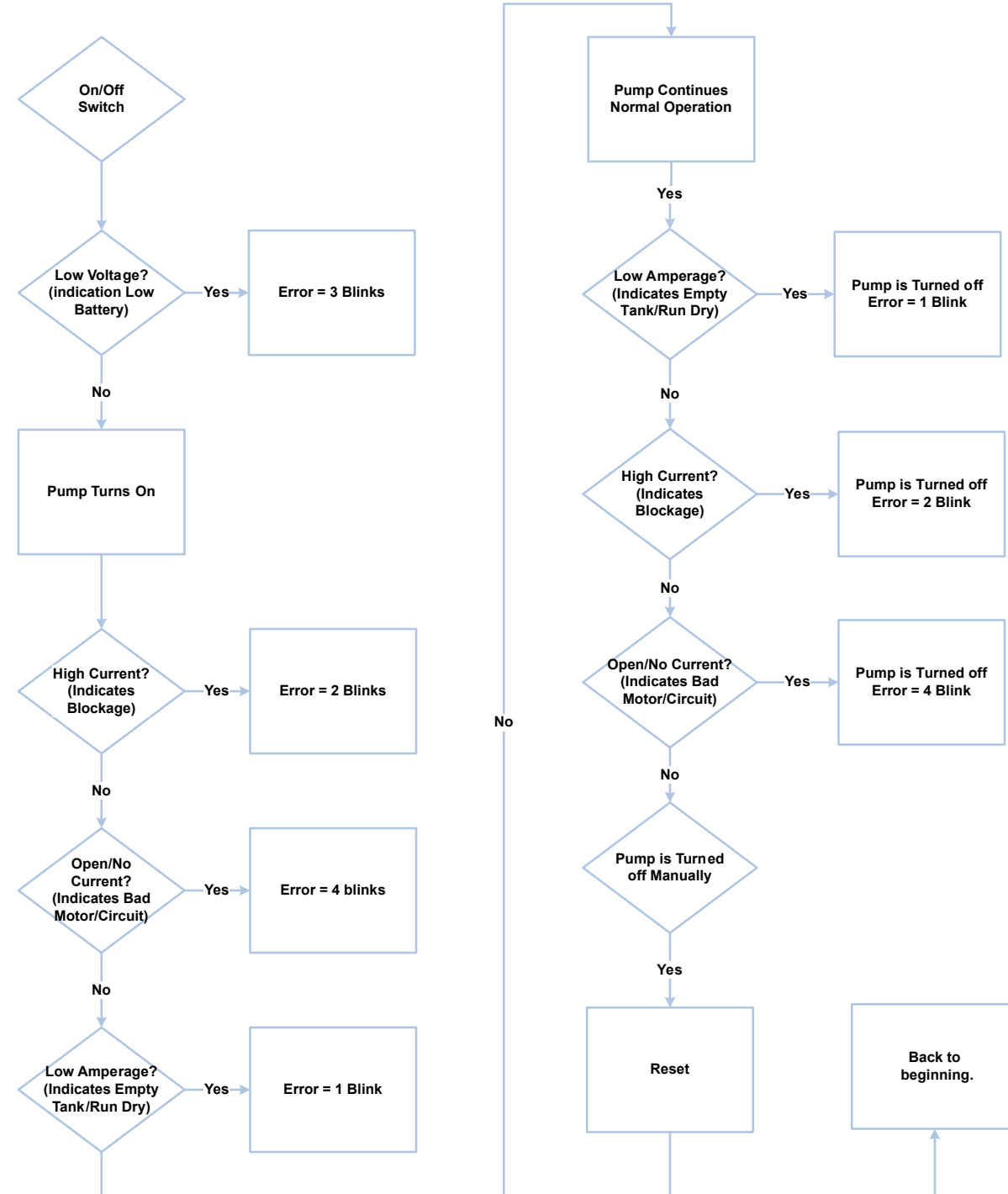


### NORMAL OPERATION



### FILL / DRAIN TIME SET-UP

1. Obtain correct tank size.
2. Pump fills at approx 9 Gallons per minute.
3. Disconnect AI unit from pump.
4. To reset the AI unit, remove power between AI unit and the battery.
5. The time to empty is not the same across all units. Most systems run until there is a run dry state and automatically shut off.
6. Reconnect power to pump and cycle power.

