Despatch

E-34
Rev. 8/86
061960

Despatch Digitronic Control Technical Data

DESCRIPTION (1.0)

The Digital Readout Temperature Controller is a time proportioning temperature controller with a 3-digit display for reading set point and sensor temperature. The controller uses a Type "J" thermocouple sensor and external set point potentiometer. There are three versions of this control; the 61-06-AL model and the 61-06-AR/61-06-AT enhanced models. The enhanced models include °C/°F selector switch, soak contact and adjustment potentiometer.

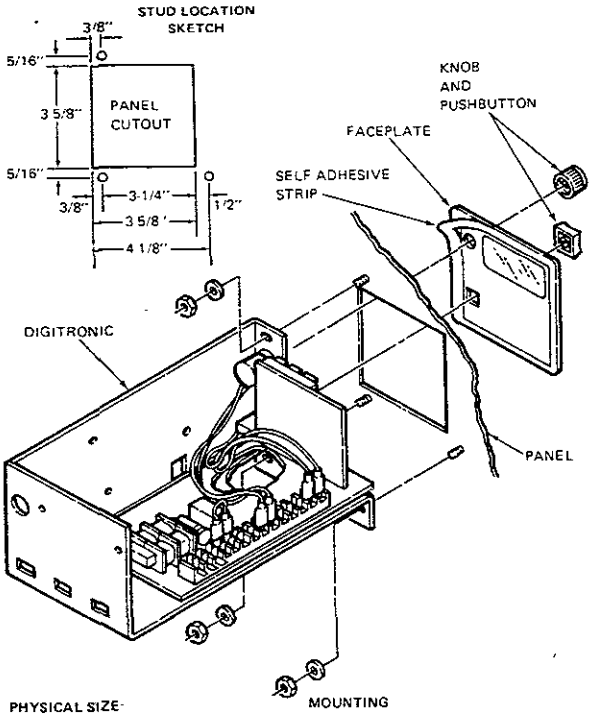
OPERATION (2.0)

The controller features an internal multiplexer which in normal operation displays setpoint for approximately 3 seconds and sensor temperature for 7 seconds. An additional indicator will also light whenever the setpoint is displayed. The display will show setpoint continuously when the push-to-set pushbutton is pushed. The display will resume normal operation when the pushbutton is released.

The controller is a single-mode time proportioning with manual reset.

The controller outputs are designed to operate either external solid state contactors, or rectifiers, and/or a proportioning motor.

The unit can be interfaced with computer or microprocessor (optional terminal strip required for 61-06-AL/61-06-AR models). The input setpoint voltage is 0-5 VDC and the signal conditioner output voltage is also 0-5 VDC.



PHYSICAL SIZE

10-1/8" Deep, 5" Wide, 5 1/8" High	Control Mounting Bracket	
4-1/4" Wide, 4" High, 3/32" Thick	Faceplate	

Knob and Pushbutton protrude about 5/8" from front

MOUNTING

The Digitronic is a panel mount instrument. The Panel Cutout is 3-5/8" x 3-5/8" (1/4 DIN)

The Control must be mounted behind the panel on three studs as shown on the stud location sketch

The Faceplate has self adhesive strips on all four sides for easy mounting

(61-06-AR Mounting shown above)

SPECIFICATIONS (3.0)

Operating Ambient Temperature — 50°F to 140°F.

A.C. Power Source — 115 volts, 50/60 Hz., ± 10%.

Power Consumption — Less than 8 V.A.

Display — 3 digit L.E.D. display featuring 0.5" high numerals.

Setpoint Range — 50°F to 999°F, +10°C to +540°C, uses external 5K potentiometer or 0-5 VDC input signal.

Setpoint Calibration — Linear, 5 mv/°F, 5 mv/°C.

Setpoint Potentiometer — External 5K, ± 5%, 10 Turn.

Push-To-Set Switch — External S.P.N.O, switch, dry circuit contacts. When pressed will connect digital indicator to setpoint circuit.

