

*Asphalt Equipment***BCS-3000G
TABLETOP
BURNER CONTROL SYSTEM****TABLE OF CONTENTS**

<u>Subject</u>	<u>Page</u>
A. General Information	2
B. Receiving and Inspection	3
C. Installation	3
D. Adjustments	7
E. Final Checkout	9
F. Panel Operation	10
G. UDC300E-E Microprocessor Temperature Controller	12
H. Configuration Record Sheet	14
I. Recommended Spare Parts	16

These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.

DRAWINGS AND SUPPLEMENTAL LITERATURE

Panel Assembly, Dual Temperature Control	CY4466
System Schematic	CX4465
Wiring Diagram	CY4467
Panel Assembly, Tabletop Recorder	CW4468
Panel Assembly, Tabletop Dual Recorder	CY4376
Panel Assembly, Tabletop Triple Recorder	CY4663
Wiring Diagram, External Components & Junction Box	CY3442
Troubleshooting Flowchart	CX4481

CAUTION

DO NOT USE A BURNER CONTROL MOTOR WHICH INCORPORATES A 24-VOLT TRANSFORMER WITH THIS PANEL.

If you are retrofitting this panel to an existing system, it may be necessary to remove the cover(s) from your existing control motor to determine whether or not it incorporates the transformer. If it does, physically remove the transformer or, at a minimum, cut/remove all leads originating from the transformer and tape them to prevent accidental shorting or grounding.

IF A CONTROL MOTOR WITH A 24-VOLT TRANSFORMER IS CONNECTED TO THIS PANEL, EXTENSIVE DAMAGE TO THE MODEL UDC300E-E MICROPROCESSOR TEMPERATURE CONTROLLER WILL RESULT.

The BCS-3000 is compatible with Barber-Colman medium and high torque motors. Other actuators may require revised electrical hookup.

A. GENERAL INFORMATION

The BCS-3000 tabletop control panel provides burner management and temperature control of a single pilot-ignited burner firing on either gas or oil. The spark ignited, gas fired pilot is interrupted after the main burner flame has been established. Two Honeywell UDC300E-E series microprocessor based controllers are provided for temperature control. The temperature controllers are electrically linked to the burner control motor to automatically adjust the burner firing rate to keep the process temperature near setpoint.

The **STACK TEMPERATURE** controller thermocouple senses the temperature of the exhaust gases while the **MATERIAL TEMPERATURE** controller thermocouple is positioned to read the temperature of the material as it exits the dryer. Both instruments generate a motor positioning output based on the difference

between the controller setpoint and process temperature input. The **CONTROL MODE** selector switch enables the Operator to assign control of the burner to either controller. An alarm contact in the **STACK TEMPERATURE** controller is used to shut down the system if the preset high temperature limit is exceeded.

CAUTION

If the process system, such as a rotary dryer application, has a fabric filter dust collector (baghouse), consult the manufacturer for recommended baghouse temperature limitations.

See Section G, Example 3 for entering the desired Alarm Setpoint.

B. RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination should be made to ascertain if there has been any damage in shipment.

IMPORTANT

For optimum use of the Hauck panel, it is suggested that the Hauck drawings provided be referred to for recommended switch and valve installation and wiring. In the event any recommended switch application is not utilized, it will be necessary to connect a jumper wire(s) between appropriate terminals on the control panel or burner junction box, as applicable. Such determination remains the responsibility of the customer, based upon his application, accepted safe installation and operating procedures, and any applicable governmental regulations.

C. INSTALLATION

1. Locate the panel on a firm support in an area which is protected from the weather and free of vibration.

IMPORTANT

The operating specification of 32-142°F., 5-95% relative humidity, noncondensing, should be considered in selecting the location for the panel.

2. Provide 120 Vac single phase GROUNDED NEUTRAL power to the burner control panel. It is recommended that the customer provide and install a master disconnect switch to interrupt power service to the panel. Maintain polarity as indicated on the drawings provided when wiring the main power

source to the panel.

3. Install a heavy gauge (No. 12 AWG minimum) ground wire between the panel ground terminal and "Earth" ground. Install and wire the burner and system limit switches, fuel valves, flame scanners, ignition transformer, and other associated components as shown in the drawing provided. SEE THE CAUTION (page 3) pertaining to certain aggregate drying applications.
4. Install the Hauck stack temperature thermocouple, as applicable, in the dryer exhaust duct to sense exhaust gas temperatures. Install the thermocouple as detailed in figure 1.

