

EngA
®

ENGINEERED AIR
®

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

FOR

DJT

MODEL 2

Two Stage Burner Control

INDOOR AND OUTDOOR MODELS



UNIT MODEL NO. _____

UNIT SERIAL NO. _____

SERVICED BY: _____

TEL. NO: _____

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DJT2 CONTROL FOR THE DJ BURNER

Report any errors or omissions to Wade Pascoe (403) 287-4775

To ensure warranty is honoured, only a qualified HVAC service person, who has received training on the DJT-2 should be employed for service and troubleshooting. If further information is required please contact the nearest Engineered Air office.

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PURPOSE

The DJT-2 would not be used on units with a BTUH rating less than 400,000. These smaller units use a Maxitrol "SR" valve for two stage firing thus not needing a DJT control.

The DJT-2 is a *two stage (or modulating)* controller designed specifically for the standard (*round*) DJ Burner and for the HTD (*rectangular*) burner up to 1,400,000 BTUH. The DJT-2 is an improved version of the original DJT in that it can optionally be set up for some modulating. The DJT-2 can be controlled with a two-stage duct control and/or two-stage room thermostat; or a modulating control signal from a T991A Honeywell 140-ohm control or one of the EngA 0 to 10 VDC controls. The DJT-2 uses a "fail safe" blocking valve (*such as an ITT K3A or HW V4055*) and a modulating Maxitrol 510 or 610 Series valve. The Maxitrol valve is a normally open valve which ramps closed as dc voltage is applied to it. (*Less than 1.5 VDC the valve is full open, above 15 VDC the valve drops to its low fire position, and at voltage signals between these two the valve will modulate*).

Diagnostic LED's (light emitting diodes) are now installed on the front panel **to assist in trouble shooting** DJ burner operation.

The DJT-2 controlled burner has a constant speed combustion blower. In order to obtain a satisfactory combustion analysis, the burner will operate at full BTUH capacity on full fire. The standard (*round*) burner can operate down to as low as 60% of the high fire capacity when on low fire. The HTD (*rectangular*) burner can be operated to as low as 40% of high fire capacity.

The following functions are performed by the DJT-2 interface.

- Two stage operation (*duct-stat or thermostat*).
- OR**
- Modulating operation (*CTRAC [0-10vdc] or T991A [135 ohm] control*).
 - Pre-purge timing (*34 seconds*).
 - Maintained purge timing (*4 minutes*).
 - Low fire light off.
 - Slow opening valve simulation (*using electro-magnetically operated Maxitrol MR 510 and MR 610 valves*).
 - Pilot lock out while main flame is firing.
 - Positive air switch checking (*normally open sail switch or air switch*).
 - Designed for use with Honeywell S8610 or equivalent flame relay, which uses an 8-second trial for ignition.

OPERATING SEQUENCE

1. Operation of the DJT-2 can be:

- A. Two Stage or
- B. Modulating Operation usually supplied by EngA C-TRAC controller in which case DJT-2 is slaved to C-TRAC.

In the text below refer to text subsections A (*two stage*) or B (*modulating*) as per the application used on your unit.

The sequence of operation is as follows:

2. A heat call is initiated by:

- A. Two Stage: A 24-volt input to terminal "W1" = low fire; "W2" = high fire

NOTE: *Two stage operation should have a jumper across terminals "R and W" to ensure the valve goes off when a heat call is complete. (This jumper draws the voltage back down.)*

- B. Modulating:

- i. The CTRAC increases the DC voltage output from CTRAC terminals "HT" and "B" (*modulates from 'off' = <2 vdc to full heat call = >8.5 vdc*). When the voltage across DJT-2 terminals "R" and "W" (negative) is above 1.5 Vdc, the DJT-2 should begin a heat call.
- ii. If a 140-ohm control (*T991A*) is used, power is taken from DJT-2 terminal "B" through the T991A controller and back to terminal "R" of the DJT-2. Again when voltage between DJT terminals "R" and "W" is above 1.5 volts a heat call should begin.

When a heat call occurs, the 'Heat Call' LED (*light emitting diode*) will come on.

- If the combustion air-proving switch is open, the combustion blower will start. As a safety procedure the DJT-2 will not start combustion blower if the air-proving switch is closed.
- After the combustion air proving switch closes, the pre-purge timer is started, and the 'Pre-purge' LED will come on.
- After the pre-purge is complete (*34 seconds*), the 'Burner Enable' LED will come on and the pre-purge light will go off. The DJT-2 closes the internal contacts between terminals "A" and "2". The Honeywell S8600 or equivalent flame relay is then energized. The internal contacts from DJT terminals "1" and "P" are also

closed to energize the pilot valve. If a pilot lights and is proven by the ignition control, it will energize the main gas valve. At the same time a 24 volt feedback signal from the ignition control will be placed on the DJT-2 terminal "3". A voltage of about 15 VDC (*or higher*) will also be placed across DJT-2 terminals "M" and "M" to drive the Maxitrol valve to low fire (*the valve is normally open*). The DJT starts in low fire mode to reduce burner rumble on "cold starts".

