4 Channel Relay (JR-4C01)

User Manual

Ver.: 1.0

Contents

#1: About Z-Wave

The Z-Wave protocol is an interoperable, wireless, RF-based communications technology designed specifically for control, monitoring and status reading applications in residential and light commercial environments. Mature, proven and broadly deployed (with over 100 million products sold worldwide), Z-Wave is by far the world market leader in wireless control, bringing affordable, reliable and easy-to-use 'smart' products to many millions of people in every aspect of daily life.

Z-Wave **products from different manufacturers can be used together in a wireless network**. Thus, this product with any Z-Wave product from other manufacturers can be used in a common Z-Wave wireless network. All non-battery-operated Z-Wave devices within the network will act as Z-Wave repeaters regardless of vendor to increase reliability of the network.

The JR Automation 4 Channel Relay is a Z-Wave device with **secure communication (S2)** and uses the radio frequency of 865.2 MHz If other devices also support the same secure communication, the data is exchanged in this secure mode. Otherwise it will switch automatically to a lower level of security to maintain backward compatibility.

Note: Security Enabled Z-Wave Controller must be used in order to fully utilize the product.

JR Automation Technology 4 Channel Relay is a fully compatible Z-Wave Plus device and S2 Security.

#2: Description and features

2.1: Description

JR automation 4 channel relay is designed for wireless home automation solution with Z-Wave technology. It communicates with all the Z-Wave based controller with 2-way feedback with wireless communication. For the Indian market, it installs in all the 4 or more-module back box. It works for all type of load to turn ON and OFF like Fan, Lights, LED, Bulb and heavy-duty load (like AC, Geyser by using intermediate relays) by each of 6A load current capacity. It also works to increase the range of Z-Wave mess network as Z-Wave repeater. Due to 4 channel relays together it's very perfect for Indian market requirement with lower cost and without any changes in the normal switchboard. The encryption mode that the switch supports is S2 Unauthenticated.

Due to easy installation and trusted Z-Wave technology it will make your home into a smart home without any maintenance and with it, you can operate your all switching device from mobile, Voice integration, scenario panel and based on the schedule as per Z-Wave controller.

2.2: Main features

- Compatible with any Z-Wave or Z-Wave Plus Controller.
- Supports protected mode (Z-Wave network security mode) with AES-128 encryption (S2 Unauthenticated).
- Support OTAU (Over the Air Update) for Firmware.
- To be installed in wall switch boxes of dimensions allowing for installation, conforming to provisions of applicable regulations.
- Due to Separate Input for Load 24VDC or 230VAC both types of Load Supported by Device.

