



**ALEX-TRONIX**  
A DIVISION OF GNA INDUSTRIES, INC.

**BCS<sup>®</sup>**

**(Battery Control System)**

PATENT #6,351,366

PATENT #6,154,354

**&**

**ENERCON**

**(Energy Conserving Controller)**

PATENT #5,914,847

**M A N U A L**

## **INTRODUCTION**

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The BCS® and Enercon are non-solar battery powered irrigation controllers. The BCS is available in 5 or 10 station models, while the Enercon is available in 4 or 8 stations. They use the same weather resistant metal outdoor enclosure, (powder coated or stainless steel) and mount identically. They use the same latching solenoid, making solenoid to valve compatibility also identical, and they program in the same way. For applications greater than 8 stations, distances greater than 2000 feet, or multiple valves per station, the BCS is recommended. For all other applications, use the Enercon.

The BCS is capable of operating valves up to 5 miles away with 14 gauge wire. To accomplish this, a patented module is attached to the latching solenoid (BCS-SOL) that permits great distances of operation. The Enercon has no module. Both models use 9 volt lithium batteries to power the latching solenoids. The BCS requires 4 of the 9 volt lithiums, while the Enercon has a battery pack attached to the back of its panel with 3 of the 9 volt lithiums. Both controllers include batteries. For outdoor applications, only the Alex-Tronix version of the Ultralife 9 volt lithium batteries are recommended and guaranteed for 2 years. In an emergency, alkaline or standard lithium 9 volt batteries may be used available at electronic stores, but their life will be significantly reduced and reliable long-term controller operation is not guaranteed.

Up to 2 BCS-SOL modules may be powered per station with the BCS. Use only one latching solenoid per station with the Enercon. Correct wiring polarity must be observed both at the controller output terminal and at the module or latching solenoid. 14 gauge direct burial wire is recommended for both controllers.

## **BCS AND ENERCON FEATURES:**

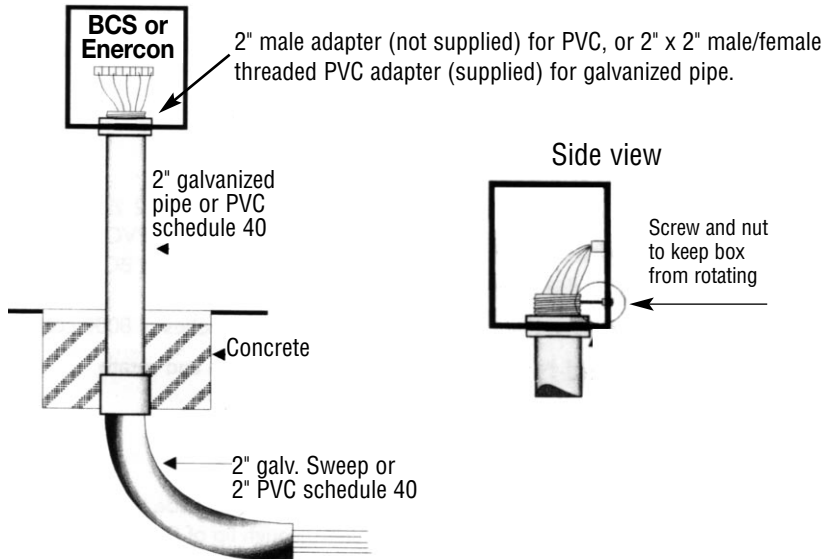
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- 5 or 10 stations (BCS) or 4 and 8 stations (Enercon) plus pump or master valve output
- Two independent programs, four starts per day per program
- Function selector programming
- Seven days a week programming or up to 5 days watering interval
- Automatic, semi-automatic, and timed manual operation
- Rain delay up to 99 days
- Station test function 1-99 minutes
- Watering budget function from 10-200% in 10% increments.
- Programmable delay between stations 0-99 seconds
- Valve cycle counter
- Enercon will automatically indicate need to change its battery pack
- Rain switch input capability
- Can be installed anywhere, with or without access to any light, as in a vandal resistant enclosure or building.
- Retrofits easily to competitors' pedestals, or can be wall mounted.
- Recognized and sponsored energy saving technology by U.S. Dept. of Energy

