATTERIES”. If you see the warning appear and disappear at various times – Replace the battery pack within 30 days. (Fig 6.)

BATTERY PACK REPLACEMENT: Refer to instructions above under “Panel Replacement” and see Figure 6 on next page. Once the panel is removed from the chassis, disconnect the power connector with red and black wires. Use a phillips screw driver to remove the four screws holding the pack in place. Note direction of the protruding wires from the battery pack. Remove depleted battery pack and replace with new pack in reverse manner, followed by replugging in the power connector. Tuck wires back into the void space. Re-install face pack into chassis. Please properly dispose of battery at your local recycling center

**IMPORTANT:** After replacing the battery pack, a manual start must be activated, then deactivated in order for the controller to measure the health of the newly installed battery pack; this action will clear the low battery warning. Not performing this action will allow the display to continue showing: “CHANGE BATTERIES” until the next automatic start.



## VALVE COMPATIBILITY:

The Enercon+Jr. can drive several types of latching solenoids, and it is recommended to use the solenoid made for the valve; however, using the Alex-Tronix LS solenoid, please visit our website at [www.alextronix.com](http://www.alextronix.com) for the latest valve compatibility chart to ensure solenoid-to-valve compatibility. Valve design and compatibility information is always changing-- If you do not see your valve on the chart (online), or have other questions, please contact our factory for further instruction. Please have the following information on hand before contacting our factory:

- Controller model number.
- Valve brand, model number, size, etc.
- Solenoid type and brand.

## CARE AND MAINTENANCE:

The Enercon+Jr. does not require in depth maintenance; however an annual check of following is good practice to ensure system reliability:

- Lubricating locks -- Open door, spray silicone lubricant annually. Do not spray into controller.
- Wire connections -- Check all connections on output board and solenoids.
- Stations Test -- Run STATIONS TEST to verify all valves are operating.
- Cleaning solvents -- Do not use caustic solutions on the Enercon II pedestal chassis.
- Cleanliness -- Internally clean spider webs, insects, dirt, mineral deposits, rust, etc.





## Warranty

Upon purchase, users of this product agree to the following terms, conditions and limitations of warranty and liability coverage:

Alex-Tronix warrants the Enercon+Jr. including batteries to be free from original defects for two years from the date of original sale. The manufacturer shall replace, free of charge any part found defective under normal use and service within the guarantee period, provided the product is installed, used and maintained in accordance with any applicable instructions or limitations issued by Alex-Tronix.

Components supplied as replacement parts are warranted for 90 days from the date of shipment. The manufacturer assumes no liability for incidental or consequential damage sustained in the adoption or use of our engineering data, service or products.

Liability is therefore limited to the repair of the product manufactured by Alex-Tronix. No agent or representative has the authority to waive or add to this agreement.

Altered products, damage due to controller doors left open or unlocked, or use of products in a manner not intended shall void this warranty.

For warranty service, ship unit prepaid to the address below. Controllers damaged in transit due to improper packaging are not covered by warranty.

## ALEX-TRONIX

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