Sensor — Type "J" thermocouple.

Signal Conditioner Calibration — Linearized signal conditioner over the range 50 to 1000°F or +10 to +540°C. Accuracy ± 2°F over 1000°F span. (.2%)

Control Mode — Time proportioning with manual reset.

Cycle Rate — 1 second typical

Manual Reset — Adjustable over the range of ± 10°F and ± 10°C. This will provide offset correction allowing alignment of setpoint and displayed temperature.

Proportional Band — Fixed at 5°F. Can easily be changed by soldering resistor to terminal lugs on P.C. board. Consult factory for resistor valves corresponding to other band widths.

Repeatability & Setability — ± ½ degree

OUTPUTS (4.0)

Control Output:

Zero crossover signal output for gating external triac assembly. This signal is optically isolated from controller circuitry. Rating 115/230 volts, 50/60 Hz.

A D.C. current signal of 5 mA is also provided for operating external solid state contactors when zero crossover output is not used.

Prop. Output

Signal — Proportional D.C. voltage of −10 to +10 volts. The proportioning band of controller is normally within 0 to 5 volts. Will operate Honeywell M774D or M744J control motor.

Soak

Contact — This contact can be used to start a timer or energize a relay at setpoint. The contact can be varied in relationship to setpoint ±9°F by adjusting the SOAK ADJ pot.

Signal Conditioner

Output — Calibrated (5 mV/°F, 5 mV/°C) for driving external meters or microprocessors. Minimum load impedance of 2K ohms required.

MANUAL RESET AND SOAK ADJUSTMENT (5.0)

When operating the oven at different temperatures and damper settings, the setpoint may vary from the oven temperature.

Manual Reset (5.1)

Align these two readings as follows:

1. Turn oven ON and allow the oven to cycle off and on at the desired setpoint for 15 minutes.
2. See figures 1A & 1C. If the oven temperature is below the setpoint on the display, turn the trim pot marked offset clockwise. If the oven temperature is above the setpoint, turn OFFSET pot (61-06-AL) or RESET pot (61-06-AR/61-06-AT) counter clockwise. 1/16 turn of the pot is equal to approximately 1°C (2°F). Adjust until both read the same.

Soak (5.2) (61-06-AR/61-06-AT Only)

The SOAK ADJ. Pot will vary the NO SOAK contacts opening or closing in relationship to the setpoint.

TESTS (7.0)

WARNING — HIGH VOLTAGE IS PRESENT ON TERMINALS. VOLTAGE CHECKS TO BE MADE ONLY BY QUALIFIED ELECTRICAL MAINTENANCE PERSONNEL: E.G., ELECTRICIAN OR TECHNICIAN. FAILURE TO HEED THIS WARNING CAN RESULT IN SERIOUS BODILY INJURY, PROPERTY DAMAGE, OR DEATH.

Thermocouple Test (7.1)

1. Place a jumper or short the terminals "TC+" and "TC−" on the control. The display should read ambient temperature and be very stable.
2. Replace the control if the unit is not stable (see Section 10.0 on Rebuilt Controls).

Control Output Test (7.2)

1. If LED 41 (Figure 1B) is on continuously and setpoint is below ambient temperature.
2. Disconnect line power from the control.
3. Remove the jumper or leads attached to terminals + and − on the control.
4. Attach a multimeter with internal impedance greater than 10,000 OHMS/volt DC across these terminals.
5. Set meter to 30 VDC range.
6. Reconnect line power to the control.
7. The meter should read approximately 10 VDC when the sensor readout is 10°C below setpoint and 0 VDC when the readout is 10°C above setpoint. The voltage should be fluctuating when both the sensor and setpoint readouts are the same.
8. Replace control if the unit does not respond as above (see Section 9.0 Calibration, and Section 10.0 on Rebuilt Controls).

TROUBLE SHOOTING (6.0)

For additional information or assistance, call our Customer Service Department (800/328-5476); in Minnesota 800/462-5396.

