Jet Inc. Model 197 Control Panel Installation and Users Manual

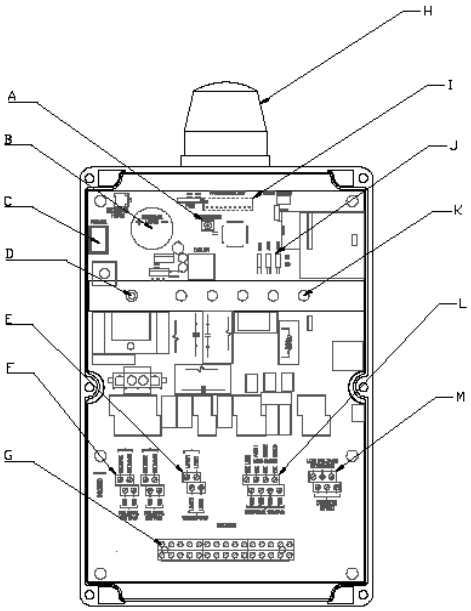
The Jet Incorporated Aerator control panel monitors and controls the operation of Jet system aerators and additional components. The panel can be configured to control single or dual aeration systems. A single aerator system controls the operation of one aerator. A dual aerator system can control two aerators, or one aerator and one re-aeration compressor.

In addition to the aerator control circuits, the control panel also contains the following circuits or features:

- Two aerator/compressor control circuits
- Three auxiliary output circuits
- Three auxiliary input circuits with normally open or normally closed selection
- One power indicator LED, and four additional error indicator LED's
- An alarm buzzer with circuit board provision for an alternate or externally mounted buzzer
- A 9-position DIP switch for selection of configuration options
- User accessible reset switch and circuit board master reset switch
- Alarm mode Auto-Dialer power and control interface
- RS232 interface circuit
- Circuit board mounted power switch and fuse

Control Panel Features

A. Master Reset Button
B. Internal Horn
C. On/Off Switch
D. External Reset Button
E. Pump Power Supply Contacts
F. Alarm and Aerator Power Supply Contacts
G. Ground Buss
H. Central Alarm Beacon
I. DIP Switch Array
J. Auxiliary Alarm Settings (NC/NO)
K. Indicator Light Array
L. Auxiliary Alarm Contacts
M. Auxiliary Alarm Contacts



Safety Instructions

WARNING: Hazardous voltage can shock, burn or cause death.

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THE MANUAL FOR THE CONTROL PANEL.

This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.

- Warns of hazards that **WILL** cause serious personal injury, death or major property damage.
- Warns of hazards that **CAN** cause serious personal injury, death or major property damage.
- Warns of hazards that **CAN** cause personal injury or property damage.

BOLD FACE FONT INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT. THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS CONTROL PANEL.

MAINTAIN ALL SAFETY DECALS.

Install, ground and wire according to local and National Electrical Code Requirements. Disconnect and lockout electrical power before installing or servicing the control panel. Electrical supply must match nameplate specifications inside of the control panel. Incorrect voltage can cause fire, damage control panel and void the warranty.

All single phase pump motors and aerators attached to model 197 Control Panels must be equipped with an automatic thermal protector, which opens the motor's electrical circuit when an overload condition exists. This can cause the pump to start unexpectedly.

Important Precaution:

All electrical work must be preformed by a qualified technician. Always follow the National Electric Code (NEC), or the Canadian Electrical Code, as well as local, state and provincial codes. Code questions should be directed to your local electrical inspector. Failure to follow electrical codes and OSHA safety standards may result in personal injury or equipment damage. Failure to follow manufacturer's installation instructions may result in electrical shock, fire hazard, personal injury or death, damaged equipment, provide unsatisfactory performance, and may void manufacturer's warranty.

Wiring at the Jobsite

1. All cable and conduit should be installed from the tank to control panel location by the system installer.

USE ONLY NON-METALLIC CONDUIT WITH THE MODEL 197 CONTROL PANEL. METALLIC CONDUIT IS NOT APPROVED FOR INSTALLATION WITH THE MODEL 197 CONTROL PANEL.

