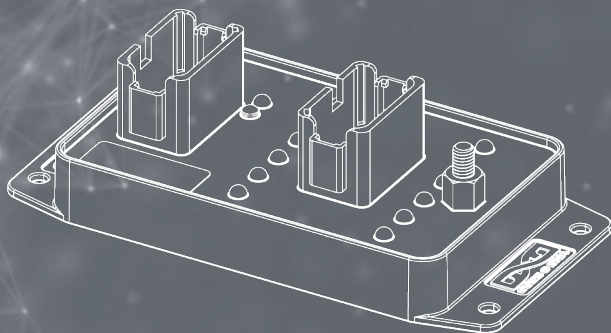


# Installation manual

## PCM12 Switch Node



## Warnings & Guidance

**IMPORTANT!** Read all instructions before installing and using. Installer: This manual must be delivered to the end user.



### **WARNING!**

Failure to install or use this product according to manufacturers recommendations may result in property damage, serious injury, and/or death to those you are seeking to protect!



**Do not install and/or operate this safety product unless you have read and understand the safety information contained in this manual.**

1. Proper installation combined with operator training in the use, care, and maintenance of emergency warning devices are essential to ensure the safety of you and those you are seeking to protect.
2. Exercise caution when working with live electrical connections.
3. This product must be properly grounded. Inadequate grounding and/or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or severe vehicle damage, including fire.
4. Proper placement and installation are vital to the performance of this warning device. Install this product so that output performance of the system is maximised and the controls are placed within convenient reach of the operator so that they can operate the system without losing eye contact with the roadway.
5. Do not install this product or route any wires in the deployment area of an air bag. Equipment mounted or located in an air bag deployment area may reduce the effectiveness of the air bag or become a projectile that could cause serious personal injury or death. Refer to the vehicle owner's manual for the air bag deployment area. It is the responsibility of the user/operator to determine a suitable mounting location ensuring the safety of all passengers inside the vehicle particularly avoiding areas of potential head impact.
6. It is the responsibility of the vehicle operator to ensure during use that all features of this product work correctly. In use, the vehicle operator should ensure the projection of the warning signal is not blocked by vehicle components (i.e., open trunks or compartment doors), people, vehicles or other obstructions.
7. The use of this or any other warning device does not ensure all drivers can or will observe or react to a warning signal. Never take the right-of-way for granted. It is your responsibility to be sure you can proceed safely before entering an intersection, driving against traffic, responding at a high speed, or walking on or around traffic lanes.
8. This equipment is intended for use by authorised personnel only. The user is responsible for understanding and obeying all laws regarding warning signal devices. Therefore, the user should check all applicable city, state, and federal laws and regulations. The manufacturer assumes no liability for any loss resulting from the use of this warning device.

**Important!** This unit is a safety device and it must be connected to its own separate, fused power point to assure its continued operation should any other electrical accessory fail.

**Caution:** When drilling into any vehicle surface, make sure the area is free from any electrical wires, fuel lines, vehicle upholstery, etc. that could be damaged

# Product Overview

The C3-DNA PCM12 Switch Node is a general-purpose Power-Control and Switching device. It provides 12 positive-switching outputs, each capable of supplying 10A, to a total maximum load of 60A. Outputs are electronically protected against overload and short-circuits. Outputs can be used in parallel to switch loads in excess of 10A but the short-circuit current increases proportionally. Outputs can be used to provide steady power to other equipment such as Radios, or to provide rapidly switched power to flash warning lights. Pulse-Width-Modulation of the outputs at 100Hz is also possible.

Four high or low sensing inputs can be used to connect to pushbuttons or switches or to monitor vehicle signals such as Stoplights, Ignition, etc.

The Switch Node can perform a wide variety of functions, including Voltage-Measurement, Battery-Management, Load-Shedding, Ignition-Bypass, Run-Lock, Flashing Headlamps, Flashing Emergency Lights, Interfacing to switches and indicator lights, etc.

