

## CANx / LoRa 433 MHz 6 x 10A Relays

### ENG - Data sheet

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### Application

6 channel CAN relay extension is designed to be used in building and industrial automation applications as an extension module to LogicMachine series devices based on CAN FT bus and LoRa 433 wireless. The configuration and monitoring of the device is done through separate LogicMachine CANx application. The device is designed for DIN-rail mounting and requires 4 DIN-units.





	Carrier frequency step	125 kHz
	Spreading factor	7-12
Clamps:	CAN FT Terminal	0.8mm <sup>2</sup>
	Relays	5 mm <sup>2</sup>
	Power supply	5 mm <sup>2</sup>
Enclosure:	Material:	Polyamide
	Color:	Gray
	Dimensions:	70(W)x91(H)x68(L) mm
Protection:	IP20 according to EN 60529	
Usage temperature:	-5C ... +55C	
Storage temperature:	-20C ... +70C	
Net weight:	158g	
Gross weight:	173g	



## Caution

### Security advice

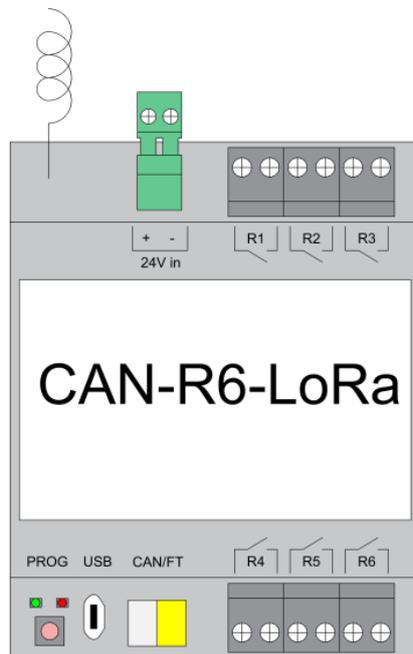
The installation and assembly of electrical equipment may only be performed by skilled electrician. The devices must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with application that can result danger of people, animals or real value

### Mounting advice

The devices are supplied in operational status. The cables connections included can be clamped to the housing if required.

### Electrical connection

The devices are constructed for the operation of protective low voltage (SELV). Grounding of device not needed. When switching the power supply on or off, power surges must be avoided.



## Default settings

Line ID: 0

Node ID: 1

Max. number of group addresses per object : 16

Reset to defaults

Press programming button for 5 seconds, the RED LED blinks 2 times, then release button - GREEN lights up shortly.

## Programming physical address

Press *Tools* → *Write device address* from CANx app. Choose address and press *Write*. Then press programming button shortly on the device, GREEN LED lights up shortly. The LED is switched off automatically in 1 second which means address is written.