The 'Pre-purge' LED will now go out.

6. After 10 seconds with the main flame on, the pilot relay (*between terminal 1 and P*) opens and the pilot is locked out.
 7. High Fire - After the flame relay proves a flame, the burner can go to high fire if there is a call for it.
 - A. Two-stage control call for second stage. Terminal "W2" will be powered with a 24-vac signal. The Maxitrol gas valve will open to high fire over a few seconds time as the voltage from the DJT-2 terminals "M" and "M" falls from 15 down about 1.5 -2 VDC.

OR

 - B. Modulating control calling for higher fire. The Maxitrol gas valve is slowly opened to the required firing rate depending on the amount of the heat call. If more than low fire is required the voltage from DJT-2 terminals "M" and "M" will modulate between 15 and 2 volts as required.
 8. When second stage or high fire is satisfied:
 - A. Two stage - terminal "W2" loses power. The DJT raises power on terminals "M" and "M" to 15 VDC again placing the DJ burner on low fire.
 - B. Modulating - as the input voltage to the DJT-2 terminals "R" and "W" reduces, the output to the modulating valve connected to DJT-2 terminals increases to 15 vdc. The system is now back to low fire.
 9. If the heat call becomes satisfied:
 - A. Two stage - the flame relay is de-energized as the DJT-2 internal relay across terminals "4" and "2" open.

OR

 - B. Modulating - The power to the DJT-2 terminals "R" and "W" reduces and the internal DJT-2 contacts across terminals "4" and "2" open.
- At this time the ignition control loses power and shuts off the main flame. The pilot flame had been turned off at point 6 above.
10. The combustion fan blower will continue to run for 4 minutes. This is a 'maintain purge' period.
 11. If another heat call occurs before the 4 minutes pass, the unit will immediately light the burner starting at point 5 above. There is no need to do a pre-purge because the burner was in a 'maintain purge' mode during this time.
 12. If no other call for heat occurs within the 4-minute period the combustion blower will shut off. If another call for heat occurs after the 4-minute timing has shut off the combustion blower, the process will begin at step 2 above.
 13. If during normal operation the combustion air switch opens, the ignition control device will be de-energized and the pre-purge cycle repeated (*control goes to step 3*).

TROUBLE SHOOTING

On some indoor units the vent orifice fitting on the RV appliance regulator is to be vented to atmosphere. The field installed vent line should be sized adequately especially on longer runs. If there is more than one regulator connected to a common run that includes the main regulator, and the line is not adequately sized, an erratic inlet pressure will result and cause improper combustion and also burner pulsating problems.

Some DJ units manifolds have RD appliance regulators with a vent limiting orifice (*usually a brass orifice marked "12A06"*). Ensure that this tiny orifice is free of dirt or debris. A plugged orifice will impede a regulators opening flow and cause improper air/fuel mixtures.

COMBUSTION BLOWER NOT STARTING

1. Is there 24 VAC to terminals "H" and "N"? If not check the fuse and or wiring.
2. Is there a heat call? Check status of heat call LED indicator. If the LED is not on check:
 - A. Two stage operation - measure the voltage between terminals "W1" and "N". A call for heat will read 24 VAC.
 - B. For modulating operation - measure the voltage between terminals "R" and "W". A call for heat will read between 1.6 and 8.5 vdc.
3. Is the air switch stuck closed?
 - A. Measure the voltage between terminals "A" and "N". If there is 24 VAC, check the air switch operation.
4. Does the combustion fan run?
 - Is the combustion air motor voltage acceptable?
 - Measure the voltage from both the terminals marked "CB" to ground. (*Two Readings*).
 - Both readings 0 VAC - check burner motor fuse.
 - Both readings 120 VAC - check burner motor and or wiring.
 - One reading 120 VAC plus one reading 0 VAC - replace DJT-2.

CONTINUOUS PRE-PURGE

1. Is the combustion air switch closing?
 - Is the pre-purge LED on?
 - If not, measure the voltage from terminals "A" to "N". If there is 0 VAC, check for obstructions in the flue and or combustion air inlet. If they are free from obstructions, check the operation of the combustion air switch.
2. Have you waited for the 34 second pre-purge to time out?
(Pre-purge LED will shut off when pre-purge cycle is finished).
3. Is there still a heat call? If the heat call LED is off then:
 - A. Two stage operation - measure the voltage from terminal "W1" to "N". The reading should be 24 VAC.
 - B. Modulating operation - measure the voltage from terminal "R" to "W". The reading should be above 1.6V.
 - If the voltage is 0 (*two stage*) or less than 1.6 (*modulating*) and the burner just quit firing, the operation may be normal. The combustion blower should shut off in 4 minutes or less.
 - If the voltage is intermittent, check the thermostat and or wiring.

