PROJEXEL TECHNOLOGIES

"Wireless Automation Simplified"

Innovative Products for Industrial Automation & Robotics

RFST C-Series WIRELESS Remote I/O Module (4CH) NPN

User Manual

RFST-CTx

RFST C-Series 04CH Tx NPN

Model Name: 04TNIH023V001
Series Name: RFST C-Series
Common Name: 04CH Transmitter NPN
Power Input: 24 VDC, 50mA (Module only)
Sensor Input: N24 VDC
HS Signal IO: Upto 30VDC/5A or 250VAC/5A
Manufactured by : Projexel Technologies
Made In India

RFST-CRx

RFST C-Series 04CH Rx

Model Name: 04RXIH023V001
Series Name: RFST C-Series
Common Name: 04CH Receiver
Power Input: 24 VDC, 50mA (Module only)
Sensor IO: Upto 30VDC/5A, or 250VAC/5A
HS Signal IO: Upto 30VDC/5A, or 250VAC/5A
Manufactured by : Projexel Technologies
Made In India

Product Description

The RFST C Series I/O modules are Machine to Machine wireless communication modules, It's features are to improve the performance of industrial SPM's (Special Purpose Machines) and enable innovators to be more creative.

Salient Advantages

- Reduces production downtime
- Prevents complex wiring and control cable brake issues
- Reduces troubleshooting time
- Connects non-linear free-moving equipment to PLC
- Improved ergonomics for operators
- Prevents industrial accidents
- Provides machine flexibility and flexible manufacturing systems (FMS)

Features

- Direct Plug-in replacement of control wires
- Ultra-low power consumption
- Automatic Package Handling
- Auto Packet Transaction Handling
- Bi-directional Signal Acknowledgement
- Fast & Secure communication

Addressing/Pairing Method (C-Tx & C-Rx)

Step 1: Turn ON all the Dip switches (0-8) of Tx Modules & Press the RST button to enter Addressing mode.
Step 2: Adjust the Dip switches to set the address (A000-255).
Step 3: Press the RST button again to exit addressing mode and enter frequency/channel setting mode.
Step 4: Turn OFF Dip switch no. 8 if still ON.
(To avoid going into Isolation mode.)
Step 5: Set the channel from (0-125) as you wish to operate it.
Step 6: Press Reset to exit the Channel settings.
Step 7: Address Scanning will begin automatically.

If No error is displayed your device is ready to pair and now the Rx Module can be Turned ON at the same address and channel.
(To set the Rx address and channel Number follow Step 1 to Step 6)

DESIGN PRECAUTION

Warning*
*Use the module in an environment that meets the general specifications of this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to the deterioration of the product.
*Check the communication status information and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely.
*Tighten any unused terminal screws within the specified torque range (0.42 to 0.50 Nm).
*Do not disassemble or modify the modules.
*Do not drop or apply strong shock to the module.
*Before handling the module, touch a ground metal object to discharge the static electricity from the human body.

INSTALLATION PRECAUTION

Warning*
*Do not install the transmitter or receiver with communication cables or with the main circuit or power cables.
*Check the rated voltage and terminal layout before wiring to the module, and connect cables correctly.
*Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
*Keep a distance of 100mm (3.94 inches) or more between them, failure to do so may result in malfunction.
*Output may remain on or off due to the failure of a remote I/O module. Configure an external circuit for monitoring output signals that could cause a serious accident.

MAINTENANCE PRECAUTION

*Shut off the external power supply (all Phases) used in the system before cleaning the module or retightening the terminal screws or module mounting screws.
*Do not disassemble or modify the modules.
*Do not drop or apply strong shock to the module.
*Before handling the module, touch a ground metal object to discharge static electricity from the human body.
*Tightening the terminal screw within the specified torque range under-tightening can cause a short circuit, fire, or malfunction.
*Over-tightening can damage the screw and/or module.

DISCLAIMER

Isolation Mode (C-Tx & C-Rx)

Isolation mode is provided in the Both Transmitter (Tx) and Receiver (Rx) modules in RFST C-Series Wireless IO modules. This mode is useful for troubleshooting purposes. By Turning, Isolation Mode ON that particular module will become completely radio silent it will neither Receive nor Transmit any radio signal.

