Model RB-24E-S
Model RB-24E-A
Model RB-24E-L
Model RB-24E-B

Conductance Type Low Water Cut-Off

with Universal Wiring Harness
For Residential
24 VAC Hot Water Boilers

Each wiring harness includes connectors which allow a RB-24E LWCO to be connected to most residential hot water boilers having a 24 volt burner circuit.

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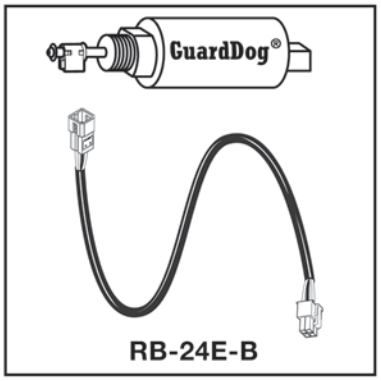
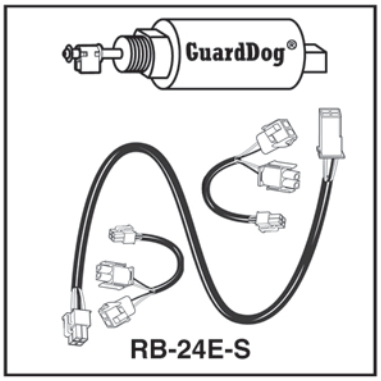
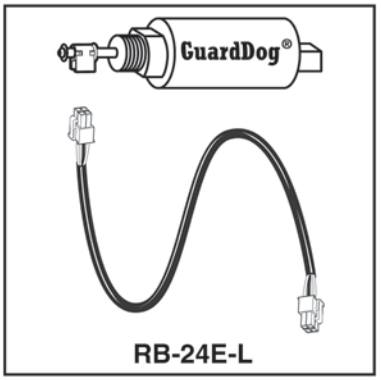


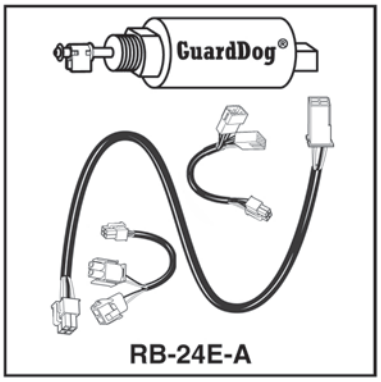
RB-24E-B



RB-24E-S



RB-24E-L



RB-24E-A

⚠ WARNING

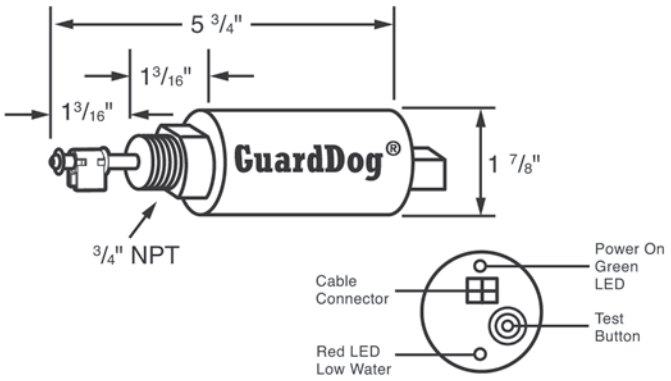
- **Before using this product read and understand instructions.**
- **Save these instructions for future reference.**
- **All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of plumbing, steam, hot water, and electrical equipment and/or systems in accordance with all applicable codes and ordinances.**
- **To prevent electrical shock, turn off the electrical power before making electrical connections.**
- **This low water cut-off must be installed in series with all other limit and operating controls installed on the boiler. After installation, check for proper operation of all of the operating controls, before leaving the site.**
- **We recommend that secondary (redundant) Low Water Cut-Off controls be installed on all boilers with heat input greater than 400,000 BTU/hour. At least two controls should be connected in series with the burner control circuit to provide safety redundancy protec tion should the boiler experience a low water condition. Moreover, at each annual out age, the low water cut-offs should be dismantled, inspected, cleaned, and checked for proper calibration and performance.**
- **This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov.**

Failure to follow this warning could cause property damage, personal injury or death.