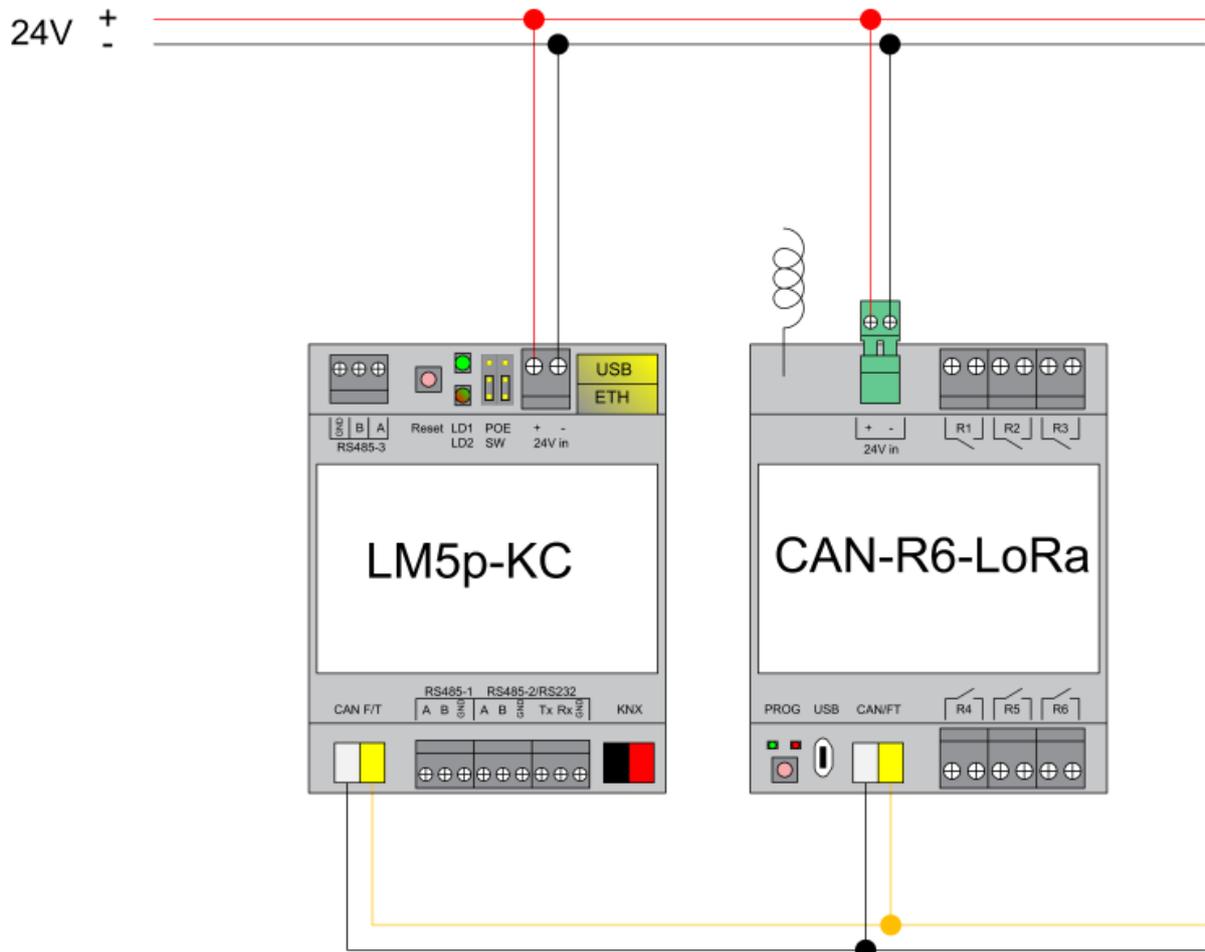
## Manual relay control

When opening the front cover, you will find buttons for manual relay control.

