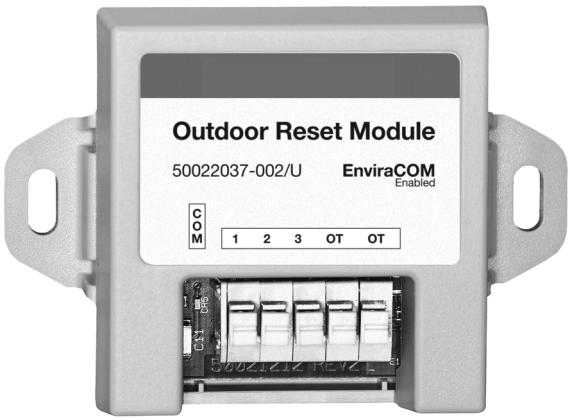
resideo

Outdoor Reset Module

INSTALLATION INSTRUCTIONS



APPLICATION

The AquaReset™ Outdoor Reset Module, when connected to the C7089U Outdoor Sensor, works with any AquaReset enabled Aquastat® such as the L7224/48 via the EnviraCOM™ 3-wire bus to optimize boiler efficiency. The Outdoor Reset Module enables efficiency Aquastat functionality, such as Outdoor Temperature Reset, a Boost function, and a Warm Weather Shutdown function to generate average operational savings of up to 15%.

SPECIFICATIONS

Electrical Ratings: Voltage: 24 Vac, 60 Hz.

Environmental Ratings:
Temperature: -30° F to +150° F (-34° C to +66° C).
Humidity: 0 to 95% relative humidity, non-condensing.

Accessories (Can be ordered separately):
C7089U1006 Outdoor Temperature Sensor

FEATURES:

- **Enables Boiler Outdoor Temperature Reset**
- **Enables Warm Weather Shutdown**
- **Enables Boost Override**
- **Easy push wire terminals that provide a secure lock with no need to screw in wires.**
- **Simple low-voltage, 5-wire installation (3 EnviraCOM, 2 temperature sensor)**
- **EnviraCOM™ Enabled**

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ CAUTION

Electrical Shock Hazard.
Can cause electrical shock or equipment damage.
Disconnect power supply before connecting wiring.

5. The Outdoor Reset Module can be wall mounted in any orientation desired or dictated by the surroundings.
6. The holes are sized for the #6 sheet metal screws (included).
7. Precise leveling of the product is not required.

WIRING

⚠ CAUTION

Electrical Interference (Noise) Hazard.
Can cause erratic system operation.
Keep wiring at least one foot away from large inductive loads such as motors, line starters, lighting ballasts and large power distribution panels.
Use shielded cable to reduce interference when rerouting is not possible.

69-2335-03

1. Mount the module with the supplied hardware.
2. Wire the 1,2, and 3 terminals on the Outdoor Reset Module to the 1,2, and 3 terminals on the EnviraCOM™ enabled thermostat (if available), Aquastat, or anywhere on the bus where access is available and convenient. See Fig. 1.
3. Wire the 2 wires from the C7089U temperature sensor See Fig. 1 into the OT terminals on the Outdoor Reset Module. One wire inserted into 1 OT terminal, the other wire inserted into the other.
4. See C7089U Installation Instructions (Form Number 69-1709EFS) for additional sensor installation instructions and specifications.

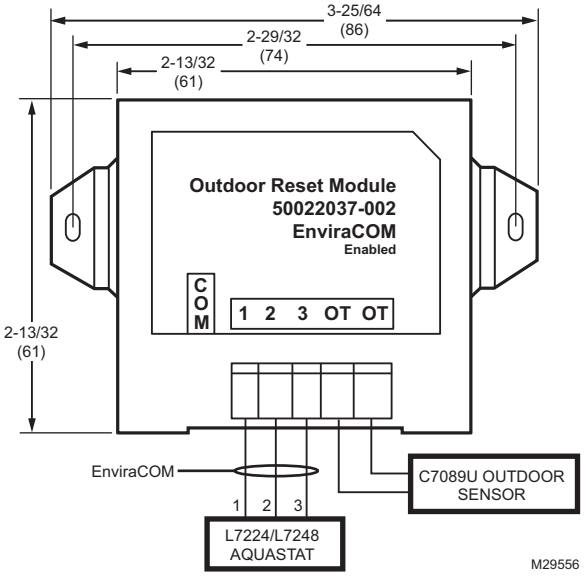


Fig. 1. 50022037-002 Outdoor Reset Module wiring diagram.