OPERATION

The Model RB-24E Low Water Cut-Off is specifically designed to provide burner cut-off if there is an unsafe water loss, which can result from a broken or leaking radiator or pipe, or a cracked section in the boiler.

Water/glycol mixtures up to 50% concentration may be used.



SPECIFICATIONS

Temperature:
Storage: -40˚F to 120˚F (-40˚C to 49˚C)
Ambient: 32˚F to 120˚F (0˚C to 49˚C)
Humidity: 85% (non-condensing)
Maximum Water Pressure: 160 psi (11.2 kg/cm²)
Maximum Water Temperature: 250˚F (121˚C)

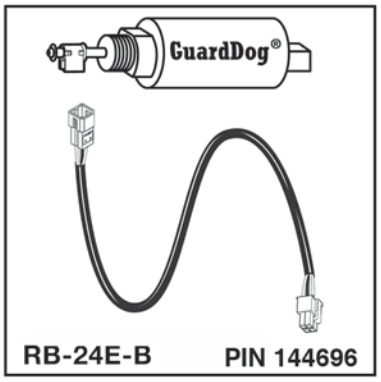
Electrical Ratings

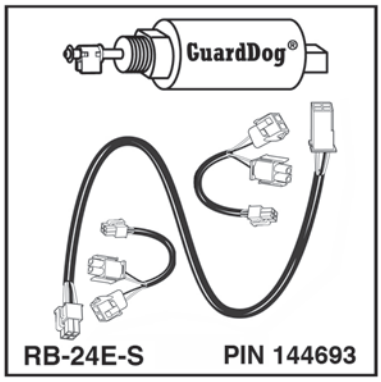
Voltage	Power Consumption	Switching Capacity
24 VAC	2.5 VA	2A at 24 VAC

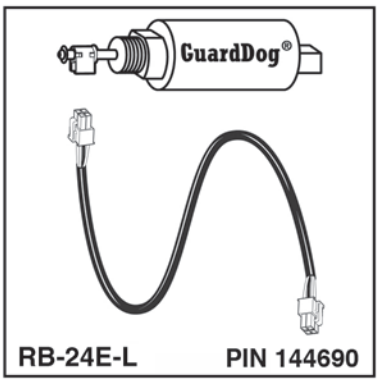
Enclosure Rating: NEMA 1 General Purpose

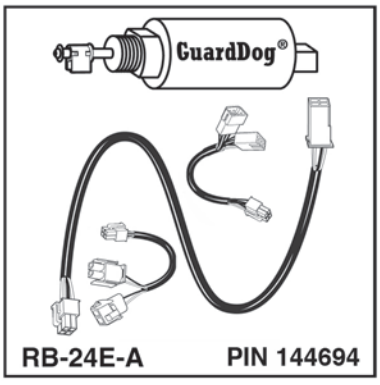
IMPORTANT: Do not use Model RB-24E on steam boilers.

IMPORTANT: Do not use on millivolt systems.









The **RB-24E-B** is for use on hot water boilers that have a harness plug connection.
- 5 foot connector cable harness

The **RB-24E-S** is for use on hot water boilers that have a transformer plug connection to the aquastat.
- 5 foot connector cable
- 'Y' harness for Honeywell Aquastat
- 'Y' harness for United Technologies burner control module

The **RB-24E-L** is for use on hot water boilers that have a control panel plug connection.
- 5 foot connector cable

The **RB-24E-A** is for use on hot water boilers that have a vent damper.
- 5 foot connector cable
- 6 pin connector 'Y' harness
- 4 pin connector 'Y' harness

INSTALLATION –

TOOLS NEEDED:
Pipe wrench or channel lock pliers.

STEP 1 - Electrical Wiring Options

⚠ WARNING

- **To prevent electrical shock, turn off the electrical power before making electrical connections.**
- **This low water cut-off must be installed in series with all other limit and operating controls installed on the boiler. After installation, check for proper operation of all of the limit and operating controls, before leaving the site.**

Failure to follow this warning could cause property damage, personal injury or death.

