

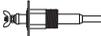
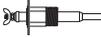
CycleGard®

CG470 Series

Low Water Cut-Offs For Steam Boilers

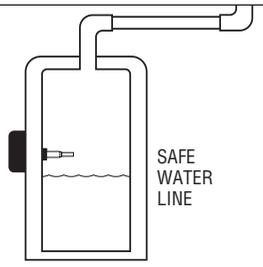
120 VAC Operating Voltage
Max. Pressure 15 psi

U.S. Patent Nos. 5,739,504 & 6,390,027

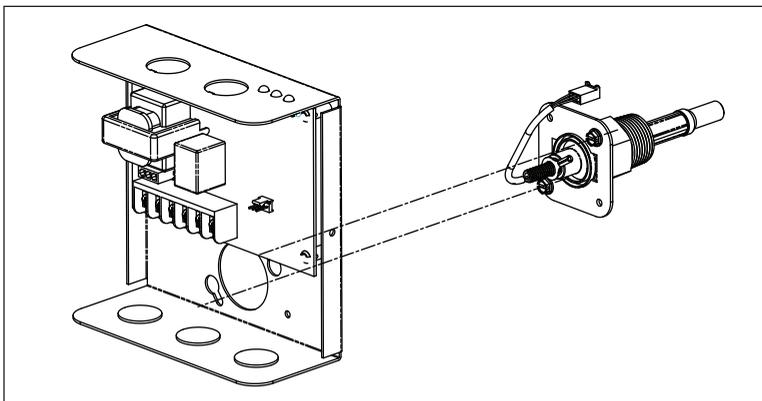
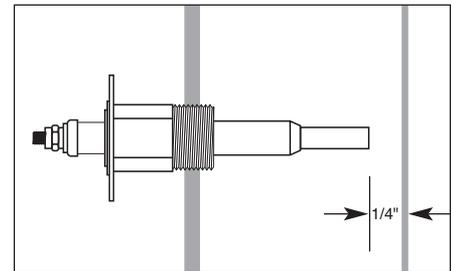
-  Automatically shuts off burner, after delay, in a low water condition to prevent dry firing.
-  Enhanced Intermittent Level Test technology – active only when water is at boiling temperature. Provides added protection in foaming and volatile water conditions.
-  Time delay sequencing prevents burner short-cycling caused by momentary dips in water level and allows a water feeder to replenish water to a level above the probe.
-  Integral temperature sensor provides High Limit Lock-Out feature for an unprecedented level of boiler protection.

MOUNTING THE CONTROL

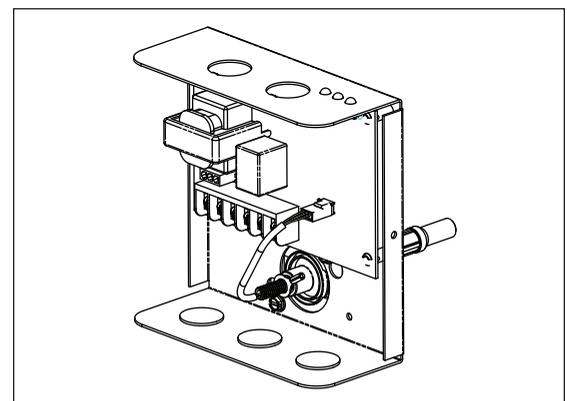
The probe may be installed in the boiler above the lowest safe water level established by the boiler manufacturer. Most manufacturers provide a suitable tapping in the side of the boiler.



STEP 1 Screw the probe into the LWCO tapping in the boiler. Allow 1/4" clearance from the probe to any boiler surface, tube or baffle. **NOTE:** Excessive use of Teflon tape to seal probe piping threads may insulate the control from boiler ground. This could result in the control not operating.



STEP 2 Loosen the two control cover screws and remove the cover. Assemble the chassis to the probe flange and secure with the screws provided.



STEP 3 Plug the wire lead from the probe into the mating connection on the circuit board.

