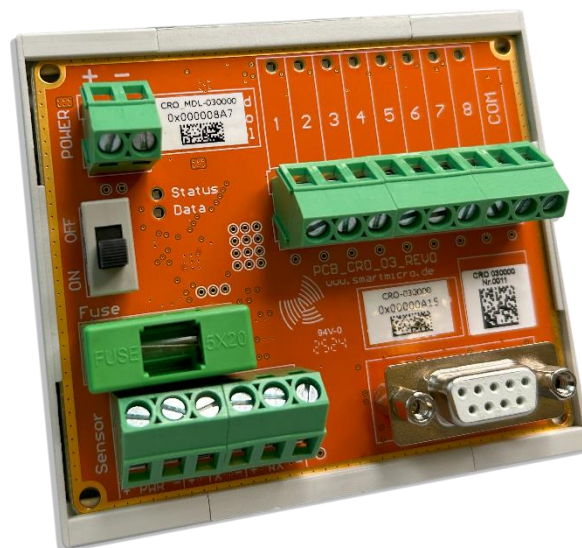


DATASHEET

TRAFFIC MANAGEMENT ACCESSORY

Cabinet Relay Option (CRO)



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1 USER SAFETY WARNING

Please read the entire document carefully before using the device.

INSTALLATION

Please pay attention to the details below before installing and connecting the device:

- Only use provided or approved equipment for the operation.
- Only skilled and instructed people shall install and connect the device.
- Be cautious when using the device on or around active roadways and pay attention to moving traffic.
- Make sure that test procedures are in accordance with local safety policies and procedures as well as company practices.

OPERATION

Using a Cabinet Relay Option (CRO) does not influence the sensor performance.

Please note that the device is not waterproof. Take care of proper rain coverage when working outside. Do not operate the device if the device itself or any cables are damaged.



Do not dispose electrical and electronic equipment in household trash.

TECHNICAL SERVICE

Only use provided or approved equipment for operation.

Do not attempt to service or repair this device:

- No user-maintainable parts are contained in the device.
- To avoid electrical shock, do not remove or open the cover.
- Unauthorized opening will void all warranties.
- smartmicro is not liable for any damages or harms caused by unauthorized attempts to open or repair the device.

2 PRODUCT SPECIFICATIONS

The smartmicro Cabinet Relay Option (CRO) is a hardware module that extends a smartmicro radar sensor by eight hardware relays via the standard RS485 communication interface.

It is suitable for the following traffic management sensors:

- TOPGRD Family
- UMRR-12 Family
 - o TRUGRD Stream
 - o TRUGRD
 - o TRUGRD Lite
 - o TRUGRD LR
- UMRR-11 Family
 - o UMRR-11 Type 44
 - o UMRR-11 Type 45
 - o UMRR-11 Type 132

It can be used to implement traffic applications without an additional controller unit being necessary.

The Cabinet Relay Option (CRO) provides both electrical connectors for the cables coming in from the sensor outside the cabinet and multiple stages of electrical surge suppression to protect the cabinet equipment from external surges and noise. This surge protection includes Gas Discharge Tubes (GDTs), Transient Voltage Suppression diodes (TVSs), high-speed resettable electronic fuses (TBUs) and a replaceable fuse.

The surge protection for power, data and relay signals is designed to be compliant to IEC 61000-4-2 (ESD), IEC 61000-4-4 (fast transients) and IEC 61000-4-5 level 4 (lightning surges, severity-level for outdoor equipment).

2.1 FEATURES AND APPLICATIONS

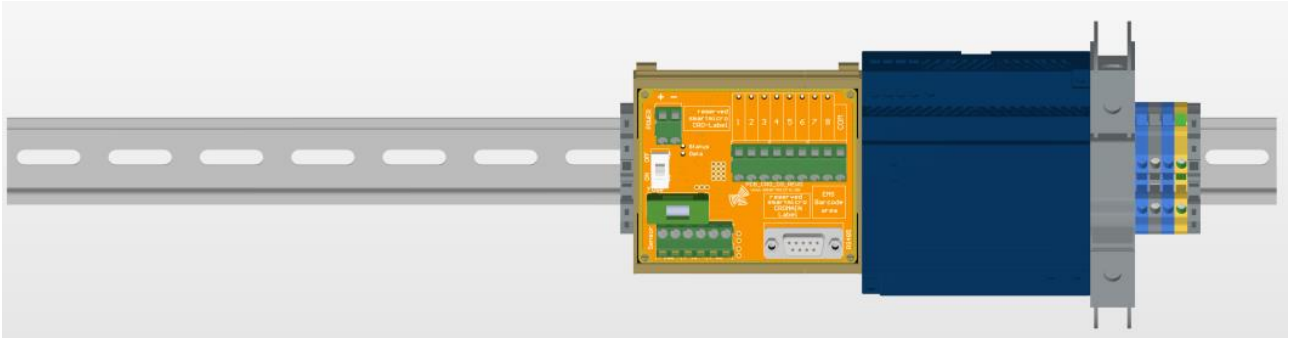
The Cabinet Relay Option (CRO) has the following features:

- Connection to one sensor cable
- Connection to power supply
- Connection for RS485 communication to PC
- Eight configurable solid-state relays per sensor (normally closed (NC) contacts)
- Surge protection on power, communication and relay lines

Important: A CRO can only be connected to one single sensor.

2.2 SYSTEM LAYOUT

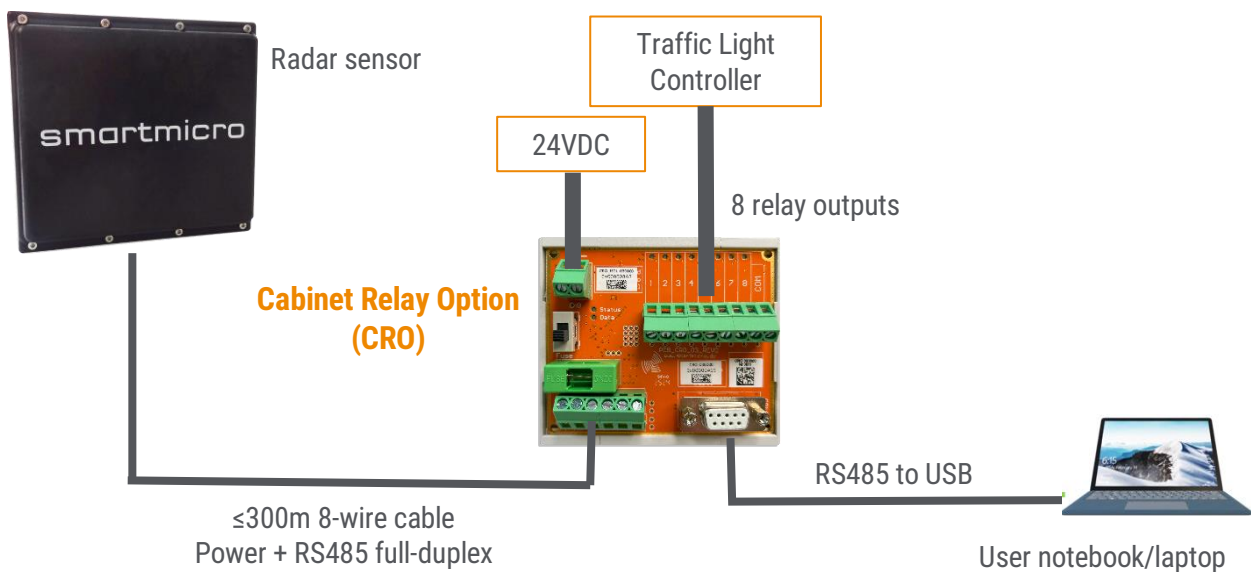
The CRO shall be mounted on a DIN rail, as shown exemplary in the picture below.



For multiple sensors, multiple CRO devices can be mounted next to each other on the same rail.



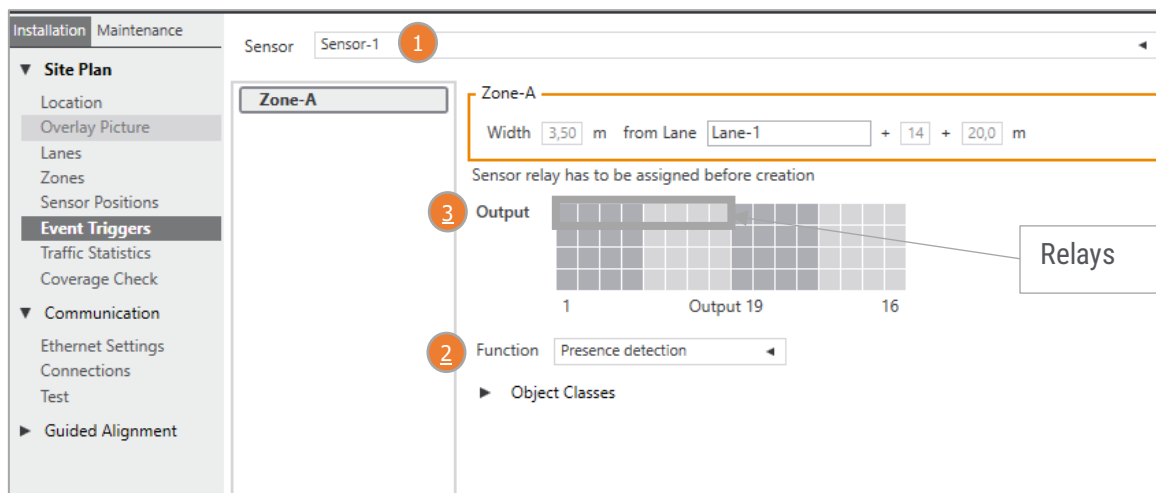
The following system layout shows how the CRO can be connected to a smartmicro sensor.