	PROBLEM	PROBABLE CAUSE	SUGGESTED REMEDY
	Erratic Sensor Readout	Broken T/C	See Thermocouple Test (7.1 & 8.0)
		Control Malfunction	See Control Output Test (7.2)
	Erratic Setpoint Readout	Bad Slide Wire on 5K Potentiometer	See Potentiometer Test (7.3)
		Control Malfunction	See Control Output Test (7.2)
	Inaccurate Temperatures	Control Miscalibration	See Calibration Procedure (9.0)
Decimal Points Between the Numerals or EEE	Sensor Readout	Thermocouple is Open or Broken	See Thermocouple Break Protection (8.0)
	Setpoint Readout	Overrange	Lower Setpoint Potentiometer or Input Signal Voltage
	Unstable Control	Damper Motor is Hunting (Constantly Opening & Closing)	Adjust Damper Motor ADJ Pot to Close Damper Motor.

POTENTIOMETER TEST (7.3)

61-06-AL and 61-06-AR only

Control (7.3.1)

1. Most controls have a bypass resistor across terminals P_1 and P_2 to limit the maximum operating setpoint temperature.
2. Remove one potentiometer lead leaving the bypass resistor across P_1 and P_2. The setpoint display will increase to approximately 200° to 400°, but the readout should be stable.
3. Replace control if the readout still is not stable (see Section 10.0).
4. See Section 7.3.2 if the readout is stable.

Setpoint Potentiometer (7.3.2.)

1. Turn the pot all the way clockwise and then all the way counter clockwise several times. This should remove any dust or dirt from the slidewire. The setpoint should be stable
2. Replace pot if the readout is still not stable.

THERMOCOUPLE BREAK PROTECTION (8.0)

The Digitronic control will shut off power to the outputs when the thermocouple is open or broken.

1. Replace with Type "J" (iron/constantan) thermocouple.
2. The white lead attaches to "+" terminal and the red lead attaches to the "−" terminal.

CALIBRATION PROCEDURE (9.0)

61-06-AL (9.1)

1. Disconnect line power to the control.
2. Attach an accurate potentiometer with a millivolt of Type "J" thermocouple output to the "TC+" and "TC−" terminals on the control (see Section 12.1).
3. Attach a multimeter with internal impedance greater than 10,000 OHMS/volt DC across terminal + and − on the control. Remove jumper, if one was installed.
4. Set meter to 30 VDC range.
5. Turn the line voltage on.
6. Set offset, bal. adjust, and FS adjust to mid range. See Figure 1A.
7. Turn millivolt source to 0.0°C or °F. Adjust zero pot on control when necessary, if the readout is not the same.

MAXIMUM SET TEMPERATURE

Refer to Paragraph 7.3.1 entitled "Potentiometer Test; Control."

The values of the bypass resistors used to limit the maximum operating setpoint temperature and connected across terminals P_1 and P_2 are as follows:

OHMS	°C	°F
None	540	999
7.5K	350	650
4.3K	260	500
3.0K	210	410

8. Turn millivolt source to 538°C (1000°F). Adjust span pot on control when necessary if readout is not the same.
9. Turn millivolt source to 150°C (302°F).
10. Adjust the FS adjust pot if the readout is not 150°C (302°F). Turn the FS adjust clockwise to turn the readout down.
11. Turn the control setpoint pot (5K) until the meter is fluctuating at about 50% on and 50% off.
12. If the setpoint readout is not 150°C (302°F) adjust the bal. adjust until the setpoint is 150°C (302°F). Turn the bal. adjust pot clockwise to turn the setpoint up.
13. Repeat steps 11 and 12 until the setpoint and sensor temperature both read 150°C and the meter is fluctuating at 50%.
14. Disconnect all power, leads and re-install jumper if necessary.
15. Place nail polish on the zero, span, FS adjust, and bal. adjust pots.