## Features

- 12 positive switching high current output channels
- 4 general purpose inputs which can be configured as active high or active low
- Supply voltage measurement
- C3-DNA Flash Patterns (supports logic, priority, mask, auto-sync, etc.)
- Configurable with the C3-DNA Configuration Toolbox software

## Specifications

|                       |           |                                                          |
|-----------------------|-----------|----------------------------------------------------------|
| Supply Voltage        | $V_s$     | 10 – 30VDC                                               |
| Standby Current       | $I_Q$     | 8mA (all outputs off)                                    |
| Output Current        | $I_L$     | 0 - 10A per output channel (60A total maximum)           |
| Short Circuit Current | $I_{SC}$  | 90A for 0.1s (per output, reset on output cycle)         |
| Input High Threshold  | $V_{IH}$  | < 3.0V (typically 2.7V)                                  |
| Input Low Threshold   | $V_{IL}$  | > 1.0V (typically 1.7V)                                  |
| PWM Frequency         | $F_{PWM}$ | 100Hz                                                    |
| Enviromental Limits   | $T_{AMB}$ | -20°C / +60°C (not suitable for engine-bay or wet-areas) |

### Overload Conditions

The outputs channels are internally protected and will automatically latch off when overloaded. The overload time will vary with operating conditions, but as a guide the outputs may sustain 40A for 1 second, 30A for 10 seconds, and 20A indefinitely. Ensure wiring is sized appropriately.

## Mounting

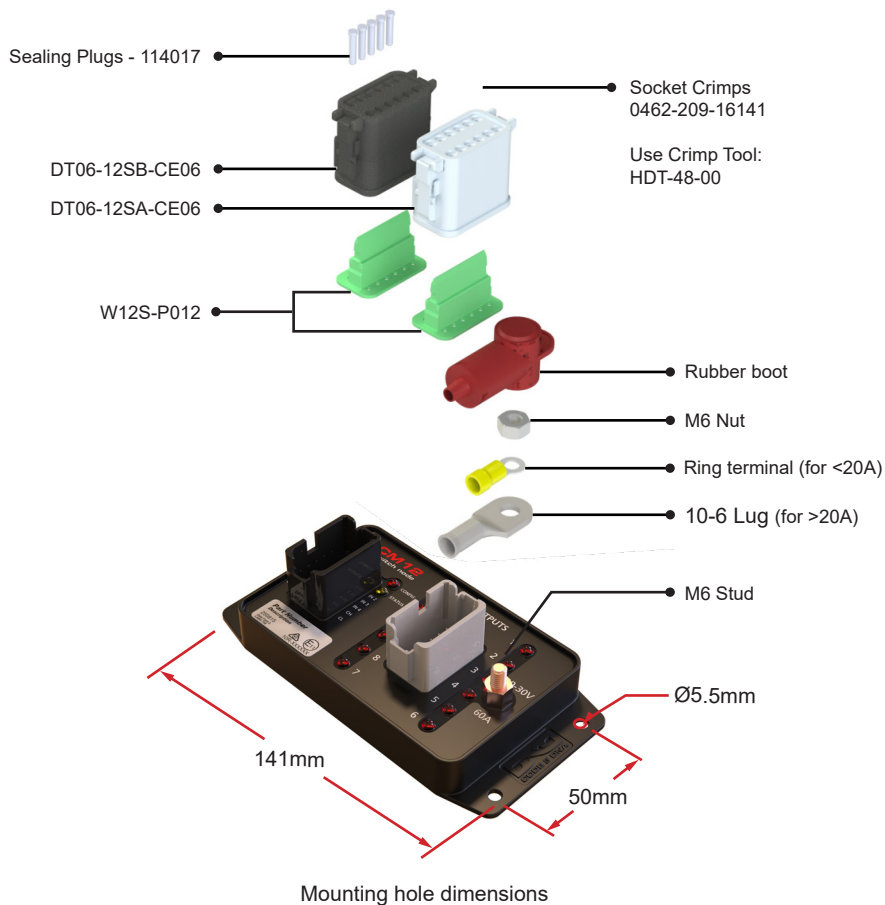


### WARNING!

The Switch Node is **NOT WATERPROOF** and is not suitable for mounting in engine-bays or wet environments. Mount in a clean, dry location.

### Deutsch DT Series Connector Parts

All pins & connectors are provided. Part numbers for reference only.



