

## Burner Control System BCS 3600

### OPERATING INSTRUCTIONS

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#### SAFETY

##### ⚠ WARNING

- This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.
- These instructions are intended for use only by experienced, qualified combustion start-up personnel.
- Adjustment of this equipment and its components, by unqualified personnel, can result in fire, explosion, severe personal injury, or even death.

#### GENERAL INFORMATION

The Hauck Burner Control System (BCS) provides burner management and temperature control of a single pilot ignited burner firing on gas, oil or liquid propane (LP). The spark ignited, gas fired pilot is interrupted after the main burner flame has been established. Flame supervision is provided by a Honeywell RM7890A1056 flame relay combined with a R7849A1023 amplifier module and one or two C7027A1049 UV scanners.

A Programmable Logic Controller (PLC) supervises burner operation and is coupled to a Human Machine Interface (HMI) to provide the operator with system status and fault annunciation.

A Honeywell UDC3200 series microprocessor based instrument is provided for temperature control. The controller is electronically linked to the burner control motor to automatically adjust the burner firing rate and maintain process temperature near the controller's setpoint. The Temperature Controller's thermocouple senses the temperature of the material or exhaust gases as it exits the dryer, depending on where it's positioned. The controller generates a position proportional output based on the difference between the setpoint and the process temperature input.

The control MODE selector switch enables the operator to assign control of the burner. The center, LOW FIRE, position of this switch is used to hold the burner at low fire. The right, MAN (manual) position enables the operator to increase (INC) or decrease (DEC) the burner position via the MANUAL switch. The left, AUTO position uses the Temperature Controller to operate the burner.

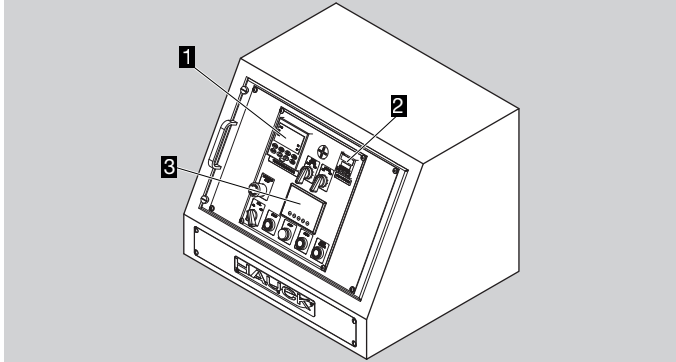
The limit contact of the High Temp Limit instrument is used to shut down the burner if the preset high temperature limit is exceeded. An alarm contact is also used to alert the Operator when the stack temperature nears the limit setting. Refer to HIGH TEMPERATURE LIMIT for entering the desired alarm setpoints.

High temperature limits will not prevent baghouse fires. They will, when properly installed and adjusted shut off the burner when the limit's temperature setpoint is exceeded. Outside factors such as chemicals, bag contamination or other ignition sources are beyond the control of the burner management system.

### CAUTION

- The HIGH TEMP LIMIT setpoint is factory set at 400°F (204 °C). If the system is equipped with a fabric dust collector (baghouse), consult the manufacturer for recommended baghouse temperature limitations.

### Part designations



- 1 UDC3200 Temperature Controller
- 2 High Temperature Limit
- 3 Human Machine Interface (HMI) Screens

## RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. Examine all parts to determine if there has been any damage in shipment. If equipment is to be stored prior to installation, provide a dry storage area.

## INSTALLATION

- For optimum use of the BCS panel, it is suggested that the drawings provided by Hauck be referred to for limit switch and valve installation and wiring. In the event that a recommended switch or valve is not used, it may be necessary to connect jumper wire(s) between appropriate terminals in the control panel or burner junction box. Such determination remains the responsibility of the Customer, based upon his application, accepted safe installation and operating procedures, and any applicable insurance guidelines or governmental regulations.
- Locate the tabletop panel on a firm support in an area that is protected from the weather and free from vibration. The drop-in version is designed to install in an existing enclosure. Reference the panel assembly drawings for mounting dimensions and required cutouts.

### WARNING

- Operating specifications of 32 to 130°F (0 to 54 °C), 30 to 95% relative humidity (non-condensing) should be considered in selecting a suitable location for the control panel.
- 1 Provide 120Vac single phase grounded neutral power to the burner control panel. It is recommended that the customer provide a master disconnect switch to interrupt power service to the panel. Maintain polarity as indicated on the drawings provided when connecting the main power source to the panel.
- 2 Install a heavy gauge (No. 12 AWG minimum) ground wire between the panel ground connector and "Earth" ground.

