

ACL

Manufacturing Inc.

ACL CSC 200 Combustion Safety Control

INSTALLATION MANUAL

FOR

ACL CSC 200 Combustion Safety Control



WARNING

This manual must be read in its entirety before installation of this controller. Installation must be performed by a qualified technician and must adhere to the standards set by the local regulatory authorities.

ACL is not responsible for the misuse or incorrect application of this product.

ACL CSC 200 Combustion Safety Control



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FEATURES

- No Programming
- 12/24VDC and solar
- Low power consumption (Power save mode operates as low as 1.2 Watts)
- CSA approved for Class I, Div 2 location
- Operational ambient temperature of -40° to +60° Celsius
- CSA approved C22.2 No 199-M89. Combustion safety controls and solid-state Ignitors for Gas & Oil burning equipment
- CSA B149.3 - 10 compliant, meets NFPA standards
- Type 4x enclosure, corrosive resistant and weatherproof
- 100% fail safe design
- On/Off control
- Safety lockout for high temperature setting
- Onboard solenoid driver for power reduction to solenoids and peak-hold solenoids
- Two adjustable type K thermocouple inputs for monitoring two separate temperature points (process temp. & high temp.)
- Pilotless burner control selectable. Single and dual stage, Low fire and High fire
- Shutdown input (ie. Low level shutdown, pressure shutdown)
- 2 Selectable thermocouple ranges of -60°C to 1100°C or 0°C to 500°C (-75°F to 2012° F or 32° F to 932° F)
- Adjustable dead band from 1, 2, 3 and 5 degrees C or 2, 4, 6 and 10 degrees F
- Easy to read four digit seven segment LED display
- LED indication of thermocouple 1 or 2 values displayed
- °C or °F readout

DESCRIPTION

The ACL CSC 200 is designed to be used in conjunction with the ACL combustion module for a complete safety combustion device. The ACL CSC 200 provides burner ignition and flame fail, as well as monitoring of two separate thermocouple inputs which can be utilized for temperature control in process applications such as tanks, line heaters, re-boilers or any other application where accurate temperature monitoring or control is required. The system is designed to operate with or without a continuous pilot.

The two independent temperature set points can be adjusted with the three membrane push buttons on the face of the controller with LED indication of Temp 1 or Temp 2. Initial set up for temperature ranges, display and dead band can be obtained through dip switch selections for various user preferences.

“THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I DIVISION 2, GROUPS A,B,C, & D OR NONHAZARDOUS LOCATIONS ONLY”

“WARNING-EXPLOSION HAZARD- SUBSTITUTION OF COMPONENTS MAY IMPAIR THE SUITABILITY FOR CLASS I DIVISION 2”

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OPERATION

Supply 12/24VDC to Controller as per drawing on page 7. Display will turn on and indicate either Temp1 or Temp 2 which ever was selected by ½ push button. The arrows up and down select the temperature set point. Once selected, the ignition controller can be turned to the On position. This will initiate ignition controller, if calling for heat and all shutdown inputs are clear. If the process is above the temperature settings, it will not initiate lighting of the burner, but will turn on once process drops below set point in the pilotless mode (I).

When the ignition switch is turned on and the controller is calling for heat, the controller will attempt ignition and the pilot output will provide voltage to the solenoid to allow pilot gas for ignition. Shutdowns, POC and remote on/off must be in a permissive state for this to occur. Pilot output will cease if there is a failure to light within 5 seconds and a FF will appear on the display. When using a single trial module, the controller will lockout and have to be reset. When using a 3 try module, the controller will attempt 2 more additional tries before locking out. This can be reset either by the local on/off switch or the remote on/off switch. Whether the I (pilotless or intermittent) selection or C (continuous pilot) selection is used, the controller will perform as above except the continuous pilot will be initiated by on/off as well as temperature demand switch, and remain on regardless of temperatures setting.

POWER CONNECTION

The ACL CSC 200 Combustion Safety Control operates in a voltage range between 10-30 Volts DC. The terminals are #19 positive, #20 negative, and #22 ground.

INPUT CONNECTIONS

THERMO-COUPLE INPUT

The controller accepts two type K (ungrounded) thermocouples on terminals 1, 2, 3 and 4. They are clearly marked on the board for each thermocouple and polarity (See wiring diagram). The temperature range can be selected via the dip switches on the main circuit board located in the top right corner. Ranges can be selected independently for each thermocouple input, either high or low. High range is -60°C to 1100°C (-76°F to 2012°F) or low range, 0°C to 500°C (-32°F to 932°F).

ON/OFF

The switch on the side of the controller is internally wired to terminals 5 and 6. This turns on and off the ignition module provided the shut down input and remote reset inputs are closed and temperature values for both thermocouples are in a permissive range. The On/Off switch also acts as a reset to clear any latched shut downs that may have tripped then cleared.