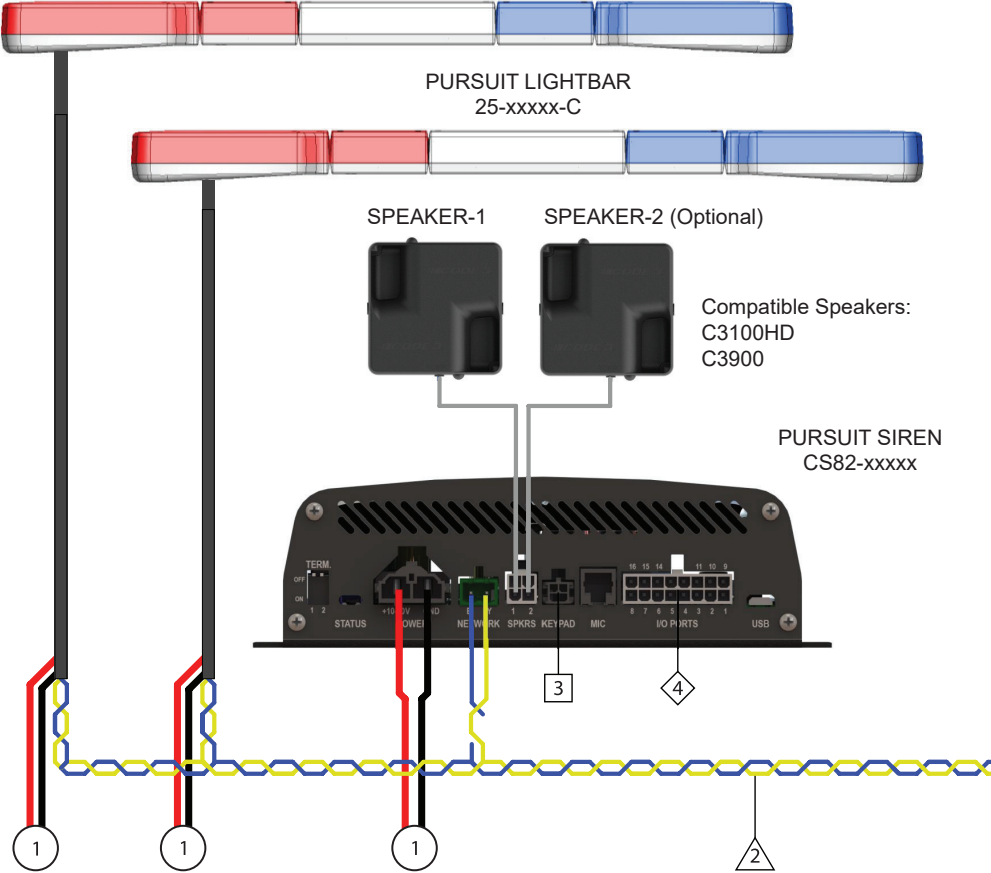
## Wiring

| Connection      | Wiring Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| M6 Stud (Power) | POWER – This is the 10-30V 60-Amp main power connection. Use a high-current compression-lug and high-capacity red wire to connect this to the vehicle battery positive via a suitable fuse or circuit breaker. If the PCM is being used for battery-management functions then extra care should be taken to minimise the voltage drop from the battery to the power stud, under expected load conditions. Use the protective rubber boot included in the wiring kit to cover this connection.                                                                                      |
| P1.12 (Ground)  | GROUND – Must be connected to electrical ground with a black or green wire. Current in the ground circuit is less than 1A, so 1-2mm <sup>2</sup> wire is suitable. If battery-voltage monitoring is required, then this pin should be connected to the battery negative terminal and the metal enclosure of the Switch Node should be isolated from the vehicle chassis.<br><br>CAUTION: If the vehicle is fitted with an earth isolation switch, the Switch Node ground must be connected to the non-battery side of the isolation switch, and NOT the battery negative terminal. |
| P1.5            | CANH – Connect to the yellow wire in the twisted-pair C3-DNA CAN bus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| P1.6            | CANL – Connect to the blue wire in the twisted-pair C3-DNA CAN bus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| P1.1–4          | INPUTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| P2.1–12         | OUTPUTS – These are rated at 10A each, but 2mm <sup>2</sup> wire is recommended to safely handle overload currents of 20 – 30A                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Notes:

1. Larger wires and tight connections will provide longer service life for components. For high current wires it is highly recommended that terminal blocks or soldered connections be used with shrink tubing to protect the connections. Do not use insulation displacement connectors (e.g., 3M Scotchlock type connectors).
2. Route wiring using grommets and sealant when passing through compartment walls. Minimise the number of splices to reduce voltage drop. High ambient temperature (e.g., under-bonnet) will significantly reduce the current carrying capacity of wires, fuses and circuit breakers. All wiring should conform to the minimum wire size and other recommendations of the wire manufacturer and be protected from moving parts and hot surfaces. Looms, grommets, cable ties, and similar installation hardware should be used to anchor and protect all wiring.
3. Fuses or circuit breakers should be located as close to the power takeoff points as possible and properly sized to protect the wiring and devices.
4. Particular attention should be paid to the location and method of making electrical connections and splices to protect these points from corrosion and loss of conductivity.
5. Ground termination should only be made to substantial chassis components, preferably directly to the vehicle battery.
6. Circuit breakers are very sensitive to high temperatures and may “false trip” when mounted in hot environments or operated close to their capacity.

GENERIC WIRING DIAGRAM



NOTES



① Each product must be wired and appropriately fused as close to the battery terminal or power distribution point as possible.



② Network Data Cable Requirements: Twisted Pair, 30mm Pitch (see C3-DNA wiring section).



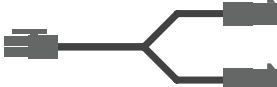
③ Controller Port: Provides regulated power and data for C3-DNA controllers. Up to 3 controllers can be driven from each port. For use with controllers, Y-adaptors and extension cables.



④ I/O Connections: Refer to C3-DNA Toolbox connection table for more detail.

ACCESSORIES

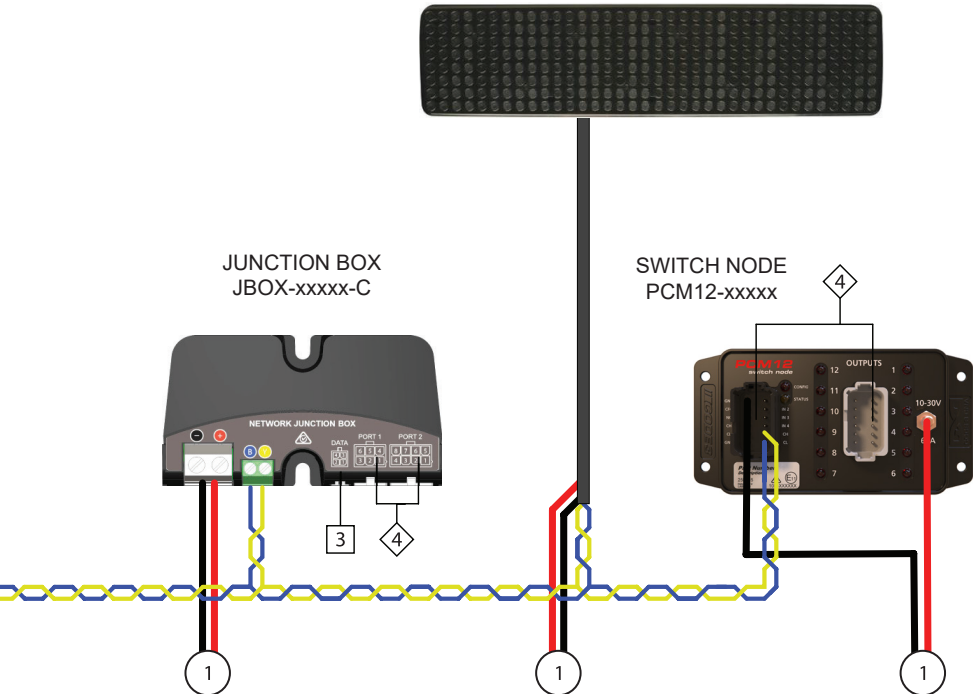
Y-SPLITTER  
CZ8014



EXTENSION CABLES  
CR8007 - 2.5m  
CR8021 - 6.0m



MESSAGE DISPLAY  
CD0012x (INCLUDES MESSAGE CONTROLLER)



CONTROLLER EXAMPLES



**SLIC**  
STANDARD  
CONTROLLER



**MTC**  
MESSAGE DISPLAY  
TOUCHSCREEN



**CR9B**  
ROTARY KNOB  
CONTROLLER



**CM9B**  
INTEGRATED  
MICROPHONE

Other controllers may be available - refer to the website for more details.

