

The POWER MANAGEMENT System

Model BP400

Designed and Manufactured by:
Omega Two, Inc. - Marine Products Division



<http://www.cland.net/~omega2>

omega2@cland.net

Manual 1.1

Software Version 1.1 & up

Hardware Revision B & up

Release date - _____

Serial Number _____

INTRODUCTION

The BP400 is a marine power controller system designed to operate the pumps, lights and horn used on most fishing boats. Because of this one small low cost integrated unit, boat wiring is simplified and reliability improved over conventional switches and circuit breakers. No individual circuit breakers are required as the BP400 uses over-current protection circuits to shut off devices that draw too much current. However, good installation practices require a fuse in the wire that supplies the +12 VDC power to the BP400. Electrical connections to pumps and lights are made easy using standard 1/4 inch quick connects.

The functions included in this unit include:

1. The display of the condition of the battery (VOLTS).
2. The display of the (TIME OF DAY). An alarm is provided to alert the user to some important event, like the time to leave to make a tournament weigh-in.
3. The control of the navigation (NAV) and anchor (ANCH) lights.
4. The control of the aeration (AER) and recirculation (REC) pumps for live wells. Both ON & OFF times are programmable.
5. The control of the (HORN). In the event of extreme limited visibility, special horn functions (Fishing, Aground and Underway) may be selected to automatically sound the horn. These conform to US Coast Guard restricted visibility standards.
6. A battery monitor that will turn off pumps in an attempt to maintain enough charge in the battery to enable the engine to start.
7. A light behind the LCD to allow the operator to see the display after dark.
8. Internal circuit protection for pumps and lights.
9. A liquid crystal display (LCD) to show the status of all functions and prompts the operator to accomplish certain functions.
10. A small internal beeper sounds each time a button is pressed on the keypad and also to alert the operator, if the ALARM function is being used.
11. A FAULT indication on the display if a pump or light is drawing too much or too little current. Associated with the word "FAULT" is the name of the circuit that has or is having problems.

DESCRIPTION OF OPERATIONS

The BP400 instrument panel is the most advanced instrument available today for controlling power in fishing boats. The following is a description of each of its functions and step-by-step instructions for using these features. While this description may look intimidating, all functions have already been set to the most frequently used values, so all you have to do is get into your new boat, go fishing, and enjoy our great outdoors. Later, as you get more comfortable with the BP-400, change it to meet your needs and desires.

WHEN THE POWER SWITCH IS TURNED OFF:

1. Definition: "Power Switch" is the switch in your boat that turns on your other instruments. The BP400 is always connected to the +12V battery so that it can maintain the correct time of day. The BP400 senses the "Power Switch" in order to know how to respond to keypad closures. The "ON/OFF" button on the keypad turns on the display and allows other buttons to respond.

2. When the Power Switch is turned off, the LCD display will be blank and all relays and other output drivers will be "open" so that devices they control are turned off. An exception is sounding the horn.

3. The microprocessor continuously monitors the condition of the battery in an attempt to maintain enough of a charge to allow the engine to start. When the voltage drops to 11.5 volts continuously for 5 minutes, all functions that draw considerable current from the battery will be turned OFF. They cannot be turned back ON until the battery voltage increases to at least 11.8 volts. The voltage display flashes when the voltage drops below 11.5 volts. The flashing display means low battery protection mode and that the pumps will not work after 5 minutes of low voltage.

WHEN THE POWER SWITCH IS TURNED ON:

4. To turn ON the BP400 press the ON/OFF switch. It may be turned OFF by pressing ON/OFF again or turning off the POWER SWITCH.

5. The battery voltage is displayed. A typical value is between 11 to 14.

6. The TIME of day is displayed. If this is the first time the instrument has been turned ON after being connected to the boats battery, the time will be "12:00 AM", and it will be necessary to set the correct time.

7. Fresh water can be pumped into the live well by turning on the aerator pump. When in Manual, the Aerator is always ON. When in Automatic, the pump turns ON and OFF at regular intervals. These intervals may be programmed or factory defaults may be used. Factory defaults are-- 2 minutes ON and 12 minutes OFF.

8. Water can be circulated in the live well by turning on the Recirculation pump. When in Manual, the Recirculation pump is always ON. When in Automatic, the pump turns ON and OFF at regular intervals. These intervals may be programmed or factory defaults may be used. Factory defaults are-- 2 minutes ON and 12 minutes OFF.