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The remote on/off terminals 7 and 8, when opened will turn off the ignition module and valve outputs when opened and reset any latched shutdown that may have tripped then cleared. Controller will not reset unless shut downs have cleared. These terminals must be wired to dry contacts of a remote switch or relay when used. A jumper must remain across 7 and 8 when not in use. When remote on/off is opened, **Rr** will appear on display.

**REMOTE
ON/OFF**

The shutdown terminals 9 and 10 are used to turn off the ignition module when opened. These terminals are wired to dry contact shutdowns such as level switches, pressure switches, or any other type of auxiliary shutdown device. If more than one shutdown switch is used, they must be wired in series. Opening of any switch connected to shutdown terminals 9 and 10 will shut off the ignition module and de-energize all 3 valve outputs. These terminals can be selected to latch or unlatch when shutdown is cleared via the dip switch settings (See dip switch diagram). Unlatch allows the module to restart ignition when cleared, latch locks out a restart until a manual reset of the On/Off switch is turned off then on or the remote reset switch is opened then closed.

**S/D
SHUTDOWN**

The alarm status provides for remote indication of whether the CSC 200 is in a normal operating mode or if it is in a shutdown state, or turned off either remotely or locally. Alarm status terminals 11 and 12 are a dry set of contacts. When power to controller is off, the contacts are open. Contacts are also open when controller is in a shutdown state (ie. Power failure or shutdown is open). This provides for a complete fail safe indication of the status of the controller.

**ALARM
STATUS**

The POC (Proof of Closure) terminals 13 and 14 are used when a proof of closure safety shutdown valve is used. This prevents the starting of any ignition if the POC switch is opened. This safety feature eliminates the risk of igniting a burner if the valve is partially open and proof of closure switch indicates open. This is also a failsafe input as it will not allow ignition to initiate if wire is broken or disconnected. **POC** will appear on the display. A jumper must be installed between 13 and 14 if this feature is not used.

**PROOF OF
CLOSURE**

The terminals 15,16,17 and 18 are to be wired directly to the ACL ignition module. This provides communication between the two, allowing for a complete combustion safety control and ignition of burner (See wiring diagram).

**IGNITION
MODULE
CONNECTION**

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OUTPUT CONNECTIONS

PILOT

The terminals 27 & 28 provide power to the pilot solenoid valve to allow gas for initial ignition and flame sensing. The voltage to this output is the same voltage supplied to the controller. This output has a low power feature for the solenoids provided by an onboard solenoid driver circuit. This circuit can reduce power consumption of solenoids as much as 80% power reduction. This circuit also helps eliminate any noise that may be produced by some solenoids, and helps extend the life of the solenoids. To utilize onboard solenoid driver, see dip switch settings.

MAIN

The terminals 25 and 26 provide power to the main solenoid valves. Power to these terminals are present only 10 seconds after pilot flame is present and shutdowns are satisfied. This output also has the same low power feature of the onboard solenoid driver.

T-MAIN

The terminals 23 and 24 provides power to the main solenoids through the temperature 1 setting. This allows for an individual temperature control of one of the main solenoids eliminating unnecessary stroking of the main safety shutdown valves to control main gas to the burner for temperature control. This output also has the low power feature of the onboard solenoid driver.

PILOTLESS OR CONTINUOUS PILOT FEATURE

Intermittent pilot (I) or Continuous pilot (C) features can be accessed through the dip switch settings. See dip switch diagram, indicated by I /C.

INTERMITTENT PILOT (Pilotless)

The ACL CSC 200 controller provides this feature for applications where a continuous pilot may not be desirable. The pilot output is only energized when the controller is calling for heat. In this case, the pilot turns on, then after 10 seconds the main and T main outputs become energized. This allows for a low fire start through the main burners or a pilot/main start where an individual pilot and main are used. This is only initiated if the on/off switch is in the on position and all shutdowns and POC are closed.

CONTINUOUS PILOT

When continuous pilot (C) is selected via (dip switch settings) the pilot output becomes energized when the on/off switch is turned to on, and all shutdowns and POC are clear and permissive, regardless of whether the controller is calling for heat.

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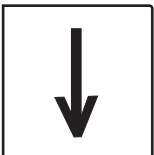
ADJUSTING SET POINTS



Selects temperature input 1 or 2 on display
Temp 1 - Bath or process temperature
Temp 2 - High temperature shutdown



Displays and increases temperature set point - Hold button down to scroll to desired set point then release. Display will then return to actual temperature reading



Displays and decreases temperature set point. Hold button down to scroll to desired set point then release. Display will then return to actual temperature reading.