## INSTALLATION (BCS OR ENERCON)

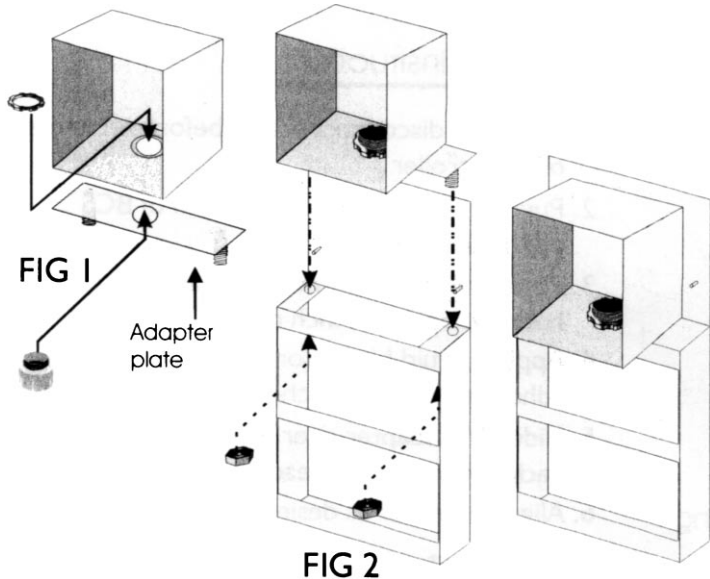
Both controllers may be installed in any convenient location since no external power or light of any form is required. Use the following guide for new installations or adapting to existing pedestal mounts:

### NEW INSTALLATION:



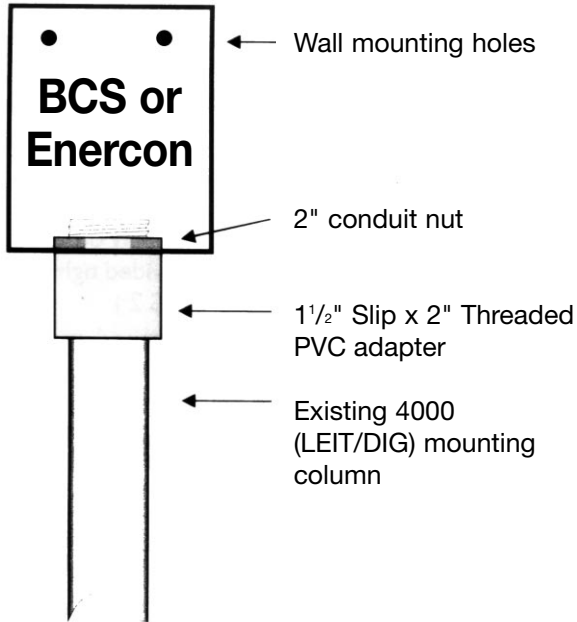
1. Use either 2" threaded galvanized pipe, or 2" schedule 40 PVC pipe
2. Dig hole with approx. dimension of: 12 x 12 x 10 inches deep.
3. Glue 2" PVC sweep to vertical PVC column. If galvanized pipe is used, thread on short piece of galvanized sweep to galvanized vertical column.
4. Run wires through column and bend ends over the top for about one foot.
5. Set column in hole and use dirt to set vertical. Pour concrete around base for permanency.
6. If PVC pipe is used, place a 2 inch male PVC adapter through bottom of box after knockout has been punched out. Using a 2 inch conduit nut, tighten adapter to bottom of controller box.
7. Once concrete is set, pass wires through PVC adapter. Use PVC glue to affix adapter to top of PVC pipe. Rotate controller to desired orientation.
8. Make connections as described in "Terminal Wiring" instructions.
9. For galvanized column, use supplied male/female adapter. Tighten nut securely.
10. To keep box from rotating, use guide hole in back of box to drill through lip of PVC or galvanized pipe. Place screw and nut through this hole.

## ADAPTING TO IRRITROL IBOC P-2B PEDESTAL:



1. Remove the IBOC controller.
2. Place optional adapter plate under BCS or Enercon controller.
3. Use one inch male PVC adapter and one inch nut to attach plate to box. Make sure that the plate is even with box and tighten snug with pliers. (fig. 1)
4. Place box and plate assembly on pedestal. Using nuts provided tighten plate onto pedestal. (fig. 2)
5. Remove hole plugs in the back of the chassis, and drill holes through pedestal back plate. Use screws to bolt box to pedestal back plate.
6. Rewire output terminal.