#3: Specification

Power Supply	230 VAC ± 10%, 50Hz
Standby Power Consumption	<0.5W
Operating Temperature	0 – 40 °C
Ambient humidity	0–90% RH without condensation
Radio protocol	Z-Wave
Radio frequency	865.2 MHz IN
Radio Signal Power	up to 5dBm
Range	up to 40m outdoors up to 30m indoors (depending on terrain and building structure)
Dimensions (L x W x H)	62.5 x 58.5 x 24.65 mm
Load Rating	6A per channel - resistive loads 16A overall - resistive loads
Overcurrent protection	Required external 16A circuit breaker
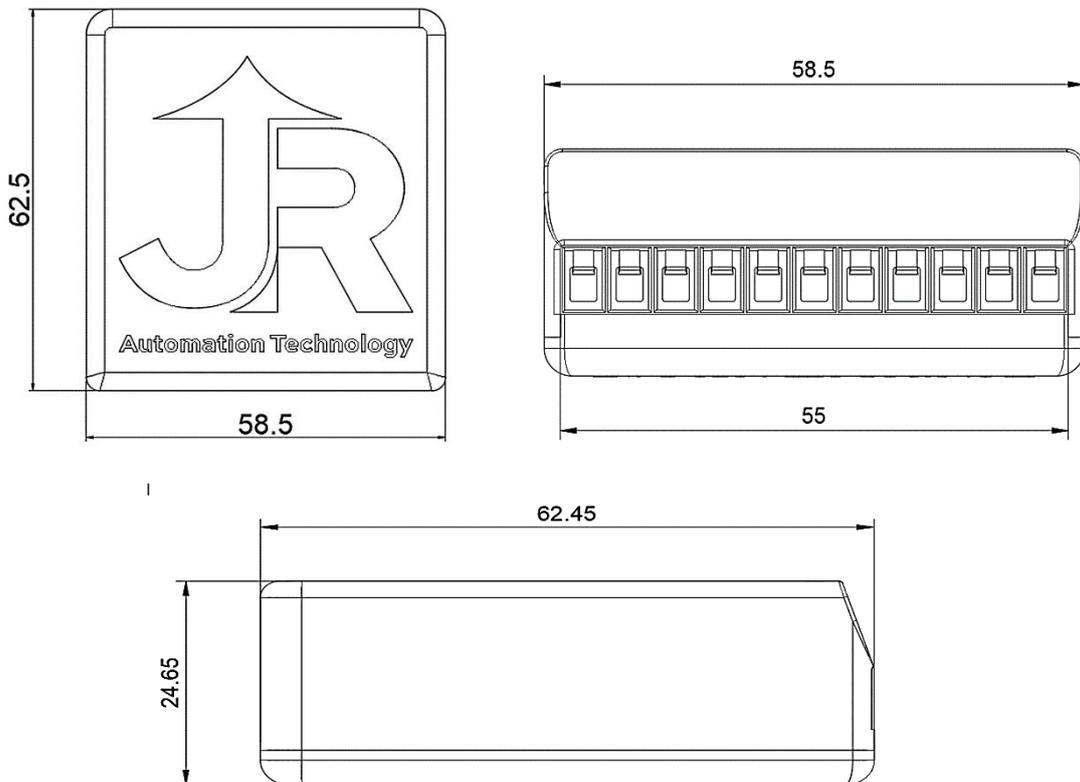
#4: Installation

4.1: Notes for Diagram
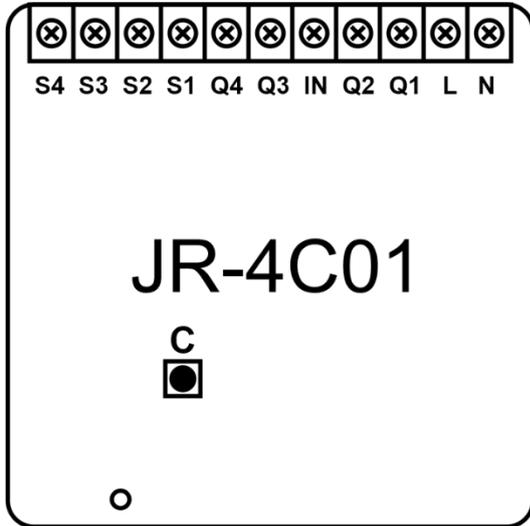
N	Terminal for neutral wire
L	Terminal for Live wire
Q1	Output Terminal For 1st Channel
Q2	Output Terminal For 2nd Channel
IN	230VAC or 24VDC INPUT for Load
Q3	Output Terminal For 3rd Channel
Q4	Output Terminal For 4th Channel
S1	Terminal for 1st Switch
S2	Terminal for 2nd Switch
S3	Terminal for 3rd Switch
S4	Terminal for 4th Switch

4.2: Preparation for Installation

Required the qualified and experience electrician with all knowledge of wiring as per manual and preparation of equipment like screwdriver and back box requirement.

- Connect only in accordance with one of the diagrams.
- Must be use overcurrent protection (fuse) of with a value not higher than 16A.
- 4 Channel Relay should be installed in a wall switch box compliant with a relevant national safety standard.
- Length of wires used to connect the control switch should not exceed 10m

4.3: Antenna Arrangement

- Place the antenna as far as possible from metal elements as they may cause signal interference.
- Do not shorten the antenna.