If left with no buttons pushed the display will revert back to show the actual thermocouple temperature reading according to the LED indication (Temp 1 or Temp 2).

Display will show (----) when thermocouples are not enabled through the designated dip switch setting or (OPEN) if the thermocouples are not connected or failed open.

CONTROLLER DISPLAY CODES



Power Failure- Indication if loss of power to controller occurs.



Flame Fail- Indicates that pilot has gone out and failed to re-light.



Process temperature indication of either TC-1 or TC-2, whichever is selected.



Indicates switch has been turned off to ignition.



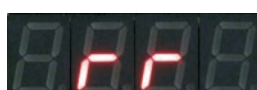
Proof of Closure- Indicates the POC switch terminals are in an open state. Jumper should be in place when not using Proof of Closure valve.



Shut down- Indicates an open switch or shutdown which is tied into terminals 9 & 10.



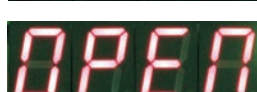
Indicates TC-2 temperature is at or above setpoint which will shutdown controller valve outputs.



Remote Reset



Indicates TC-2 disabled. May be selected with dipswitch.

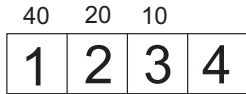


Indicates an open thermocouple condition on either thermocouple 1 or 2. Controller valve outputs become de-energized.

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Dip Switch Option Chart

SOLENOID DRIVER DIP SWITCHES



Selecting dipswitch 1,2,or3 or any combination will provide a percentage of cycle time for the solenoid outputs for power saving. (I.e.) Switch 1 (40%) and Switch 3 (10%) when selected will provide 50% cycle time.

12	PWR FAIL LATCH
11	HIGH TEMP LATCH
10	S/D LATCH
9	I/C PILOT
8	PWR SAVE
7	TC 2 H/L
6	TC 2 D/E
5	TC 1 H/L
4	BTN D/E
3	D BAND 2
2	D BAND 1
1	°C/°F