2. Use only UL listed Direct Burial and non-metallic conduit and wiring for control and aerator installation.
3. Cable should be carefully measured; cables and wiring must not be spliced. Spliced connections could result in aerator or alarm sensing malfunctions.
4. When ordering and measuring cable be sure to:
    a. Leave ample cable in aerator mounting casting to install aerator at desired depth
    b. If direct burial cable is used it must be encased in conduit from the aerator mounting casting to the edge of the concrete tank. It should not cross over any access covers or panels
    c. If direct burial cable is used leave slack in the line to allow for possible settling in the trench or tank
    d. Above grade entrance to the house is recommended if the control panel is mounted inside the dwelling. If direct burial cable is used conduit should be in place from the beginning of the foundation to the entrance of the dwelling.
5. Jet recommends burying cable and conduit at least two feet deep to prevent accidental damage to the external wiring
6. Proper procedures and solvents must be used to protect the integrity of the external wiring.

Control Panel Installation

The control panel should be given to the electrician on site for installation. The installer or distributor must make sure that the control panel settings are correct for the type of system and components being installed. Refer to control panel settings section for more information on desired system configurations.

1. Mount the control panel in a location that will be easily accessible, clearly visible from at least 50 feet and out of reach from children. The panel is weather proof and can be mounted outdoors. If outdoor installation is required consideration should be taken to minimize the impact of climate on the panel. If possible do not mount the panel in direct sunlight.
    a. To mount panel remove the panel cover by removing the four Philips head screws, the panel can then be mounted with the four

screw points adjacent to the corner screw receivers for the panel cover.

b. Additional mounting brackets are supplied if larger mounting hardware is desired.

2. After mounting the control panels determine the location of conduit and wiring for the control panel. Make sure to check local codes and regulations regarding power requirements.
3. The Jet model 197 control panel is not equipped with knockouts for electrical conduit connections. Pilot holes must be drilled in the enclosure to allow conduit access into the panel. For best results use a GreenLee® punch for the conduit access holes. Make sure the holes are the proper size for the type of conduit selected. Ideally conduit should enter from the bottom of the enclosure to increase protection from water infiltration into the panel. Be sure to avoid damaging the internal components of the control panel when drilling conduit access holes.

Refer to the Conduit Location Template for conduit entry locations.

4. Attach all conduit and cable connectors to the control panel. Be sure to follow the manufacturer's instructions for proper connection installation.

ONLY UL APPROVED WATERTIGHT HUB AND FITTINGS CAN BE USED WHEN ATTACHING CONDUIT AND WIRING TO THE CONTROL PANEL. Jet recommends using Carlon or T&B liquidtight non-metallic conduit and fittings for field installations. Sample instructions have been provided, refer to the proper model connector fitting instructions provided by the manufacturer for exact installation instuctions.

5. Assure that all connections are properly installed and watertight.
6. Pull all cables and wiring through the conduit and connectors into the control panel. Make sure to allow sufficient wiring to make all connection within the control panel.
7. Make all the appropriate connections to the control panel terminal blocks as required for the system. If several connections are required it may be useful to label the inbound and outbound wiring according to the system design to aid in future maintenance and troubleshooting.
8. The control panel is designed to operate on up to four separate circuits, depending on the system configuration and local regulatory requirements. Each individual circuit should be a separate 115-volt, single phase, 60 Hertz AC circuit. Alarm, aerator, and compressor circuits should not exceed 15 amp breakers from the central breaker panel. The pump circuit may operate on either 115V or 220V circuit with a 15 amp breaker.
9. Power supply wiring should be at least #14 AWG solid copper wires.
10. A grounding conductor should be installed from the ground buss bar to the main breaker panel in the dwelling. All system component grounds should then be connected to the grounding buss.

Failure to connect system components or the model 197 to proper ground will void any product warranties.