4. Is the ignition control locked out?
 - Measure the voltage across DJT-2 terminals "H" to "N". This should read 24 VAC, and the burner enable indicator light should be on. If not check the control fuse and or wiring.
 - Measure the voltage from terminal "2" to "N". If this reads 24 VAC the ignition control is most likely locked out. Reset a Honeywell S8600 (or Penn G67KG) ignition control by removing and then restoring power. If a flame relay (Fireye M series II) is used push the reset button. If resetting fails to bring on the burner troubleshoot the ignition control and burner.
 - If the reading across terminal "2" and "N" (ground) is 0 vac then replace DJT-2.

CONTINUOUS LOW FIRE

1. Is the thermostat or CTRAC calling for high fire?
 - A. **Two stage operation** - First insure there is a jumper on the terminals "R and W". If not install it. If there is, measure the voltage from terminal "W2" to "N". If the voltage is 0 vac or intermittent, check the thermostat and or wiring.
 - B. **For modulating operation** - First ensure there is a 750-ohm bleed resistor between terminals "R and W". If not install it. If there is still a problem measure the voltage on terminals "R and W". If the voltage is below approximately 1.6 VDC check the CTRAC. (*If there is a T991 control in use to modulate the flame, the voltage reading at "R and W" is still a valid reading and should be between 2-8 vdc if operating above low fire.*)
2. Is there a 24 vac feedback signal to terminal "3" of the DJT-2 from the ignition control. If not check wiring and/or the ignition control.
3. Is the Maxitrol MR regulating valve OK?
 - Measure the (DC Volts) voltage across terminals "M" and "M". A reading of 5 VDC or less (*valve is reverse acting*) indicates the DJT-2 is calling for full fire. If the burner is not firing fully and inlet gas pressure is correct, check the Maxitrol valve setting and or operation. If the DJT-2 and gas valve are operating properly the voltage on terminals "M" and "M" will be about 2 vdc at high fire and 15 vdc or more at low fire.

NOTE: An open circuit in the Maxitrol valve or wiring will cause the DJT-2 to output over 25 VDC and operate at high fire as it is a normally open valve.

4. Incorrect firing rate:
(i.e. valve pressure does not respond to valve input voltage)
 - With < 2vdc on the valve, it may not go to high fire if the valve plunger is stuck or the vent orifice is plugged.
 - Is the plunger installed correctly in the Maxitrol valve? The MR-510 or MR-610 valves are the only valves in the Maxitrol line to have the silver end of the plunger mounted up. If the plunger is in upside down operation will be reversed. The silver end has a black dot in the middle of the top. This black dot is where a magnet can be attached to remove the plunger.
5. If the DJT-2 remains at low fire with no heat call on the "W1 and W2" terminals, install and leave a jumper on terminals "R and W". If the DJT-2 is being controlled by a 0-10 VDC signal (*such as from a CTRAC*) install a 750-ohm resistor across "R and W".
6. If the DJT2 is operating at continuous low fire even when the operating control terminals (W1 and W2) are at 0 volts or disconnected, place a jumper on terminals "R and W". If the DJT2 is controlled by a

CTRAC2 there should be a 750-ohm resistor across the DJT2 terminals "R and W".

- 7 If the above steps have not corrected the problem, the DJT-2 is likely faulty. Replace the DJT-2.

CONTINUOUS HIGH FIRE

- 1 A. Two-stage operation - is the thermostat calling for high fire? Measure the voltage from terminal "W2" to "N". If there is a 24 VAC present, check the thermostat and or wiring.
- B. If a CTRAC is used for modulating control, is it calling for high fire? Measure voltage across terminals "R" and "W". If it is 8.5 VDC or higher trouble shoot the CTRAC.
2. Is the DJT-2 calling for full fire?
 - Measure the voltage (*DC Volts*) from terminals "M" to "M".
 - A voltage reading of 15 VDC or greater means that the DJT-2 is calling for low fire. (*Valve is reverse acting*). If full fire continues check MR valve operation and low fire adjustments.
 - Voltage reading 5 to 15 VDC. Check the low fire adjustment pot setting. Note care must be taken when adjusting this pot in order to maintain proper combustion. (*Refer to section on adjusting the low fire*).
 - Voltage reading under 5 VDC, replace interface.