## ADAPTING TO DIG/ALTEC/SOLATROL 4000 SERIES MOUNTING COLUMN:

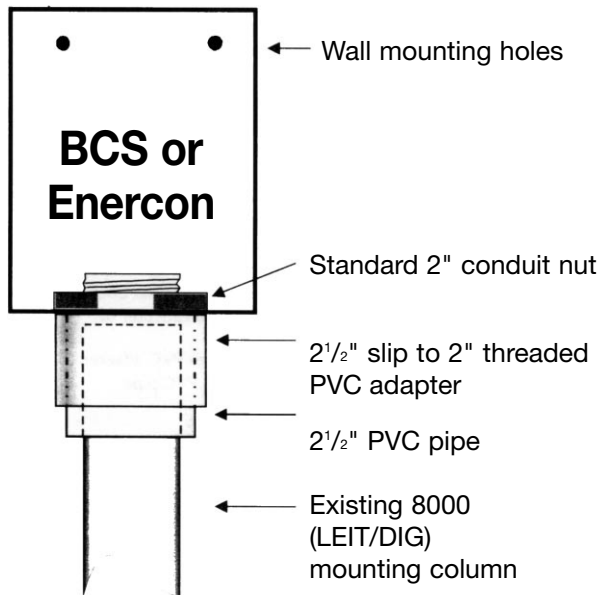


1. Mark and disconnect wiring before removing old controller.
2. Punch knockout hole on bottom of controller box.
3. Place 1½" slip x 2" male PVC adapter through hole and tighten 2 inch conduit nut.
4. Apply "Liquid Nails" (or other appropriate adhesive) to top 2 inches of mounting pipe.
5. Slide PVC adapter over pipe and rotate back and forth to spread glue.
6. Align controller as desired.
7. Re-connect wiring.
8. To keep box from rotating, use guide hole in back of box to drill through lip of PVC or galvanized pipe. Place screw and nut through this hole. (See New Installation)

### WALL MOUNT

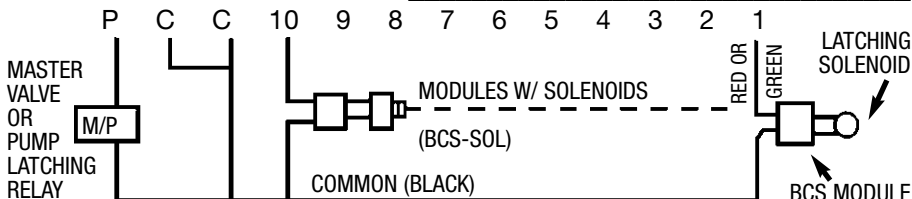
Controller may be mounted on a wall or post or in a "Strong Box" by using the two holes in back of metal case.

## ADAPTING TO DIG/ALTEC/SOLATROL 8000 SERIES MOUNTING COLUMN:



1. Mark and disconnect wiring before removing 8000 series controller.
2. Use hacksaw to cut off top collar of mounting column.
3. Glue about a 3 inch section of a 2 1/2" schedule 40 piece of PVC pipe inside 2 1/2 to 2 inch PVC schedule 40 male adapter using PVC glue.
4. Place PVC adapter inside knocked out box hole and tighten nut.
5. Apply "Liquid Nails" to top 2 inches of 8000 column.
6. Slide PVC adapter over column and rotate back and forth to spread glue.
7. Align controller as desired.
8. Re-connect wiring.
9. To keep box from rotating, use guide hole in back of box to drill through lip of PVC or galvanized pipe. Place screw and nut through this hole. (See New Installation)

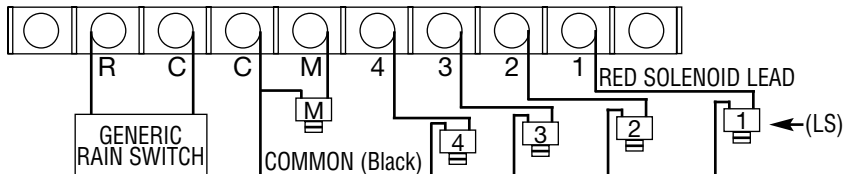
## BCS TERMINAL WIRING



- P: This is the pump or master valve output that goes to the BCS module attached to optional pump latching relay. Wire the pump magnetic starter through this latching relay contact. Up to 15 amps at 250 volts can be handled through this relay.
- C: These are the common terminals which should be wired to the black BCS module lead attached to the latching solenoid at the valve.
- 1-5 or 1-10: These are the stations outputs. These terminals must be wired to the positive (red) lead of the modules.