### WARNING

- A ground wire is also required between the burner junction box and the control panel terminal strip.
- 3 Determine the burner control motor type and install one of the following jumpers:
  - a. From fuse 5 to Ground for a sinking type motor, Barber-Coleman EA57 medium torque.
  - b. From fuse 5 to 7A for a sourcing type motor, Barber-Coleman EA71 or EA73 high torque.
- If the burner control motor needs to be driven open until purge time is completed the control needs to be configured. See page 2 (Adjustment) for instructions.
- 4 Wire the fuel valves, valve position limit switches and fuel pressure limit switches as shown on the external component wiring diagram.
- 5 Install the exhaust fan flow limit switch in the dryer exhaust duct as shown in page 9 (Exhaust Fan Flow Limit Switch Installation) . Wire the normally open contact of the exhaust flow limit to the appropriate terminals in either the burner junction box or the BCS control panel.
- 6 Install a limit switch on the exhaust damper set to close when the damper is greater than 50% open.
- 7 Install the stack temperature thermocouple in the dryer exhaust duct to sense exhaust gas temperature. See page 10 (Stack Thermocouple Installation) for installation instructions.
- 8 Install a Hauck Rapid Response material temperature thermocouple in the material discharge chute to sense the temperature of the material leaving the dryer. See page 11 (Material thermocouple installation) for recommended installation.
- 9 Connect the thermocouples to the appropriate terminals in the BCS control panel using thermocouple cable of the same type as the Material and Stack thermocouples.
- 10 Install the pilot (if applicable) and main flame scanner(s) on the burner and wire them to the appropriate terminals in the burner junction box. Reference burner instructions for scanner installation details.
- 11 Refer to the external component wiring diagram for interconnection between the burner junction box and the BCS panel terminal strips.

## ADJUSTMENT

- 1 Set the purge timer for the required purge time and whether the control motor needs to be open during the purge cycle.
  - a With the control power ON push the F4 (SETUP) button on the HMI.



- b Push the **SERVICE** button on the HMI screen.



**c** Enter the service password using the keypad on the HMI.



**d** Enter the amount of time needed to complete the purge cycle, in seconds, into the purge timer window by selecting the PURGE TIMER field and entering the time using the keypad on the HMI.



**e** If the control motor needs to be open during the purge cycle turn on the **HIGH FIRE PURGE** by touch the switch symbol.  
**f** Push the MAIN soft key to exit the SERVICE screen.

## ⚠ WARNING

- Before igniting the burner, the dryer must be purged to remove possible accumulation of combustible gases. A minimum of four complete air changes must be supplied. Multiply the total system volume (dryer, baghouse and exhaust ducts) in cubic feet by four. Divide this value by the low fire air flow in cubic feet per minute. The result will be the required purge time in minutes
- 2** Perform the fuel motor calibration procedure described in page 5 (Control motor slidewire calibration).
- Recalibrate annually or whenever a control motor is serviced or replaced.
- 3** Verify that all low fire limit switch contacts are closed when the burner is at 0% and open when the burner leaves low fire. Reference the burner operating instructions for switch adjustment.
- 4** Verify that all purge permissive contacts are closed after the burner control motor drives open for purge (Sealed-in burners only).

## FINAL CHECKOUT

- 1** Ensure sure that all equipment and components have been installed in accordance with the manufacturer's instructions.
- 2** Verify all wiring and tighten connections.
- 3** Confirm all linkage adjustments and insure that control arms and linkage rods are tight.
- 4** Clean all traps and filters.
- 5** Check all fuel and air supply lines for leaks.
- 6** Verify all pressure settings.

## PANEL OPERATION

- 1** Open applicable manual shutoff valves to supply air and fuel to the system.
- 2** Twist to release the EMERGENCY STOP button and verify that the FUEL selector switch is in the desired position.
  - a** The Temperature Controller, High Temperature Limit and flame relay will perform their self-test procedures.
  - b** The burner control motor will drive to its low fire position.
  - c** The RESET indicator will come on.
  - d** A "BURNER STOPPED" message will appear
- 3** Start the combustion air and exhaust fans and all other equipment required for plant operation. After all safety limits have closed, a "PRESS RESET TO START PURGE" message will appear.
- 4** Place the control MODE selector in the desired position and verify setpoints of both the Temperature Controller and High Temperature Limit(s).
- 5** Momentarily press the RESET button to initiate the system purge sequence.
  - a** Run Relay, CR102, will be energized.
  - b** The RESET indicator will go out.
  - c** If HIGH FIRE PURGE was setup in the SERVICE screen the burner control motor will drive open to prepare for system purge and a "WAITING FOR PURGE LIMITS" message may appear (Sealed-in burners only).
- 6** Provided that all purge permissive contacts are closed:
  - a** The Purge Timer will begin its timed delay, and a "PURGING ... SECONDS" message will appear.
- 7** After the purge delay, has been completed:
  - a** The PURGE COMPLETE relay, CR228, will be energized.
  - b** The burner control motor will drive closed to prepare for pilot ignition (Sealed-in burners only).
  - c** A "WAITING FOR LOW FIRE LIMITS" message may appear.
- 8** When the motor has reached its low fire start position and the burner low fire limit switches have closed:
  - a** "READY to START" will be displayed.
  - b** The START pushbutton will flash indicating that the burner is ready to start.
- 9** Momentarily press the START pushbutton to begin the burner ignition sequence