9. Pressing the LIGHTS switch will turn on the Anchor light or both the Anchor and Navigation lights. The LCD display is also lit from the back when the Navigation lights are ON.

Functions of Key Pad:



Select Button:

Press this button first when you want to change any function. Examples: Change the time of day; change on or off times of the aerator or recirculation pumps; or enter a restricted visibility horn mode.



Increase Button:

This will increase values.



Decrease Button:

This will decrease values.



Accept Button:

Press this button to exit any function.



AERator Pump:

The aerator button is used to turn the aerator pump ON and OFF. To turn ON (manual mode) push once. To turn ON (timer mode) push again. To turn the pump OFF, press the AER button one more time. Each time this button is pressed, the function of the pump will rotate to the next mode as just described and as shown below. The aerator pump will automatically turn OFF if the battery drops below 11.5 volts for more than 5 minutes.

Note: Each of the functions, AER, Rec, Lights and bilge will be shown on the display in sequence to let you know what features are turned on.

Recirculating Pump:

The Recirculator button is used to turn the Recirculating pump ON and OFF. To turn ON (manual mode) push once. To turn ON (timer mode) push again. To turn pump OFF, press button one more time. Each time the button is pressed the function of the pump will rotate to the next mode as just described and as shown below: The Recirculating pump will automatically turn OFF if the battery drops below 11.5 volts for more than 5 minutes.

Note: Each of the functions, AER, Rec, Lights and bilge will be shown on the display in sequence to let you know what features are turned on.

Lights:

The LIGHT button is used to turn the anchor and navigation lights ON and OFF. To turn ON the anchor lights, push once. To turn ON both the anchor and navigation lights, push again. To turn all lights OFF, press the LIGHT button one more time. Each time the button is pressed the function of the lights will rotate to the next mode as just described and as shown below:

Note: Each of the functions, AER, Rec, Lights and bilge will be shown on the display in sequence to let you know what features are turned on.

Bilge Pump:

The BILGE button is used to turn the bilge pump ON and OFF. Pressing the button once will turn it on, a second press will turn it off. There is no automatic function on this pump.

Note: Each of the functions, AER, Rec, Lights and bilge will be shown on the display in sequence to let you know what features are turned on.

Horn:

The HORN button is used to turn the horn ON. The horn will sound while pressing the HORN button. (Also, see section on setting restricted visibility functions)

Setting the Clock :

This command allows the user to set the hours and minutes in 12 hour format. Pressing the ACCEPT button moves between HOURS, MINUTES on the AM and PM. The time will start counting with seconds at :00 when you exit this editor .







ACCEPT = CLOCK
SELECT = ALARM

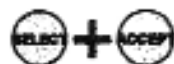
display shows:

Press  again. You are now in the clock setting function

SET CLOCK
12:01 PM

display shows:

-  Increase MINUTES value by 1 (one). or,
 -  Decrease MINUTES value by 1 (one). or,
 -  Accept MINUTES value shown
- next:
-  Increase HOURS value by 1 (one). or,
 -  Decrease HOURS value by 1 (one). or,
- Passing 12:00 will change AM to PM, or PM to AM.
-  Accept HOURS value shown & return to normal operation..



Setting the ALARM :

Setting the alarm is similar to setting the clock. In fact, you enter the function the same way. Next, press SELECT again and you are setting the ALARM. When the ALARM time equals the CLOCK time the beeper will "chirp" for one minute and turn itself off. You may turn the beeper off by pressing HORN.




display shows:

ACCEPT = CLOCK
SELECT = ALARM



press  to select the ALARM setting function.

display shows:

SET ALARM
12:01 PM

-  Increase MINUTES value by 1 (one). or,
-  Decrease MINUTES value by 1 (one). or,
-  Accept MINUTES value shown

next:

-  Increase HOURS value by 1 (one). or,
 -  Decrease HOURS value by 1 (one). or,
- Passing 12:00 will change AM to PM, or PM to AM.



Display shows:

SET ALARM
ACCEPT = ON

Pressing SELECT will exit with alarm time set but without the alarm enabled (it will not make a sound). Pressing ACCEPT will cause the alarm to sound for one minute when the clock time equals the alarm value. This is visible because a special α character will appear in the upper right hand corner of the display and will blink on and off until the alarm function is deactivated.