NOTE: The AI3 can be re-configured utilizing the dash control as supplied on some vessels by certain instrument manufacturers. If the information supplied by the boat builder does not specify if the dash instrument can program the AI unit, please check with \_\_\_\_\_ for instrument manufacturers that are compatible.

NOTE: Once the AI unit reaches full or empty, each "bump" of the switch will only run at a predetermined time set by the factory.



Install to ABYC standards E11

The American Boat & Yacht Council (ABYC) develops safety standards for boat building and repair. These standards are useful guidelines when planning and installing boat electrics (see Application Brief: DC Main Power Distribution). ABYC publishes standards for AIC, overcurrent protection, and ignition protection. The AI Unit is rated by the ABYC E-11 BRANCH CIRCUIT PROTECTION COMPLIANT.



The AI Unit carries a CE mark and conforms to the following standards:

EN 50081-1 & EN 50082-1 / EN 50082-1

Following the Provisions of the Electromagnetic Compatibility Directive 89/336/EEC

ISO 8846 / Electrical Devices Protection Against Ignition of Surrounding Flammable Gases

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# JABSCO®



## AI3

ActiveIntelligence

18500-06XX  
Series



**JABSCO**

**AI3**  
Active Intelligence

The AI3 unit or *Active Intelligence unit* controls and monitors the fill / drain time on boats equipped with ballast holding tanks. The unit is designed to evaluate information and drive actions of linked components and system processes in real-time. AI3's analytical capabilities to protect the ballast system in the event the pump was to run without water, line blockages, low voltage or short conditions.

**FEATURES:**

- Operates 3 pumps or channels at one time
- Automatic Shut-off
- Hose block protection
- Low voltage protection
- Over ballast protection
- Variable ballast adjustment
- Resistant to water & most boat cleaning chemicals

**WARNING : ELECTRICAL**

Failure to follow the procedures below will void the product warranty and/or cause possible harm to persons or pump. In accordance with ABYC E-11, AC and DC Electrical Systems on Boats guidelines.



Always install proper fuse size to prevent damage to product should a short occur. Failure to install proper fuse could increase risk of pump malfunction potentially resulting in personal injury and/or fire hazard.

**NORMAL OPERATION:**

**To Fill ballast tank** Turn switch to fill position, ballast pumps will fill tanks to factory pre-set time and stop automatically. Pumps can be stopped at anytime during this operation by turning of the switch.

**To Drain ballast tank** Turn switch to drain position, ballast pumps will empty tanks until the tanks are empty. Pumps can be stopped at anytime during this operation by turning off switch.

**Unit Function Testing**

- If the battery voltage is below 10 VDC the switch will blink 4 times, signaling that the battery is too low to run the pump.
- If the battery voltage is good the pump is turned on. The AI3 then checks the pump for prime, if the pump doesn't prime then the AI3 shuts the unit off in 12 seconds and blinks the corresponding code.
- if the pump primes the AI3 checks for line blockage, if there is line blockage (High Amperage) then the unit will shut off blinking the corresponding code.
- if there is no blockage the unit then checks for open current, if there is an open in the motor then the unit shuts off blinking the corresponding code, if not then the unit runs normally.
- If during the operation the tank runs dry then the unit will, in seven seconds, shut off blinking 1 blink to signify run dry.
- If the unit becomes clogged then the unit will, instantaneously, shut off blinking 2 blinks to signify high current draw.
- If the unit experiences an open condition, winding breaks, power removed between AI3 and the pump, the unit will within 20 seconds, shut off blinking 3 times to signify the open condition.

**TANK SIZE AUTO-LEARNING FEATURE**

The unit learns how to fill and empty the tank by remembering the time filled and comparing it to the time emptied. So for example, if the default fill time is 4-1/2 minutes and the tank has drained for 2 minutes, if the system is switched backed to fill, AI3 will fill the tank for 2-1/2 Min.

As long as there are no anomalies to the system, the unit will allow the pump to run until it reaches the programmed time and will shut down.

**INSTALLATION INSTRUCTIONS**

1. Install the AI3 unit in a dry location as close to the pumps as possible.



Keep all wire connections above the highest water level. Wire connections should be sealed with a marine grade sealant to prevent wire corrosion.