- a Start Relay, CR320, will be energized.
  - b The RM7890A flame relay will be energized and perform its safe start check.
  - c "IGNITING PILOT" will be displayed and the ignition transformer and pilot solenoid valves will be energized.
- 10 If a satisfactory pilot flame is detected by the UV scanner:
- a Flame signal strength will be displayed on the HMI
  - b A "PILOT ON" message will appear.
  - c The ignition transformer will be de-energized.
  - d Power will be supplied to the main fuel valves.
  - e "MAIN VALVES ON" followed by "MAIN FLAME TRIAL" will be displayed as the flame relay performs a 10 second main flame trial for ignition.
- 11 After the ignition trial, has completed, the pilot solenoids will be de-energized and the pilot will go out.
- 12 When a 10 second internal timer has been completed:
- a The pilot scanner will be de-energized, (If applicable).
  - b The burner control motor will be released from low fire, and respond to the motor positioning outputs of the temperature controller.
- 13 Start material flow to the dryer. Use the ▲ and ▼ keys of the Temperature Controller to manually control the burner firing rate, or press the MANUAL/AUTO key on the controller to begin automatic temperature control.
- The center, LOW FIRE, position of the MODE switch will return the burner to its low fire position.
  - In the event of a Temperature Controller failure, the MAN. (MANUAL) position of the control MODE selector will enable the Operator to increase (INC) or decrease (DEC) the burner via the MANUAL INC/DEC switch.
- 14 To terminate burner operation, press the STOP pushbutton.
- a Run Relay, CR102, will be de-energized and the RESET indicator will come on.
  - b Purge Complete relay, CR228, and Start Relay, CR320, will be de-energized and a "BURNER STOPPED" message will appear.
  - c The Honeywell RM7890 flame relay will be de-energized.
  - d All fuel valves will be de-energized.
  - e The burner control motor will drive closed.

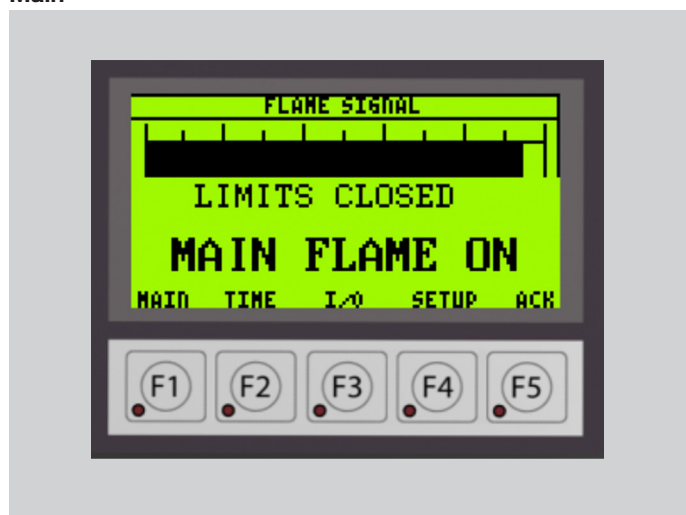
## ASSISTANCE IN THE EVENT OF MALFUNCTION

- ? **No power to instruments or indicators.**
  - Check for 120Vac between L1 and L2. Reset circuit breaker.
- ? **"WAITING FOR PURGE LIMITS"**
  - Check purge limits series: 120Vac on terminals 19, 24C, 24B, 24A and 24.
- ? **"WAITING FOR LOW FIRE LIMITS"**
  - Check low fire series: 120Vac on terminals 19, 21B, 21A and 21.
- ? **"IGNITION FAILURE RESET REQUIRED"**
  - Verify operation of pilot solenoids and ignition transformer. Check pilot adjustment and fuel supply.
  - Check for 120Vac on terminals 8 and 9.
  - Replace flame relay.
- ? **FLAME RELAY FAULT RESET REQUIRED**
  - Verify pilot and main burner setup.
  - Clean UV scanner lens and verify operation.
- ? **"EXHAUST FAN FAULT"**
  - Monitor module 1 input 2. Check exhaust flow switch (terminal 12) and exhaust fan interlock (terminal 13)
- ? **"COMBUSTION AIR FAULT"**
  - Monitor module 1 input 3. Check combustion air interlock (terminal 14) and air pressure switch (terminal 16)

- ? **"LOW GAS PRESSURE"**
  - Monitor module 1 input 4. Verify that the manual gas valve is open and that the low gas pressure switch is made (120Vac on terminal16A)
- ? **"HIGH GAS PRESSURE"**
  - Monitor module 1 input 7 and the high gas pressure switch is made (120Vac on terminal18)
- ? **"OIL PRESSURE FAULT"**
  - Monitor module 1 input 5. Verify that the manual valve is open and that the low and high pressure switches are made (120Vac on terminal17A)
- ? **"ATOMIZING AIR FAULT"**
  - Monitor module 1 input 6. Verify that compressed air is available and that the supply pressure switch is made (120Vac on terminal17C)
- ? **"OIL TEMPERATURE FAULT"**
  - Monitor module 1 input 7. For heavy oil systems, verify that oil heater is operating and that both the low and high oil temperature switches are made (120Vac on terminal18)
- ? **"COMPRESSED AIR FAULT"**
  - Monitor module 2 input 3. For oil firing with compressed air atomization, the compressed air pressure switch must close within 5 seconds after the compressed air solenoid is energized (120Vac on terminal 30A)
- ? **"HIGH LIMIT FAULT"**
  - Monitor module 2 input 2. (120Vac on terminal 26) Observe the display and OUT indicator of the High Temp Limit instrument. "OPEN" indicates an open TC or broken wire. The instrument must be manually reset by pressing the RESET key.
- ? **"STACK TEMP NEAR LIMIT"**
  - Warns the Operator that the High Limit instrument is nearing the High Limit setpoint (factory set at 380 F). Manually decrease the burner firing rate or increase material feed rate to avoid burner shutdown.
- ? **PURGE TIMER NOT SET**
  - Warns the operator that the internal purge timer has not been set in the PLC.