4.4: Electrical connection

1. Switch off the mains voltage.
2. Open the wall switch box.
3. Connect with the following diagram:
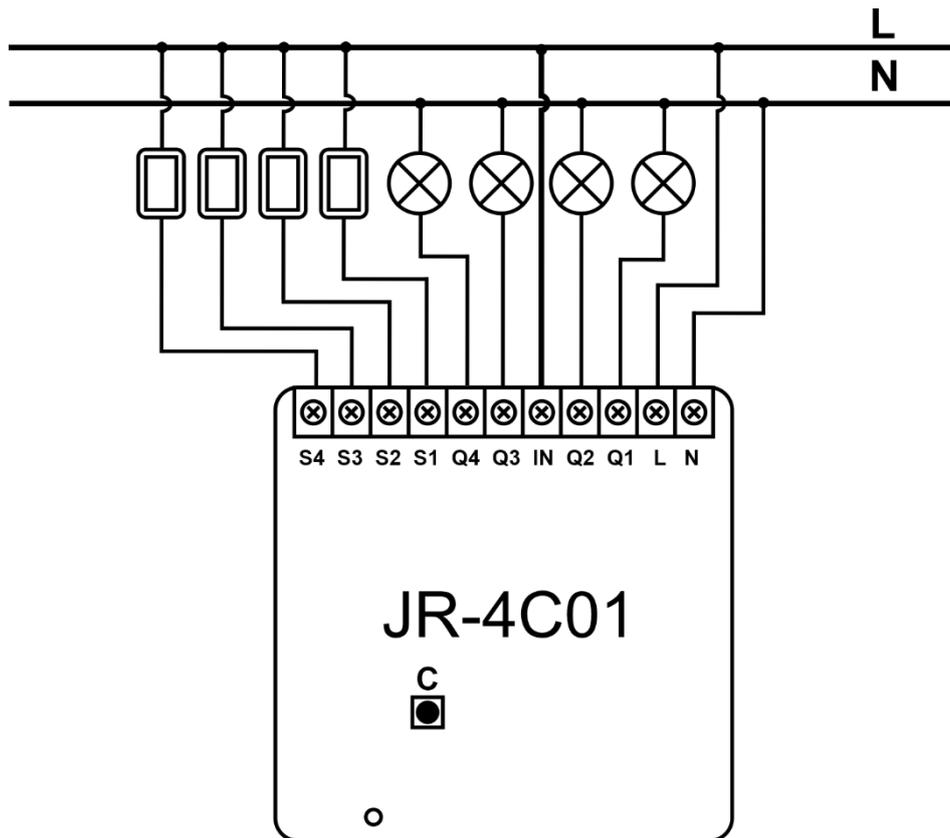
[Wiring Diagram of JR-4C01]

4. After verifying correctness of the connection switch on the mains voltage.
5. Add the device to the Z-Wave network.
6. Turn off the mains voltage, then arrange the device and its antenna in a wall switch box.
7. Close the wall switch box and turn on the mains voltage.

#5: Adding/removing the device
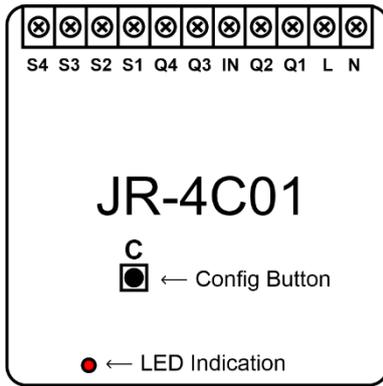
LED Colour Indications: -

🔴RED: Device is not part of any Z-Wave network, node id is zero.

🔵BLUE: Device is in Learn Mode.

🟢Green: Device is part of some Z-Wave network and it has unique node id.

5.1 Adding the Device

To add the device to the Z-Wave network:

1. Keep the device in Z-Wave range.
2. Power the device.
3. Set the main controller in (Security/non-Security Mode) add mode (see the controller's manual).
4. Quickly, three times press the Config Button, LED colour will change from Red to Blue.
5. Wait for the adding process to end.
6. Successful adding will be confirmed by the Z-Wave controller's Message and LED Colour will change to Green.