2. Power to the AI unit should be supplied with a wire gauge of sufficient size to operate the ballast pump. The AI3 unit comes with 8 gauge wire leads installed at the control box. See chart for wire gauge versus wire run length. Minimum 8 gauge is recommended for installation from battery.

SPECIFICATIONS	
VOLTAGE RANGE	10 - 14.3 VDC
AMPERAGE RANGE	5-15 AMPERES PER CHANNEL
TEMP. RANGE	-30 C - 70 C (-22F - 158 F)
CERTIFICATIONS	ISO 8846, CE, ABYC E-11 BRANCH CIRCUIT PROTECTION, RoHS
WEIGHT	3.4 LBS. (1.54 kg)

Each AI3 internal module can be programmed to allow specific fill and drain times by utilizing a LIN protocol format control or pre-set at the factory. Standard set times are programmed by the factory for each OEM as required. The pump switch is turned to the on position for each or all channels as the user prefers for ballast operation Each channel is marked on the cover 1, 2 or 3.  
Channel 1 - Port ballast tank  
Channel 2 - Starboard ballast tank  
Channel 3 - Fore ballast tank

3. Connect the power leads from the power source through a circuit breaker(not supplied) rated at the pumps operating specifications as supplied by the pump manufacturer to the power input leads on the AI3 control module. The black lead is the negative from the battery and the red lead is the positive from the battery. The control module has the leads notated on the module cover.

- Black (-) From battery
  - Red (-) From battery
4. The AI3 unit comes with a switch port module, and is set as:
- Alignment tab on the top
  - Ground -1 Left Top
  - 12 V out - 3 Left Bottom
  - Line In - 2 Top Right
  - Line out - 4 Bottom Right

5. The AI3 LIN network switch port(4 pins) utilizes a Ballast Control - Digital Network

- Looking into the connector
- Alignment tab on the top
- Ground -1 Left Top
- 12 V out - 3 Left Bottom
- Line In - 2 Top Right
- Line out - 4 Bottom Right
- 4 Way Molex MXL150 Plug
- Connector 54-0402-038 (33472-0406)

6. There are three leads from the AI3 control module (cover marked) pump as noted.

- Blue (-) to pump
- Red (+) to pump

The two pin power connector on the AI3 module are

- 3 - 2 pair pump leads
- 14 AWG
- 2 Way Deutsche DTP Receptacle
- 54-0202-052 (DTP04-2P)
- 54-0202-051 (WP2P)

7. The LIN port (SEE FIG 1.)
8. Connects hoses as required per the pump manufactures installation instructions.
9. Power to the unit can now be turned on. Make sure valves are open for water supply and boat engine is running. When the unit is set to fill, the pump will turn on and fill the ballast tank until it reaches the programmed time limit or the module detects one of the codes below and the unit reacts to protect the pump. If you encounter an error as noted by the following blink code chart, refer to the troubleshooting chart on this data sheet.

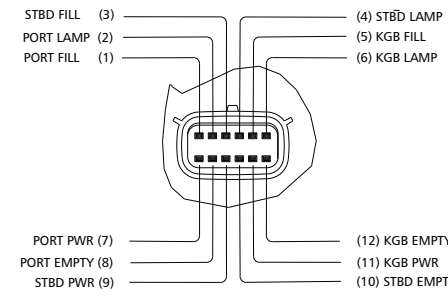
- 1 Blink = Run Dry
- 2 Blinks = Line Blockage/Stall
- 3 Blinks = Power Loss between unit and pump
- 4 Blinks = Inadequate Power to unit
- 5 Blinks = AI Failure
- 6 Blinks = Program complete

Each AI3 box has the lead function marked on the box cover corresponding to the lead.

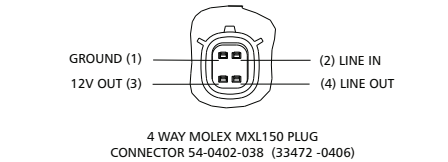
Note: Start up current at the start of the pumping cycle can be quite high, but usually only for milliseconds. Having the boat engine running helps assure full current supply at startup of the ballast pumps.