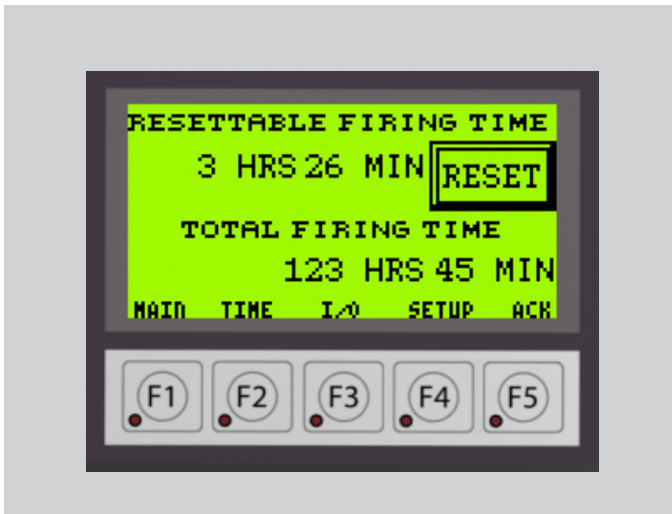
## HUMAN MACHINE INTERFACE (HMI) SCREENS

### Main



F1 Displays limits and system status along with flame signal strength.

## Time



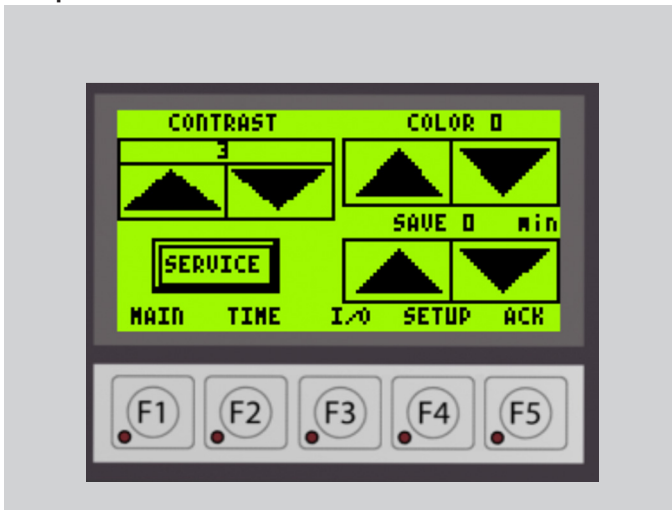
F2 Displays resettable and accumulated firing time.

## Input/Output



F3 Displays input and output status of the CPU module. Touch the MODULE 1 and MODULE 2 buttons to display their input status

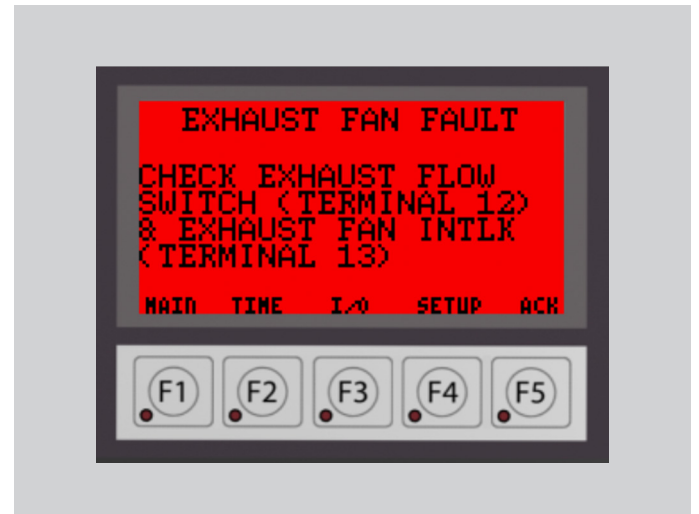
## Setup



F4 Enables contrast adjustment, Backlight color selection and Screen Saver delay time.

Note: 0 = Screen Saver Disabled

## ACK



F5 key mimics the function of the alarm silence button. It also displays the alarm status message along with related troubleshooting information.

## CONTROL MOTOR SLIDEWIRE CALIBRATION

→ The burner control motor incorporates a position feedback slide-wire. A signal from the Temperature Controller is connected to the slidewire in order to generate position feedback signal for the control panel.

→ The following calibration procedure must be performed before operating the burner for the first time

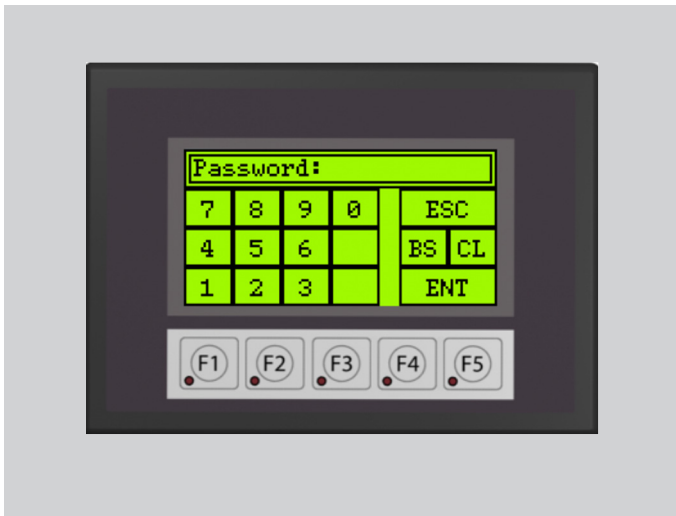
→ **RECALIBRATE ANNUALLY OR WHENEVER A CONTROL MOTOR, SLIDEWIRE OR TEMPERATURE CONTROLLER IS SERVICED OR REPLACED.**

- 1 Place the MODE selector in the AUTO position.
- 2 Press the F4 key to enter the SETUP screen.