61-06-AR/61-06-AT (9.2)

1. Disconnect line power to the control.
2. Attach an accurate potentiometer with an ambient compensated millivolt of Type "J" thermocouple output to the "TC+" and "TC−" terminals on the control (see Section 12.2).
3. Set Digital Voltmeter (DMV) to 30 VDC range.
4. Turn the line voltage on.
5. Set reset and soak adjust pots to mid range. See Figure 1B & 1C.
6. Set °C/°F switch to °C. Allow unit to warm up 15 minutes before calibration.
7. Connect digital voltmeter (DVM) from COM (−) J69 Plug Pin #4 to W113 (+). Set millivolt source to 0°C (0.00 mv). Adjust °C lo pot for 0.00V +/− .005V on DVM. Adjust zero pot for 000 on display when LED (6) indicator on the front of the control is off.
8. Set millivolt source to 540°C (29.64 mv). Adjust °C hi for 2.700V +/− .005V on DVM. Adjust F.S. pot for 540 on display when LED (6) indicator is off.
9. Repeat steps 7 and 8 as necessary.
10. Set millivolt source to 260°C (14.11 mv), display should read 260 +/− 1 with LED (6) indicator is off.
11. Set °C/°F switch to °F.
12. Set millivolt source to 32°F (0.00 mv). Adjust °F lo pot for 32 on the display when LED (6) indicator is off.
13. Set millivolt source to 990°F (29.20 mv). Adjust °F hi pot for 990 on the display when LED (6) indicator is off.
14. Repeat steps 12 and 13 as necessary.
15. Set millivolt source to 500°F (14.11 mv), display should read 500 +/− 1 when LED (6) indicator is off.
16. Connect DVM from COM (−) J69 Plug Pin #4 to W116(+). Adjust set pot (see figure 1C) for 2.500V on DVM. With set point switch depressed, adjust the balance pot for 500 on display.
17. Adjust the reset pot until the load is cycling 50 percent. The cycle time should be about 1 second +/− ¼ second. LED (41) should cycle with the load.
18. Disconnect all power and leads if necessary.
19. Place nail polish on the zero, °C/°F Hi & Lo, FS adjust, and bal. adjust pots.
20. Place °C/°F selection switch to desired setting.