COMBUSTION BLOWER WILL NOT SHUT OFF

1. Is the heat cycling on and off? If the burner off time is less than 4 minutes, the combustion blower will not shut off. It is in the 'maintain purge' mode.
2. Is the thermostat or CTRAC giving an intermittent call for heat? To test:
 - A. Two Stage - Disconnect the wire from terminal W1.
 - B. Modulating - Disconnect the wire from terminal R.

If the combustion blower does not stop after 4 minutes, replace the DJT-2.

ROUGH LIGHT OFF

1. Refer to the section on "Low Fire Setup" in the "Combustion Set Up" Procedure.

UNSTABLE DISCHARGE TEMPERATURES

1. Generally unstable discharge temperatures are the result of poor temperature sensing. However some temperature swing will always be present due to the nature of the DJ heat exchanger.

NOTE: *If two stage firing is used, temperature swings cannot be avoided. Normal swings can be up to 25°F depending on conditions.*

Below are some of the most likely places to look for the cause of excessive temperature swings.

- Temperature sensor (*duct-stat bulb or thermostat*) is mounted in a poor location.
- Thermostat heat anticipator and or interstage settings.

COMBUSTION SET UP PROCEDURES

NOTE: *All units are set up at the factory. Extreme caution is advised when making any of the following adjustments without proper instrumentation.*

To do flue gas analysis, drill a hole in the flue to get the analyser probe directly into the flue outlet. This prevents diluted flue gas readings due to vent/drain holes in the chimney.

HIGH FIRE SETUP

NOTE: In order to adjust the HIGH FIRE SETTING the flue gases must be checked for CO and CO₂. This will require the use of a combustion gas analyser.

Failure to do so may result in poor combustion and the formation of DANGEROUS combustion by-products.

1. Bring the unit on to a sustained high fire. (Between 0 and 5 vdc to the Maxitrol valve).

NOTE: It may take up to 45 seconds for the unit to attain full firing rate as the valve opens.

2. Measure the manifold gas pressure and compare the readings with the required pressure on the units rating plate. If adjustments are required, adjust the regulator located in the Maxitrol MR valve (the large adjustment screw).

NOTE: The DJT-100 requires more than 60 CFH of gas. This is beyond the regulating capabilities of the MR-610 valve. Therefore DJT-100's have a RV regulator located at the front of the manifold. When setting up high fire ensure inlet pressure is maintained at the nameplate rating using the following set-up.

- A. Adjust the MR-610 regulator fully open (clockwise).
- B. Set the manifold pressure with the RV regulator.
3. Allow the unit to fire with the correct manifold pressure for 3 minutes the flue gases are analysed. This is to allow purging of the burner drum. The readings must fall within the following ranges:
 - CO less than 300 ppm
 - O₂ 3.0% to 4.0%
 - CO₂ 10.3% to 9.8%
4. If required adjust the combustion air adjustment slider to obtain the correct readings. If you adjust the slider, recheck the manifold pressure as it may change due to the air pressure changes. After each adjustment allow 2-3 minutes for the readings to settle to their new values.

LOW FIRE SETUP

NOTE: In order to adjust the LOW FIRE SETTING the flue gas contents MUST be checked for CO and CO₂ or O₂ gases.

1. Bring the unit to a sustained low fire on a two-stage unit (power only on "WI"), or adjust the input to DJT-2 terminal "R" and "W" to 1.6 VDC on a modulating unit.
2. Allow the readings to stabilize for 4 minutes before taking any flue gas readings.
3. Analyse the flue gases for CO and O₂, (CO₂ is acceptable instead of O₂). The readings obtained must fall in the range given below:

STANDARD (Round) BURNER	HTD (Rectangular) BURNERS
CO less than 200 PPM	CO less than 200 PPM
O ₂ 10.0% to 11.5%	O ₂ 11.5% to 12%
CO ₂ 6.4% to 5.5%	CO ₂ 4.5 % to 5.5 %

4. If the readings do not fall within the given ranges the low fire gas settings should be adjusted. Do not adjust the combustion air slider.

NOTE: There are two methods to adjust the low fire. To determine the proper method, measure the DC voltage at the Maxitrol valve. If the voltage is over 15 VDC the adjustments should be made at the Maxitrol valve. If the voltage is under 15 volts the DJT-2 has control of the low fire and the adjustment should be made on the DJT-2 low fire adjustment pot.

A. Low Fire Adjustment on the Maxitrol MR Valve

- The low fire adjustment is the small screw located under the cover on the valve. Rotating the adjustment screw clockwise will reduce the CO and O₂ readings, and will increase the CO₂ reading.
- If the adjustments cause the burner to light roughly, the second method of low fire adjustment should be used.