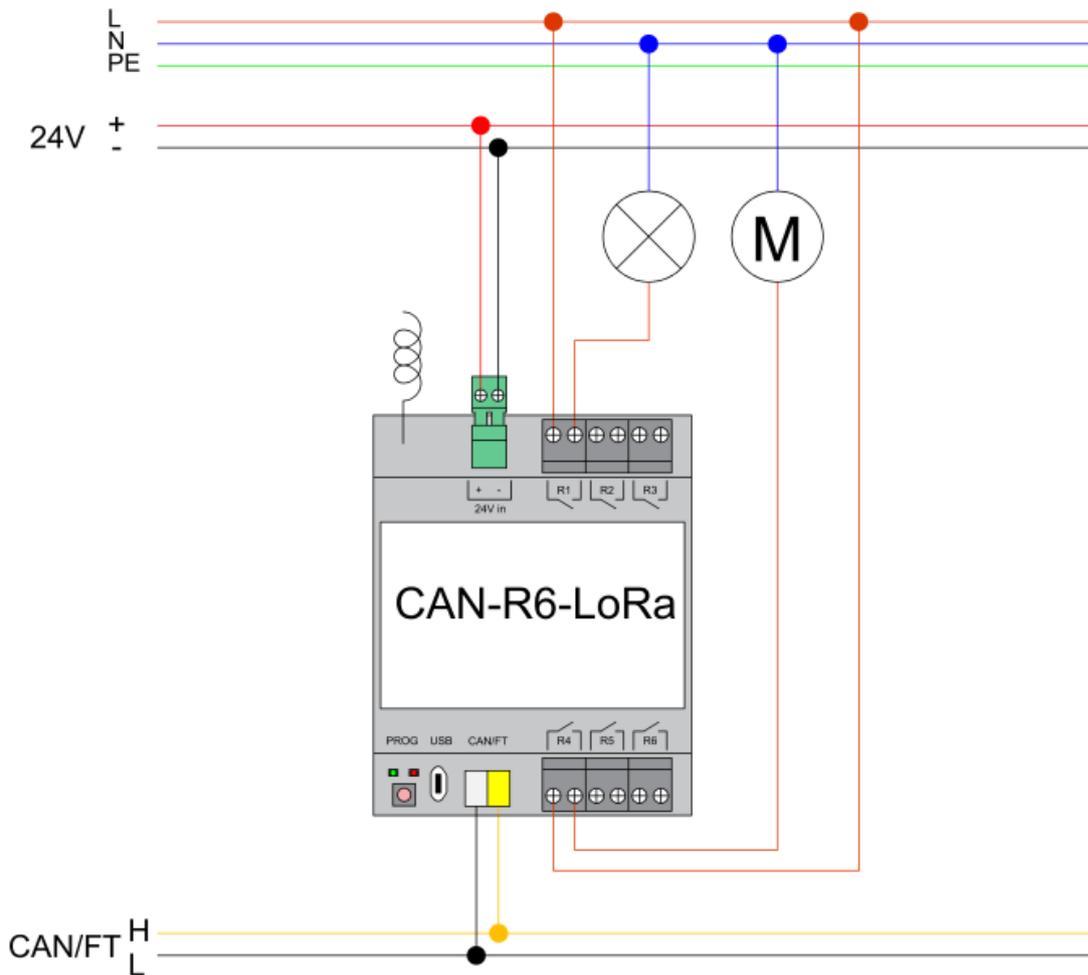


## Connection diagrams

### CAN FT connection and power supply



Lamp / motor / etc. connection



## canX software settings

### Relay

R6 (6 Relay outputs + LoRa) (0.4)

Device location + Add ×

All Enabled Disabled

Relay 1 + Relay status 1 ⊖

Port 1

Port 2

Port 3

Port 4

Port 5

Port 6

LoRa general

LoRa messages

LoRa security

Relay 1

Normal - Off after power-up

Flags

F T R W

Group addresses + Add 1 bit (boolean)

✕ 0/0/2 UIO8 (8 Universal IO ports + LoRa) - Input 1

Q

Tags

Q No tags set

↓ Save and write to device Save Cancel

**Default flags:** read (R), write (W), transmit (T)

**Relay mode:**

Normal – Off after power-up

Inverse – Off after power-up

Normal – On after power-up

Inverse – On after power-up

**Group addresses** – you can assign group addresses from the predefined list or add manually by clicking on ADD button. You can assign max 16 group addresses to one object / output.

## Relay status

R6 (6 Relay outputs + LoRa) (0.4) Device location + Add x

▼

All Enabled Disabled Relay 1 ✔ Relay status 1 ✔

Port 1

Port 2

Port 3

Port 4

Port 5

Port 6

LoRa general

LoRa messages

LoRa security

**Relay status 1**

Normal ▼

Disabled

Normal

Inverse

Q No group addresses selected

**Flags**

F T R W

**Tags**

Q No tags set

**Default flags:** read (R), transmit (T)

**Output status:** Disabled, Normal, Inverse

**Group addresses** – you can assign group addresses from the predefined list or add manually by clicking on ADD button. You can assign max 16 group addresses to one object / relay status

## LoRa General settings

**Frequency** – define the frequency LoRa will operate in. Frequency should be equal on transmitter and receiver(-s).

Frequency TX power Bandwidth Spreading Factor

**Frequency**

433 MHz
LoRa disabled
<b>433 MHz</b>
433.125 MHz
433.250 MHz
433.375 MHz
433.500 MHz
433.625 MHz
433.750 MHz
433.875 MHz
434 MHz
434.125 MHz
434.250 MHz
434.375 MHz
434.500 MHz
434.625 MHz
434.750 MHz

**TX power** – output power of LoRa transceiver

Frequency TX power Bandwidth Spreading Factor

**TX power**

17 dBm
<b>17 dBm</b>
16 dBm
15 dBm
14 dBm
13 dBm
12 dBm
11 dBm
10 dBm
9 dBm
8 dBm
7 dBm
6 dBm
5 dBm
4 dBm
3 dBm
2 dBm

**Bandwidth** – define the bandwidth of the channel. The lower the bandwidth – the lower the data rate / longer the distance. Bandwidth should be equal on transmitter and receiver(-s).