Option 1
RB-24E-A 4-Pin Damper 'Y' Harness with GRAY Color Tubing for Atmospheric Boilers

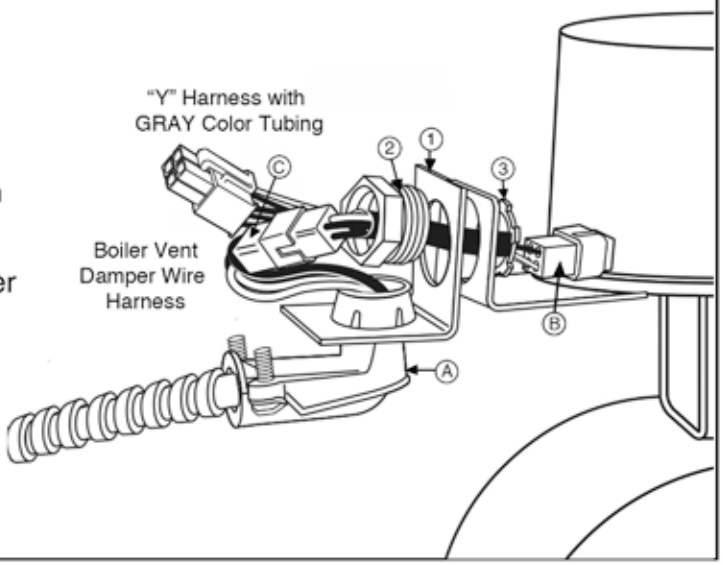
Install angle bracket (1) on vent damper using fitting (2) and nut (3).

(A.) Install BX connector to angle bracket.

(B.) Plug 4-pin connector of 'Y' harness to 4-pin connector on vent damper.

(C.) Plug 4-pin connector of boiler's vent damper wiring harness to connector of 'Y' harness.

NOTE
This 'Y' Harness can only be used with vent dampers with 4-pin connectors.



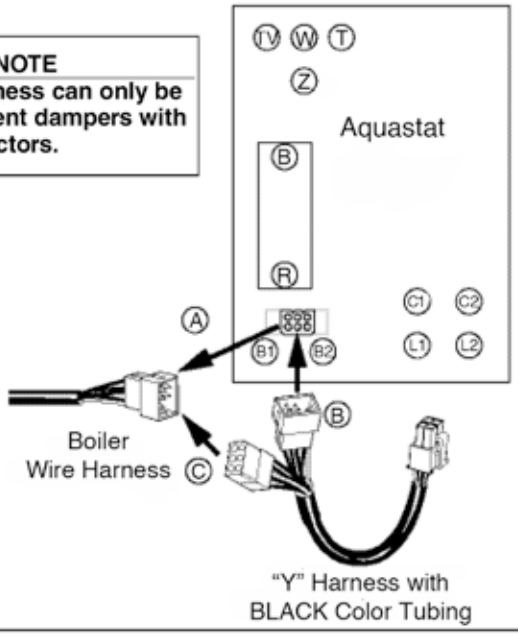
Option 2
RB-24E-A 6-Pin Damper 'Y' Harness with BLACK Color Tubing for Atmospheric Boilers

(A.) Remove 6-pin connector of damper wiring harness from connector on aquastat.

(B.) Plug 6-pin connector of damper 'Y' harness to connector on aquastat.

(C.) Plug connector of damper 'Y' harness to connector of boiler's damper wiring harness.

NOTE
This 'Y' Harness can only be used with vent dampers with 6-pin connectors.



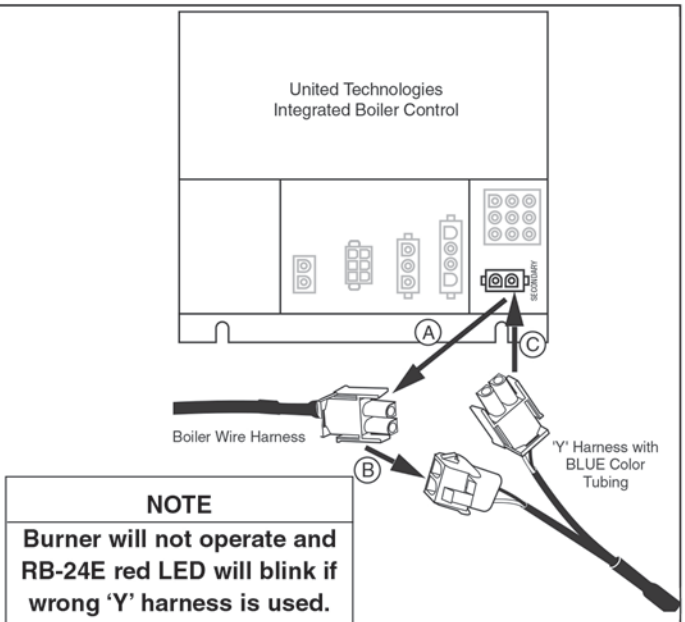
STEP 1 - Electrical Wiring Options (continued)