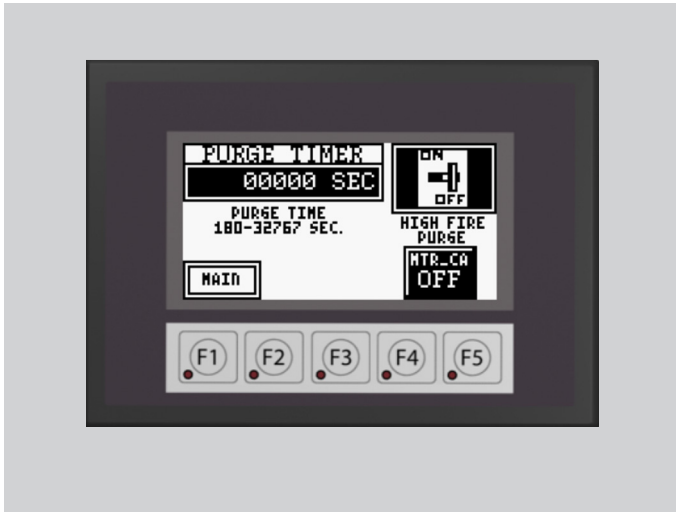


Setup

- 3 The press the SERVICE soft key on the HMI and enter the password using the keypad screen to get to the SERVICE screen.



Keypad



Service



Motor calibration

- 4 Select the MTR\_CA soft key on the HMI, this will enable the burner control motor to be driven by the Honeywell Temperature Controller without having to fire the burner.
- 5 Enter the calibration mode on the Temperature Controller by pressing the [SETUP] key until the display reads CALIB POSITION.
- 6 Press the [FUNCTION] key to display DISABLE POS PROP then press the ▲ key to change the upper display DO AUTO.
- 7 Press [FUNCTION] to begin motor calibration. The lower display will read ZERO VAL while the upper display will show the slidewire feedback value.

- 8 Wait for the zero value to stop changing and confirm that the motor is in its low fire position then press [FUNCTION] again to advance to SPAN VAL. The control motor will drive open and the upper display value should increase. If it is necessary to reverse control motor operation, interchange 2 and 3 and 7 and 8 on the control motor terminal strip.
- 9 After the feedback value, has stopped increasing, confirm that the motor has reached its high fire position then press [FUNCTION] followed by [LOWER DISPLAY] to complete the calibration sequence.
- 10 Once the motor calibration is completed turn off the calibration mode by selecting the MTR\_CA soft key again.

## UDC3200 SERIES CONTROLLER











- The Honeywell UDC3200 series controller has been configured at the factory with parameters which generally produce accurate temperature control.
- Before making any field adjustments, other then as noted in this instruction sheet, please contact the Hauck service department.

### Operator Interface

- This section describes the function of the various displays and keys
- Examples are given for changing the controller setpoint and operating the burner in MANUAL.
- Detailed information is given in the vendor literature supplied with the control panel.



Head 1	Head 2
3200	Upper display with 4 larger digits shows Process Variable value (normal operation) and special annunciator features. During Configuration, the upper display provides guidance for the operator through prompts (7 - characters)
SP 3200	During normal operation, the lower display shows key-selected operation parameters such as Output, Setpoints, Inputs, Deviation, active Tuning Parameter Set, Timer Status, or minutes remaining in a setpoint ramp (4 digits). During configuration, the lower display provides guidance for the operator through prompts.
ALM	Indicated alarm 1 and/or alarm 2 conditions exists.
DI	Indicates digital input 1 and/or 2 on.

Head 1	Head 2
<b>OUT</b>	Indicates control relay 1 and/or 2 on.
<b>F</b> or <b>C</b>	Indicated either degrees Fahrenheit or Centigrade.
<b>MAN</b> or <b>A</b>	Indicates either Manual or Auto mode.
<b>SP</b>	Indicates local setpoints #1. Also, a bar is lighted when the setpoint being used is shown on the lower display.
	Selects functions within each configuration group
	Scrolls through the configuration groups.
	Returns controller to normal display from Set Up mode. Toggles various operating parameters for display.
	Increases setpoints or output value. Increases the configuration values or changes functions in configuration mode groups.
	Infrared traneceiver
	Selects Manual or Auto mode.
	Hold key down to cycle through configured setpoints.
	Enables Run/Hold of the SP ramp or program plus timer start.
	Decreases setpoint or output value. Decreases the configuration values or changes functions in configuration mode groups.
	NEMA 4x and IP66 screw attachment (each corner).

#### Keys and functions

#### Changing the setpoints

- 1 Press the [LOWER DISPLAY] key until SP and the current setpoint appears in the lower display.
- 2 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.
- 3 To decrease the set point value, reverse the above procedure.