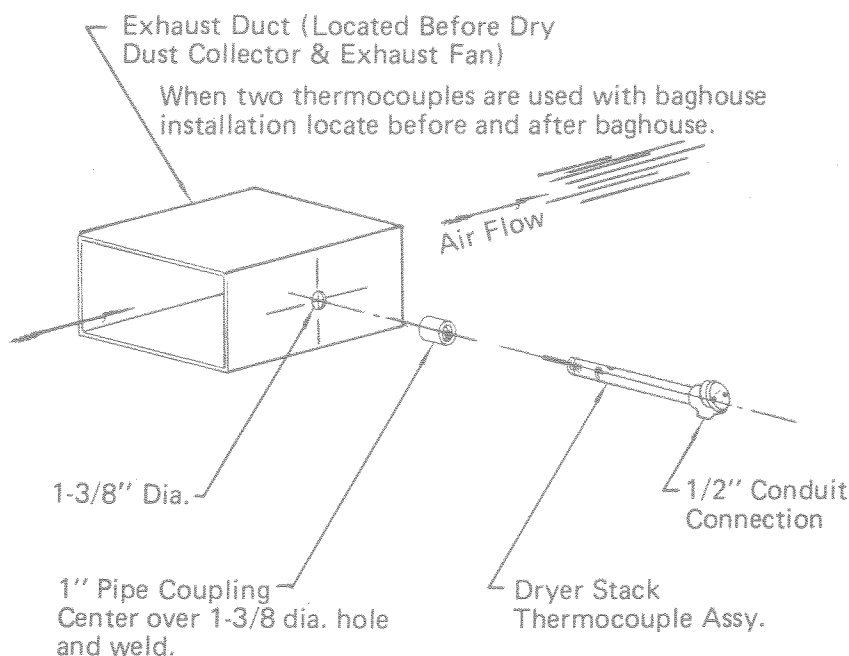


Fig. 1 - Drawing showing placement of thermocouple in exhaust duct.

IMPORTANT

RUN THE THERMOCOUPLE LEAD WIRE SEPARATE FROM ALL OTHER CABLES TO AVOID INTERFERENCE TO THE T/C SIGNAL. The thermocouple wire is iron constantan; the constantan wire (red) connects to the negative terminal and the iron wire (white) connects to the positive terminal. If there is any doubt about the identity of the wires, the iron wire can be identified since its magnetic and the constantan is not.

5. Install a Hauck Rapid Response Material Temperature Thermocouple in the material discharge chute to sense the temperature of the material leaving the dryer. The thermocouple should be installed as shown in figure 2.

6. Wire the thermocouples to the proper terminals in the panel.

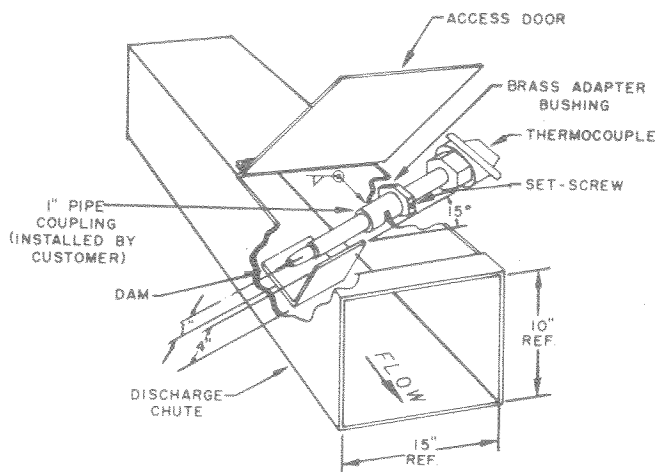


Fig. 2 - Drawing showing the placement of the thermocouple and "dam" in the dryer discharge chute.

IMPORTANT

A small clearance (1" maximum) should be provided under the thermocouple so material will not be trapped between the thermocouple and the chute. Trapped material will cause a heat loss path and the thermocouple will give erroneous readings.

The thermocouple should make good contact with the material but not be subject to severe abrasion caused by high velocities. If the material is moving so fast that it bounces and leaves air adjacent to the thermocouple, the temperature it senses will be lower than the material. It may be necessary to place a dam in the chute so that the thermocouple is in a relatively slow moving area next to the dam. The dam must only be wide enough and high enough to create a localized area of build-up where the material loses velocity BUT DOES NOT STOP FLOWING. The thermocouple must not be located in a stagnant zone or erroneous temperature readings will result. Because of the large number of variables involved, it is impossible to set down any exact size or location of the dam that will always work. Field experimentation will be necessary if good results are to be obtained. It is advisable to tack weld the dam in place so that it can be easily modified if it fails to perform satisfactorily.