11. Individual power sources should be connected to the control panel according to the wiring diagram provided on page 9 of this manual.
12. Additional alarm return and external relay contacts are provided to monitor and control additional components of the system:
    a. Auxiliary Alarm Inputs – there are three additional alarm inputs that can be operated in either a normally closed (N/C) or normally open (N/O) alarm state. The alarm state can be reversed by moving the jumper directly above each alarm input to the desired setting. The N/O alarm operates on 12 volts AC low amperage circuit.
    b. Auxiliary Relay Outputs – there are two additional 120 volt relay outputs designed to control external relays for operation of external components. These outputs are 120 volt low amperage and are not designed to carry any significant electrical load, or to directly control external pumps or other devices
    c. Smaller gauge wire (#16 or #18 AWG) may be used for additional alarm and relay inputs depending on the proximity of the system components and the panel.
13. If an integrated pump control is desired the model 197 control panel is equipped with an internal pump control relay. The pump should always be operated on an independent circuit. The pump control relay is designed to supply continuous power to the pump circuit provided there is not an active alarm condition. In the event of an alarm state the pump control relay will deactivate power to the pump circuit.
14. Make sure all power supply connections have been fastened securely; recommended torque for terminal connections is 4 to 5 ft/lbs.
15. Perform an initial power supply test on all available circuits. Ensure that power from the dwelling is sufficient to properly operate all system components. All circuits should have 120 volts or equivalent available.

All wiring must be in accordance with local and national electric codes. Contact your local electrical inspector for more information regarding proper wiring procedures.

16. Typically the aerator and system components will not be installed at the time of initial wiring for the system control. The current sensing ability of the panel will create an alarm condition if there are no components active during standard operation. The control panel should be left in the off position until the entire system has been installed.

SAMPLE HUB AND CONNECTOR INSTALLTION INSTRUCTIONS

Carflex Fittings Installation Instructions

LT43C-CAR, LT43F thru J, LT20C-CAR, LT20F thru J.

1. Cut the end of the Carflex conduit or Carflex® X-Flex™ tubing square.
2. Install compression nut and sealing gland ring over the end of the conduit or tubing.
3. Insert the ferrule end of the fitting into the conduit using a clockwise twisting action.
4. Screw fitting body into compression nut.
5. When installation is completed, use a wrench, tighten compression nut one-quarter (1/4) turn past hand-tight. Do not over tighten fitting.

*To prevent damage to conductors, conduit and fittings, do not twist Carflex during installation.

LT43D-New, LT43E-New, LT20D-New, LT20E-New.

1. Cut the end of the Carflex conduit or Carflex® X-Flex™ tubing square.
2. Install compression nut over the end of the conduit or tubing.
3. Insert the ferrule end of the fitting into the conduit using a clockwise twisting action. (Be sure conduit is fully inserted to the bottom of the fitting shoulder).
4. Screw compression nut onto fitting body.
5. Use a wrench, and tighten compression nut one (1) full turn past hand-tight. Do not over tighten fitting.

*To prevent damage to conductors, conduit and fittings, do not twist Carflex during installation.

Control Panel Settings an Functions

The Jet model 197 control panels are designed to be used with several system configurations. The primary selection of control panel operation is selected by the array of DIP switches located at the top of the circuit board. Refer to the following chart which outlines the function of the separate DIP switches and their corresponding system controls:

Aerator Timer Control			
Switch One *	Switch Two *	Switch Three *	Aerator Run Time *
Off	Off	Off	Continuous Run
On	Off	Off	On 50 min. / Off 10 min.
Off	On	Off	On 45 min. / Off 15 min.
On	On	Off	On 40 min. / Off 20 min.
Off	Off	On	On 35 min. / Off 25 min.
On	Off	On	On 30 min. / Off 30 min.
On	On	On	Continuous Run
Switch Four	**Inactive**		
Auxiliary Output Control			
Switch Five	Switch Six	Auxiliary Alarm Function	
Off	Off	All Outputs Inactive	
On	Off	Output One Active	
Off	On	Outputs One and Two Active	
On	On	All Outputs Active	
Multiple Aerator Controls			
Switch Seven	Toggle multiple aeration alarm sensing		
Off	Single Aerator System		
On	Dual Aerator System		
Switch Eight	Toggle high/low current sensing		
Off	Aerator 2 circuit high current sensing for Aerator		
On	Aerator 2 circuit low current sensing for Compressor		
Test Mode Control			
Switch Nine	On/Off	Toggle Test Mode	