OPERATION

General

The 50022037-002 Outdoor Reset Module is a device which when connected to an AquaReset enabled Electronic Aquastat via the EnviraCOM™ communication bus, enhances the available features to include Outdoor Temperature Reset, a stepped Boost function as well as a Warm Weather Shutdown feature to provide increased boiler efficiency while meeting thermostat heat demand. Set-up of the Outdoor Setback curve as well as the Boost function is done using the 3-digit/3-button display on the L7224/L7248 Aquastat (See L7224 Installation Instructions Form Number 69-1720 and/or Form Number 68-0281 for more information).

Adjusting Settings

The 3-digit/3-button display on the L7224/L7248 Aquastat is used to set up the Outdoor Reset Curve, Boost and Warm Weather Shutdown parameters. To discourage unauthorized changing of Aquastat settings, a procedure to enter the ADJUSTMENT mode is required. To enter the ADJUSTMENT mode, press the UP, DOWN, and I buttons (See Fig. 2) simultaneously for three seconds. Next, press the I button until the feature requiring adjustment is displayed then use the arrow up/down buttons to set the parameter value (See Table 4). After 60 seconds without any button inputs, the controller will automatically return to the normal display mode.

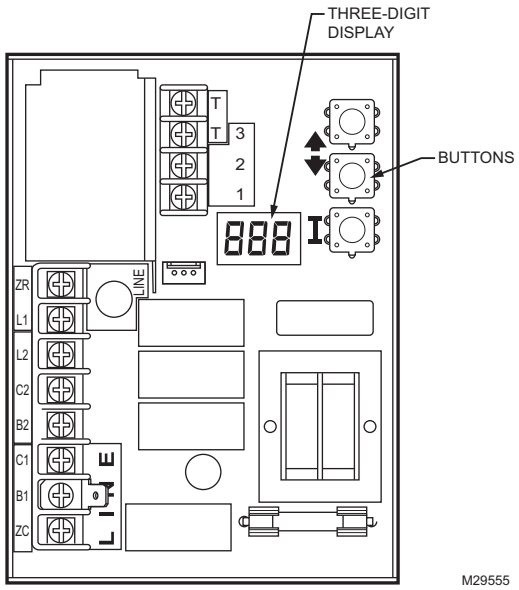


Fig. 2. Location of L7224/L7248 3-digit display and buttons.

Outdoor Reset

The Outdoor Reset feature adjusts the target boiler temperature to a point below its local high limit setting and above the boiler's condensation temperature by using the EnviraCOM communication bus to directly adjust the Aquastat set-point. Should a call for Domestic Hot Water be detected, the boiler temperature is commanded to return to the High Limit setting, ensuring a hot water supply is available. When the Domestic Hot Water demand is met, the Outdoor Reset feature is once again enabled. See Table 1 and Fig. 3.

Application and Settings Pointers

The energy savings concept behind Outdoor Reset is to minimize the energy in the boiler that is lost during the off cycle. This is accomplished by maintaining the boiler temperature as low as possible and/or running the boiler for longer periods of time. Although considerable energy savings exists, the boiler is only one part of the system that includes thermostats, other controls, and radiation. To maximize savings while avoiding call-backs due to uncomfortable homeowners, some care must be taken when adjusting the control parameters. Listed below are some insight into operation and adjustment pointers. See Fig. 3.

Low Boiler Temperature: This is the minimum temperature that the boiler is designed to operate to. Setting this too low will result in condensation in the boiler and reduce boiler life. Typically this setting is 130° F (54°C) for gas boilers and 140°F (60°C) for oil boilers. Some new cast iron boilers are designed to operate at lower temperatures. Consult the manufactures' specifications.

Low Outdoor Temperature: As the outdoor temperature decreases, the boiler temperature is increasing to provide more heat to the home. This is the outdoor temperature at

which point the boiler should be heating to its high limit setting. Note this isn't necessarily the design temperature and depends on how well the radiation was designed at the installation. Setting this too low will result in the home receiving too little heat as the outdoor temperature drops. This is the critical setting in avoiding call-backs.