Option 3
RB-24E-S Transformer 'Y' Harness with BLUE Color Tubing

(A.) Remove connector of boiler wiring harness from boiler control transformer connector.

(B.) Plug connector of boiler wiring harness to connector of 'Y' harness with BLUE color tubing.

(C.) Plug connector of 'Y' harness with BLUE color tubing to boiler control transformer connector.



NOTE

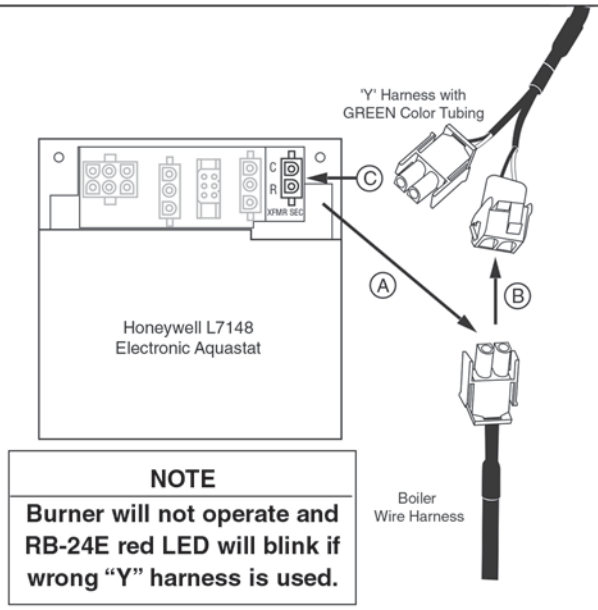
Burner will not operate and RB-24E red LED will blink if wrong 'Y' harness is used.

Option 4
RB-24E-S Transformer 'Y' Harness with GREEN Color Tubing

(A.) Remove connector of boiler wiring harness from Aquastat transformer connector.

(B.) Plug connector of boiler wiring harness to connector of 'Y' harness with GREEN color tubing.

(C.) Plug connector of 'Y' harness with GREEN color tubing to Aquastat transformer connector.



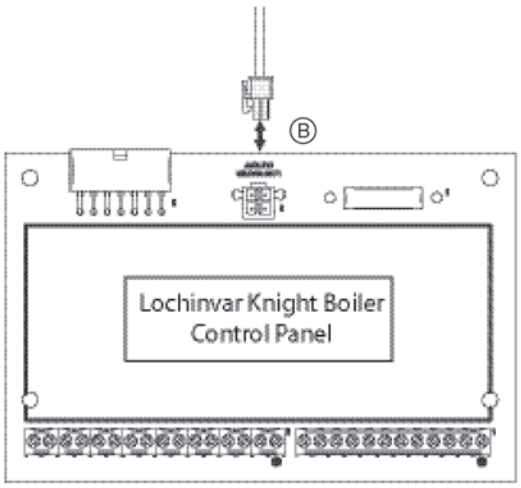
NOTE

Burner will not operate and RB-24E red LED will blink if wrong "Y" harness is used.

Option 5
RB-24E-L Connector
with Gray or Orange Color Tubing for Control Panel Connection

Ⓐ Remove jumper plug from plug-in connector on control panel

Ⓑ Plug connector of wiring harness into plug-in Connector on control panel.