* - DIP switches one, two, and three will be fused in the ON position for 197 controls used with NSF Listed J-1500 series treatment systems which must have continuous aeration

Aerator / compressor monitoring and control
The aerator 1 circuit is always active and is intended to operate an aerator motor. The aerator 2 circuit is enabled by DIP switch settings and can be configured to operate an aerator motor or a compressor. DIP switch settings also configure the hourly on-time duty cycle of the aerator circuits, which can range for 30 minutes on / 30 minutes off, to continuous run (note – NSF listed J-1500 series systems must operate on continuous run). The current of each aerator circuit is controlled by an independent relay. A current transformer in each aerator circuit is used to monitor the aerator / compressor current. While in normal operation mode, in the event of an over current or under current condition of any of the critical treatment components (aerator / compressor) the system will shut down the affected circuit and enter an automated reset program. The automated reset program will attempt to re-start the affected circuit after a five minute delay cycle. If the circuit then functions properly the system returns to normal status, if the circuit does not function properly then the program enters another five minute delay cycle. If after the second five minute delay cycle the circuit is will not function properly the program enters a one hour delay cycle. If the circuit cannot function properly after the one hour delay cycle the power control relay for the corresponding aerator circuit is turned off, and the panel enters the alarm condition, which is indicated by a flashing LED and central alarm beacon, and an audible signal. If so equipped, the panel will also signal an auto-dialer or modem to transmit the alarm condition. The over-current or under-current conditions can be distinguished by different flash rates of the LED and beep rate of the buzzer. While in test mode the automated reset program will be deactivated. The control panel may be left in test mode if instantaneous alarm function is required.

Pump motor control
The pump motor control circuit is always active, and the pump motor control relay will be on. In the event of an alarm condition the pump circuit will turn off power to the pump.

Auxiliary output control
The active auxiliary output circuits are selectable with the DIP switches. Relays in the auxiliary output circuits control switching of 120VAC to the output terminal blocks. The 120VAC is fused on the circuit board and switched by the circuit board power switch. As currently configured, auxiliary output 1 is intended for control of the alarm signal beacon mounted to the top of the enclosure, and causes the beacon to flash in an alarm condition. If Auxiliary outputs 2 & 3 are enabled, the outputs are on during normal operation and off in an alarm condition.

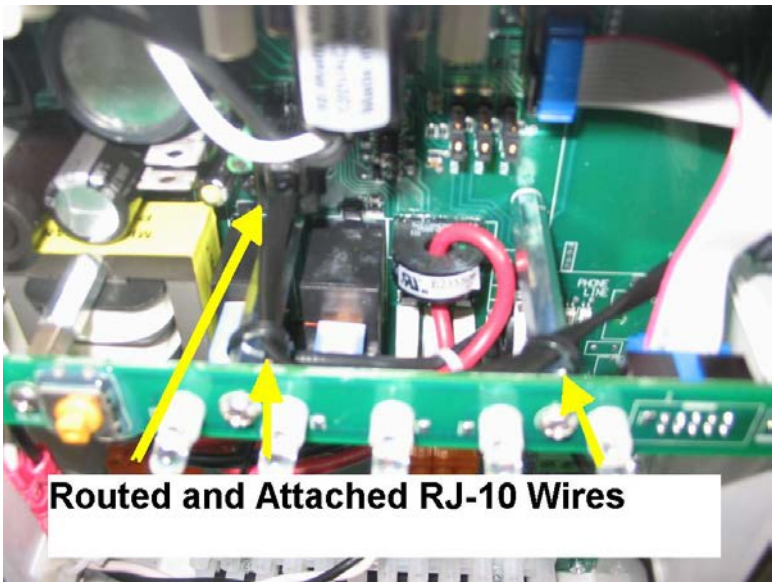
Auxiliary inputs
The auxiliary inputs are intended for sensing the open or closed condition of additional system components and sensing switches. Typically the auxiliary inputs are expected to be connected to float switches for sensing water levels. The active auxiliary input circuits are selectable with the DIP switches. Each auxiliary input circuit has a jumper selection for normally closed or normally open operation. The sensing signal at the auxiliary input terminal block is a current limited 12VAC. Note: Auxiliary contact three will is interlocked with the pump relay and will deactivate the pump circuit. Do not use this contact for high water floats in pump tanks.

