



**ASR2-RF
TWO CHANNEL
STANDARD ASR UNIT
Z-WAVE INFORMATION**



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1 Description of System and Unit

1.1 General Description of Horstmann System

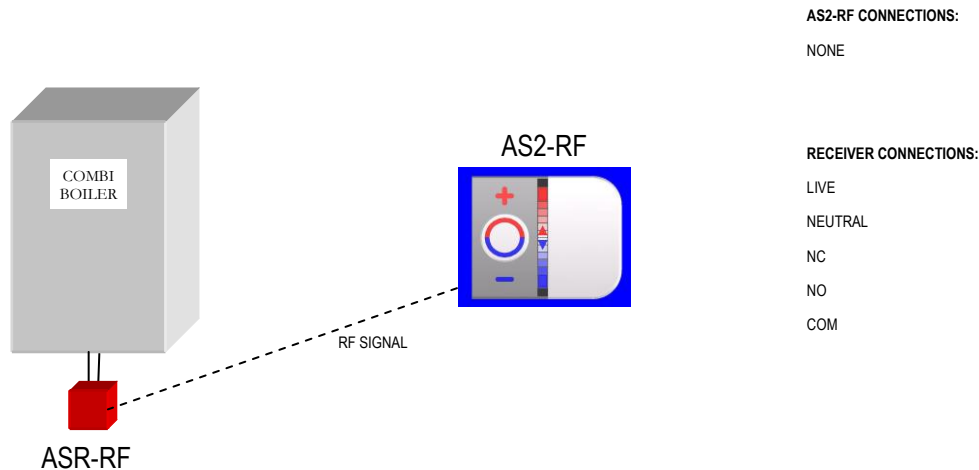


Figure 1 – System Diagram

The ASR unit is part of a system designed by Horstmann to control a boiler, by receiving Thermostat Mode SET commands or Binary Switch SET commands from another device. The unit has two channels, where each channel is independent and can be controlled from the same control unit or different control units (on the same network). For most properties control will be in point to point mode, but the unit is also capable of working in a Z-Wave mesh network.

As a Z-Wave product the ASR unit is capable of being added to any network and controlled by any unit on that network capable of sending the Thermostat Mode SET command, Binary Switch SET command or encapsulated forms of these commands.

In the event that a channel is being controlled by the Thermostat Mode SET command, and it has not received a Thermostat Mode SET command within 60 minutes, the channel will be switched off (failsafe mode) and manual override to switch that channel on/off will be available (NOTE: manual override is available at any time and cancels timeout to failsafe mode until another Thermostat Mode SET command is received).

In the event that a channel is being controlled by the Binary Switch SET command, there is no failsafe mode since the last Binary Switch SET command and manual override to switch that channel on/off will be available at all times.

1.2 ASR Unit Description

The unit can be fitted to a standard 6-pin wall plate, and is powered from a 230V 50Hz mains supply. The pin out for this unit is (viewed from behind) shown in figure 2. The unit has two relays inside the unit with internal connections as shown in figure 2. NC (Normally closed) is the off state of the each relay. The appearance of the unit is shown in figure 3.

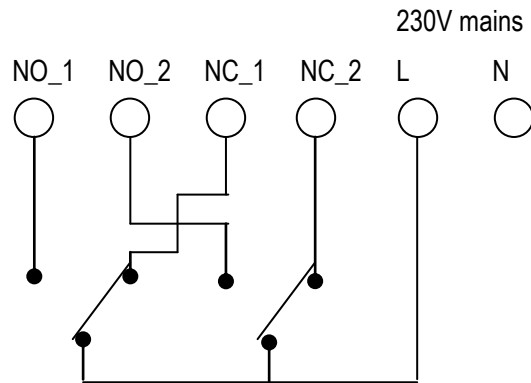


Figure 2 – ASR Unit Pin Out (Rear View)