#### Adjusting the burner firing rate in the manual mode

- 1 Press the [AUTO/MANUAL] key to place the Controller in the Manual Mode. The MAN indicator will come on and the lower display will automatically change to show % OUT.
- 2 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.
- 3 To decrease the % Output value, reverse the above procedure.

## TEMPERATURE CONTROLLER CONFIGURATION RECORD SHEET

SET UP GROUP	LOWER DISPLAY (FUNCTION)	FACTORY CONFIGURATION	FINAL SETTING
TUNING	PROP BD RATE MIN RESET RPM SECURITY LOCKOUT AUTO MAN RUN HOLD SP SEL	15.00 0.00 1.00 0 NONE ENABLE DISABLE ENABLE	
SP RAMP	SP RAMP SP RATE	DISABLE DISABLE	
ACCUTUNE	FUZZY ACCUTUNE	DISABLE DISABLE	
ALGORITHM	CONT ALG TIMER IN ALG1	PID A DISABLE NONE	
OUT ALG	OUT ALG MOTOR TI	POSITN 40	
INPUT 1	IN 1 TYPE IN 1 HIGH IN 1 LOW RATIO 1 BIAS IN 1 FILTER 1 BURNOUT 1	J TC L 550.0 F 20.00 F 1.000 0.0 1 UP	
INPUT 2	IN 2 TYPE	SLIDEW	
CONTROL	PV SOURCE PID SETS LSP'S RSP SRC SP TRACK	INPUT 1 1 ONLY 1 ONLY NONE NONE	
CONTROL cont.	PWR MODE SP HI LIMIT SP LO LIMIT ACTION OUT RATE OUT HI LIM OUT LO LIM I HI LIM I LO LIM DROPOFF DEADBAND FAILSAFE FAILMODE MAN OUT AUTO OUT PB OR GAIN MIN OR RPM	MANUAL 550.0 F 20.00 F REVERSE DISABLE 100.0 0.0 100.0 0.0 0.0 2.0 0.0 NO LATCH 0.0 0.0 PB PCT RPM	
COM	COM ADDR COMSTATE IRENABLE BAUD TX DELAY	3 DISBALE ENABLE 19200 1	
ALARMS	A1S1 TYPE A1S2 TYPE A2S1 TYPE A2S2 TYPE ALARM HYST BLOCK DIAGNOST A1S1 VALUE A2S1 VALUE A2S2 VALUE	NONE NONE NONE NONE 0.1 DISABLE DISABLE Not Applicable Not Applicable Not Applicable	
DISPLAY	DECIMAL TEMPUNIT PWR FREQ LANGUAGE	NONE DEG F 60 HZ ENGLISH	

## HIGH TEMPERATURE LIMIT

The high temperature limit has been configured at the factory and should not require any adjustments. The procedure for changing the limit or alarm setpoint and a configuration record are given below. Detailed information is given in the vendor literature supplied with the control panel.



### Changing the limit or alarm setpoint

- 1 Hold the SETUP key and press the ▲ key. The lower display will show SLCT and the upper display will read OPTR.
- 2 Release the SETUP key and press the ▲ key until the upper display reads SETP then press SETUP again to display the current limit setpoint.
- 3 Use the ▲ or ▼ keys to change the setpoint.
- 4 Press SETUP to advance to PhA1 and again use the ▲ or ▼ keys to change the alarm setpoint if desired.
- 5 Hold SETUP key and press the ▲ key then release the SETUP key and press the ▲ key until the upper display again reads OPTR; then press SETUP to return to the operating (normal) display.

### CONFIGURATION RECORD SHEET

→ SLCT = CONF

→ ULOC = 20

Lower Display (Function)	Factory Configuration	Final Setting
INPT	J.F	
RUL	999.9	
RLL	-199.9	
OFFS	0.0	
CTRL	HI	
SPUL	999.9	
SPLL	-199.9	
ALA1	P_HI	
PHA1	380.0	
AHY1	0.1	
ALA2	PL_O	
PLA2	-199.9	
AHY2	0.1	
USE2	A1_d	
USE3	A2_d	
DISP	ENAB	
CLOC	20	
AHY2	0.1	
AHY2	0.1	

- 1 After completing Configuration, simultaneously press the ▲ and SETUP keys. ConF will appear in the Upper Display.
- 2 Press the ▲ arrow key until the Upper Display reads SETP then press SETUP. ULoc will appear in the Lower Display.
- 3 Press the ▲ arrow until Upper Display reads 10.
- 4 Press SETUP to enter the set point mode.

- 5 Set the limit set point at 400 F and PhA1 at 380 F. All other settings remain at their factory defaults.

Lower Display (Function)	Factory Configuration	Final Setting
SP	400.0	
HYSt	0.1	
FiLt	2	
PhA1	380.0	
AHY1	0.1	
PLA2	-199.9	
AHY2	0.1	
SLoc	10	