## ENERCON TERMINAL WIRING

Slide battery pack on back of panel and plug in two wire connector. Make sure red wire goes to the plug position marked "red." Wire outputs as follows:



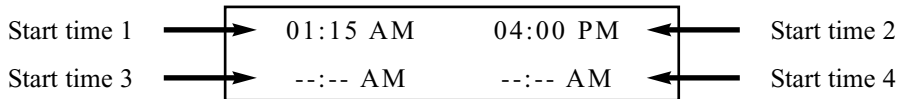
- R: If used, connect the rain switch (not supplied) common and normally closed terminals between the R (for rain switch) and C (common) Enercon output terminals.
- C: Common terminals to solenoid (black leads) and rain switch
- M: Master valve or pump output that can either be wired to a latching solenoid that operates a master valve, or to an optional latching relay to energize a magnetic starter to a pump. The pump or master valve sequence is as follows: Upon the start of an irrigation cycle, the station comes on first, then the master valve is activated. At the end of the cycle, the station goes off first, then the master valve.
- 1-4 or 1-8: To latching solenoid red wires.

## RAIN SWITCH WIRING

Note: if the rain switch is used, slide small dip switch on back of panel to "Rain switch used" position. If rain switch is not used, leave in "not used" position. If the rain switch is connected, the BCS or Enercon will allow a valve to time out and close, but not allow another one to open as long as the rain switch is activated.

## CONTROLLER PROGRAMMING (BCS OR ENERCON) \_\_\_\_\_

1. Press any button to view screen. To conserve energy, screen automatically turns off one minute after the last time a button is pushed or a rotary switch is turned. Controller operates normally whether or not screen is on. Also FUNCTION SELECTOR need not be in RUN for normal operation.
2. Rotate FUNCTION SELECTOR to TIME OF DAY/RUN. Press the SELECT button to activate programming sequence. The flashing digit is the one that can be changed. ADJUST the day, time of day, and AM or PM as needed by pressing the + and - buttons as required. Each digit may be advanced with each push or will scroll up or down to desired setting. Use the + adjust to set AM or PM. When finished programming this function, press ENTER. The Enercon indicates need to change battery pack in TIME OF DAY/RUN function.
3. To assign stations to program A or B, rotate the FUNCTION SELECTOR to STATION ASSIGNMENT. Press SELECT to enable this function. Select program A or B where the stations are to be assigned. Rotate the STATIONS rotary switch to each of the stations to be assigned and press ENTER for each station. Pressing ENTER a second time will remove those stations one at a time. Each station can be assigned to either or both programs. By assigning a station to both programs with four starts each, up to 8 starts are possible per station per day.
4. To assign watering days to programs A and B, rotate to WATERING DAYS and press SELECT to enable programming. As with station assignment, rotate DAYS rotary to each day in succession and press ENTER each time to assign the day to either program. Pressing ENTER a second time removes watering day from selected program. A or B programs may be set for either days of the week or intervals of days. The intervals of days start with the day of programming.
5. Rotate to WATERING DURATION on FUNCTION SELECTOR switch and press SELECT. Choose station by rotating STATION switch to desired station. Program hours or minutes with the + and - ADJUST buttons up to 24 hours in one minute increments. Press ENTER to save each station watering time.
6. To program start times, rotate to START TIMES PGM A or B. Each program shows four start times on the display.



Press SELECT to program starting times for each program. Press ENTER when all the starting times are displayed as desired for each program. If there is no starting time, display shows ---:--. If station assignments, watering times, or watering days

have not been assigned, the display will say INCOMPLETE PROGRAM. If a start time is programmed which is at the same time as the current time or already passed, it will be ignored and resume at the next scheduled start time.

7. To operate the controller semi-automatically, rotate to SEMI-AUTO. SELECT A or B and press ENTER. All the stations assigned to the selected program will come on sequentially for one cycle for their programmed duration and shut off. One or both semi-automatic programs can be operated at a time. Starting semi-automatic program terminates any automatic program in progress.
8. The next functions are BUDGET & DELAY. Press SELECT once to activate this function. Now press SELECT again to choose which function is to be adjusted. Press ENTER to activate that function. Now use the + and - buttons to adjust the budget from 10% to 200% in 10% increments. Any budget setting other than 100% will show a % on the display as a reminder that water time selections are budgeted. The budget only affects the automatic or semi-automatic station watering times, not the test, manual time settings, or delay. **Once budgeted, station watering times can only be adjusted if the budget is re-set to 100%.** The display shows the remaining watering time on the station while it is running. If the watering time is budgeted, this remaining time is the budgeted time. The budget will round up to the next minute, but not less than 1 minute. DELAY is the time between stations from 1-99 seconds to allow time for one valve to close before the next one opens in case of low water volume or pressure. SELECT that function and ENTER it in order to adjust it.
9. For manual operation, rotate to MANUAL STATION. Press SELECT and adjust the time desired for manual operation up to 23 hours and 59 minutes. Rotate the station switch to the station desired for manual operation and press ENTER. The selected station will come on and time out according to the time programmed and shut off. Using the manual function interrupts any active watering program in progress and will resume, after the manual function is finished, with whatever station would have been active had it not been interrupted by manual operation.
10. For STATION TEST, initiate by pressing SELECT and program 1-99 minutes. Every station assigned to either A or B program will come on sequentially for one cycle. This function interrupts the program in progress. The program resumes after completing TEST with whatever station would have been on had it not been interrupted.
11. CONTROLLER OFF: Display shows controller status of ON or OFF on the first line. Second line permits change of status by pressing SELECT and ENTER, with new status updated on top line. If CONTROLLER OFF was selected, it will also show in TIME OF DAY function. Shutting controller off shuts off any operating valve, terminates irrigation cycle, and prohibit any other automatic or semi-automatic starts. Manual starts and test cycle operation are still possible while