High Outdoor Temperature: This is the outdoor temperature at which the Low Boiler Temperature is achieved. This is the parameter that most impacts the energy savings. Setting this too high results in less energy savings as the thermostat will call for heat and the boiler will run at much higher outdoor temperatures. Setting this too low will result in too narrow a range for the control to be adjusting boiler temperature. In most cases the default of 40°F (4.4°C) is fine.

NOTE: In many cases these parameters will not need to be adjusted as their default values are designed to accommodate mid-Atlantic and lower New England areas.

CAUTION

Possible Equipment Damage

When enabling the Outdoor Reset function, be sure to refer to the boiler OEM's instructions for the lowest return water setting to avoid condensation in the heat exchanger. which can result in equipment damage.

Table 1. Outdoor Reset Curve Settings and Defaults.[1]

Parameter	Minimum value	Maximum value	Default
High Limit	130°F (54°C)	240°F (116°C)	180°F (82°C)
Minimum Outdoor Temperature	-40°F (-40°C)	40°F (4.4°C)	0°F (-18°C)
Minimum Boiler temperature	80°F (27°C)	180°F (82°C)	130°F (54°C)
Maximum Outdoor Temperature	30°F (-1°C)	70°F (21°C)	40°F (4.4°C)

[1] Minimum, Maximum and Default High Limit settings shown are for the L7224U. Values may change for other Aquastats. Check the specific Aquastat Installation Instruction manual for more information on default settings.

Boost

If heat demand is not met within a certain time period while the boiler is in setback mode (following the Outdoor Reset curve), a Boost period is invoked where the boiler set point is increased by a value called the Boost Step. Each time the Boost Period elapses and heat demand is not satisfied, the boiler set-point is again increased by the Boost Step, up to the maximum setting provided by the High Limit setting (see Table 2 and Fig. 3). Boost is reset when the heat demand is satisfied (local or remote call for heating has ended). Simply reaching the boiler set-point does not reset the Boost. Continuous Boost calls may be an indication of a poorly set Outdoor Reset Curve for the environment or faulty equipment. A Boost warning will be indicated on the 3-digit Aquastat display if Boost is required on 60 consecutive cycles. See Table 5.

The Boost Period can be set from OFF to a range of 5 minutes to 30 minutes, adjustable in 1 minute increments. The default setting is 10 minutes. See Table 2.

The Boost Step can be set from Off to a range of 5°F (-15°C) to 20°F (-7°C).

Table 2. Boost Settings and Defaults.

Parameter name	Minimum value	Maximum Value	Default
Boost Period	5 minutes (or Off)	30 minutes	10 minutes
Boost Step	5°F (or Off)	20°F	10°F

Warm Weather Shutdown

The Warm Weather Shutdown feature causes a "Warm Start" boiler to shut down when the outdoor temperature exceeds a specified value. Warm Start boilers maintain a minimum temperature by setting the Low Limit on the Aquastat. If enabled this features cancels the Low Limit setting when the outdoor temperature exceeds a specified value.

CAUTION

Zone Panel Settings

In applications with zoning panels having a priority zone for domestic hot water: Disable the warm weather shutdown feature on the Aquastat.

The Warm Weather Shutdown feature can be set from OFF to a range of 40°F (4.4°C) to 70°F (21°C), adjustable in 10 degree increments. The default setting is OFF. See Table 3.

Table 3. Warm Weather Shutdown Settings and Defaults.

Parameter name	Minimum value	Maximum Value	Default
Warm Weather Shutdown	40°F (or Off)	70°F	Off

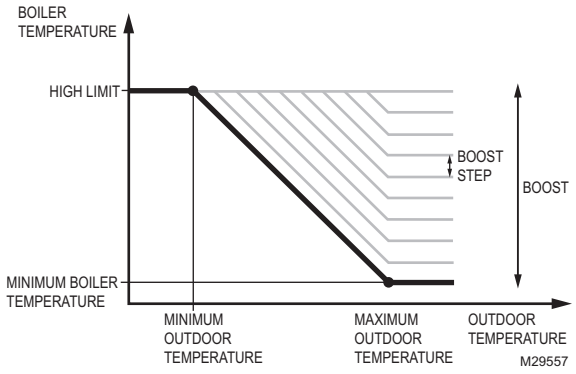


Fig. 3. Outdoor temperature setback curve with boost.