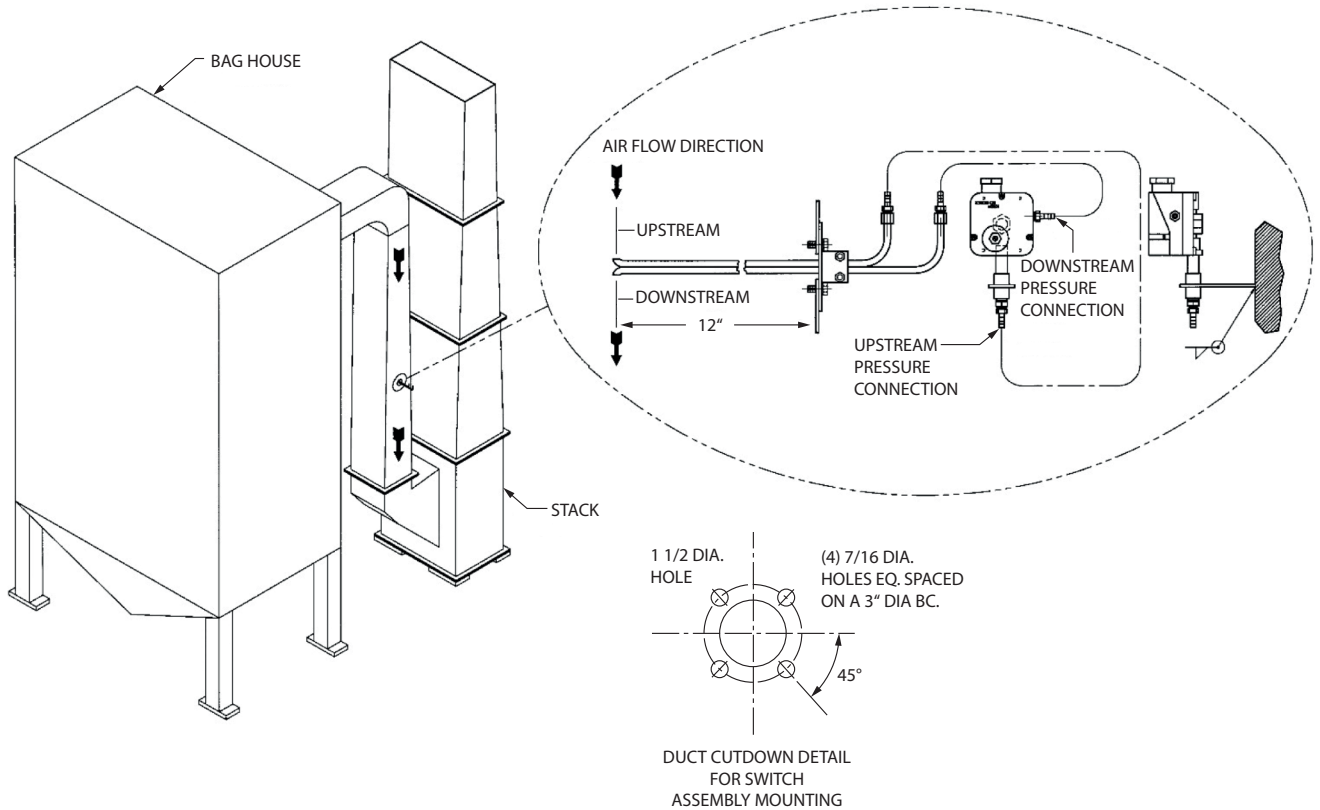
## EXHAUST FAN FLOW LIMIT SWITCH INSTALLATION

Mount the exhaust fan flow switch in the dryer exhaust duct as shown below.

- 1 Cut a 2" hole in the duct where the pitot tube will be located.
- 2 For "blind" applications, mark two of the holes using one half of the mounting flange.
- 3 Reach through the 2" hole to hold the nuts in place to mount the plate half. Use silicone sealant as a gasket. Tighten the nuts and bolts securely. Insert the pitot approximately 12" into the duct and hold in place.
- 4 Using the second half of the flange, tighten the 1/4-20 bolts to hold the pitot in place.