NOTE

During normal operation, the thermocouples should be rotated once a month to expose a different area of its surface to the abrasive forces of the material. This procedure will increase the effective life of the thermocouple. If excessive wear occurs, a protective tube may be added to shield the shaft in the region of the high velocity flow.

NOTE

The thermocouple lead wires should be run separately from all other wiring. If run with other cables, stray currents could cause false readings.

7. Mount the flame scanner(s) on the burner and wire the unit(s) into the panel.

NOTE

The scanner cable(s) from the burner to the panel must be run separately from all other cables. If run with other cables, stray currents could cause false scanner readings and nuisance shutdowns.

8. Mount the exhaust fan flow switch in the dryer exhaust duct as shown in figure 3.

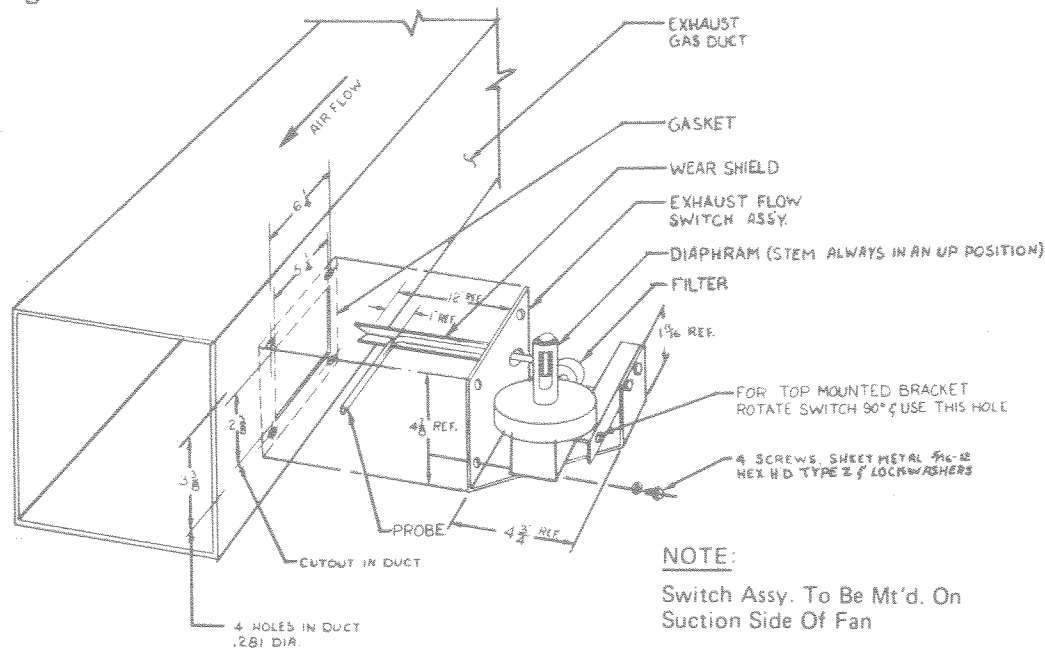


Fig. 3 - Drawing showing the installation of the exhaust fan flow switch.

9. Wire the exhaust flow switch to the appropriate terminals. The exhaust flow switch is an interlock which requires the exhauster to be operating prior to ignition of the burner.
10. If gas is used to fire the burner, wire the automatic valves and switches in the gas supply line to the appropriate terminals. On oil and LP fired systems, these units are normally prewired at the factory.
11. Wire the control cable to the control panel. Wire the other end of the control cable to the burner junction box, (if applicable).

12. Wire the suggested interlocks to the panel. Wire the other end of this cabling to the appropriate motor starter. Wire the cable to the interlocks as follows:

<u>Starter Interlock</u>	<u>Wire Numbers</u>	
Combustion Blower	20	40
Exhaust Fan (if applicable)	27	41
Tertiary Air Fan (if applicable)	43	44

NOTE

Motor starter interlocks must be dry contact switches. DO NOT USE OCCUPIED INTERLOCKS. The interlock must be dedicated to the control panel function.

SPECIAL NOTE

Those customers utilizing Hauck start-up service should STOP at this point. The balance of the installation will be completed when the Hauck service technician is on site.