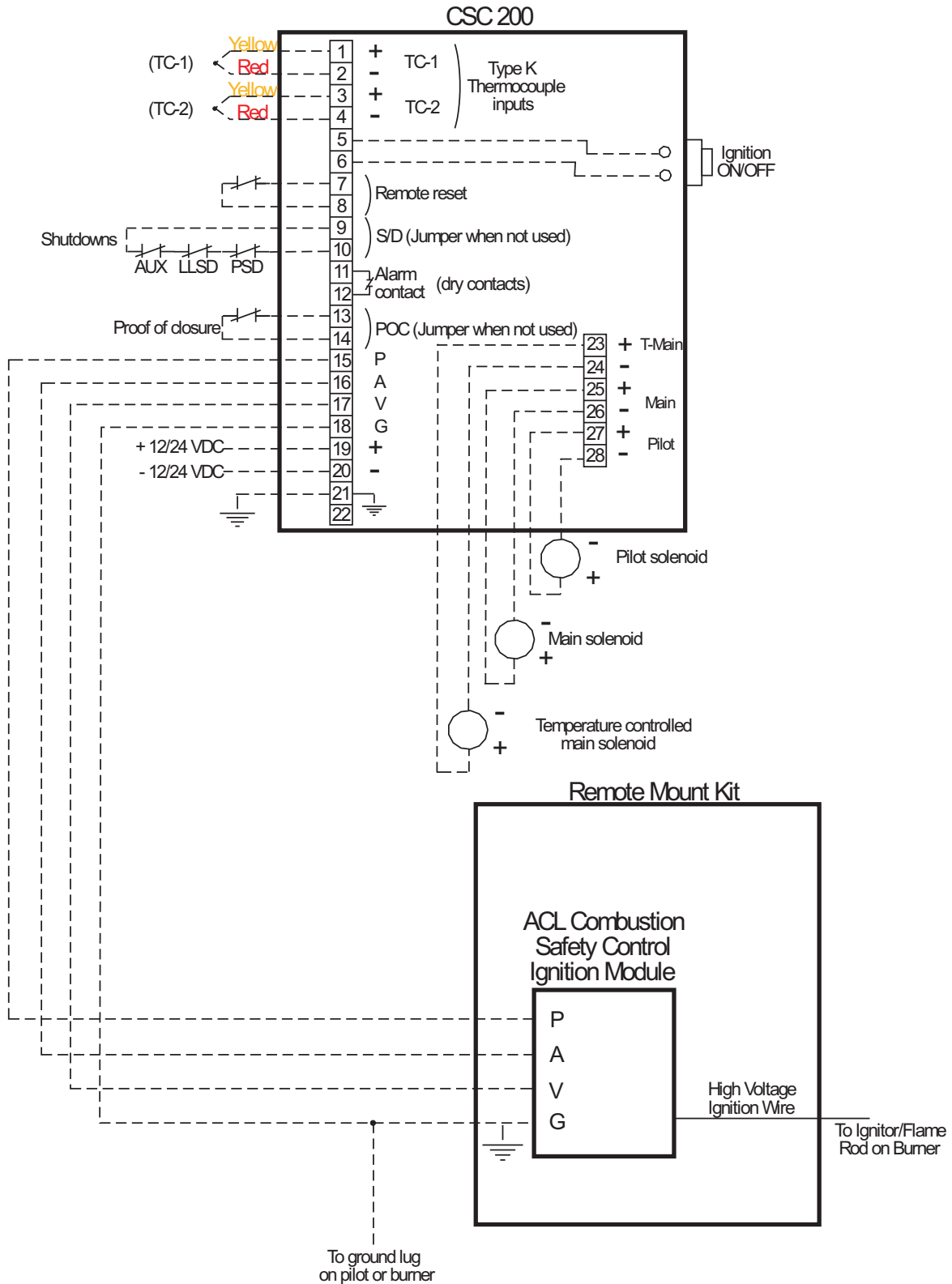
← OFF / ON →

SW 3	ON	ON	OFF	OFF
SW 2	ON	OFF	ON	OFF
°C	1°	2°	3°	5°
°F	2°	4°	6°	10°

DEADBAND SETTINGS

- Switch #1** Selects display temperature to read in either °C or °F.
- Switch #2** Dead band setting. (see chart)
- Switch #3** Dead band setting. (see chart)
- Switch #4** Disables or enables up and down buttons for TC 2 settings.
- Switch #5** Thermocouple 1 high and low temperature range setting. -H (-60°C to 1100°C or -76°F to 2012°F) -L(0°C to 500°C or -32°F to 932°F)
- Switch #6** Thermocouple 2 disable when not in use and enable when in use.
- Switch #7** Thermocouple 2 high and low temperature range setting. -H (-60°C to 1100°C or -76°F to 2012°F) -L(0°C to 500°C or -32°F to 932°F)
- Switch #8** Power save model display automatically dims after 2 minutes when no buttons are pressed.
- Switch #9** Continuous pilot mode (C) when selected or pilotless mode (intermittent)(I) when selected.
- Switch #10** Latches the shutdown and locks controller from restarting when shutdown clears. When set to off, controller ignition resumes automatically if shutdown clears and controller calls for heat.
- Switch #11** Latches temp #2 and locks controller from restarting when temperature clears below setpoint. When set to off, controller ignition resumes automatically if temperature falls below setpoint, and all shutdowns are clear.
- Switch #12** If power failure to controller occurs, the power fail latch setting doesn't allow controller to restart ignition when power returns. When set to off, controller ignition resumes automatically when power returns.

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SPECIFICATIONS CHART

Voltage	Current (max) Controller Only	Current (power save mode) Controller Only	Power (max) Controller Only	Power (power save mode) Controller Only	Relay Contact Max Allowed	Operating Temp.
12 VDC	.500A	.10A	6W	1.2W	2 amp Per Output	-40 C to 60 C
24 VDC	.250A	.05A	6W	1.2W	2 amp Per Output	-40 C to 60 C

* NOTE: Maximum current not to exceed 5A total

APPLICABLE STANDARD & CODE REQUIREMENTS

CSA Standard C22.2 No.0-10 - General Requirements-Canadian Electrical Code Part II

CAN/CSA-C22.2 No. 0.4-04 - Bonding of Electrical Equipment

CSA Standard C22.2 No. 94-M91 - Special Purpose Enclosures

CSA Standard C22.2 No. 142-M1987 - Process Control Equipment

CSA C22.2 No. 199-M89 - Combustion Safety Controls and Solid-State Igniters for Gas and Oil Burning Equipment

CSA Standard C22.2 No. 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

UL Standard 50, 12th Edition- Industrial Control Equipment for Use in Hazardous (Classified) Locations

UL746C, 6th Edition - Standard for Polymeric Materials - Use in Electrical Equipment Evaluations

UL 508, 17th Edition - Industrial Control Equipment

ANSI/UL 698 13th Edition- Industrial Control Equipment for use in Hazardous (Classified) Locations

ANSI Z21.20-2005 - Automatic Gas Ignition Systems and Components

ANSI ISA 12.12.01-2007- Non Incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

NOTES

Lined area for notes.



Website: www.aclmfg.com

Limited Warranty

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any product which is found to be defective in such workmanship or material will be repaired or replaced by Seller for a period of one year from purchase date. Warranty of such items do not include shipping, installation or set-up.

Liability Statement

ACL Manufacturing Inc. Shall not be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss of expenses of any nature incurred by the buyer or any third party.

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