⚠ WARNING **Electrical shock hazard.** To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing control. Only qualified personnel may install or service this control in accordance with local codes and ordinances. Read instructions completely before proceeding.

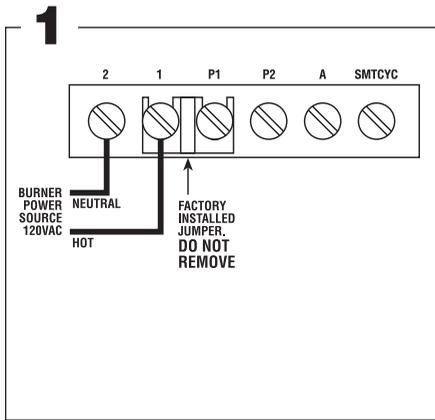
⚠ CAUTION To prevent serious burns, boiler should be thoroughly cooled before installing or servicing control.

⚠ WARNING **Frozen pipes/water damage.** Central heating systems are prone to shut down as a result of power or fuel outages, safety related fault conditions or equipment failure. Installation of freeze protection monitoring or other precautions is recommended for unattended dwellings in climates subject to sustain below-freezing temperatures.

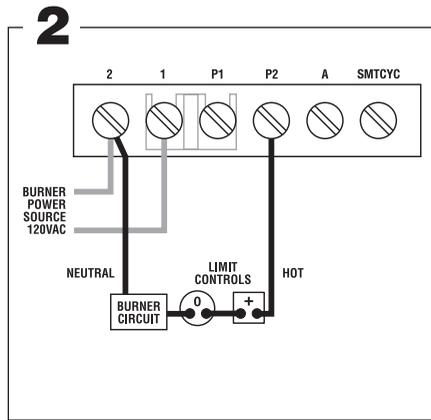
**HYDROLEVEL
COMPANY**

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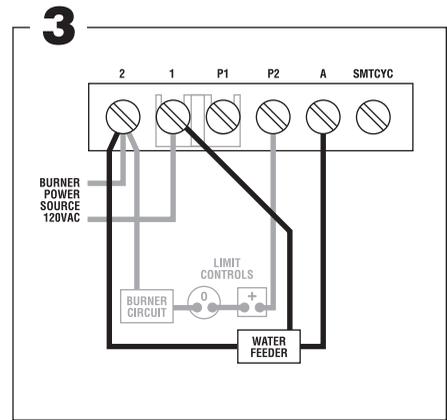
WIRING – Model CG470



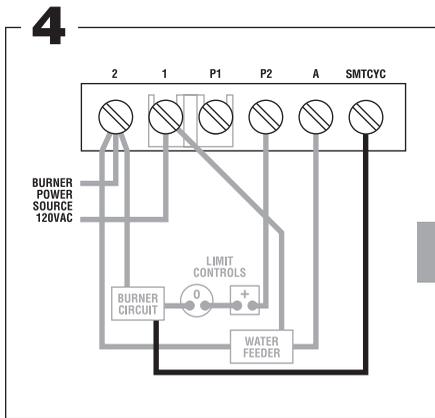
1
Connect input voltage (120 VAC, 60 HZ) to terminals 1 and 2.



2
Connect terminal 2 to burner circuit neutral. Connect terminal P2 to burner circuit in series with other limit controls. Consult boiler manufacturer instructions for proper terminal connections. Control should be wired in series with and before other limit controls.