D. ADJUSTMENTS

Please read section G to familiarize yourself with the operation of the UDC300E-E Temperature Controller before proceeding with the following adjustments:

1. Calibrate the UDC300E-E **MATERIAL TEMPERATURE** Controller for 0 & 100% motor position as follows:
 - a. Make sure the panel **POWER** switch is in the **OFF** position.
 - b. Carefully remove relay R4 from the Master Control Printed Circuit Board.
 - c. Install a **TEMPORARY** jumper wire between terminals 18 and 54 on the Master Control Board. This will allow the burner control motor to be driven without firing the burner.
 - d. Turn the panel **POWER** switch **ON** and place the **CONTROL MODE** selector switch in the **MATERIAL** position.
 - e. Confirm that lockout in tuning set up group is set to "NONE" and that **OUT ALG** in algorithm set up group is set to **POSITION**.
 - f. To enter calibration mode:
Press **[SET UP]** key until the upper display reads **CALIB** and lower display reads **POSITION**.
 - g. Set motor traverse time:
Press **[FUNCTION]** until the upper display shows a numerical value and the lower display shows **MTR TIME**. Press the **[▲]** or **[▼]** arrow keys until the proper motor stroke time is reached. (See motor specs or measure time.) **NOTE:** Setting range is 5 to 1800 seconds.
 - h. Press **[FUNCTION]** key until upper display is at **DISABLE** and lower display is **POS PROP**.
 - i. Press **[▲]** or **[▼]** to change upper display to **DO AUTO**.
 - j. Press **[FUNCTION]** key to activate decrement relay. **ZERO VAL** will appear on the lower display. The motor will move to the 0% position. When the motor stops the display should stop counting.

- k. Press **[FUNCTION]** key to activate the increment relay. **SPAN VAL** will appear on the lower display and the motor will move to the 100% position. When the motor stops the display should stop counting.
 - l. Press **[FUNCTION]** key to store 100% value.
 - m. Press **[LOWER DISPLAY]** or **[SET UP]** key to exit calibration mode.
2. Move the **CONTROL MODE** selector switch to the **STACK** position and repeat steps e thru m above for the **STACK TEMPERATURE** controller.
 3. Verify the setpoint of the High Stack Temperature Limit alarm in **BOTH** controllers as follows:

CAUTION

If the process system, such as a rotary dryer application, has a fabric filter dust collector (baghouse), consult the manufacturer for recommended baghouse temperature limitations.

- a. Press and hold the **[SET UP]** key until the display reads **SETUP ALARMS**.
- b. Press the **[FUNCTION]** key once to change the lower display to **A1S1 VAL**. The upper display will show the current alarm set point. Use the **[▲]** or **[▼]** arrow key to change to the desired High Stack Temperature Limit set point.
- c. Press the **[LOWER DISPLAY]** key to exit the Set Up mode and return the controller to normal operation.

IMPORTANT

The two UDC300E-E controllers are interchangeable. In the event of a Stack controller failure the Material controller can be moved to the Stack Temperature controller housing and burner operation can be continued utilizing **STACK TEMPERATURE** control. Before exchanging instruments **VERIFY THE SETTING OF THE HIGH STACK TEMPERATURE LIMIT ALARM**.

4. Place the Temperature Controller in the Manual Mode and drive the Burner Control Motor to its 0% and 100% positions. Adjust the Burner Control Linkage, if required, to ensure that the Air Control Valve is rotated through its full travel and that the Fuel Control Valve(s) move smoothly from their **LOW FIRE** to **HIGH FIRE** settings.
5. Adjust the Low Fire Limit Switch cam so that the switch contacts are **CLOSED** when the burner is in the 0% position, and so the contact **OPENS** when the burner position is slightly increased.
6. Adjust the Primary Air Limit Switch, if applicable, so that the switch contacts are **CLOSED** when the Primary Air Valve is fully **OPEN**.
7. Turn the panel **POWER** switch to the **OFF** position. **REMOVE THE TEMPORARY JUMPER WIRE FROM BETWEEN TERMINALS 18 & 54 AND REPLACE RELAY R4.**

8. Open the front of the panel and adjust the Purge Timer Potentiometer to obtain the desired Purge Time delay. Four system air changes are required. Multiply the system volume (cu. ft.) by 4. Divide the result by the system purge fan volumetric rate (standard cu. ft. per minute). The result will be the required Purge Time in minutes.
9. Set the internal **FUEL SELECTOR** switch to the desired fuel position.
10. Adjust the remaining limit switches to the values required by your application. Consult the Manufacturer's literature for the proper method of switch adjustment.
11. Final adjustment of the low and high pressure switches should be made at the time of initial startup. To adjust the LOW air pressure switch, reduce the air pressure at the burner until the burner goes out or improper combustion takes place.* The pressure should then be increased by whatever amount is necessary to maintain ignition or the desirable condition.* The LOW fuel pressure switches should also be adjusted to break at a pressure just below that required to maintain burner ignition at the desirable condition.* The HIGH fuel pressure switches should be adjusted to break at a pressure just above that obtained at the burner during correct high fire operation. Refer to vendor literature for correct method of switch adjustment.