5.2 Removing the Device

To remove the device from the Z-Wave network:

1. Power the device.
2. Set the main controller into remove mode (see the controller's manual).
3. Quickly, three times click the Config button LED colour will change to Blue.
4. Wait for the removing process to end.
5. Successful removing will be confirmed by the Z-Wave controller's message and Red LED colour.

#6: Factory Default Reset

Reset procedure allows to restore the device back to its factory settings, which means all information about the Z-Wave controller will be deleted.

WARNING! Resetting the device is not the recommended way of removing the device from the Z-Wave network. Use reset procedure only if the primary controller is missing or inoperable. Certain device removal can be achieved by the procedure of removing described.

1. Press and Hold Config Button for 10 sec until White LED Indication start blinking.
2. Release Config button. Now you have 5sec to Reset Device otherwise it back to Normal Mode.
3. Single Click Config Button.
4. After few seconds the device will be restarted, which is signalled with the red LED indicator colour.

#7: Z-Wave Specification

The device is a Z-Wave Plus Device, and thus support all command classes required for Z-Wave Plus. In addition, the device supports Basic control commands for light control.

7.1: Z-Wave Specific Device Information

The device reports the following Z-Wave device specific information:

Property	Reported Value
Device Type	On/Off Power Switch
Basic Device Class	ROUTING_SLAVE
Generic Device Class	GENERIC_TYPE_SWITCH_BINARY
Specific Device Class	SPECIFIC_TYPE_POWER_SWITCH_BINARY
Z-Wave Plus Node Type	NODE_TYPE_ZWAVEPLUS_NODE
Z-Wave Plus Role Type	ROLE_TYPE_SLAVE_ALWAYS_ON
Z-Wave Plus Icon Type	GENERIC_ON_OFF_POWER _SWITCH
Z-Wave Plus User Icon Type	GENERIC_ON_OFF_POWER _SWITCH

7.2: Supported Z-Wave Command Classes

The following table lists all the supported Command Classes supported by the device. The usage of each command class is covered in the following sections.

Command class of root device:

NO	Command Class	Insecure Inclusion	Insecure on Secure Inclusion	Secure on Secure Inclusion
1	COMMAND_CLASS_ZWAVEPLUS_INFO (V2)	YES	YES	
2	COMMAND_CLASS_TRANSPORT_SERVICE (V2)	YES	YES	
3	COMMAND_CLASS_SECURITY (V1)	YES	YES	
4	COMMAND_CLASS_SECURITY_2 (V1)	YES	YES	
5	COMMAND_CLASS_SUPERVISION (V1)	YES	YES	
6	COMMAND_CLASS_ASSOCIATION (V2)	YES		YES
7	COMMAND_CLASS_ASSOCIATION_GRP_INFO (V1)	YES		YES
8	COMMAND_CLASS_BASIC (V2)	YES		YES
9	COMMAND_CLASS_DEVICE_RESET_LOCALLY (V1)	YES		YES
10	COMMAND_CLASS_FIRMWARE_UPDATE_MD (V4)	YES		YES
11	COMMAND_CLASS_MANUFACTURER_SPECIFIC (V2)	YES		YES
12	COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION (V3)	YES		YES
13	COMMAND_CLASS_MULTI_CHANNEL (V4)	YES		YES
14	COMMAND_CLASS_POWERLEVEL (V1)	YES		YES
15	COMMAND_CLASS_SWITCH_BINARY (V1)	YES		YES
16	COMMAND_CLASS_VERSION (V3)	YES		YES

Command Class of Endpoints:

NO	Command Class	Insecure Inclusion	Insecure on Secure Inclusion	Secure on Secure Inclusion
1	COMMAND_CLASS_ZWAVEPLUS_INFO (V2)	YES	YES	
2	COMMAND_CLASS_SECURITY (V1)	YES	YES	
3	COMMAND_CLASS_SECURITY_2 (V1)	YES	YES	
4	COMMAND_CLASS_SUPERVISION (V1)	YES	YES	
5	COMMAND_CLASS_ASSOCIATION (V2)	YES		YES
6	COMMAND_CLASS_ASSOCIATION_GRP_INFO (V1)	YES		YES
7	COMMAND_CLASS_BASIC (V2)	YES		YES
8	COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION (V3)	YES		YES
9	COMMAND_CLASS_SWITCH_BINARY (V1)	YES		YES

7.3: Basic Command Class Mapping

- Basic set = 255 maps to Binary switch set = 255
- Basic Set = 0 maps to Binary Switch set = 0
- Basic Get/Report maps to Binary Switch Get/Report

#8: AGI Configuration

Association (linking devices) – direct control of other devices within the Z-Wave system network.

Associations allow:

- reporting the device status to the Z-Wave controller (using Lifeline group).
- creating simple automations by controlling other devices without participation of the main controller (using groups assigned to actions on the device).

All endpoints support report status through root device lifeline group#1 support 5 destination nodes.

Endpoint 1 to 4 support control other devices through association group #2~#5, and each group support 5 destination nodes maximum. Group #2 corresponding to endpoint 1 switch state, and group #3 corresponding to endpoint 2 switch state, etc.

Root	Profile	Commands	Group Name
Group 1	General: Lifeline	Device Reset Locally Switch Binary Report	"Lifeline"
Group 2	Control: KEY01	Basic Set	"JRS-1"
Group 3	Control: KEY02	Basic Set	"JRS-2"
Group 4	Control: KEY03	Basic Set	"JRS-3"
Group 5	Control: KEY04	Basic Set	"JRS-4"

Endpoint 1	Profile	Commands	Group Name
Group 1	General: Lifeline	Switch Binary Report	"Lifeline"
Group 2	Control: KEY01	Basic Set	"JRS-1"

Endpoint 2	Profile	Commands	Group Name
Group 1	General: Lifeline	Switch Binary Report	"Lifeline"
Group 2	Control: KEY02	Basic Set	"JRS-2"

Endpoint 3	Profile	Commands	Group Name
Group 1	General: Lifeline	Switch Binary Report	"Lifeline"
Group 2	Control: KEY03	Basic Set	"JRS-3"

Endpoint 4	Profile	Commands	Group Name
Group 1	General: Lifeline	Switch Binary Report	"Lifeline"
Group 2	Control: KEY04	Basic Set	"JRS-4"

2nd, 3rd, 4th and 5th group allow to control 5 regular or multichannel devices per association group.

It is not recommended to associate more than 10 devices in general, as the response time to control commands depends on the number of the associated devices. In extreme cases, system response may be delayed.

Configure Operation for endpoints

For endpoints (from 1 to 4) operate with group 1, a controller needs to send Association set commands(in the case endpoint only notice status via switch binary report command) or Multichannel Association Set(in case end points will notice status via switch binary report on encapsulated command and common status of root device – status of root device is OFF in case of all endpoints OFF, and ON in case of at least one endpoint ON).

For endpoints (from 1 to 4) operate with groups (differ with "lifeline"), a controller will have to send Association Set Command or Multichannel Association Set Command.

#9: WARRANTY

The Manufacturer is only responsible for equipment malfunction resulting from physical defects of the device for up to 18 months from the date of purchasing.

The warranty policy will not be applied for cases such as below:

- Damages resulting from external causes e.g.: flood, storm, fire, lighting, natural disasters, earthquakes, high or low temperature and weather condition.
- Damages resulting from not following the instructions of operating manual.
- Damages casqued by faulty electrical installation by the customer, including use of incorrect fuses.
- Mechanical damages (cracks, fractures, cuts, abrasions, physical deformations caused by impact, falling or dropping the device or other object, improper use or by not observing the operating manual).
- Damages resulting due to power surges, improper connection to the grid supply, and not following the instruction of product operating manual shall not cover in warranty.

Automation Technology