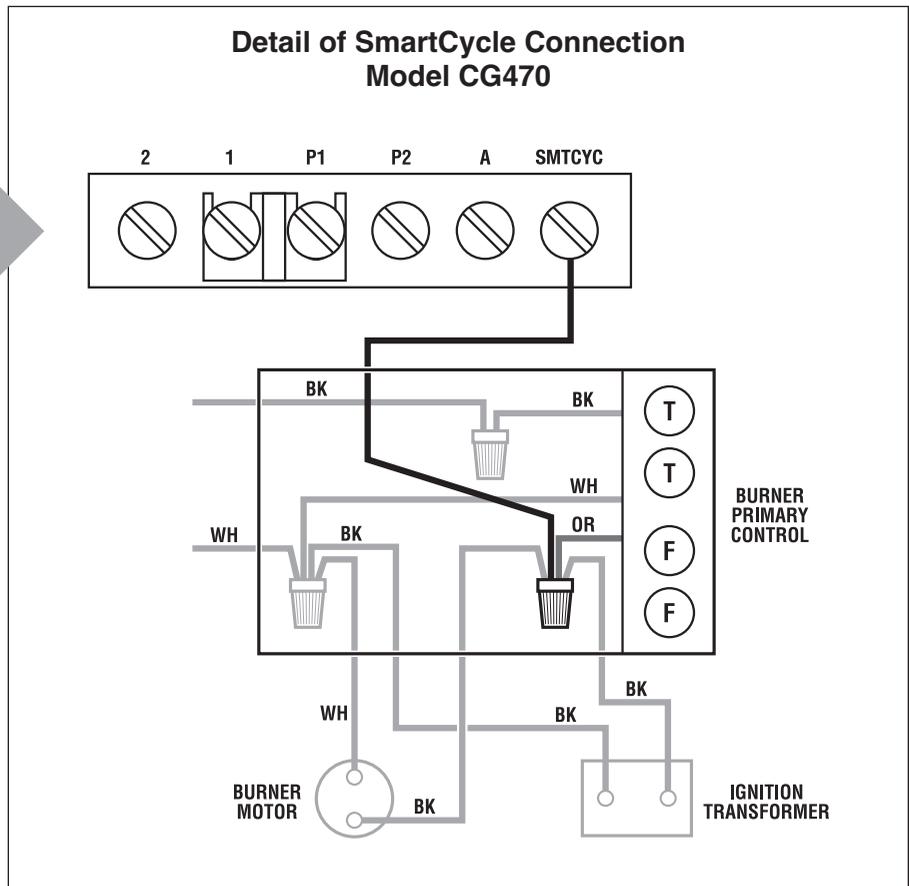
3
Optional water feeder connection. Connect feeder N to terminal 2. Connect Feeder H to terminal 1. Connect feeder “FEED” or “W” to terminal A. For water feeders with 2 leads, connect feeder neutral to terminal 2 and feeder hot to terminal A.
NOTE: Use of a solenoid valve or McDonnell & Miller Model 101A water feeder may cause flooding and is not recommended for use with this low water cut-off.



OPTIONAL ACTIVATION

Connect “SMTCYC” terminal on the CycleGard control to the orange burner wire (120VAC) located under the primary. See detail illustration at the right.

See SmartCycle description on next page.



Enhanced Intermittent Level Test Feature

To provide added protection to today's smaller boilers, CycleGard Model CG470 is equipped with an enhanced Intermittent Level Test (ILT) feature. Fifteen minutes after the boiler reaches boiling temperature, the ILT feature removes power from the burner for 60 seconds. During this ILT test, foam dissipates and the water level quickly stabilizes, allowing the CG470 to monitor the true water level in the boiler. If the water in the boiler is at a safe level, the control will re-energize the burner. If the water level has dropped to a level below the probe, the control will keep the burner off (and send power to an optional water feeder) until the water level is replenished. The 60 second ILT test will repeat every 15 minutes as long as the boiler remains at boiling temperature. The ILT feature disengages when the boiler temperature is below the boiling point.



The optional Smart Cycle feature is designed to prevent unnecessary ILT tests in the event the burner cycles off for other reasons (ex. pressure limit or thermostat calls). When activated (see wiring on previous page), the Smart Cycle feature restarts the 15 minute timing sequence each time the burner fires. So, for example, if the pressure control shuts down the burner, the Smart Cycle feature will reset the 15 minute clock once the pressure control re-energizes the burner. This prevents an ILT from occurring sooner than is needed as the control was able to monitor the settled water level during the pressure limit interruption.