***IMPORTANT**

Fuel flows should not exceed the amount of available air for combustion in normal operation in order to prevent formation of carbon monoxide and/or unburned fuel. The fuel flows should be limited by setting the high fuel pressure switches to prevent incomplete combustion in normal circumstances. If atmosphere is of a reducing type (i.e., CO or unburned fuel present), additional safety precautions will dictate the proper setting of the high pressure switches.

E. FINAL CHECKOUT

1. Be sure that all equipment and components have been installed in accordance with the manufacturer's instructions and drawings.
2. Verify that all necessary preliminary adjustments have been made.
3. Be sure all switches and valves are properly installed and correctly wired.
4. Be sure all traps and filters in the system which may have accumulated dirt or other foreign material are cleaned.
5. Make a final check of all fuel and air supply lines for leaks caused by loose fittings, unions, valves, etc.

F. PANEL OPERATION

1. With the panel power **OFF**, open the hinged door and verify that the **FUEL SELECTOR** switch is in the desired position.
2. Open all manual shutoff valves to supply air and fuel to the system.
3. Place the panel **POWER** switch in the **ON** position; the following events will occur:
 - a. The alarm horn will sound. Press the **ALARM SILENCE** pushbutton.
 - b. The burner control motor will drive to its low fire position.
 - c. The Tertiary Air Damper, if applicable, will drive **OPEN** for purge.
4. Start the combustion air blower and other related plant equipment.
5. Place the **CONTROL MODE** selector switch in the **STACK** position and verify the setpoint of both temperature controllers.
6. If all system limits are **CLOSED**, the **LIMITS CLOSED** light will come **ON** and the purge timer will begin its timed delay.
7. Press the **LIMITS SET** pushbutton to energize the limits hold circuit.

NOTE

If a momentary break in the limits circuit causes the system to shut down, the **LIMITS CLOSED** light will come **ON** again as soon as the limits circuit is again satisfied. To aid in troubleshooting, the **LIMITS SET** light will go **OUT** and remain **OUT**. This indicates that the shutdown was caused by one or more of the switches in the limits circuit rather than by a flame failure.

8. After the Purge timer has completed its timed delay; purge latch relay, R1, will be energized and the **PURGE COMPLETE** light will come **ON**. The Tertiary Air Damper, if applicable, will be released to follow the burner fuel control motor.
9. Verify that the burner control valve is in the low fire position.
10. Press and **HOLD** the **PILOT** pushbutton to start the pilot ignition sequence.
 - a. The load relay and safety switch heater of the Honeywell RA890G flame relay will be energized.
 - b. The ignition transformer and pilot solenoid valve will be energized.
11. If a satisfactory flame is recognized by the UV detector:
 - a. The safety switch heater will be de-energized.
 - b. Auxiliary Flame relays, R4 & R5, will be energized.
 - c. The purge timer, 1TR, will be de-energized and reset.
 - d. Alarm Silence relay, R6, will be de-energized, and the flame alarm circuit will be reset.
 - e. The **PILOT ON** light will come **ON**.

12. Release the **PILOT** pushbutton.
13. If a satisfactory flame is not established within the safety time of the RA890G flame relay:
 - a. The safety switch heater will continue to heat until it trips.
 - b. The pilot solenoid and ignition transformer will be de-energized.
 - c. The **RESET** light will come **ON**. It will be necessary to open the access door on the front enclosure and reset the flame relay before proceeding.

CAUTION

It is recommended that power be shut off before opening the control panel. If the panel remains "hot" while resetting the flame relay, exercise **CAUTION** to avoid contact with exposed terminals and wiring.

14. Momentarily move the **MAIN FLAME** switch to the **START** position to ignite the main burner. Main flame hold relay, R3, will be energized and latched on.

AUTOMATIC FUEL VALVE APPLICATIONS

- a. The main fuel and fuel blocking valves will **OPEN** and the gas vent or oil return valve as applicable will **CLOSE**.
- b. Trial for ignition timer, 2TR, will begin its timed delay (10 seconds for gas or 15 seconds for oil).