As Outdoor Temp reaches Warm Weather Shutdown set-point (if enabled), the boiler is kept from cycling and will only service DHW demands if the Aquastat Zr terminal is configured for Domestic Hot Water request. See Table 4.

Table 4. Programming Parameters.

HL_	High Limit.
Hdf	High Limit Differential.
LL**_	Low Limit.
Ldf**	Low Limit Differential.
ELL***	ZR input configured as External Low Limit (ON/OFF)
duu	ZR input configured as external Domestic Hot Water (DHW) request (ON/OFF)
ASC	Anti Short Cycle Timeout (seconds); "OFF" is disabled.
otL*	Outdoor Temperature Low (minimum) parameter for the outdoor reset curve (°F or °C)*
otH*	Outdoor Temperature High (maximum) parameter for outdoor reset curve (°F or °C)*
btL*	Boiler Temperature Low (minimum) parameter for outdoor reset curve*
bP*	Boost Period (minutes). "OFF" is displayed if Boost is inactive*
bS*	Boost step (°F or °C) shown only if Boost is active (bP=ON)*
UUS*	Warm Weather Shutdown Temperature (°F or °C)*
F-C	Temperature units (°F or °C)

* Settings available for adjustment on the 3-digit Aquastat display only when the "Outdoor Reset Module" is installed.
**Not displayed when connected to an L7248 Aquastat Control.
***Only displayed when connected to an L7248L Aquastat Control.

OUTDOOR RESET MODULE ALARMS AND TROUBLESHOOTING

The 50022037-002 Outdoor Reset Module's enhanced diagnostics provides contractors with information alerting them if boiler efficiency is deteriorating or the system is not running optimally. The information can be read on the Aquastat's 3-digit display or hand held tools. See Table 5 for available diagnostics, Error Codes and Troubleshooting hints.

Table 5. LED Error Codes.

Error Code	Cause/Action	EnviraCOM Alarm
Err1	Sensor fault; check water sensor.	18
Err2	EnviraCOM fault; check EnviraCOM wiring.	18
Err3	Hardware fault; replace controller.	18, 58
Err4	B1 fault; check B1 wiring/voltage.	64
Err5	Low Line; check L1-L2, 110 Vac.	59
Err6a	Warning: Fuse; check EnviraCOM wiring, replace fuse.	92
Err7	Warning: EEPROM, HL, LL, Hdf, Ldf; reset to default values.	N/A
Err 8[b]	Repeated B1 fault (voltage present at B1 when output is turned off); check B1 wiring/voltage.	25
Err9[a]	Warning; Outdoor Reset System failure; communication to Outdoor Reset Module lost, Outdoor Reset Module failure, multiple outdoor temperature sensors detected on the bus, or outdoor temperature sensor failure. Check EnviraCOM wiring (1, 2, 3), check sensor wiring.	50, 53, 149
Err 10[a]	Warning: Boost Failure; Boost Mode active at least once per cycle for the last 60 consecutive cycles. Check Outdoor Reset curve settings.	150
Err 11[a]	DHW Module Sensor failure. Warning: DHW System failure; communication to DHW Module lost, DHW Module failure, or temperature sensor failure. Check EnviraCOM wiring (1, 2, 3), check sensor wiring.	146, 147, 148

[a] Warnings are generated to enunciate the system is not operating optimally, but the Aquastat is still operating and maintaining boiler temperature. In the instance where an Outdoor Reset Module is used, the warnings may indicate a reset curve setting error one or more features is not running optimally, and the Aquastat is reverting to default settings or has stopped running the Outdoor Reset algorithms. The warnings are cleared when the issue(s) is resolved.

[b] To clear Err 8 condition, depress and hold all three user keys simultaneously for 60 seconds. Err 8 condition clears and display returns to normal. Err 8 condition is designed to catch welded relays on the Aquastat and will normally only occur near end of life for the control. If Err 8 condition has occurred early in the controls life, be sure to check for voltage feedback to B1 when B1 should be off and check current draw on b terminal to be sure oil burner is not drawing excessive current. Err 8 condition will keep repeating if B1 fault is not cleared.

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