



# START-UP PROCEDURE

## **UNITS WITH FX-14 DIRECT DIGITAL CONTROL**

Start-up must be performed by a trained, experienced service person.

The following general start-up procedure applies directly to indirect fired heating systems. Please note any added options for a specific unit which may affect control sequence or terminal numbering prior to attempting start-up or service work. Read entire start-up procedure and review all reference material (Unit Specifications, Gas Train/Burner Specifications, Sequence of Operation, Parts Lists, and Electrical Schematic) supplied with each unit.

### **STEP 1**

From user interface panel (MUI-1), disable unit operation (OFF mode) and set the temperature setpoint near its lowest setting. Set Auto-Off-On switch (SW-2) to "Off" position.

Turn off incoming electrical power and gas supply to unit. Electrical power can be turned off at unit disconnect. Gas supply shut-off is at the inlet of unit's gas manifold.

### **STEP 2**

Verify that incoming electrical and gas supply match name plate requirements (i.e., voltage/amp capacity, gas pressure and volume capacities, etc). If they do not, stop at this point and contact Titan Air.

### **STEP 3**

Open access doors to blower and control vestibule sections. Check all electrical connections and hardware (blower drives, bearings, damper linkages, etc.) for tightness and correct field wiring connections.

### **STEP 4**

Check that all gas, pilot, vent, and pressure sensing lines are properly connected and unobstructed. Verify incoming gas line was "blown out" to flush out debris prior to connecting gas line to unit. Also verify incoming gas line has been purged of air up to unit's gas inlet.

### **STEP 5**

At manifold pressure test port, downstream of modulating gas valve, connect your gas pressure gauge (pressure gauge must read inches of water column to 10" with capability of reading a negative pressure). If unfamiliar with the user interface, take time to review sequence of operation which includes a description of multiple screens available on MUI-1.

### **STEP 6**

Turn on incoming electrical power at unit disconnect. Make sure blower access door is securely held open. Turn blower service switch (SW-5) on.

### **STEP 7**

If an optional intake or discharge damper is installed, blower will not start until damper motor's internal "proof open" end switch closes (damper motor and end switch wiring are generally completed in the field after damper is mounted). If an intake or discharge damper is not installed, blower should start immediately. Check blower for proper rotation direction. If rotation is reversed, turn both service switch and disconnect switch off. For 3 phase motors, reverse any two



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leads. For single phase motors, see instructions on the motor.

### STEP 8

With proper blower rotation verified, check and record RPM of blower. RPM of blower should only be increased or decreased if unit is not delivering rated CFM. Contact Titan Air before attempting to change CFM capacity of unit.

### STEP 9

Enabling associated exhaust or opening an overhead door may be necessary to keep from over pressurizing the building. If assistance is needed, contact Titan Air.

### STEP 10

Start unit with SW-5. Check and record motor amp draw. If motor amp draw exceeds listed Full Load Amps (FLA), stop and contact factory.

### STEP 11

Turn unit off. Check gas line for proper and tight connections with no leaks.

### STEP 12

Turn on main gas valve. If unit is equipped with a low gas pressure switch (P-2), reset to on position.

### STEP 13

Start unit with SW-5 and adjust setpoints to enable burner.

### STEP 14

Unit should go through its complete burner ignition sequence. On new installations, resetting flame safeguard may be required to purge air from gas line. If unit does not cycle through its burner ignition sequence after a few attempts, refer to the service information in following section for troubleshooting instructions.

### STEP 15

On the flame safety are 2 microamp test ports.

### STEP 16

Set temperature setpoints below current discharge conditions to force low fire. Check and record micro amp's while sensing low fire. *Low fire should provide a continuous flame maintaining a stable signal at near the upper range.*

### STEP 17

At main low voltage terminal strip, carefully remove sensor wires. Insert the 1000 ohm test resistor in place of sensor. This will simulate a temperature of approximately 70 degrees. Increase temperature setpoint to maximum. This will force modulating valve to a sustained high fire position. Check the manifold pressure. Resulting total manifold pressure should be compared to unit's rated manifold pressure. If the total is higher or lower than rated pressure, adjustment can be made at gas pressure regulator. Do not set total manifold pressure over name plate rating.

### STEP 18

With burner on high fire, turn high temperature limit (TL-1) to its lowest setting. The limit should trip out and shut down burner. Turn TL-1 back to factory setting of 185 deg. F and reset control.

### STEP 19

Remove test resistor and re-connect sensor wiring.



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### STEP 20

With all wiring in place and unit operating in "HEAT" mode, adjust room or supply temperature (depending on type of temperature control) setpoint and observe modulation of burner.

For typical applications with limited internal heat gain, it is suggested that maximum discharge temperature be set at approximately 100°F and minimum discharge temperature be set at or slightly above desired room temperature (offset of 0°F to +10°F).

### STEP 21

With unit operating in "FAN\_ONLY" mode, cycle burner from SW-6. Verify that burner fully lights within a few seconds.

### STEP 22

Low temperature safety function is built into the FX-14 controller. To test this function, remove discharge sensor wires and replace with a 1000 ohm resistor. From the technician setup screen, increase low temperature safety setpoint to 80 degrees. Unit should then shut down after built-in timer setting has "timed-out". Remove resistors and replace sensor wires when proper operation has been verified. Press and hold left and right arrow keys on MUI-1 for 4 seconds to reset the fault.

### STEP 23

With unit operating and burner on, close 2nd manual gas shutoff valve. Burner should shut down in a few seconds with unit shutting down. Open hand valve and reset flame safety.

### STEP 24

Turn SW-5, SW-6, and disconnect off. Verify that all terminals, electrical connections, and hardware (bearings, sheaves, blower wheels, etc.) are securely tightened. Adjust all controls to desired settings. Remove all gauges, meters, and hand tools from the unit. Replace all covers on controls. Make sure all safety devices are reset.

### STEP 25

Turn disconnect on. Start unit from remote panel. Set all user interface modes and setpoints as desired. Verify proper unit operation in all modes according to unit's sequence of operation.

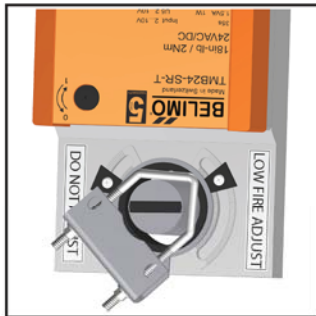
Unit should be ready for operation. To assure long lasting and efficient operation of Titan equipment, a regular service inspection should be set up. Refer to the maintenance section at back of this manual for detailed maintenance information.

**BELIMO ACTUATOR COUPLED WITH MODULATING VALVE**



**Low Fire Adjustment:**

Disconnect wire at terminal #1 on actuator. Press "clutch" to manually rotate shaft as needed. Adjust mechanical stop at counterclockwise end of actuator's stroke to set low fire. Need continuous flame across burner AND strong amplified signal at flame safeguard test ports.



**High Fire Adjustment:**

Adjust high fire at separate regulator Do NOT adjust mechanical stop at clockwise end of actuator's stroke. Refer to instructions in start-up procedure.

**Actuator Replacement/ Installation:**

Installation of a replacement actuator should be made with actuator rotated to high fire position. Clockwise high fire mechanical stop should be set and line mark on modulating valve stem should be parallel with pipe as shown in "High Fire Position" photo above. Set low fire mechanical stop similar to original actuator. Adjust low fire per start-up procedure.