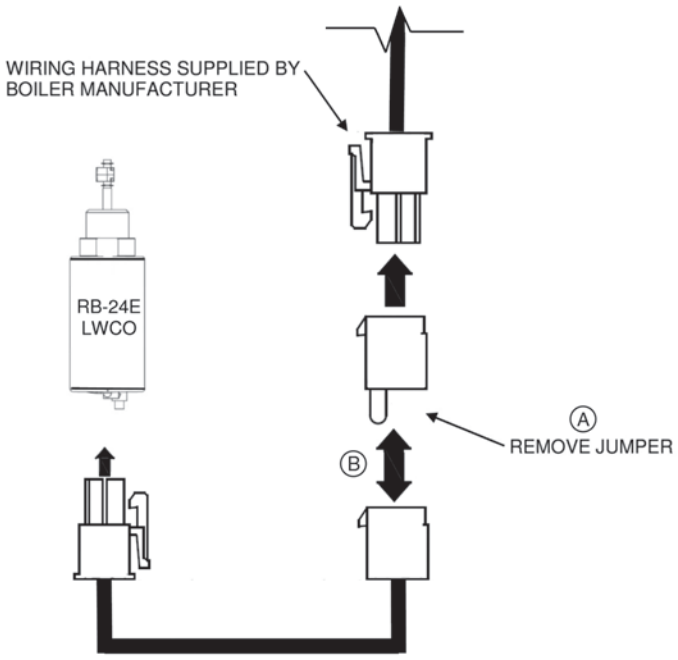


Option 6
RB-24E-B Connector
with Purple Color Tubing for Harness Plug Connection

Ⓐ Remove jumper plug from plug-in connector on control panel

Ⓑ Plug connector of wiring harness into plug-in Connector on harness plug connection.

Note: For Burnham Alpine Boiler



STEP 2 - Determine the Location of the Low Water Cut-Off

Determine where to install the probe control based on the following requirements:

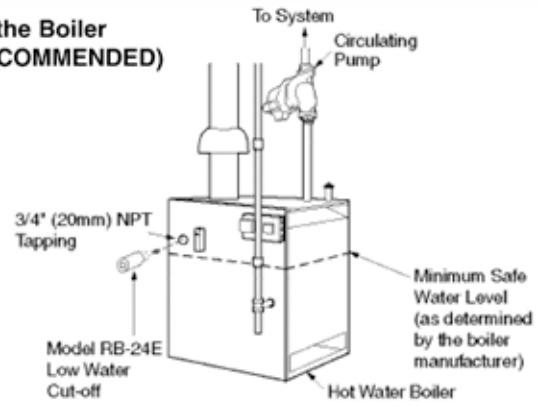
1. If tappings are provided on the boiler, the probe control must be installed in a tapping above the minimum safe water level, as specified by the boiler manufacturer. If no specified minimum safe water level is designated, contact the boiler manufacturer.

2. **If no tapping is provided** on the boiler, the probe control can be installed in a header or riser pipe above the boiler. Refer to the Typical Installation Diagrams below.

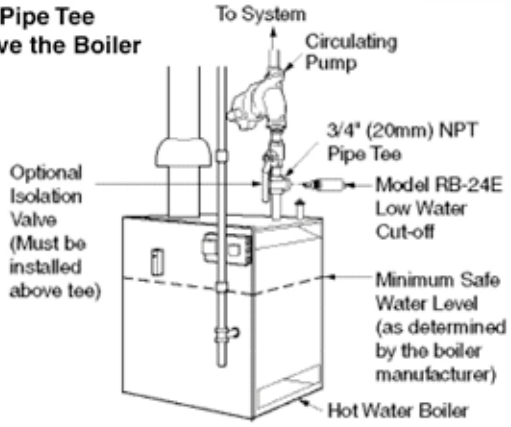
NOTE
Make sure RB-24E is located close enough (no more than 4 ft.) to burner control so the harness can be connected.

TYPICAL INSTALLATIONS

On the Boiler (RECOMMENDED)



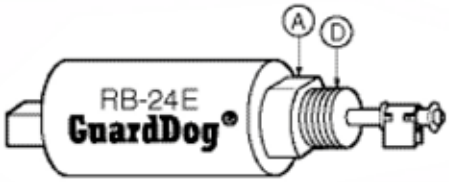
In a Pipe Tee Above the Boiler



STEP 3 - Installing the Low Water Cut-Off

a. **Sparingly,** apply pipe sealant to the external threads (D) of the probe(A).