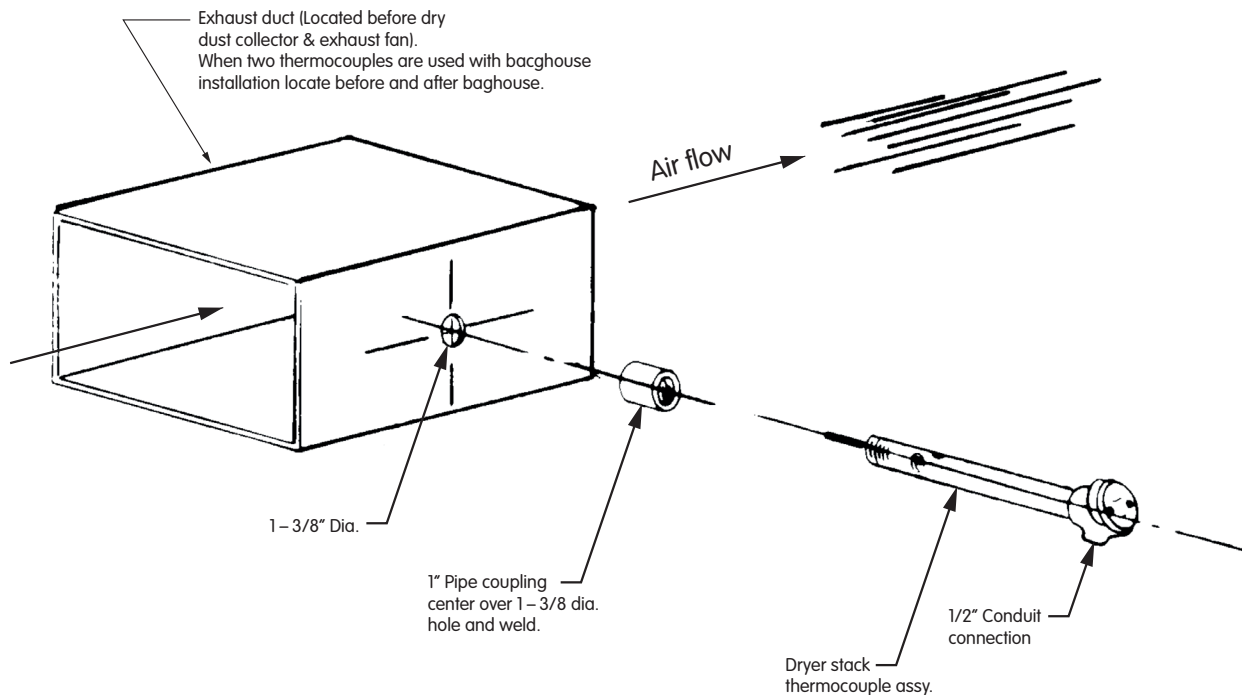
## ⚠ WARNING

- Do not fasten both halves of the flange. One side is left unbolted for removal and cleaning of Pitot tube.
- 5 For other applications, weld the four duct mounting nuts to the inside of the ductwork using the flange as a pattern.
  - 6 Use silicone caulk as a gasket
  - 7 Remote mount the pressure switch to a vibration and heat free location. Connect the plastic tubing from the pitot to the switch connecting the upstream side of the pitot to the bottom of the switch and the downstream side of the pitot to the top side of the switch. Wire switch per schematic



## STACK THERMOCOUPLE INSTALLATION

→ Install a Hauck stack temperature thermocouple in the dryer exhaust duct to sense exhaust gas temperatures.

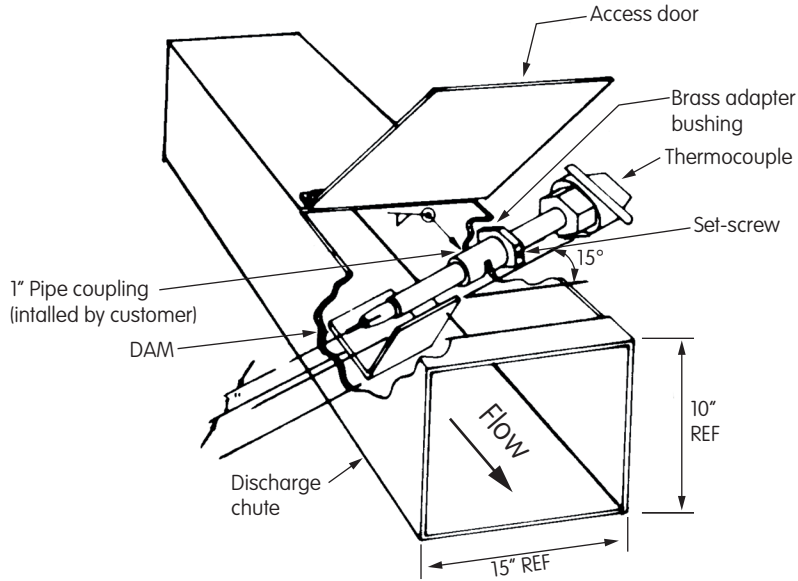


*Drawing showing placement of thermocouple in exhaust duct.*

→ Thermocouple cables must be separated from AC power and control wiring to avoid interference and nuisance shutdowns. Observe polarity when making thermocouple connections. Regardless of TC type, the red wire is always negative.

## MATERIAL THERMOCOUPLE INSTALLATION

- Install a Hauck Rapid Response Material Temperature Thermocouple in the material discharge chute to sense the temperature of the material leaving the dryer.



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

- 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.
- During normal operation, the thermocouple 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
- Thermocouple cables must be separated from AC power and control wiring to avoid interference and nuisance shutdowns. Observe polarity when making thermocouple connections. Regardless of TC type, the red wire is always negative.
- Wire the thermocouple to the proper terminals in the panel.

## RECOMMENDED SPARE PARTS

PART NO.	QTY	DESCRIPTION
HK302263	1	Flame Relay RM7890A1056
14553	1	Flame Amp R7849A1023
16281	2	Honeywell UV Scanner C7027A-1049
PRJ101034364	1	Honeywell UDC3200
HK402731	1	High Temperature Limit
101044055	1	Click Analog CPU C0-12ARE-D
101044056	1	Click 8 point AC Input Module C0-08TR
101044057	1	Click 8 point Relay Output Module C0-08NA
101033971	1	Click Power Supply C0-01AC
10049313	2	Relay, DPDT, Phoenix Contact, PLC-RSC-120UC/21-21
HK55167	5	Fuse, 7A, 1/4 x 1-1/4, Littlefuse type 313007
HK43868	1	Stack Thermocouple, Hauck TC200A-J

## CONVERTING UNITS

see [www.adlatus.org](http://www.adlatus.org)

## FOR MORE INFORMATION

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit [www.ThermalSolutions.honeywell.com](http://www.ThermalSolutions.honeywell.com) or contact your Honeywell Sales Engineer.

### Honeywell Process Solutions

Honeywell Thermal Solutions (HTS)  
1250 West Sam Houston Parkway  
South Houston, TX 77042  
[ThermalSolutions.honeywell](http://ThermalSolutions.honeywell)

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