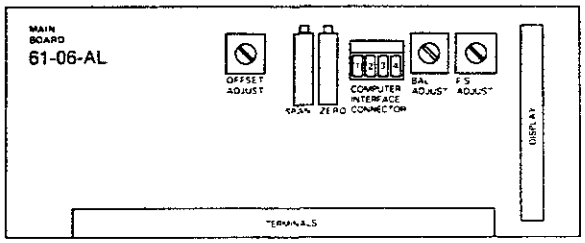


Figure 1A

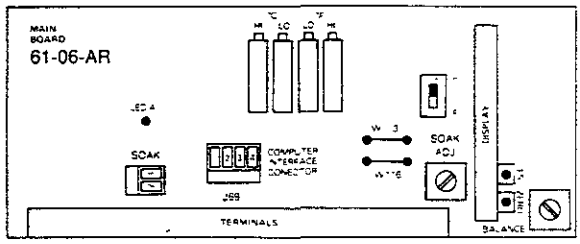


Figure 1B

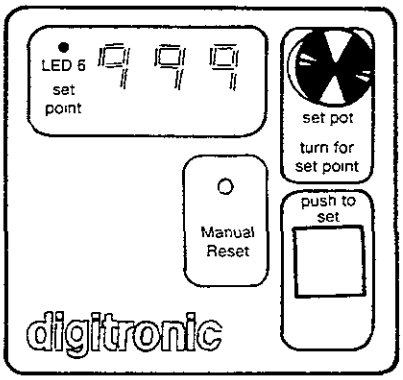


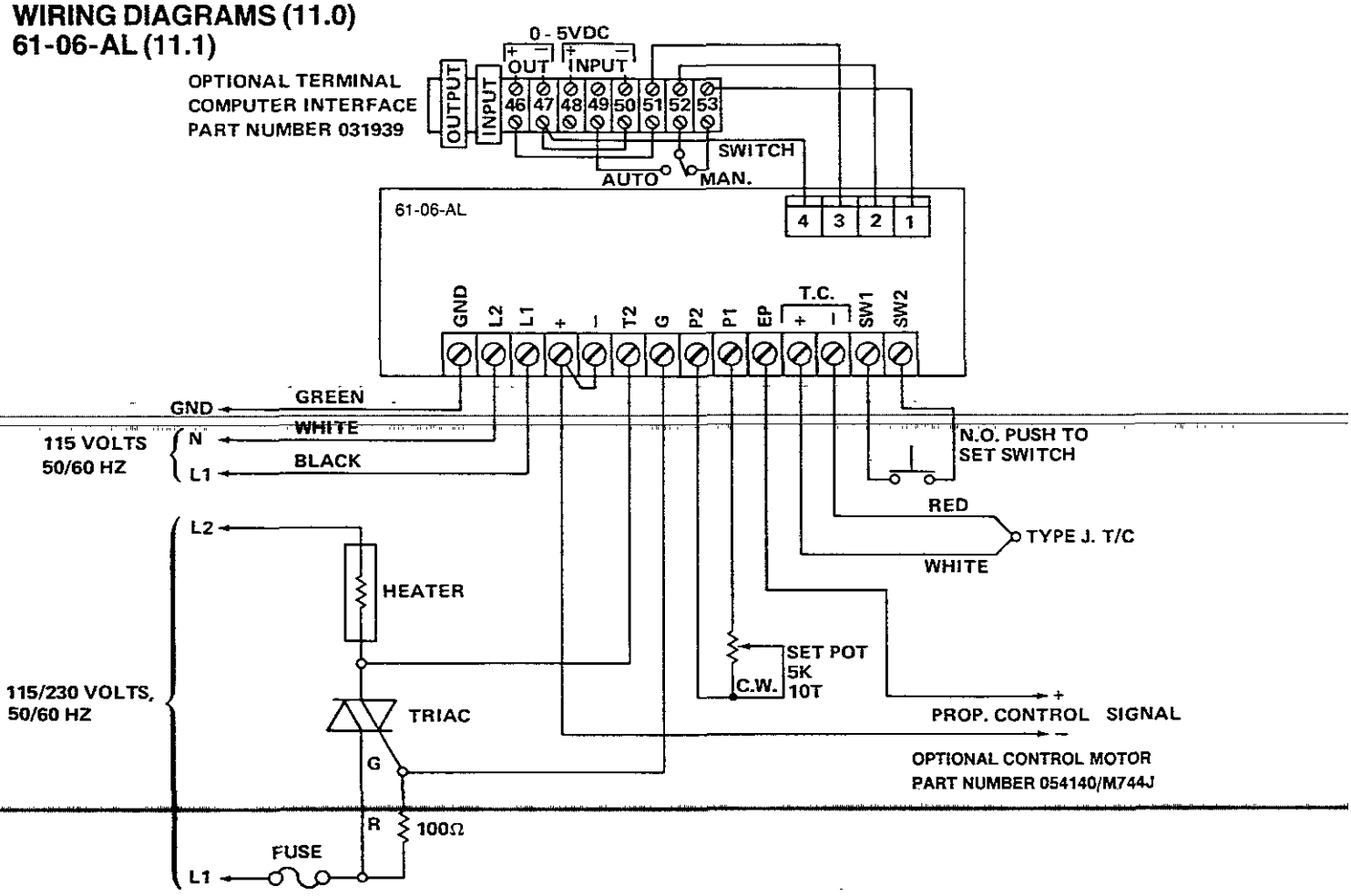
Figure 1C

COMPUTER INTERFACE (10.0)

The control is designed to accept a 0-5 VDC (1 MA at 5 volts) analog signal that will program the set-point. The feedback or temperature signal is also a analog 0-5 VDC from the signal conditioner. 5 VDC signal corresponds to 1000 engineering units (5 mV/unit). Part number 055091 is an optional terminal which is required to accomplish this interface with a microprocessor or computer 61-06-AL and 61-06-AR models only (see Figures 2 and 4). No additional terminal strip is required for the 61-06-AT.