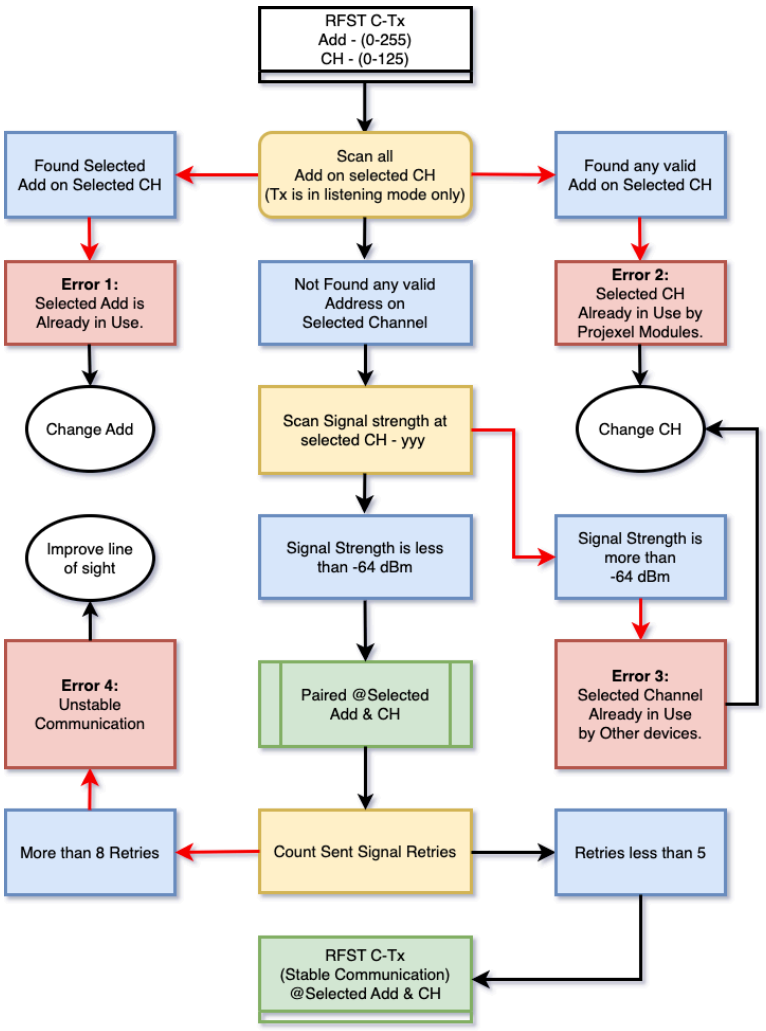
To activate Isolation Mode just Turn ON Dip Switch no. 8

Errors and Solution

Err1: Another Projexel module is operating on the same address.
Solution: Select a different Address to avoid accidental cross-talk.
Err 2: The Selected Channel(Frequency) is busy, other Projexel module is using the selected frequency.
Solution: Choose a different channel to avoid delay in signal processing.
Err 3: Selected Channel is busy, other Non-Projexel device is using selected frequency.
Solution: Choose a different channel to avoid any delay in signal processing.
Err 4: Weak signal strength among Tx and Rx.
Solution: Improve line of sight and operate modules within the specified range.

Device Information		
Specifications	**RFST- CTx (Transmitter)**	**RFST- CRx (Receiver)**
Module Dimensions L x W x H (in mm)	160 x 65 x 50	160 x 65 x 50
Net Weight (in gm) *	150	150
Range	100 meters (Line of Sight)	
Band Operation	2.4 GHz ISM	
Data Transfer Speed	250 Kbps ~ 2 Mbps	
Signal Acknowledgment (Sent & Receive)	Yes (At Both End)	
Secure Communication	7 Layer Data Lost Protection	
Compatibility	100% Digital Sensors (NPN) & All PLC	
Communication type	Half-duplex	
Supply voltage	12~24VDC	
Modulation	GFSK	
Sensitivity	- 100 dBm	
Pairing time	< 0.5 Sec	
Scan time	< 10 mS	
Battery Pack ***	Optional (5000 mAh)	
Battery Life **	3 years (20 Days working in single charge*)	
Addressing method	Dip Switch	
Health Signal Indicator	Available	
Healthy Signal Output	Available	
Operating Temperature Range	-40°C ~ +80°C	
Storage Temperature Range	-40°C ~ +125°C	

Tx Pairing mode (Flow diagram)



What is the data transfer speed from Transmitter to the receiver module?

Less than 10 mS

What is the temperature range in which the Tx & Rx module can establish stable communication?

-40 to +80 degree Celsius

Is there any software required to configure or troubleshoot the Projexel wireless network?