2.3 SOFTWARE CONFIGURATION

The output configuration can be done in the Traffic UI. The Traffic UI installation software simplifies the planning and field installation of smartmicro sensors with an intuitive step-by-step guide. The configuration includes site planning, sensor selection and configuration as well as physically installing the device at an intersection. It can be downloaded from the smartmicro website

In the Traffic UI, under the menu Installation -> Site Plan -> Event Triggers, the first 8 outputs of the output matrix are 1:1 mapped to the relays (see picture below).

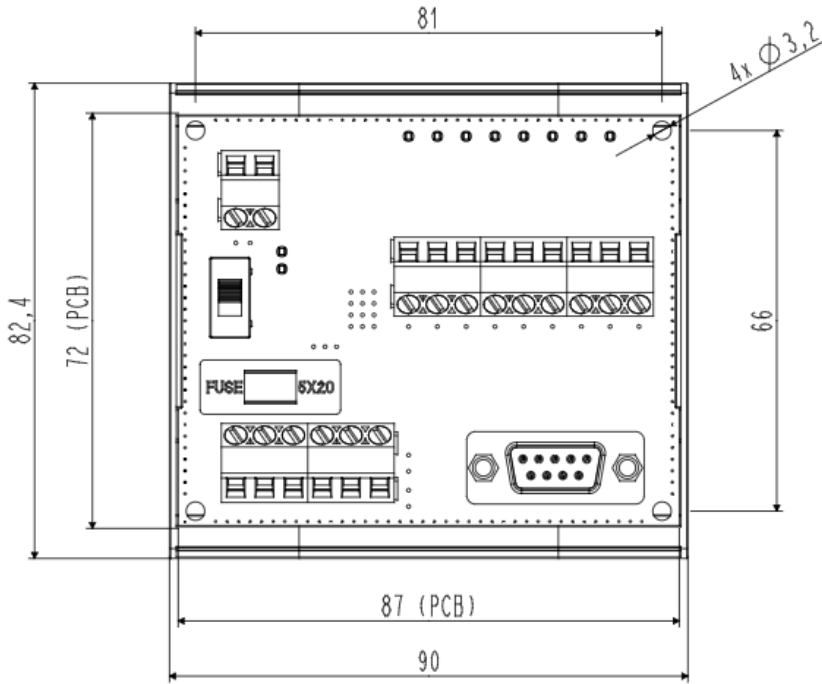


These steps need to be followed to configure every output:

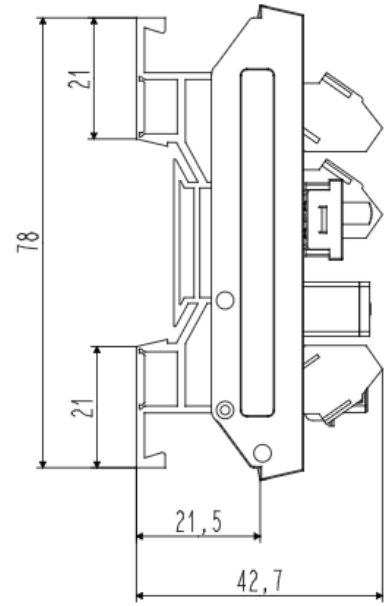
1. Select the sensor from the drop-down list
2. Select the desired function for the trigger
 - Presence
 - Queue
 - Wrong-way
 - Speed trigger
 - Custom
3. Select the desired output in the matrix
4. Repeat the process to configure the next sensor connected to another CRO

2.4 PRODUCT DIMENSIONS

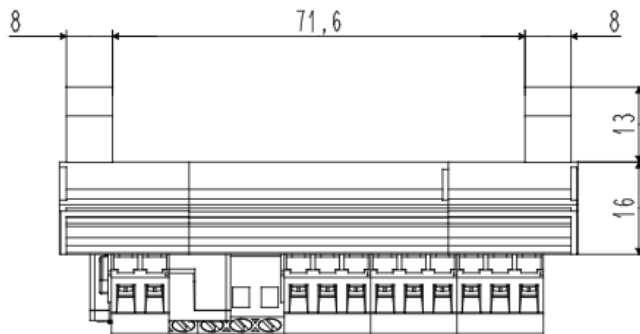
All values are given in mm.