MANUAL RESET MAIN GAS VALVE APPLICATIONS

- a. The main gas vent valve will **CLOSE** and the gas blocking valve will **OPEN**.
 - b. Manually operate the main gas valve lever to ignite the main burner and begin the 10 second trial for ignition.
15. After the trial for ignition period has been completed:
 - a. The ignition transformer and pilot solenoid valve will be de-energized.
 - b. The **PILOT ON** light will go **OUT** and the **MAIN FLAME PROVED** light will come **ON**.
 - c. Low fire hold timer, 3TR will begin its timed delay.

NOTE

If the main burner fails to ignite within the trial for ignition period the pilot and main fuel valves will **CLOSE** and the alarm horn will sound. Silence the alarm and allow the system to repurge before attempting to relight the pilot and main burner.

16. After the low fire hold timer has completed its delay (5 seconds for gas or oil):
 - a. The burner control motor will respond to the output of the **STACK TEMPERATURE** controller.
17. Start material feed to the dryer and press the **MANUAL/AUTO** key of the **STACK TEMPERATURE** controller to place the controller in the **AUTOMATIC** mode.

18. After the **MATERIAL TEMPERATURE** controller begins to respond to the material exiting the dryer drum, the **CONTROL MODE** selector switch may be moved to the **MATERIAL** position and the **MATERIAL TEMPERATURE** controller placed in the **AUTOMATIC** mode to transfer control of the burner motor to the material controller.
19. To terminate burner operation move the **MAIN FLAME** switch to the **OFF** position and press the **ALARM SILENCE** pushbutton.

G. UDC300E-E MICROPROCESSOR TEMPERATURE CONTROLLER

The UDC300E-E Temperature Controllers have been preset at the factory with tuning parameters which generally produce accurate temperature control. If you experience temperature control problems, **PLEASE CONTACT THE HAUCK SERVICE DEPARTMENT** before adjusting the tuning parameters.

Figure 4 shows the Operator interface of the UDC300E-E. The following paragraphs describe the function of the various displays and keys. Examples are given for changing the Controller Set Point, positioning the Burner Control Motor in the Manual Mode, and changing the High Stack Temperature alarm set point. Additional information on the UDC300E-E is given in the vendor literature.

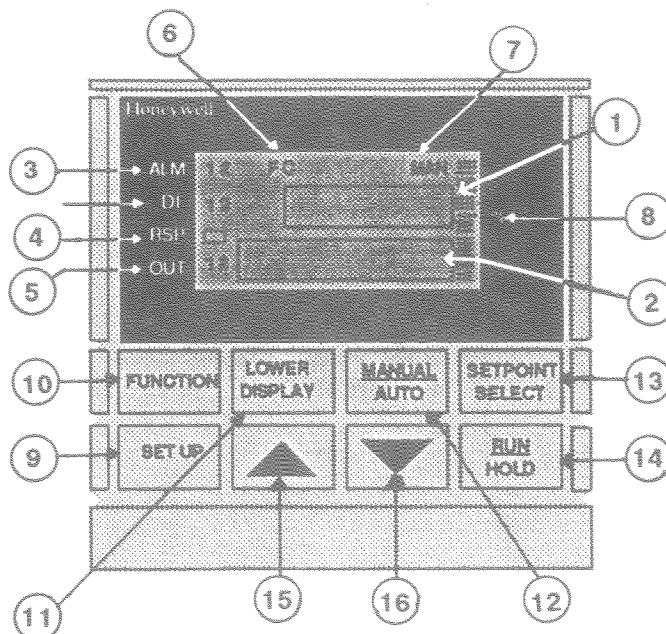


Fig. 4 - UDC300E-E Temperature Controller

1. **UPPER DISPLAY:** Normally shows Process Variable temperature. Also displays parameter values or selections when in the Configuration Mode.
2. **LOWER DISPLAY:** Shows value of Set Point, amount of deviation from Set Point or Motor position in %. Also displays function groups and parameters when in the Configuration Mode.
3. **ALARM 1 INDICATOR:** Lights when Alarm 1 setting has been exceeded.