Hi Temp Lock-Out

Unlike any other steam low water cut-off, the CG470 monitors boiler temperature in addition to water level. This feature will shut down and lock out the burner circuit if the boiler reaches an unsafe level (250°F).



OPERATING INSTRUCTIONS

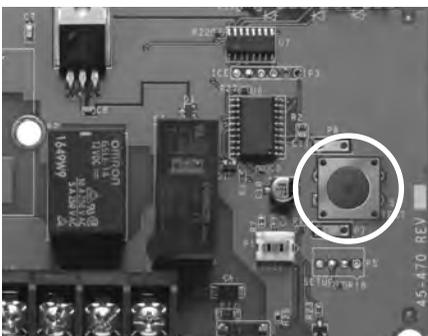
NOTE: For proper low water cut-off operation, the boiler should be cleaned at initial installation and periodically thereafter. Refer to the boiler manufacturer's instructions for cleaning procedures.

OPERATING TEST PROCEDURE

1. After installation, bring the boiler water to a safe operating level, turn on power and set the thermostat to call for heat. The amber LED lamp should be off. **The boiler will fire immediately.**
2. *Slowly* lower the boiler water to a point below the probe. The amber LED lamp on the control will light. The lamp may begin to flicker with the bouncing water level. Stop draining the boiler when the lamp glows steadily. **NOTE:** The water should not be lowered beyond a visible point in the gauge glass.
3. The boiler will shut down within 15 seconds.

TEST BUTTON

The CG470 is equipped with a button to test wiring and control operation. To use the test button, remove the cover and press the button located on the circuit board. The burner



will shut off for the length of time the button is pressed. If the burner does not shut off, remove power and recheck wiring. **Note:** Hydrolevel recommends lowering the water level (as described in "Operating Test Procedure") to functionally test the control and probe operation on an annual basis.

IF BURNER DOES NOT SHUT DOWN IN LOW WATER

1. Check terminal block wiring to insure that all connections are correct.
2. Check the probe installation to insure that there is 1/4" clearance from any surface within the boiler or pipe. (Refer to Step 1 on page 1 of this instruction sheet.
3. Clean the boiler in accordance with the manufacturer's instructions. Machining oils, grease, rust and other contaminants in the boiler water can cause foaming or surging and make a low water condition difficult to detect during burner operation.

IF THE AMBER LED LAMP IS ON

The amber LED lamp indicates that the water is below the probe. If the gauge glass shows that the water is at the correct operating level and the amber LED is lit, check the following:

1. Check for plugged gauge glass.
2. Make sure probe lead wire is properly secured to the terminal.
3. Check for proper ground between probe and boiler shell. Excessive use of Teflon

tape or sealing compound may isolate the probe from the boiler shell.

4. Remove probe and examine for oily residue. Clean probe with steel wool and skim boiler.

IF THE RED LED LAMP IS ON

The red LED lamp indicates that the boiler has experienced an unsafe temperature (250°F). The control will lock out the burner circuit and illuminate the LED when this occurs. **DANGER:** Adding water to an overheated boiler can cause an explosion. The boiler must be allowed to fully cool before adding water. The boiler should be evaluated by a qualified service technician before restoring operation. The CycleGard control should be replaced.

IF THE RED LED LAMP IS BLINKING

A blinking red LED lamp indicates that the control has been locked out on an unsafe temperature at some point in its history. The CycleGard control should be replaced.

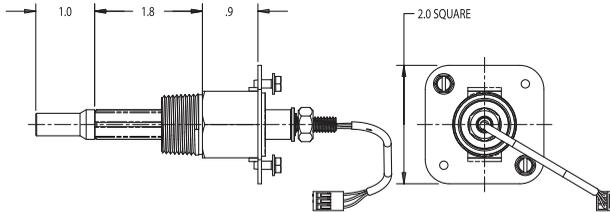
IF THE GREEN LED LAMP IS ON

The green LED lamp indicates that the control is conducting an Intermittent Level Test. The burner does not fire during the test period. See Intermittent Level Test Feature on this page for more details.