Front Side



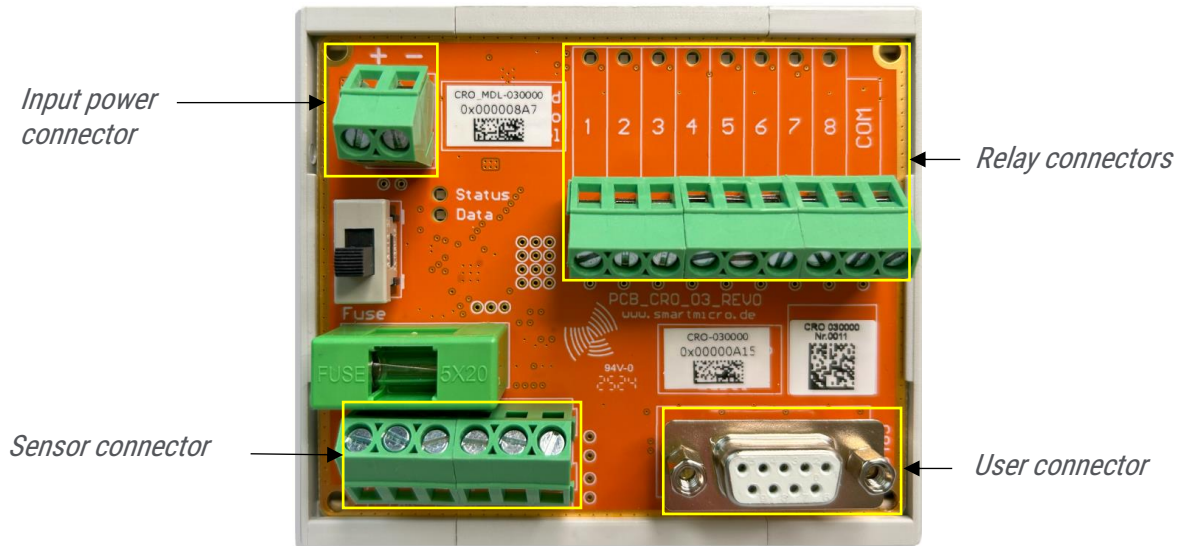
Left Side



Top Side

2.5 PRODUCT CONNECTORS

Each Cabinet Relay Option (CRO) Module has connectors for input power, a sensor, relays and a user connector.



The following table lists all pins and explains their functions.

Connector	Pin No.	Function
Input Power Connector	1	Positive Power Supply (VCC)
	2	Negative Power Supply (GND)
Sensor Connector	1	Sensor VCC
	2	Sensor GND (-)
	3	Sensor RS485 TX H
	4	Sensor RS485 TX L
	5	Sensor RS485 RX H
	6	Sensor RS485 RX L
Relay Connectors	1	Channel 01
	2	Channel 02
	3	Channel 03
	4	Channel 04
	5	Channel 05
	6	Channel 06
	7	Channel 07
	8	Channel 08
	COM	Common connection

User Connector	1	Adapter RS485 TX L
	2	Adapter RS485 TX H
	3	Adapter RS485 RX H
	4	Adapter RS485 RX L
	5	Adapter RS485 GND
	6	NC.
	7	NC.
	8	NC.
	9	NC.

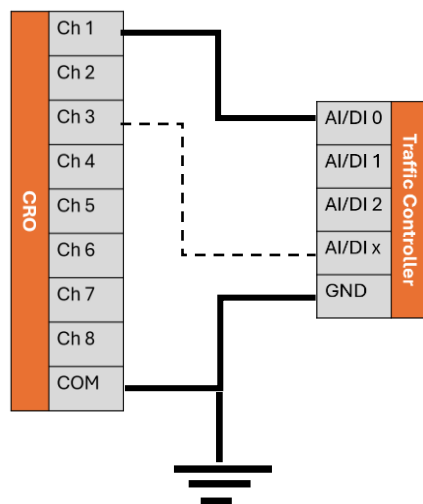
2.6 WIRING DIAGRAMM

Relays are bi-directional, but it is recommended to connect the ‚COM‘ pin to ground. When a zone gets triggered, the relay contact will be closed. Based on the maximum relay current of 170mA, the load impedance shall be greater than 140ohm at 24V. The recommended load impedance value is 1kohm.