TO REDUCE RUMBLE ON COLD STARTS**B. Low Fire Adjustment Using the Low Fire Pot on the DJT-2**

This method of low fire adjustment should only be used if rough ignitions are encountered on the DJ burner. Located on the face of the DJT interface is a 6mm-access hole to the low fire pot. The following steps should be followed when adjusting this pot.

1. Bring the DJ burner to low fire:
 - Two stage burner; W1 is energized with 24 VAC or
 - Modulating burner: adjust for 1.6 VDC across DJT-2 terminal "R" to "W". If low fire cannot be maintained at a constant voltage, disconnect the C-TRAC connections to terminals "R" and "W", then jumper 24 VAC from DJT-2 terminal "H" to DJT-2 terminal "W1" to simulate two stage low fire. "M to M" voltage should be about 14-15 VDC.
2. Measure and record the low fire pressure. This pressure was clocked and set the proper low fire rate at the factory.
3. Measure the DC volts to the Maxitrol MR valve. If the voltage is less than 12 volts, adjust the low fire pot on the DJT-2 controller till the voltage is over 12 VDC.
4. Adjust the low fire setting (*small screw*) on the Maxitrol MR valve till the pressure is .2 to .3 inches water column below the pressure recorded in step 2.
5. Adjust the DJT-2 low fire pot till the pressure returns to the reading taken in step 2. Note there are small time delays built into the DJT-2 control so the pot should be moved slowly. If it is not possible to get the required pressure, repeat steps 3, 4 and 5. This time set the low fire pressure in step 4 slightly higher.
6. Cycle the burner through an ignition attempt. The burner should now light at the reduced pressure setting as set in step 4 above. After a few seconds the DJT-2 will decrease the signal (VDC) to the MR valve until the normal low fire operating pressure set point is reached.
7. If there is still a rough ignition problem (*rumbling*) reduce the pressure setting in step 4 by an additional .05 inches.

NOTES: In "5" above the time delay is 3 – 4 seconds. The best way to ensure the time delay is complete is to have a DC voltmeter attached to the valve. When the reading settles the time delay is complete.

In "7" above, if you have a magnahelic gauge you can adjust the .05 inches. If you do not have a magnahelic an adjustment of $\frac{1}{2}$ to 1 turn of the regulator is a guestimate.

The DJT-2 uses a MR-410, 510, or 610 Maxitrol valve. The valve is a normally open valve with a magnetically operated plunger. The plunger has a silver end with a dark spot in the centre of it. When the plunger is installed in the valve, it must have the silver end up.

DJ140 IGNITION PROBLEMS

In addition to the following ignition problems, the DJ140 may have another problem. Due to burner size a large combustion air fan is in use. As the DJT unit has a constant combustion fan speed, the quantity of air passing in to the air tube at pilot ignition time may be too much. If this is a problem, install a screw into the pilot air tube to reduce the quantity of air going to the pilot box.

IGNITION AND PILOT SENSING PROBLEMS

Check the condition of the pilot assembly. Check for damaged or dirty ceramics, proper gasket, and pilot set up. If you are still having problems lighting the burner, check the items listed below:

1. If the combustion has been set up, the ignition should be checked. Whenever the total air slider has been adjusted it affects how much air flows into the pilot air tube.
2. Occasionally some ignition control devices have the power to throw a spark through the casing to the mounting screw near the spark connection, or through the back of the case. Mount the ignition control off the wall on insulated spacers and do not install a mounting screw next to the spark wire location.
3. Check the resistance of the flame and spark rod to the wire connector terminal on the rod. This should not exceed 2 ohms. If it does, replace the assembly.
4. Ensure there is a good ground path from the burner surface to the ignition control device and/or the ignition transformer. A high resistance ground path will destroy a signal.
5. Ensure that the ignition control and its transformer secondary are both adequately grounded. If there is not an adequate ground then there will be a weakened flame rod signal. Be aware that if there is a BMS tied into the system and the BMS is grounded, there may be some electrical noise problems.
6. Spark gap should be set at $\frac{1}{8}$ inch.
7. Check for cracked porcelains on the spark and flame rods. These have been found to be cracked in the area where they pass through the mounting plate also. You cannot see into this area and you can even have it feel tight. (*If possible it may be best to check it with an ignition device.*)
8. Ensure there are no burrs or dirt in the pilot line orifice and air tube. These items have often been found with dirt, rust, insulation, paper, etc., blocking them. This includes checking the short connector at the blower housing where the rubber tube attaches. Also ensure no capacitor mounting screw is blocking the inlet to the pilot tube.
9. Usually changing the pilot assembly will not have much of an affect on the pilot signal if both assemblies are in good condition and installed correctly.
10. Ensure the pilot assembly gasket is tightly installed to stop air leakage into the pilot area.
11. Standard (*round*) burner only. If the burner plate is not centered in the hole, it may allow too much of a gap over the top of the burner, thus increased airflow through the larger opening may roll onto the pilot box. Place a spacer under the burner plate to raise it into a centered position.
12. Due to the low capacities of some small units with standard (*round*) burners only, there may be too much air entering into the pilot air tube. It may be necessary to reduce this air quantity by placing a screw through the side of the combustion blower outlet in a manner that the screw also passes through the metal tube that the rubber hose connects to. This normally only occurs on units with an input of less than 300,000 BTUH. **Some units have a screw mounted capacitor, ensure the screw does not obstruct the pilot tube's air path.**