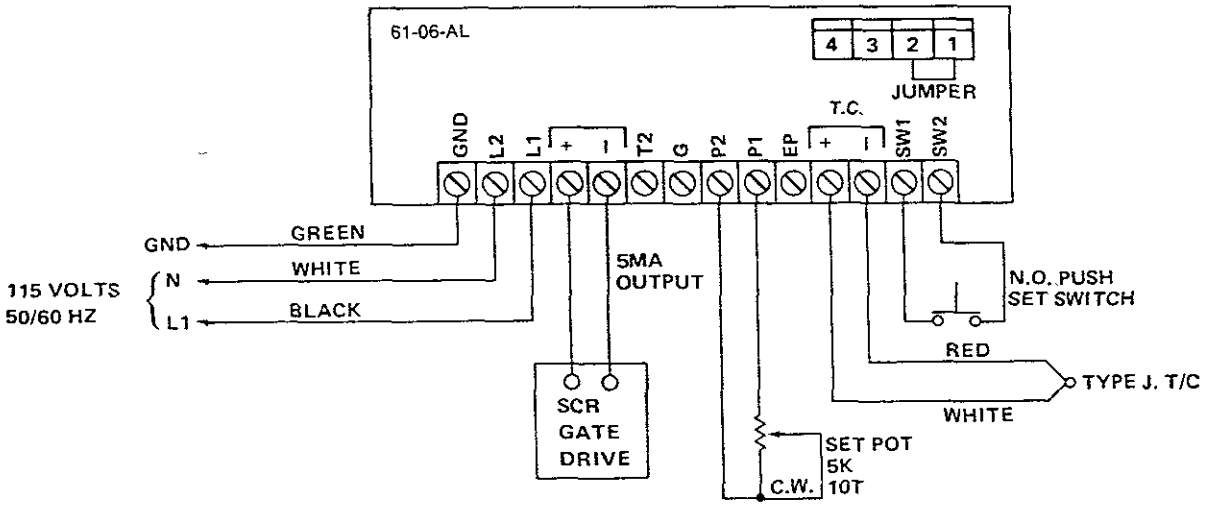
WIRING DIAGRAMS (11.0)

61-06-AL (11.1)