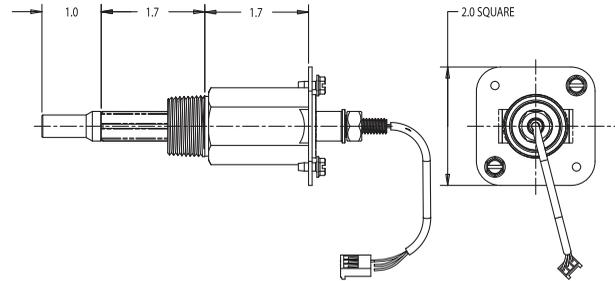
MAINTENANCE

To ensure optimum performance remove and inspect probe annually. Clean any sediment or scale from the probe using a scouring pad or steel wool. Re-install the probe and perform the Operating Test Procedure described on page 3.

PROBES



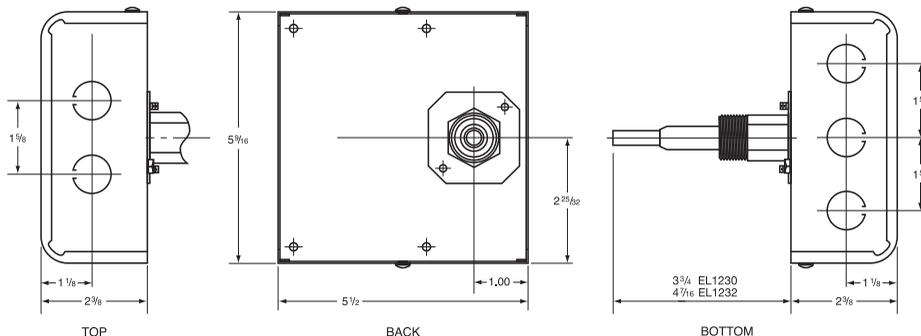
EL1230 – STANDARD MODEL – 3/4" NPT



EL1232-P – 3/4" NPT

The Probe Makes the Difference The probe used in all Hydrolevel controls offers you distinctive advantages. Unlike float devices, there are no moving parts to wear stick, or “hang-up” the in harsh boiler environment. A stuck or “hung-up” float can cause dangerous low water conditions. And if suddenly released, a float can feed cold water into overheated tubes or plates and cause explosive results. The Hydrolevel control has no float bowl so sediment cannot collect. The reliable microprocessor-based design and low maintenance probe are designed to provide years of troublefree operation.

DIMENSIONS



SPECIFICATIONS

MAXIMUM PRESSURE: 15 PSI
INPUT VOLTAGE: 120 VAC, 60 HZ
SWITCH RATINGS: 5.8 FLA, 34.8 LRA
SWITCH CONTACTS: SPDT
ALARM CIRCUIT: 125 VA @ 120 VAC Pilot Duty



LIMITED MANUFACTURER'S WARRANTY

We warrant products manufactured by Hydrolevel Company to be free from defects in material and workmanship for a period of two years from the date of manufacture or one year from the date of installation, whichever occurs first. In the event of any claim under this warranty or otherwise with respect to our products which is made within such period, we will, at our option, repair or replace such products or refund the purchase price paid to us by you for such products. In no event shall Hydrolevel

Company be liable for any other loss or damage, whether direct, indirect, incidental or consequential. This warranty is your EXCLUSIVE remedy and shall be IN PLACE OF any other warranty or guarantee, express or implied, including, without limitation, any warranty of MERCHANTABILITY or fitness for a particular purpose. This warranty may not be assigned or transferred and any unauthorized transfer or assignment thereof shall be void and of no force or effect.