13. If a BMS signal is applied, caution should be taken about removing the transformer grounds that may interfere with the BMS signal. It is possible that you may have disconnected the ignition control or ignition transformer ground.
14. Water and ice have been located in the pilot gas lines, in the pilot air tube, in the pilot box, and in the pilot gas orifice. Ensure these areas are free of moisture, locate the source and correct it.
15. Snow, ice or water on the ignition control(s) can stop a pilot from igniting or proving. These devices and their associated parts must be kept clean and dry.
16. On some indoor units the vent orifice fitting on the RV appliance regulator is to be vented to atmosphere. The field installed vent line should be sized adequately, especially on longer runs. If there is more than one regulator connected to a common run, which includes the main regulator and the line, is not adequately sized, changes in pressure on the RV diaphragms are applied to all regulators. This includes the main regulator so an erratic inlet pressure will result and cause improper combustion and also burner pulsating problems.
17. Some DJ unit manifolds have RV appliance regulators with a vent-limiting orifice, usually a brass orifice marked '12A06'. Ensure that this tiny orifice is free of dirt or debris. A plugged orifice will impede regulators opening flow and cause improper air/fuel mixtures.

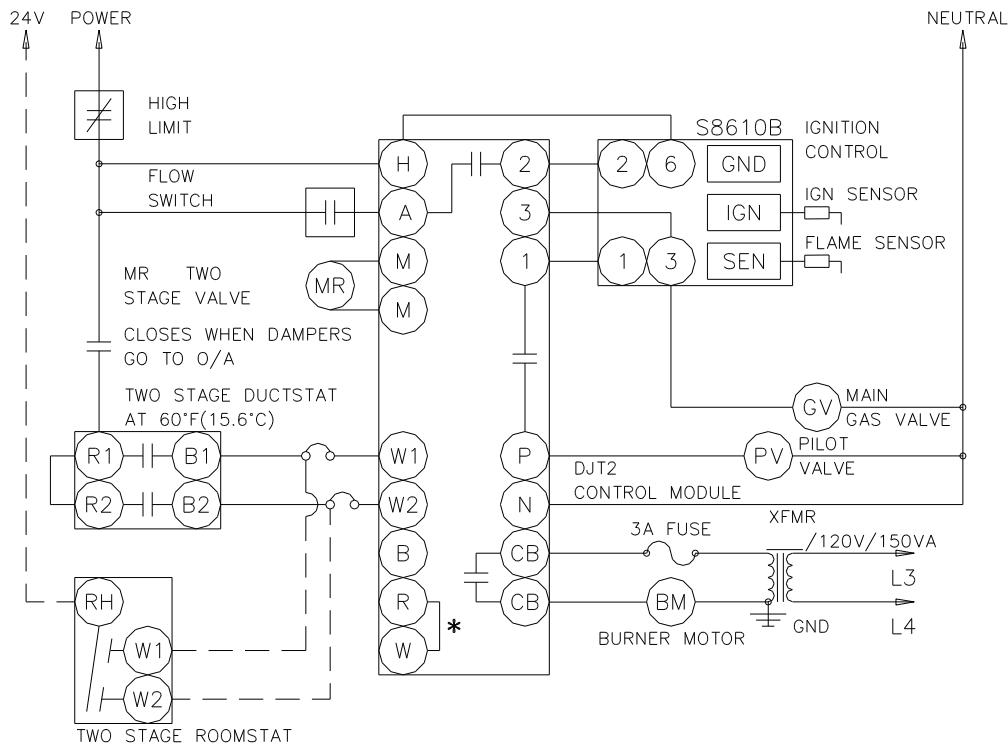
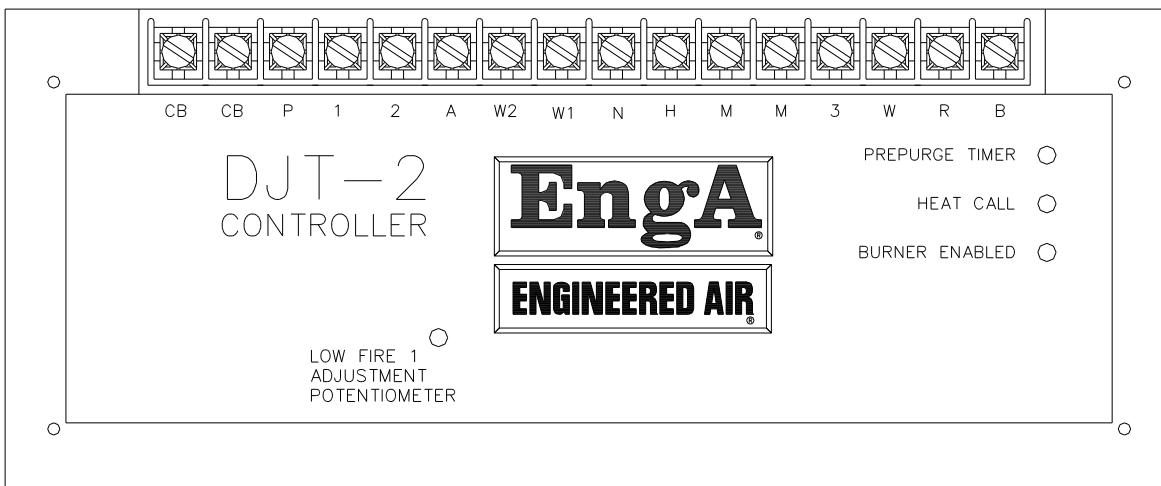
If these are all OK, check the combustion settings. Either the manifold pressure is incorrect, orifices plugged, the curve matching pot is set wrong, or the combustion air set incorrect. For further information refer to the section for **Combustion Set Up**.