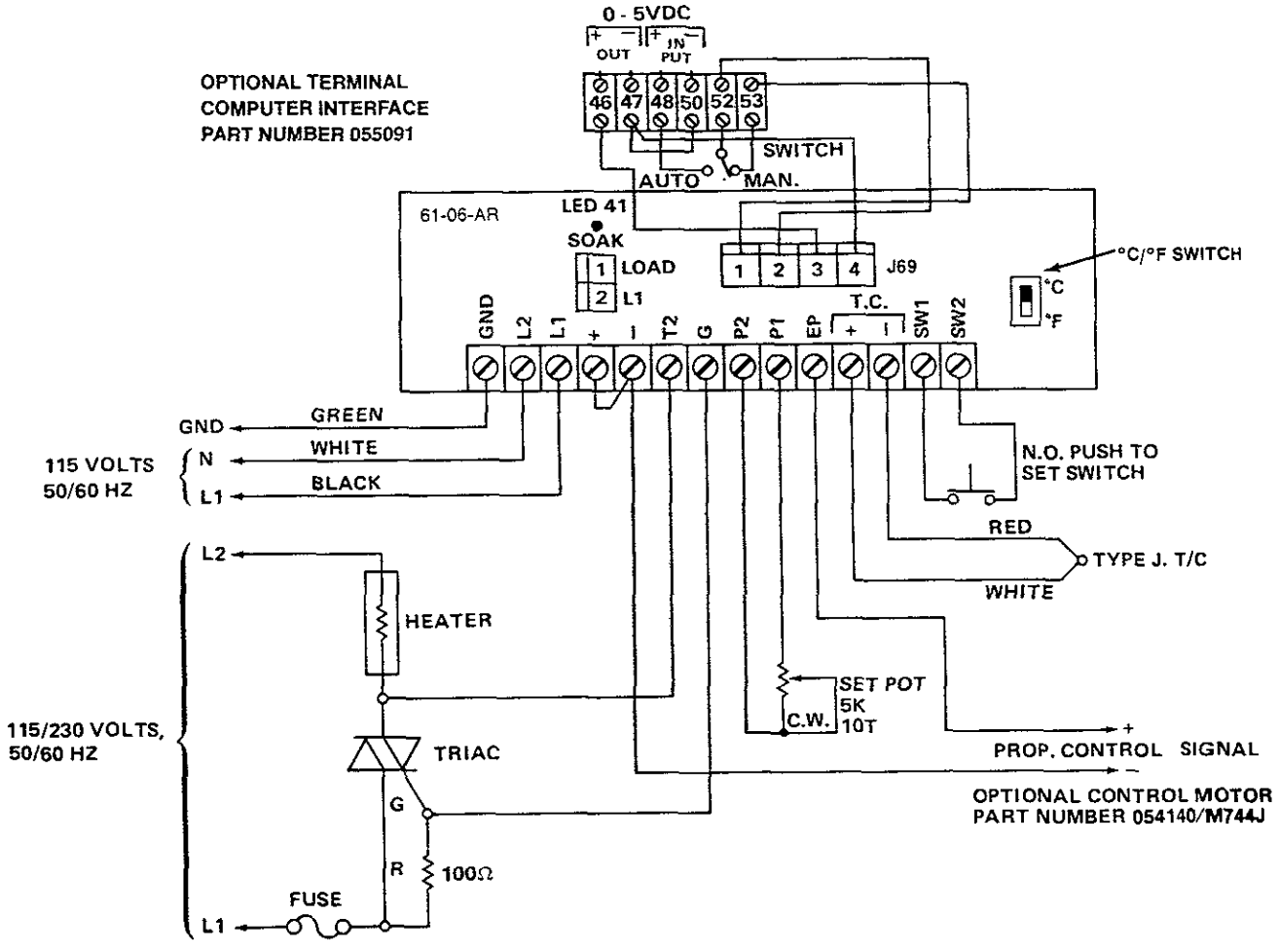
CONNECTIONS FOR TRIAC. & COMPUTER INTERFACE