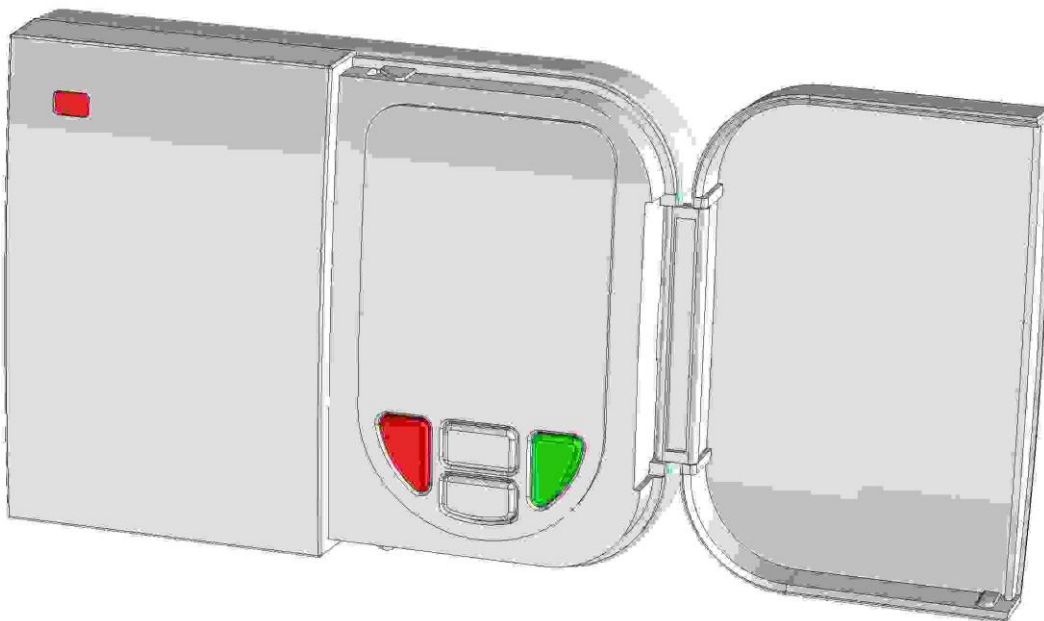


Figure 3 – Front View of ASR

The unit has four buttons and a three colour LED indicator in the top left corner that is used as follows:

LED Indication	Unit Mode	Button Usage
Flashing Red	Unit is currently excluded from a network	Red and Green – No function White buttons – Network function
Flashing Green (3s only)	Unit has been successfully included on to the network	Red and Green – No function Both White buttons – Network function
Solid Amber	Unit is included on to a network, and a channel has not timed out to failsafe mode to indicate loss of comms.	Red and Green – No function White buttons – Network function
Solid Red	Unit is reflecting the status of the channel selected depending on the white button pressed. Solid Red indicates that the relay for that channel is OFF.	Top White button held for Channel 1 or Bottom White button held for Channel 2. Red and Green – switches channel relay off or on respectively. White buttons – Network function
Solid Green	Unit is reflecting the status of the channel selected depending on the white button pressed. Solid Green indicates that the relay for that channel is ON.	Top White button held for Channel 1 or Bottom White button held for Channel 2. Red and Green – switches channel relay off or on respectively. White buttons – Network function
Flashing Amber	One of the channels has entered failsafe mode.	With Top White button held or Bottom White button held the Red and Green buttons switches relay output off and on respectively. White buttons – Network function

NOTE: It is not possible to determine which channel has entered failsafe from button presses and LED indications.

Table 1 – User Functionality of the ASR

Pressing and holding both white buttons together for ~1s will cause the unit to issue its Node Information Frame and enter learn mode for 1s to support being included / excluded from a network.

Pressing and holding one white button for ~1s will cause the unit to issue an End Point Capability Report.

1.3 Factory Test Mode

In this mode, operation of the relay outputs and LEDs can be tested via the buttons. Also the unit will transmit the 868MHz carrier frequency continuously.

The factory test mode is entered by holding down the red and green buttons together on a power up from mains.

To indicate that test mode has been entered the LED indicator will be solid AMBER and the relays will be off.

To test, press the buttons in the following order, for the following responses:

Button	LED	Relay 1	Relay 2
Red button	Solid Red	Off	On
Upper White button	Solid Amber	On	On
Green button	Solid Green	On	Off
Lower White button	Off	Off	Off

Table 2 – Factory Test Mode for the Unit

To exit factory test mode, disconnect the mains.

The aim of this mode is to facilitate rapid testing of the ASR unit in production.

2 Network Operations

2.1 Inclusion into a Network

1. Power up the unit from the mains, and if the LED indication is flashing red, then the unit is in the 'node is reset' condition and can be included on to a network.
2. Put the controller that is going to include this unit in to its network in to learn mode.
3. Press and hold both white buttons together until the LED indication starts flashing green. This should take 1 - 2s.
4. The unit should now be part of this new network, and the LED indication will go solid amber.

NOTE: If the LED does not flash green then the include process has been unsuccessful.

NOTE: The ASR can be included on to another network by other manufacturer's devices, that are Z-Wave compliant, through this inclusion process.

2.2 Exclusion from a Network

1. If the unit is on, and the LED indication is not flashing red, then the unit is part of a network, and can be excluded from that network.
2. Put the controller that is going to exclude this unit from the network in to learn mode.
3. Press and hold both white buttons together until the LED indication starts flashing red. This should take approx. 1 - 2s.
4. The unit should now be in the 'node is reset' condition and no part of the network.