Indicator LEDs
There is a blue power indicator LED that is lit when power is applied and the microcontroller is running. There is a one red LED for indication of aerator over or under current conditions. There are three red LEDs for indication of input error conditions on the auxiliary inputs. In normal operation, with no error conditions present, only the blue power indicator LED will be on. Auxiliary alarm circuits should be properly labeled on the wiring diagram or control panel cover.

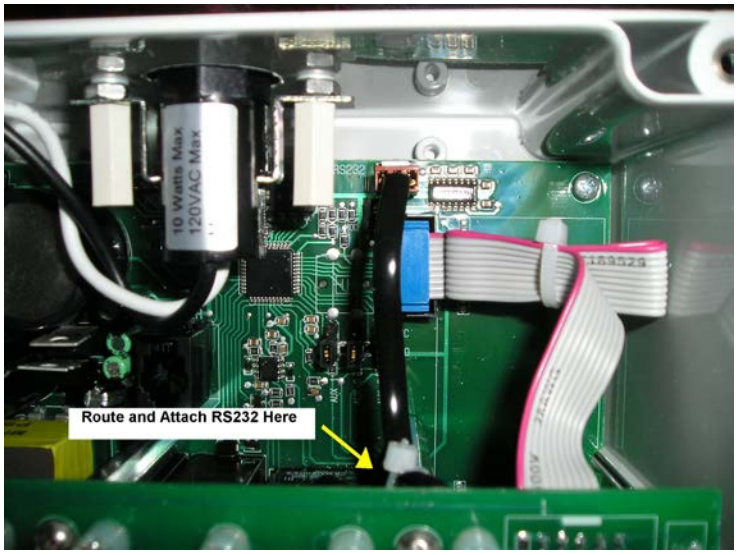
Alarm buzzer
The alarm buzzer sounds when an error condition exists. There is circuit board provision for an externally mounted or alternate model buzzer. When power is initially turned on, the buzzer will sound for ½ second to confirm that the buzzer is operational. For purposes of testing or servicing, the buzzer can be silenced for alarm conditions by DIP switch setting.

Reset switch and master reset switch
The user accessible reset switch has dual functionality. If no alarm condition exists, and the reset switch is held down for at least two seconds, the microcontroller will perform a self-reset. If an alarm condition has been triggered, the reset switch will clear the alarm state. However, if the error condition is still present, the alarm may immediately re-trigger. After the third reset press with a continuing alarm condition, the buzzer will be silenced, but the LED error conditions will not be cleared and no further operation is possible until the panel is reset by the master reset switch or by removal and reapplication of main power. The circuit board mounted master reset switch causes a microcontroller reset.

Auto-dialer interface
The circuit board has a connector configured to provide power and a triggering signal to select models of commercial, automatic telephone voice dialers. If an Auto-Dialer is installed on the model 197 Control Panel use wire ties to secure RJ-10 cable to LED array mounting posts to ***ensure there is no contact between the RJ-10 cable and 197 control panel printed circuit board or components*** (see image at right)



RS232 interface circuit
An interface circuit for RS232 communications allows for connection of the panel to a computer or other data logging equipment. If this equipment is connected to the model 197 Control Panel use wire ties to secure RS232 cable to LED array mounting posts to ***ensure there is no contact between the RS232 cable and 197 control panel printed circuit board or components*** (see image at below).



Fuse and power switch
The power to the on-board circuitry and to the auxiliary outputs is fused and there is an on-board power switch for use by service or maintenance personnel.

Start Up Check List

These procedures should be preformed by the Jet installer after all of the system components and aerators have been connected to the system. This test should only be conducted after the electrician has completed the panel installation and before occupation of the dwelling. Refer to the control panel settings and functions section to review that the proper DIP switch configuration is appropriate for the system installed.