In the following, three different schematics will be presented based on the hardware to which the CRO will be connected to.

2.6.1 HARDWARE WITH INTERNAL INPUT RESISTANCE

Usually, traffic controllers have a higher input impedance for their digital or analog input. in this case the CRO relay output can be connected directly to the controller input channel. The traffic controller will configure the internal pull-up or pull-down resistance to have 0V or 24V on active trigger.



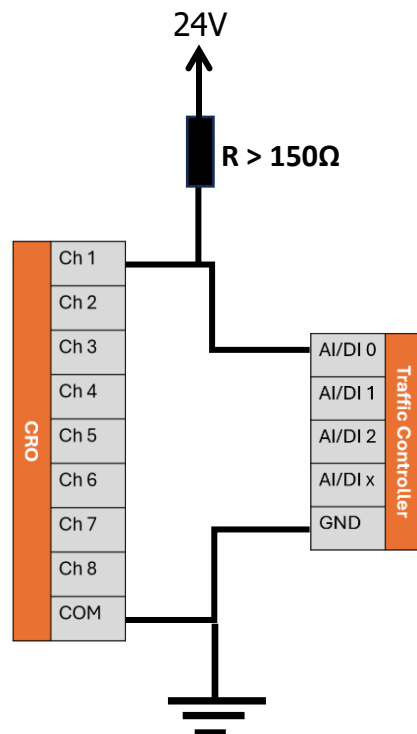
2.6.2 HARDWARE WITHOUT INTERNAL RESISTANCE

For all hardware without internal input resistance for current limitation, 2 use cases are available based on the desired logic, hence, pull-up or pull-down resistance.

2.6.2.1 PULL-UP RESISTANCE

This works as follows:

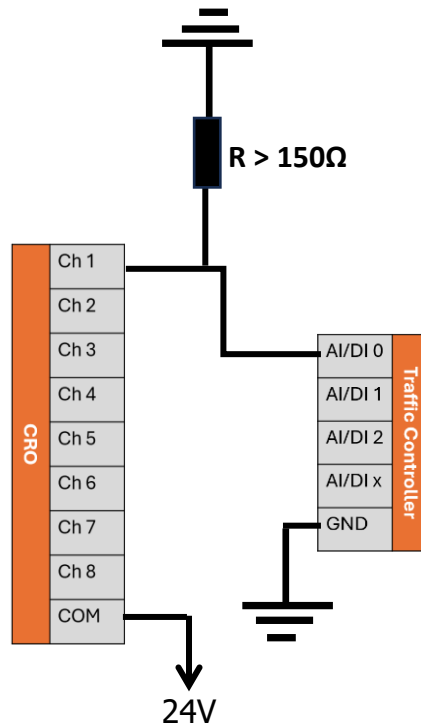
- Zone is triggered -> relay is closed -> 0V (logic 0) is measured on the hardware input
- Zone is not triggered -> relay is open -> 24V (logic 1) is measured on the hardware input



2.6.2.2 PULL-DOWN RESISTANCE

This works as follows:

- Zone is triggered -> relay is closed -> 24V (logic 1) is measured on the hardware input
- Zone is not triggered -> relay is open -> 0V (logic 0) is measured on the hardware input



3 CHARACTERISTICS

Parameter	Typical Values (min... max.)	
Temperature	(-40...+85°C) (-40...+185°F)	
Supply Voltage	24V	
Relay Voltage	(0...32V)	
Relay Current	(max. 175mA)	
Outline Dimensions	Height	82.4mm 3.2in
	Width	90mm 3.5in
	Depth	42.9mm 1.7in
Weight	119g 4.2oz	
Supported Cables	AWG 24-12	
Surge Protection of Power Lines, Data Lines & Relay Channels	Compliant to IEC 61000-4-2 (ESD), IEC 61000-4-4 (fast transients) and IEC 61000-4-5 level 4 (lightning surges, severity-level for outdoor equipment).	

4 COMPLIANCES

The Cabinet Relay Option (CRO) complies with the following regulations:

- IEC 61000-4-2 (ESD)
- IEC 61000-4-4 (fast transients)
- IEC 61000-4-5 level 4 (lightning surges, severity-level for outdoor equipment)

5 LEGAL DISCLAIMER NOTICE

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