No, all the wireless modules can be easily configured using dip switches available on the modules themselves and the display will indicate any error in the network otherwise it will show the module's communication status.

Is there any chance to lose any data during wireless transmission between Tx and Rx?

No, each Transmitter module performs an auto acknowledgement function to prevent such situations from happening. To do so Transmitter adds incremental numbers along with the payload so that the receiver will know if there is any data lost during wireless communication and request for the missing one again (15 times) in case there is any missing data packet. If the data packet if still missing after 15 retries Rx will create an error and send the alert signal to PLC via HS Signal break.

Is there any chance of cross talk between Projexel Wireless Modules?

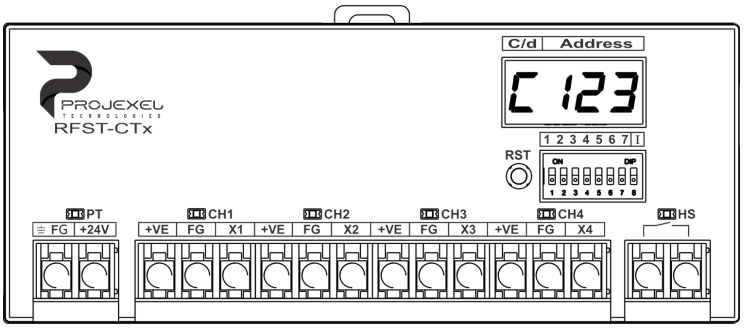
No, we have established multiple hardware and software protocols, as well as secure radio communication protocols, to protect against cross-talk between Projexel Wireless Modules. All inputs and outputs are physically isolated from radio signals and other electronic noise signals such as static charges, surge charges, and so on.

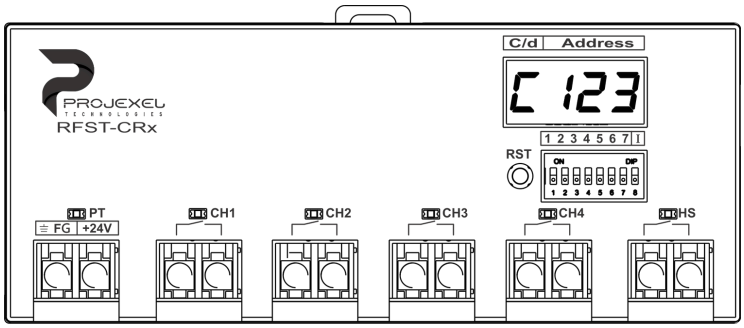
What is the range of stable communication of these M2M wireless modules?

100 meters on the factory floor with a line of sight and in an open area it could go up to 300 meters between one Tx and Rx modules, however by using our repeaters you can have signals wirelessly from the distance as much as you like.

What will happen if someone connected two different pairs on the same address or channel?

To prevent such situations we have programmed these modules with multiple errors. This will prevent such conditions completely, each Tx module will scan its surroundings before sending any signal to find if there is any other device available in the network, which could be impacted by the new address or channel that we are about to use.