REPLACING A DJT WITH A DJT MODEL 2

- The DJT-2 is similar in appearance to the DJT-1. The DJT-2 has LED's (*light emitting diodes*) to assist the operator in knowing what the controller is doing in its operation.
- Wiring terminals on the DJT model 1 are similar to those on the DJT model 2 and located in a similar position with the only exception being the DJT-2 does not have a terminal "4". Terminal "4" and terminal "A" were jumpered on the DJT-1 so the wires from the SJT-1 "4 and A" can now be placed on terminal "A" on the DJT-2.
- The DJT-2 has some additional terminals expanding its capability. Terminals "W, R, and " are not used in the application where the DJT-2 is being used as an upgrade.
- Terminals "1 and P" allow for an interrupted pilot. The interrupted pilot is to reduce the heat on the spark and flame rod assemblies on the standard (*round*) DJ burner. If you wish to take advantage of this feature when making a conversion, note the following wiring.
 - The pilot valve was wired directly to the ignition control
 - To wire the interrupted pilot option connect the wire that went to the pilot valve hot to the DJT-2 terminal "P".
 - Wire from the DJT-2 terminal "1" to the connection on the ignition control that the pilot was wired to.
 - When the control is placed into operation the pilot flame should lock off after the main burner has operated for a few seconds.
- The DJT-2 has the added ability to modulate between 60% low fire and 100% high fire. This feature will not be used if you are converting from a DJT-1 to a DJT-2 without additional system modification.

When installing a DJT-2 in place of a DJT-1, add the following wire:

- If it is a **two-stage operation** (*wiring to terminals "W1 and W2"*) place a jumper on DJT-2 terminals "R and W".
- If the DJT-2 is **controlled by a C-TRAC2** place a 750-ohm resistor across the DJT-2 terminals "R and W".



NOTES: 1) OBSERVE POLARITY H TO H AND N TO N IN POWER SUPPLY TO C-TRAC AND DJT-2

2) USE A COMMON TRANSFORMER WITH NO GROUND TO SUPPLY THE C-TRAC AND DJT-2

* JUMPER REQUIRED ON 2 STAGE UNITS.

** 750Ω RESISTOR REQUIRED ON C-TRAC CONTROL.

WIRING SCHEMATIC

DJT-2 CONTROL MODULE

REVISIONS: MAR 12/99

DATE: APRIL 26/91	DRN.BY: ALW	CHKD.BY: WP	DRWG.NO.: MD-2301A
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EngA