NOTE: If the LED does not flash red then the exclude process has been unsuccessful.

NOTE: The ASR can be excluded from a network consisting of other manufacturer's devices, that are Z-Wave compliant, through this exclusion process.

2.3 Node Information Frame

Pressing and holding the white buttons together for ~1s will cause the unit to issue its Node Information Frame and enter learn mode for 1s.

This can be done at any time the unit is on, but if it is for purposes other than inclusion and exclusion there will be no visible feedback on the unit to indicate success or failure.

Other purposes are for association in to a controller's control group, disassociation from the group, part of an assigned route, and transmission of the NIF for determining its device and command classes.

2.4 Use as a Repeater

The ASR is a mains powered device that is listening at all times, and can therefore function as a repeater node in any Z-Wave compliant network that it is part of.

On losing and restoring mains power, the unit must remember its network status.

2.5 End Point Capability Reports

The unit supports two static end points for the two channels.

Pressing the Top White button for ~1s will cause the unit to issue an end point capability report for end point 1 (channel 1).

Pressing the Bottom White button for ~1s will cause the unit to issue an end point capability report for end point 2 (channel 2).

Broadcasting end point capability reports in this manner has been implemented to support association of a channel to a controller unit that supports control of the unit through the Multi-Channel Command Class.

3 Device and Command Classes

3.1 Device Classes

The Z-Wave network role for the ASR-RF unit will be a Routing slave, listening at all times.

Basic Device Class = ROUTING SLAVE.

Generic Device Class = GENERIC TYPE THERMOSTAT.

Specific Device Class = 0 (Defined by Zensys). This is not currently documented in the 'Z-Wave Device Class Specification' [1].

3.2 Command Classes Supported

Support requires that the unit is able to receive commands and respond within that command class [2].

3.2.1 Manufacturer Specific Command Class (V1)

The unit shall respond to the GET command with the following REPORT parameters:

Product ID = 0x0059 (assigned by Z-Wave vendor)

Product Type ID = 0x0003 (assigned by Horstmann, 0003 is the ID for a Radio Control Wiring Centre)

Product ID = 0x0002 (assigned by Horstmann, 0002 identifies unit as two channel).

3.2.2 Version Command Class (V1)

The unit shall respond to the GET command with a REPORT containing version information for the Z-Wave code, and a two byte identifier for the application code (written by Horstmann). Production Code will start from Version 1 Revision 0 so the two byte identifier shall start from 0x01 0x00.

The unit shall respond to the Version Command Class GET with the Version Command Class REPORT for any requested command class that is supported or not. For unsupported classes, the version number returned is 0.

3.2.3 Multi-Channel Command Class (V2)

The unit fully supports this command class with two static end points, and the channels will respond to encapsulated Basic, Thermostat Mode and Binary Switch command classes.

As Version 2 is supported it is also backward compatible with controllers that use Multi-Instance Command Class (V1).

3.2.4 Thermostat Mode Command Class (V1)

Un-encapsulated commands will be mapped to end point 1 (channel 1), whereas encapsulated commands are used for each end point (channel).

The unit shall respond to the Thermostat Mode Supported GET command with a Thermostat Mode Supported REPORT with a bit mask of 0x03 to indicate that only the Off Mode and Heat Mode are supported.

The unit shall respond to the Thermostat Mode GET command with a Thermostat Mode REPORT, whereby the mode parameter will reflect the status of the output to the boiler – 0 = off, 1 = on (Heat).

The unit shall respond to the Thermostat Mode SET command, whereby the mode parameter will operate the output to the boiler – 0 = off, 1 = on (Heat).

Any other mode values will be ignored.

3.2.5 Binary Switch Command Class (V1)

Un-encapsulated commands will be mapped to end point 1 (channel 1), whereas encapsulated commands are used for each end point (channel).

The unit shall respond to the Binary Switch GET command with a Binary Switch REPORT, whereby the switch value reported will reflect the status of the relay output – 0 = off, 0xFF = on.

The unit shall respond to the Binary Switch SET command, whereby the switch value will operate the relay output – 0 = off, 0x01-0x63 or 0xFF = on. Any other switch values will be ignored.

3.2.6 Basic Command Class (V1)

Un-encapsulated commands will be mapped to end point 1 (channel 1), whereas encapsulated commands are used for each end point (channel).

The Basic Command Class has been mapped to the Thermostat Mode Command Class as follows:

Basic SET	Not Supported.
Basic GET	Thermostat Mode GET.
Basic REPORT	Thermostat Mode REPORT.

3.3 Command Class for Control

Control requires that the unit is able to send commands and receive responses within that command class.

There are no command classes used for control of another device.



HORSTMANN

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