Frequency TX power Bandwidth Spreading Factor

**Bandwidth**

- 125 kHz (lower data rate, longer range)
- 125 kHz (lower data rate, longer range)
- 250 kHz
- 500 kHz (higher data rate, shorter range)

**Spreading factor** - The basic principle of spread spectrum is that each bit of information is encoded as multiple chirps. Within the given bandwidth the relationship between the bit and chirp rate for LoRa modulation may differ between spreading factor (SF) 7 to 12. Spreading factor should be equal on transmitter and receiver(-s).

Frequency TX power Bandwidth Spreading Factor

**Spreading Factor**

- SF7 (higher data rate, shorter range)
- SF7 (higher data rate, shorter range)
- SF8
- SF9
- SF10
- SF11
- SF12 (lower data rate, longer range)

### Date rates

Best case: SF7 / 500 kHz = 16ms per message (22 kbps)

Default: SF7 / 125 kHz = 62ms per message (5.5kbps)

Worst case: SF12 / 125 kHz = 1300ms per message (0.3 kbps)

2x increase in bandwidth provides 2x less air time

SF+1 takes approximately 2x more air time compared to previous SF

### LoRa Messages

**ACK mode** – message acknowledgement mode

ACK disabled - no ACK will be done (faster and less reliable communication)

ACK enabled - each message will be acknowledged (slower, more reliable)

ACK gateway mode – the node will retransmit ACK to the next node

ACK mode | Filter mode | Statistics 

### ACK mode

ACK disabled (faster, less reliable) 

ACK disabled (faster, less reliable)

ACK enabled (slower, more reliable)

ACK gateway mode (slower, more reliable)

**Filter mode** – define either to pass messages with F (Filter) flag enabled in object settings

### Flags

F  T  R  W

ACK mode | Filter mode | Statistics 

### Filter mode

No filtering 

No filtering

Pass messages without filter flag

Pass messages with filter flag

**Statistics** – receive statistic information to group address – source address / RSSI signal level / TX power. Statistics telegram can be sent on all valid telegrams which are received by LoRa.

ACK mode | Filter mode | Statistics 

### Statistics

Enabled (Source, RSSI, TX power) 

### Flags

F  T  R  W

### Group addresses Add 4 byte LoRa status

✕ 0/0/3 R6 (6 Relay outputs + LoRa) - Statistics



### Tags

 No tags set

Address	Name	Datatype	Tags	Value	Properties
0/0/1	UIO8 (8 Universal IO ports + LoRa) - Statistics	4.5. 4 byte LoRa status		0.4 / -15 dB / 17 dBm	E R P
0/0/2	UIO8 (8 Universal IO ports + LoRa) - Input 1	0.1. 1 bit (boolean)		0	E R P
0/0/3	R6 (6 Relay outputs + LoRa) - Statistics	4.5. 4 byte LoRa status		0.2 / -15 dB / 17 dBm	E R P

## LoRa Security

Define security key 1 or/and key 2 in HEX form. Up to 8 HEX characters are supported for each of the keys. Encryption keys must be equal for all LoRa devices on the same line

Encryption key 1  Encryption key 2

*Up to 8 HEX characters, separated by space.*

*Encryption keys must be equal for all LoRa devices on the same line*

## Notification LEDs

- During transmission you can see two LEDs on LoRa device

	Sending LoRa telegram
	Receiving LoRa telegram

- In case statistics is enabled on receiver device and CAN FT line is disconnected from it, both LEDs will light up (receiving telegram from sender, sending telegram with statistics).
- In case ACK is enabled, both orange and blue LEDs will light up.