Aerator Pump

Automatic Timer Programming:

This function allows the user to select an OFF time and an ON time in minutes for the timer mode of the aerator pump.




display shows:

AERATOR
OFF TIME 12

-  Increase OFF value (maximum 15 minutes).
-  Decrease OFF value (minimum 1 minute).
-  Accept the OFF time and move to

display shows:

AERATOR
ON TIME 2

-  Increase ON value (maximum 15 minutes).
-  Decrease ON value (minimum 1 minute).
-  Accept the ON time and return to normal operation.






+ **Recirculating Pump**

Automatic Timer Programming:

This mode allows the user to select an **OFF** time and an **ON** time in minutes for the timer mode of the Recirculating pump. The time display will show the **OFF** time and the **ON** time for the pump.




display shows:

RECIRCULATE
OFF TIME 12

-  Increase OFF value (maximum 15 minutes).
-  Decrease OFF value (minimum 1 minute).
-  Accept the OFF time and move to

display shows:

RECIRCULATE
ON TIME 2

-  Increase ON value (maximum 15 minutes).
-  Decrease ON value (minimum 1 minute).
-  Accept the ON time and return to normal operation.

+ **Restricted Visibility functions:**

When you are in fog or other poor visibility conditions, the US Coast Guard Navigation rules require that you provide periodic sound signals. Three Inland rules have been preprogrammed for you.

display shows:

AGROUND HORN
ACCEPT = ON

Now, press SELECT

display shows:

UNDERWAY HORN
ACCEPT = ON

Now, press SELECT

display shows:

FISHING HORN
ACCEPT = ON

Now, press SELECT

Pressing SELECT once more exits the routine. Once you press ACCEPT, that restricted visibility signal will sound until the HORN button is pressed. To restart, you will need to go thru the above selection process again.

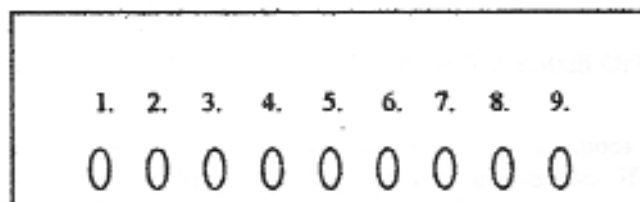
AGROUND = horn on 2 seconds, off for 2 seconds, on 2 seconds, off for 2 seconds, on 2 seconds. It repeats every 2 minutes

UNDERWAY = horn on 5 seconds. It repeats every 2 minutes

AT ANCHOR = horn on 5 seconds, off for 2 seconds, on for 2 seconds, off for 2 seconds, on for 2 seconds. It repeats every 2 minutes

SERVICE Wiring Diagram

BP-400 viewed from rear of unit



1. Stern Lights - #16 AWG or larger. White / black stripe recommended.
2. Navigation Lights - Use #16 AWG or larger. White recommended.
3. Recirculation Pump - Use #16 AWG or larger. Green/Red recommended.
4. +12V (Switched) - Connect to main switch. Use #20 AWG or larger, Red recommended.
5. Ground (-) - Negative connection for internal electronics. #16 AWG or larger, Black recommended.
6. +12V (Main) - The (+) power supply input for the drivers and unit. Use 30A max fuse and #10 AWG or larger wire. Red recommended.
7. Aerator Pump - Use #16 AWG or larger. Green recommended.
8. Horn - Use #16 AWG or larger. Blue recommended.
9. Bilge - Use #16 AWG or larger. Brown recommended.

Installation tips:

- Turn master switch off, and disconnect the positive battery cable.
- It is a good idea to use stranded wire for your connections because of the increased current-carrying capacity and the flexibility of the wire. The blue colored crimps are for 14-16 AWG, and the yellow are for 10-12 AWG.
- Use different colored wires for connecting to the terminals. You can track each wire easier as you thread them in and out of tight spaces. A wrong connection can be very frustrating, and may damage the unit.
- Each driver is fault protected. However, repeated closures on a fault will shorten the life of the driver. You may wish to use in-line fuses for additional protection of your unit and devices. Check an automotive parts store for 10 Amp size, and place them where they can be kept dry and readily accessible.
- Thread your wires through the cutout. Strip the wires back about 1/4" for the female quick connects, and crimp. Connect the ground wire first, then start in the middle of the unit, and work your way outward to the ends.

This drawing is **REPRESENTATIVE** of an installation.
**CONTACT YOUR BOAT MANUFACTURER FOR
SPECIFICS CONCERNING YOUR BOAT**

Things your DEALER can do to correct a problem:

**ALL SERVICE WORK MUST BE DONE EXTERNAL TO THE INSTRUMENT
WARRANTY IS VOID IF THE UNIT HAS BEEN OPENED**

Symptom: Unit appears dead.