controller is off. Also, in CONTROLLER OFF, any remaining RAIN DELAY time is cleared.

12. Use the RAIN DELAY feature to inhibit the controller from operating its pre-set program up to 99 days. Entering this function stops the irrigation cycle for the number of days programmed. The RAIN DELAY counts down the days until irrigation is resumed.

On the second line of the display, the valve cycle count is displayed. It is recommended that the nine volt batteries be changed after 5,000 valve actuations or 2 years with lithium batteries from Alex-Tronix.

13. The new Enercon 4/8 has the additional capability of warning the user that the battery pack needs to be changed by alternately displaying "CHANGE BATTERIES" and the normal display. This indication will ONLY occur while the FUNCTION SELECTOR is in the TIME OF DAY/RUN position. 5 year battery life is possible with both controllers.
14. To reset the entire program except for current time of day and valve cycle count, press the reset button in the Enercon located between the front panel and circuit board just above the output terminal connection on the circuit board. To reach reset button, swing out panel and button is about 2½ inches below top along edge of board. In the BCS, the reset button is located at the bottom edge of the circuit board between the front panel and board about 1½ inches from the left side when panel is swung open. Button is about ½" square.
15. With the BCS, it takes 2 seconds to operate a valve and the Enercon 6 seconds.

## CAUTIONS

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- Touching circuit board directly could damage the electronics due to static discharges.
- Do not puncture, incinerate, or submerge lithium batteries.
- Keep controller front door closed and locked. Do not leave any holes open. Improper installation and exposure to the environment will void warranty.
- Do not attempt to repair or modify controller.
- **Field wiring, make good connections with gel filled wire nuts and observe correct polarity.** The common wire is negative and colored black.
- With both models, the station output comes on first, then the pump. At the end of the cycle, the station goes off then the pump.
- Replace battery pack or 9 volt batteries with Alex-Tronix supplied lithiums after 5 years or 5,000 cycles or when indicated by Enercon display in RUN function.
- Failure to observe any of these cautions will void warranty.
- See 11 above with respect to CONTROLLER OFF. The BCS and ENERCON - operate differently in this function.
- 3.6 volt electronic batteries need to be changed when display starts to fade out or every 10 years. Contact factory for instructions.

## **ELECTRICAL INFORMATION**

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### **BCS**

Output current to solenoids not to exceed 100 milliamps for 2 seconds (2 modules)

Electronics current with operating display approximately 2 milliamps.

Idle current with display off typically 17 microamps.

Electronics battery: Two size AA 3.6 volt lithium batteries in parallel,  
4400 maH total capacity.

Valve batteries: Four nine volt lithium batteries in series, 36 volts DC, 1000 maH capacity.

Output fuse,  $\frac{1}{2}$  amp, 5 x 20 mm size.

### **ENERCON**

Electronics current with operating display approximately 2 milliamps.

Idle current without display about 17 microamps.

Electronics battery: Two size AA 3.6 volt lithiums in parallel, 4400 maH total capacity.

Valve batteries: Three nine volt lithium batteries in series, 27 VDC, 1000 maH capacity.

## **WARRANTY**

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

Alex-Tronix warrants the Enercon or BCS 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 of Alex-Tronix has the authority to waive or add to this agreement. Altered products, damage due to boxes left open or unlocked, or use of products in a manner not intended shall void this warranty. For warranty service, ship unit pre-paid to the address below. Controllers damaged in transit due to improper packaging are not covered by warranty.



## **ALEX-TRONIX CONTROLS**

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