4. **RSP INDICATOR:** Lights when remote Set Point or 2nd Set Point has been selected.
5. **OUT1, OUT2 INDICATORS:** Shows when Temperature Controller output relay is energized to drive the Burner Control Motor.
6. **UNITS INDICATOR:** Indicates degrees F or degrees C is being displayed.
7. **AUTO/MANUAL INDICATOR:** Indicates A for Automatic or **MAN** for Manual controller mode.
8. **DEVIATION BARGRAPH:** Shows deviation between Process Variable and Set Point. Each bar indicates a deviation of 1% of span (7.5 Degrees F for Type J TC L range).
9. **[SET UP] KEY:** Places the controller in the Set Up mode. Sequentially displays Set Up and Calibration groups and enables the **[FUNCTION]** key to display individual functions within each Set Up group. Selections made in this mode affect the basic operation of the Controller (deg. C or deg. F, Thermocouple type, Alarm type, etc.). These codes have been preset by Hauck and should not be changed without consulting the Hauck service department.
10. **[FUNCTION] KEY:** Used in conjunction with the **[SET UP]** key to select the individual functions within a Set Up group.
11. **[LOWER DISPLAY] KEY:** Selects the operating parameter shown in the Lower Display.
SP: Controller Set Point.
2SP: Second local Set Point when so configured.
DEV: Deviation between Process Temperature and Set Point.
OUT: Burner control motor position expressed as a percentage (0 = Low Fire 100 = High Fire).
Also used to exit the SET UP mode and return the controller to its normal operating mode.
12. **[MANUAL/AUTO] KEY:** Alternately selects Manual or Automatic control mode.
13. **[SET POINT SELECT] KEY:** Alternately selects Set Point 1 or Set Point 2.
KEY ERROR appears if 2nd Set Point is not configured.
14. **[RUN/HOLD] KEY:** Not used.
15. **[▲] KEY:** Used to increase Set Point, % Output or Configuration values.
16. **[▼] KEY:** Used to decrease Set Point, % Output or Configuration values.

EXAMPLE 1: CHANGING THE SET POINT

Press the [LOWER DISPLAY] key until SP and the current set point appears in the lower display.

Press and hold the [▲] key to increase the set point value. To make changes more quickly, press the [▼] key while holding [▲] key. This will shift the changing digit one place to the left.

To decrease the set point value, reverse the above procedure.

EXAMPLE 2: POSITIONING THE CONTROL MOTOR IN THE MANUAL MODE

Press the [AUTO/MANUAL] key to place the Controller in the Manual Mode. The MANUAL indicator will come on and the lower display will automatically change to show % OUT.

Press and hold the [▲] key to increase % Output value. To make changes more quickly press the [▼] key while holding [▲] key. This will shift the changing digit one place to the left.

To decrease the % Output value, reverse the above procedure.

EXAMPLE 3: CHANGING THE ALARM SET POINT

Press and hold the [SET UP] key until the display reads SETUP ALARMS.

Press the [FUNCTION] key once to change the lower display to A1S1 VAL. The upper display will show the current alarm set point. Use the [▲] or [▼] arrow key to change to the desired set point.

Press the [LOWER DISPLAY] key to exit the Set Up mode and return the controller to normal operation.

CAUTION

If the process system, such as a rotary dryer application, has a fabric filter dust collector (baghouse), consult the manufacturer for recommended baghouse temperature limitations.

H. CONFIGURATION RECORD SHEET

Hauck part number 56887 Honeywell model UDC300E-E-000-22-0000-0.

SET UP GROUP	LOWER DISPLAY (FUNCTION)	FACTORY CONFIGURATION	FINAL SETTING
<u>TUNING</u>			
	PROP BAND	15	_____
	RATE MIN	0.00	_____
	RESET RPM	1.00	_____
	SECURITY	0	_____
	LOCKOUT	NONE	_____
	AUTO MAN	ENABLE	_____
	SP SEL	ENABLE	_____
	RUN HOLD	DISABLE	_____
<u>SP RAMP</u>			
	SP RAMP	DISABLE	_____
	SP RATE	DISABLE	_____
	SP PROG	DISABLE	_____
<u>ALGORITHM</u>			
	CONT ALG	PID A	_____
	OUT ALG	POSITION	_____
	RLY TYPE	MECHANICAL	_____
<u>INPUT 1</u>			
	DECIMAL	X X X X	_____
	UNITS	DEG F OR DEG C	_____
	IN 1 TYPE	J TC LOW	_____
	IN 1 HIGH	770 F OR 410 C	_____
	IN 1 LOW	20 F OR -7 C	_____
	BIAS IN 1	0.0	_____
	FILTER 1	0	_____
	BURNOUT	UP	_____
	POWER FREQ	(See order for 50 or 60 Hertz power)	_____
	LANGUAGE	ENGLISH	_____
<u>CONTROL</u>			
	PID SETS	1 ONLY	_____
	SP SOURCE	1 LOCAL	_____
	SP TRACK	NONE	_____
	POWER UP	MANUAL	_____
	SP HI LIMIT	770 F OR 410 C	_____
	SP LO LIMIT	20 F OR -7 C	_____
	ACTION	REVERSE	_____
	OUT RATE	DISABLE	_____
	OUT HI LIM	100.0	_____
	OUT LO LIM	0.0	_____
	DROPOFF	0	_____
	DEADBAND	2.0	_____
	FAILSAFE	0.0	_____
	MAN OUT	0.0	_____
	AUTO OUT	0.0	_____
	PB OR GAIN	PB PCT	_____
	MIN OR RPM	RPM	_____