**FIG. 1 : LIN PORT**

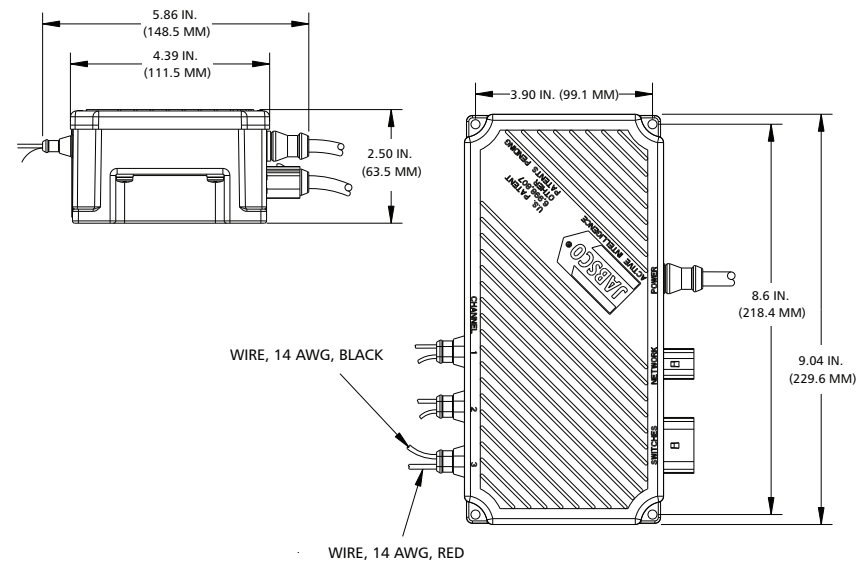
**BALLAST CONTROL MANUAL SWITCH**



**BALLAST CONTROL DIGITAL NETWORK**



**DIMENSIONAL DRAWING**



**TROUBLE SHOOTING**

Problem	Possible Cause	Action	Correction
Pump will not turn on	No power to AI3 Module	Check power to AI3 module	Re-apply power to AI3 module. Unit does not start, confirm power at leads, then replace AI3 module.
	Switch inoperable	Check wiring to switch	If wiring to switch is good then check power to switch
	Pump inoperable	Check wiring to pump	If power to module is good and power out of module is good replace pump
	System needs reset	Check power to all areas	Turn power off to the system and then back on and retry

**SWITCH BLINK**

Blinks	Meaning	Action	Resolution
One blink	Run Dry	Tanks empty	Pump will shut down in 14 seconds and will not restart until power is cycled
Two blinks	High Amp draw	Line blocked, pump stalled	Pump will shut down immediately and not restart until power is cycled. If problem persists unit will shut down immediately again until problem is resolved
Three blinks	Power loss between module and pump	Open condition, winding breaks, power removed between AI3 and pump	Module will shut down after 20 seconds of loss of power between module and pump and will not restart until cycled.
Four Blinks	Low Voltage	Charge Battery	Pump will not start if power to AI3 is less than 10 VDC
Six Blink	Timer Limit	Programmed Limit	AI has reached programmed or maximum run time

**FILL DRAIN TIME**

Problem	Cause	Action	Resolution
Does not empty/fill completely	Fill-Drain time setting incorrect	Reset module fill-Drain time	To increase fill-Drain time – Utilize LIN protocol instrument gauge as specified by instrument control manufacturer.
	Power has been removed during Fill/ Drain mode	Restore Power to AI3 Unit to reset the time to 0.	

**ABYC WIRING CHART**

TOTAL CURRENT ON CIRCUIT IN AMPS	FEET																			
	10	15	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	
	12 Volts - 3% Drop Wire Sizes (guage) – Based on Minimum CM Area																			
5	18	16	14	12	12	10	10	10	8	8	8	6	6	6	6	6	6	6	6	6
10	14	12	10	10	10	8	6	6	6	6	4	4	4	4	2	2	2	2	2	2
15	12	10	10	8	8	6	6	6	4	4	2	2	2	2	2	1	1	1	1	1
20	10	10	8	6	6	6	4	4	2	2	2	2	1	1	1	0	0	0	0	2/0
25	10	8	6	6	6	4	4	2	2	2	1	1	0	0	0	2/0	2/0	2/0	2/0	3/0
30	10	8	6	6	4	4	2	2	1	1	0	0	0	2/0	2/0	3/0	3/0	3/0	3/0	3/0