1. Make sure the battery is OK. The unit will shut itself OFF if the battery voltage is less than 7 volts.

2. Make sure the unit has power by testing the connections labeled +12V and GND. If this voltage is missing, check the in line fuse. If blown, replace with a value shown on the diagram in the manual.

3. Disconnect the +12 volts (red) wire from the back of the unit or disconnect the positive battery terminal. Then, reconnect. This will reset the electronic circuits and may cause it to work again.

Symptom: The battery seems to discharge when the boat is not being used. The BP400 instrument uses very little current from the battery when every light and pump is turned off. Like the electric clock in your car, the instrument can discharge the battery after several weeks of not recharging the battery. The length of time before the battery discharges to the point where the engine cannot be started depends on many things, including 1) condition of the battery, 2) whether the pumps have been used, 3) the amount of current that the engine (it also draws current continuously from the battery) and other items in the boat have used. **For extended periods of no usage, keep a trickle charger on the battery, or disconnect the positive lead from the battery.**

Things YOU can do to correct a problem:

1. Make a list of each function that does not work or work properly. This can give you a good insight as to where the problem originates. Look for anything that is common to some or all of the defective functions.

2. Most electronic equipment failures are related in some way to connections. Look for broken or frayed wires.

3. Ask your dealer to assist you in finding the problem.

4. Call the factory. You will need the information your dealer wrote on your portion of the warranty registration card including the serial number, the date purchased, and the dealer from whom you bought it. You will also want to know the functions that do not work that you listed in #1 above.

Call 417-831-5155 8 AM - 4:30 PM Central time Monday - Friday

Ask for "marine service"

Service Policy:

It is intended that all instrument repairs are to be done by the factory. Service parts and repair information will not be furnished to dealers or service establishments

Please call 1-417-831-5155 for a return material authorization (RMA) number before returning a unit for repair.

Returning an instrument to the factory for service:

If the unit is considered in warranty:

1. Call the factory and discuss the problem with a service technician to make sure that the problem is actually in the instrument. Sending in the instrument and leaving the problem in the boat will not cure the problem.
2. Ask the service technician for an "RMA" number.
3. Package the unit securely, preferably in the original box. The warranty does not include shipping damage, so it is best to do it right.
4. Include a note taped to the instrument that tells us about the problem. Comments like "doesn't work" are of no value in helping us find the problem. Comments like "Horn is intermittent" are very helpful.
5. Make sure your name, phone number, and RMA number are on BOTH the inside and the outside of the shipping carton. An envelope taped to the outside is acceptable for including this information.
6. Insure the package.
7. We prefer you ship UPS or Federal Express.
8. You pay the shipping charges to us. We pay them when we ship the unit back to you via UPS ground. We will refuse packages shipped C.O.D.

Returning the instrument if the unit is out of warranty:

1. The procedure is almost the same to send an out-of-warranty instrument back for repair as that described above for a warranty return.
2. The difference is you will be charged for the repairs. We will call you once we know what the repair charges will be. You may send a check for that amount or we can return the unit to you C.O.D. Dealers who have previously completed a credit application and have been approved may have their units returned on account.

SPECIFICATIONS

SIZE:	7.3 (W) by 3.4 (H) by 2.75 (D) inches Requires a cutout of 6"(W) by 1 7/8" max. (h)
WEIGHT:	approximately 10 Oz.
OPERATING VOLTAGE:	12 VDC nominal. Display will operate from 7 to 15 volts.
CURRENT REQUIREMENTS:	approximately .008 amp with the unit ON but all pumps and lights turned OFF. The current drops to about .004 amps when the Power Switch is turned OFF.
OPERATION TEMPERATURE:	0 to 120 degrees Fahrenheit. The unit will operate outside these limits, but performance parameters have not been established. The display may start to turn dark at elevated temperatures.
STANDARD EQUIPMENT:	one- BP400. one- Owner's manual. one- Warranty Registration card.

Notice:
Omega Two reserves the right to make changes to this product
without prior notice and without liability.

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Returning an instrument to the factory for service:

If the unit is considered in warranty:

1. Call the factory and discuss the problem with a service technician to make sure that the problem is actually in the instrument. Sending in the instrument and leaving the problem in the boat will not cure the problem.
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