ENGINEERED AIR

BEING REPLACED BY M-20 ETC
NO SPRING ON TOP OF PLUNGER
DIRECT ACTING, POWERS OPEN

M450, M550 AND M650
N.C. VALVE
DJ-20, 40, 60, 100, 140

- SET HIGH FIRE MAIN RV REGULATOR
- SET LOW FIRE AT LOW FIRE ADJUSTMENT

 GAS FLOW

LOW FIRE
ADJUSTMENT NO COVER
VENT HOLE (MUST BE
PLUGGED IF VALVE IS
TOP LOADED)
12A05
VENT ORIFICE

WHITE PLASTIC DISK
COVERING PLUNGER
BLACK SIDE UP

BEING REPLACED BY M-20 ETC
NO SPRING ON TOP OF PLUNGER
DIRECT ACTING, POWERS OPEN

ES350 N.C. VALVE
DJ-60, 100, 140
HIGH TURNDOWN UNITS ONLY

- SET HIGH FIRE MAIN RV REGULATOR
- SET LOW FIRE AT LOW FIRE ADJUSTMENT

 GAS FLOW

LOW FIRE
ADJUSTMENT NO COVER
VENT HOLE (MUST BE
PLUGGED IF VALVE IS
TOP LOADED)
12A06
VENT ORIFICE

WHITE PLASTIC DISK
COVERING PLUNGER
BLACK SIDE UP

NO SPRING ON TOP OF PLUNGER
DIRECT ACTING, POWERS OPEN
LOW FIRE LOCK RING MUST BE TIGHT

M420, M520, AND M620
N.C. VALVE
DJ-20, 40, 60, AND 100
STANDARD AND HIGH TURN DOWN UNITS

- SET HIGH FIRE MAIN RV REGULATOR
- SET LOW FIRE AT TOP ADJ ZERO V
- THEN ADJUST LOW FIRE AT 2.25 VDC
AT BOTTOM/SIDE LOW FIRE ADJUSTMENT
USING HT BURNER SETUP DETAIL

 GAS FLOW

TOP ADJ.
SILVER OR BRASS LOW
FIRE ADJUSTMENT NO
COVER W/ LOCK RING
VENT HOLE (MUST BE
PLUGGED IF VALVE IS
TOP LOADED)
LOCATION BOTTOM/
SIDE FOR SECOND
LOW FIRE ADJUSTMENT
BYPASS

WHITE PLASTIC DISK
COVERING PLUNGER
BLACK SIDE UP

SPRING ON TOP OF PLUNGER
POWER DRAWS PLUNGER UP
REVERSE ACTING, POWERS CLOSED

MR410, MR510 AND MR610
N.O. VALVE
DJ-20, 40 WITH A1010 AMPLIFIER
DJ-60 WITH DJT MODULE
"PACKS" XE AND RT WITH MAXITROL
A1010 AMPLIFIER

- SET HIGH FIRE MAIN RV REGULATOR
(REFER TO DJT-2 MANUAL)
- SET LOW FIRE AT LOW FIRE ADJUSTMENT

 GAS FLOW

BRASS LOW FIRE
ADJUSTMENT NO COVER
VENT HOLE (MUST BE
PLUGGED IF VALVE IS
TOP LOADED)
12A06
VENT ORIFICE

BRASS DISK COVERING
PLUNGER BLACK SIDE UP

SPRING ON TOP OF PLUNGER
REVERSE ACTING, POWERS CLOSED

SR500 N.O. VALVE (24 VAC)
DJ-20, 40 TWO STAGE
ROOM CONTROL
0 VOLTS - HIGH FIRE
24 VOLTS - LOW FIRE

- SET HIGH FIRE ON LARGE BRASS
SCREW ADJUSTMENT
- SET LOW FIRE ON SMALL BRASS
SCREW ADJUSTMENT

 GAS FLOW

BRASS LOW FIRE
ADJUSTMENT NO COVER
VENT HOLE
12A06

BRASS DISK COVERING
SPRING, UNDER SPRING
IS PLUNGER, SILVER
SIDE UP

NO SPRING ON TOP OF PLUNGER
REVERSE ACTING, POWERS OPEN

ES345D-L
DJ-140 HIGH TURNDOWN ONLY
1050 - 1400 MHZ

12A06
TO BE REMOVED AND TOP LOADED
FROM BURNER BOX

RUN 1/4" Ø ALUMINUM
TUBING THROUGH
7/8" Ø KNOCKOUT

HIGH FIRE REGULATOR

 GAS FLOW

WHITE PLASTIC DISK COVERING
PLUNGER BLACK SIDE UP

SET LOW FIRE AT LOW FIRE
BYPASS*, AND THEN ADJUST
LOW FIRE AT 2.25 VDC AS
PER SETUP PROCEDURE*

* LOW FIRE
BYPASS ADJUSTMENT

GAS VALVE DETAILS MAXITROL GAS VALVES

EngA
®

ENGINEERED AIR
®

REVISIONS: NOV 5/98

DATE:	DRN.BY:	CHKD.BY:	DRWG.NO.:
APRIL 21/97	ALW	WP	