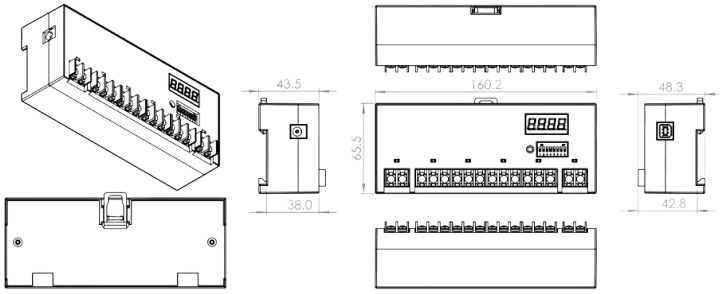




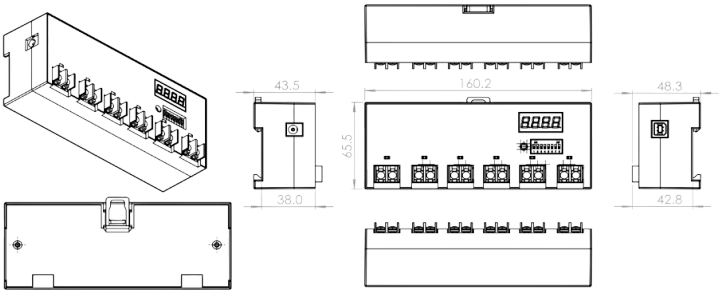
Pin Configuration and Functions of Transmitter (24 VDC Source)			
Pin		I/O Type	Description
Name	No.		
PT (Power Terminal)	FG	Power Input	Negative Terminal for Module Power (N24) VDC
	24V		Positive Terminal for Module Power (P24) VDC
CH1 (*Channel 1)	VE	Power Output	Positive Terminal To Power Sensor (P24) VDC
	FG		Negative Terminal To Power Sensor (N24) VDC
	X1	I/P	Channel 1 Input Terminal (N12~24) VDC
CH2 (*Channel 2)	VE	Power Output	Positive Terminal To Power Sensor (P24) VDC
	FG		Negative Terminal To Power Sensor (N24) VDC
	X2	I/P	Channel 2 Input Terminal (N12~24) VDC
CH3 (*Channel 3)	VE	Power Output	Positive Terminal To Power Sensor (P24) VDC
	FG		Negative Terminal To Power Sensor (N24) VDC
	X3	I/P	Channel 3 Input Terminal (N12~24) VDC
CH4 (*Channel 4)	VE	Power Output	Positive Terminal To Power Sensor (P24) VDC
	FG		Negative Terminal To Power Sensor (N24) VDC
	X4	I/P	Channel 4 Input Terminal (N12~24) VDC
HS (*Healthy Signal)	HS-1	I/P	HS Input (P12~24) VDC
	HS-2	O/P	HS Output
PT LED	-	O/P	Indicates Power Status ON/OFF
CH1 LED	-	O/P	CH1 ON/OFF Status LED
CH2 LED	-	O/P	CH2 ON/OFF Status LED
CH3 LED	-	O/P	CH3 ON/OFF Status LED
CH4 LED	-	O/P	CH4 ON/OFF Status LED
HS LED	-	O/P	Communication Status ON/OFF
Dip Switches	DP1- DP7	I/P	Addressing Switches (0~125 addresses)
	DP8	I/P	Isolation Mode for Radio Silence
Status Display	C/d Address	O/P	Connection Status & Address Display
Reset Switch	RST	I/P	Module Reset Switch
Power Input DC Jack Battery	-	Power Input	24~30 VDC Battery Power Input Jack
USB Jack **	-	-	For Future Firmware Updates

Pin Configuration and Functions of Receiver (24 VDC Source)			
Pin		I/O Type	Description
Name	No.		
PT (Power Terminal)	FG	Power Input	Negative Terminal for Module Power (N24) VDC
	24V		Positive Terminal for Module Power (P24) VDC
CH1 (*Channel 1)	CH1-1	I/P	Channel Input (Upto 30VDC/5A, Upto 250VAC/5A)
	CH1-2	O/P	Channel 1-1 Output
CH2 (*Channel 2)	CH2-1	I/P	Channel Input (Upto 30VDC/5A, Upto 250VAC/5A)
	CH2-2	O/P	Channel 2-1 Output
CH3 (*Channel 3)	CH3-1	I/P	Channel Input (Upto 30VDC/5A, Upto 250VAC/5A)
	CH3-2	O/P	Channel 3-1 Output
CH4 (*Channel 4)	CH4-1	I/P	Channel Input (Upto 30VDC/5A, Upto 250VAC/5A)
	CH4-2	O/P	Channel 4-1 Output
HS (*Healthy Signal)	HS-1	I/P	Channel Input (Upto 30VDC/5A, Upto 250VAC/5A)
	HS-2	O/P	Channel HS-1 Output
PT LED	-	O/P	Indicates Power Status ON/OFF
CH1 LED	-	O/P	CH1 ON/OFF Status LED
CH2 LED	-	O/P	CH2 ON/OFF Status LED
CH3 LED	-	O/P	CH3 ON/OFF Status LED
CH4 LED	-	O/P	CH4 ON/OFF Status LED
HS LED	-	O/P	Communication Status ON/OFF
Dip switch	DP1- DP7	I/P	Addressing Switches (0~125 addresses)
	DP8	I/P	Isolation Mode for Radio Silence
Status Display	C/d Address	O/P	Connection Status & Address Display
Reset Switch	RST	I/P	System Reset Switch
Power Input DC Jack Battery	-	Power Input	24~30 VDC Battery Power Input Jack
USB Jack **	-	-	For Future Firmware Updates

RFST-CTx (Dimensions)



RFST-CRx (Dimensions)



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