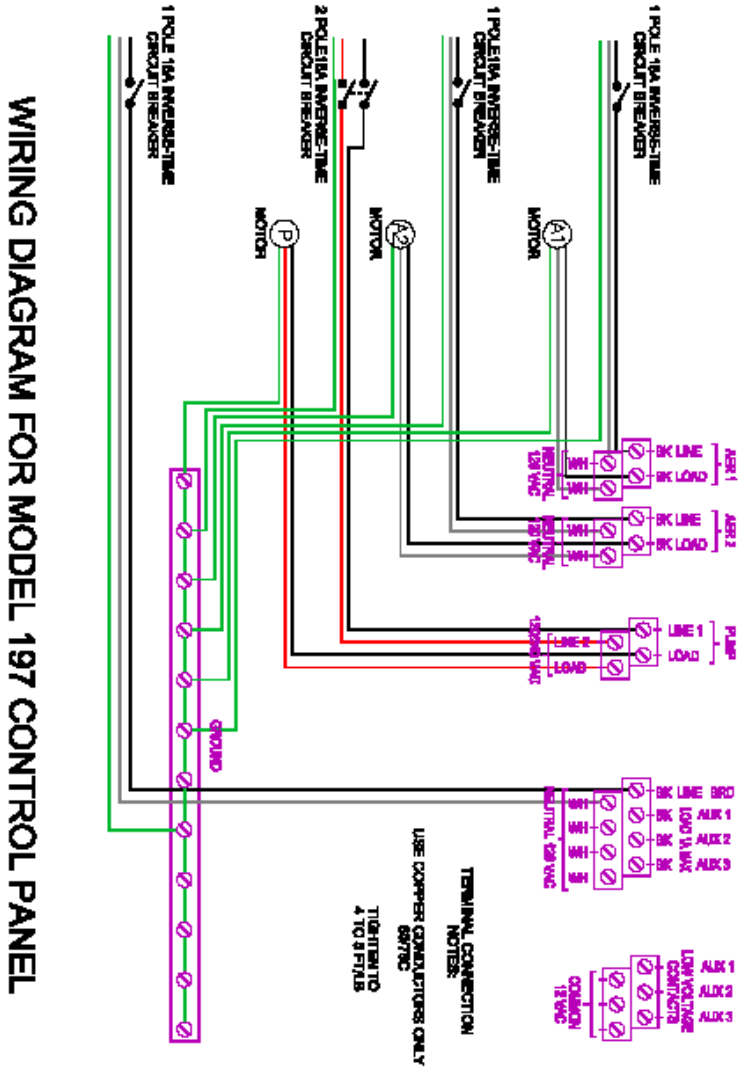
- ✓ Make sure that the settings and pump controls are appropriate for the system configuration and comply with local regulations.
- ✓ Check the system wiring to ensure the installation instructions have been followed correctly.
- ✓ Check to make sure all aerator, pump, and auxiliary connections are watertight. Ensure there is no exposed wiring prior to turning on the system.
- ✓ Set the control panel power switch to the “Off Position”, and then turn power on at the main breaker panel for all of the system circuits.
- ✓ Turn on the control panel power, the self test should alarm for two seconds then all alarms should return to normal state. The blue indicator light should now indicate that there is power to the panel and circuits.
- ✓ Check to make sure all system components are operational. If a pump is connected to the system it may not immediately function depending on additional float and timer control settings.
- ✓ Test all inbound and outbound power with a multi-meter. All circuits should have between 105 and 132 volts AC power supplied to the aerator, compressor, and pump circuits.
- ✓ If aerator circuits are set for timer intervals the cycle will begin with the on aerator condition. To observe aerator timer intervals additional time will need to be spent on site, or use the “Test Mode” to accelerate the timer cycles.
- ✓ If tests are not satisfactory recheck and correct the system wiring as needed.
- ✓ Once all checks are completed return the “Test Mode” to its normal position and reset the control panel with the “Master Reset” switch.
- ✓ Make sure to correct distributor information is on the front of the panel and complete the control panel warranty card with the appropriate information.