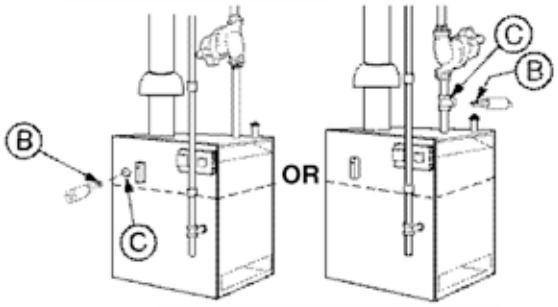
⚠ WARNING
Do not use PTFE tape. Only use pipe sealant. Failure to follow these instructions will cause the probe not to function as intended and could cause property damage, personal injury or death.



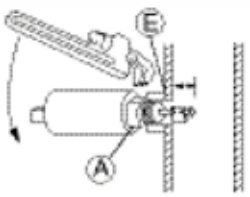
b. Insert the probe portion (B) of the low water cut-off into the ¾" (20mm) NPT tapping (C) on the boiler

OR into a ¾" (20mm) NPT pipe or reducing tee (D) above the boiler. Do not cross thread the low water cut-off.

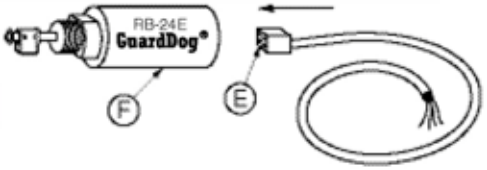
Fully **hand tighten** the low water cut-off (approximately 4 revolutions) to approximately 6 ft•lb (8 N•m).



c. Using a wrench, tighten the unit (A) into the tapped connection (E) that was determined in Step 1 of these instructions. Tighten to 47 ft•lb (64 N•m).



d. Install the plug end of the cable (E) into the low water cut-off (F).



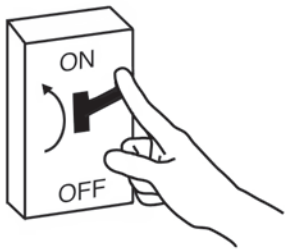
STEP 4 - Testing

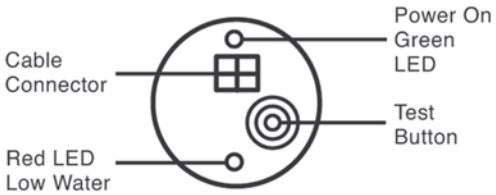
a. **Before filling the system,** turn on the electric power to the boiler. The low water cut-off's green "Power On" LED should be illuminated. With the room thermostat set on "heat," confirm that the burner **will not** operate without water in the system. The low water cut-off's red LED should be illuminated.
NOTE: The burner will come on briefly (1 second or less) and then shut off to verify proper operation.

b. Fill the system with water. When water is just above the probe, the low water cut-off's red LED should turn off.

c. Check and confirm that the boiler's thermostat, burner and safety limits are operating properly after filling system and before leaving the site.

d. Check the threaded connection of the low water cut-off for leakage. Tighten, if necessary.





Testing Control Using "Test Button"

Pressing the "Test Button" interrupts the probe circuit which simulates water off the probe.

a. Press and hold "test button" while burner is running.

b. The burner should turn OFF and red light turn ON if burner is wired correctly.

c. Release the test button and the red light should turn off and the boiler should turn on provided that the boiler water in contact with the probe.

INSTALLATION COMPLETE

TROUBLESHOOTING:

If control fails to operate, perform the following diagnostic checks.

1. Check to be sure that the water level in the boiler is at or above the level of the probe.
2. Re-check all wiring to ensure proper connections as specified in boiler manufacturers wiring diagrams.
3. Check to ensure that PTFE tape has not been used on the threaded connection of the probe to the boiler.
4. Check the quality of the boiler water to ensure adequate conductance.

Boiler Does Not Turn Off (when water is below probe)

- Turn off boiler and check boiler wiring connections.
- Turn off boiler, drain boiler and remove control to check if the tip of the probe is touching a metal surface.

Boiler Does Not Turn ON

- Make sure water is above the level of the probe.
- Make sure probe is installed in a location where an air pocket cannot develop.
- Check boiler wiring connections.

Boiler Does Not Turn ON and RB-24E Red LED blinking

- Problem is wrong transformer 'Y' harness.
- Turn off boiler and install correct transformer 'Y' harness.