ALARMS

A1S1 TYPE	PV	_____
A1S2 TYPE	NONE	_____
A2S1 TYPE	NONE	_____
A2S2 TYPE	NONE	_____
A1S1 H L	HI	_____
ALARM HYST	0.1	_____
A1S1 VALUE	400 F OR 204 C	_____
A1S2 VALUE	Not Applicable	_____
A2S1 VALUE	Not Applicable	_____
A2S2 VALUE	Not Applicable	_____

I. RECOMMENDED SPARE PARTS

<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
20577	1	Relay, UV, Honeywell No. RA890G-1260
20579	2	Scanner, UV, Honeywell No. C7027A-1049-2
17292	3	Relay, 3PDT, P-B No. KUP14A15 or equivalent
40250	1	Timer, Omnetics No. MMS115A5Z480B
40743	1	Timer, Omnetics No. MMS115A1Z14-1/4B
40744	1	Timer, Omnetics No. MMS115A1Z9-1/2B
16169	10	Bulb, 120V No. 6S6
44672	1	Indicator, Neon, Radion No. BN2113-T
49937	5	Bulb, 120V, C-H No. 120PSB



OPERATION:

1. Verify that the **FUEL SELECTOR** switch is in the desired position and all appropriate manual shutoff valves are open.
2. Turn the panel **POWER** switch to the **ON** position and press the **ALARM SILENCE** pushbutton.
3. Start all related plant equipment to provide air and fuel flow to the system.
4. Place the **CONTROL** selector switch in the **STACK** position and verify the set-points of both temperature controllers.
5. If all system limits are satisfied, the **LIMITS CLOSED** light will come **ON**.
6. Press the **LIMITS SET** pushbutton to energize the **LIMITS HOLD** circuit.
7. Wait for the **PURGE COMPLETE** light to come **ON**.
8. Depress and **HOLD** the **PILOT** pushbutton until the **PILOT ON** light comes **ON** then release the pilot pushbutton.

NOTE

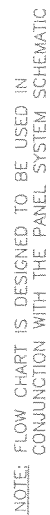
If the pilot does not light within the safety time of the RA890G flame relay, the **RESET** light will come **ON**. Allow approximately 30 seconds for the safety switch to cool before opening the control panel and pressing the flame relay reset button.

CAUTION

It is recommended that power be shut off before opening the control panel. If the panel remains "hot" while resetting the flame relay, exercise **CAUTION** to avoid contact with exposed terminals and wiring.

9. Momentarily turn the **MAIN FLAME** switch to the **START** position.
10. The main fuel valves will be energized, the burner will be ignited and the **MAIN FLAME PROVED** light will come **ON**. The pilot will then be de-energized and the **PILOT ON** light will go **OUT**.
11. The low fire hold timer (5 seconds for gas or oil) must time out before control of the burner motor is passed to the **STACK TEMPERATURE** controller.
12. Start material flow to the dryer and place the **STACK TEMPERATURE** controller in the **AUTOMATIC** mode.
13. After the **MATERIAL TEMPERATURE** controller begins to respond to the material exiting the dryer, the **CONTROL** switch may be moved to the **MATERIAL** position and the controller placed in the **AUTOMATIC** mode to begin material temperature control. Alternately, the switch may be left in the **STACK** position for continued stack temperature control.
14. To terminate burner operation, turn the **MAIN FLAME** switch to the **OFF** position.

These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.



	COMMAND	QUESTION	ACTION TO
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TITLE	DIAGRAM, FLOW CHART	PROCESS CODE		DRAWN BY GHL	DATE <i>10/28/97</i>	SCALE	WING SIZE INCHES	SHEET NO. CX448-1
MATL				CHECKED BY <i>[Signature]</i>	APP'D.			
					ENG.			
					SALES			
					PROD.			