Troubleshooting Guide

Problem	Probable Cause	Solution
No Power to Panel	• No power from main breaker panel • Internal panel power switch in off position	• Check wiring and main breaker panel • Check on/off switch
Aerator Alarm After Start Up	• Aerators not connected and running • DIP aerator selection incorrect • Aerator/Compressor DIP setting incorrect	• Check aerator(s) and connections • Confirm DIP settings are correct for system design
Auxiliary Alarm After Start Up	• Alarm settings incorrect (NO/NC) • Alarm or float condition is active	• Check alarm setting jumpers for proper NO/NC • Check external devices and floats
No Power to Aerators	• Inbound power inactive • Timer setting in “Off” cycle	• Check connections and main breaker panel • Reset panel to override “Off” cycle
No Power to Pump	• Inbound power inactive • Alarm condition active	• Check connections and main breaker panel • Resolve alarm conditions
Auxiliary Outputs Inactive	• DIP settings incorrect • Excessive load on external device	• Check DIP settings • Confirm power requirements for external device
Aerator Timer Not Functioning	• Incorrect DIP settings	• Check DIP settings
Aerator Reset Not Functioning	• External reset locked out • External toggle not contacting button	• Reset panel with Master Reset button • Adjust depth of external toggle
Aerator Alarm with Compressor	• DIP not set to compressor function	• Check DIP setting
Alarms not Functioning	• Automated reset program active (Normal Function)	• Toggle test mode “ON” if instant alarms desired

Electrical Wiring Diagram

Refer to the wiring diagram below when connecting aerators, compressors, pumps, and auxiliary equipment to the Jet model 197 control panels. (Note: The location of the terminal blocks has been re-formatted for this manual and does not exactly correspond to the location of the terminal blocks on the circuit board)



1-YEAR LIMITED WARRANTY

Jet Inc. warrants all new system components supplied by Jet against defective materials and workmanship, under normal service for one year commencing upon date of shipment from the factory. To make a claim under this warranty, you should notify your Jet Distributor or notify Jet Inc., Customer Service Department by phone at 1-800-321-6960 or by mail at 750 Alpha Drive, Cleveland, Ohio 44143. If a component or part is proven defective during this warranty period there shall be no charges for labor or materials required for the repair or replacement of the defective component. Jet shall have the option to require the defective part be returned, freight prepaid, for evaluation at the factory before allowing a claim. All components must be returned by an authorized Jet distributor who is in good standing with Jet Inc. Jet Inc. may, at its option, elect to repair or replace the defective components, or refund the purchase price of the defective component(s). The system owner shall assume all responsibility for freight charges to and from Jet Inc. This warranty does not cover system components or parts that have been (I) damaged due to disassembly by unauthorized persons, improper installation, misuse, or lightning, (II) subjected to external damage, (III) damaged due to improper or altered wiring, or overload protection, or (IV) damaged by failure to follow the suggestions outlined in any associated product documentation or Owners Manuals. Items normally consumed in service such as fuses, filter cartridges, spin plates, grease, oil, etc. are not warranted. This warranty applies only to the Jet system components supplied by Jet Inc. and does not include any of the wiring, plumbing, drainage, or any other part of the disposal system.

JET INC. SHALL NOT BE HELD RESPONSIBLE FOR ANY DAMAGES CAUSED BY DEFECTIVE COMPONENTS OR MATERIALS, OR FOR LOSS INCURRED BECAUSE OF THE INTERRUPTION OF SERVICE, OR ANY OTHER SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES OR EXPENSES ARISING FROM THE MANUFACTURE, SALE, USE OR MISUSE OF THE COMMERCIAL TREATMENT PLANT. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW, INCLUDING FITNESS IS IN EFFECT ONLY FOR THE ONE YEAR WARRANTY PERIOD SPECIFIED ABOVE. (SOME STATES DO NOT ALLOW EXCLUSIONS OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR ALLOW LIMITATIONS OF HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.)

Jet Inc. reserves the right to revise, change, or modify the construction and design of the Jet system components or any component part or parts thereof supplied by Jet, without incurring any obligation to make such changes or modifications in present equipment. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.