Figure 2

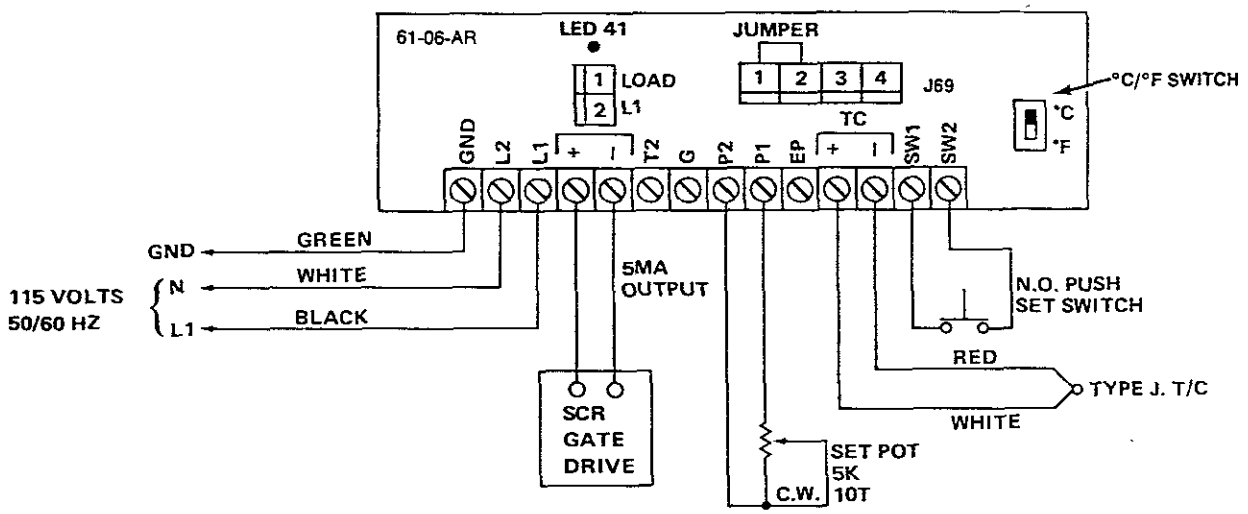


CONNECTIONS FOR EXTERNAL GATE DRIVE
Figure 3

61-06-AR (11.2)

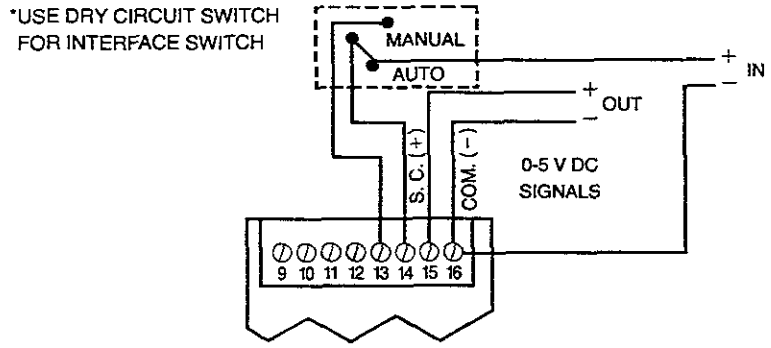


CONNECTIONS FOR TRIAC. & COMPUTER INTERFACE
Figure 4

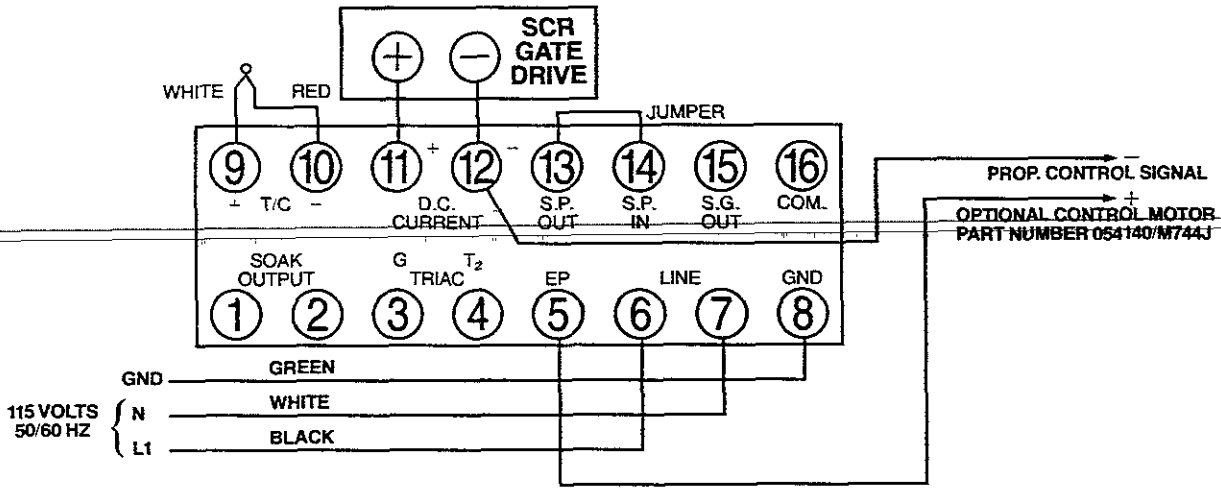


CONNECTIONS FOR EXTERNAL GATE DRIVE
Figure 5

61-06-AT (11.3)



OPTIONAL COMPUTER INTERFACE
Figure 6



CONNECTIONS FOR EXTERNAL GATE DRIVE
Figure 7

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