## C3-DNA General Wiring Information

The Code 3 Distributed Network Architecture uses a proprietary communication protocol operating over the highly reliable and industry standard CAN bus physical layer.

For correct and reliable operation, “twisted-pair” data wires must be used to connect between each of the C3-DNA devices on a vehicle. C3-DNA uses a yellow wire for CANH and a blue wire for CANL. These wires are typically 0.25mm<sup>2</sup> with a nominal 30mm twist-pitch.

Often the data wires are integrated into product power cables. This is the case for all C3-DNA compatible Lightbars, Message-Displays and Keypads. For long data-only runs without power (the length of a fire-truck for example) it is often convenient to use the yellow and blue twisted-pair in the standard keypad extension cables, leaving the red and black power wires unconnected.

CAN bus wiring is ideally a linear “bus” or “back-bone” arrangement, with devices on short “stubs” along the length and with termination at each end. However, due to the nature of Emergency Vehicles and the location of warning devices, this ideal topology is often hard to achieve in practice. Because of this, C3-DNA has been designed to allow for somewhat more flexible wiring and termination arrangements. When installing a C3-DNA system, there is generally no need to be concerned about termination and bus-topology, so long as there are at least one or two devices that include termination components, and twisted-pair data wires are used.

CAN termination and biasing is provided by the JBox and the Siren. A C3-DNA system must contain at least one of these devices, unless the system consists of a single device only (e.g. a Switch Node performing stand-alone battery management functions), or unless discrete termination resistors are added to the system. Contact the factory for more information about these special cases.

## C3-DNA Configuration Software

C3-DNA devices and systems can be configured using the code 3 DNA Syssem Configuration Toolbox software. For more information, including download links, please refer to:



## Glossary of Functions

| Name             | Description                                                                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level-#          | System warning level. 1 = lowest level.                                                                                                                                                             |
| ALERT            | Legacy term. Activates Lights and Sirens                                                                                                                                                            |
| PRI              | Legacy term. Primary warning level - highest level of warning light function.                                                                                                                       |
| SEC              | Legacy term. Secondary warning level - for lower level of warning lights.                                                                                                                           |
| White Flash      | Activates white flash steady output. Normally de-activated at night.                                                                                                                                |
| White Cut        | Masks white flashing warning modules. Normally enabled at night.                                                                                                                                    |
| Alley Left       | Steady white light illumination - LHS of vehicle.                                                                                                                                                   |
| Alley Right      | Steady white light illumination - RHS of vehicle.                                                                                                                                                   |
| Takedown         | Steady white light illumination - FRONT of vehicle.                                                                                                                                                 |
| Worklight        | Steady white light illumination - REAR of vehicle.                                                                                                                                                  |
| Sign Light       | Illuminated sign light option on lightbars.                                                                                                                                                         |
| LF-Enable        | "Enables the operation of siren low-frequency tones, where configured. Low frequency tones are normally only activated for a timed burst of 8 seconds for enhanced an intersection warning signal." |
| Test Volume      | Once enabled, reduces the siren volume by 45dB for safe workshop operation and testing.                                                                                                             |
| Parklight        | Vehicle parklight circuit. Dims the lightbar output at night.                                                                                                                                       |
| Ignition (IGN)   | Vehicle ignition circuit.                                                                                                                                                                           |
| Accessories      | Vehicle accessory circuit.                                                                                                                                                                          |
| MDT              | Required for Mobile Data Terminal. Output/s active when lights, siren or both are active (as configured).                                                                                           |
| EM BLUE          | Emergency warning lights - blue. Normally connected to discrete directional modules.                                                                                                                |
| EM RED           | Emergency warning lights - red. Normally connected to discrete directional modules.                                                                                                                 |
| DNC              | Do Not Connect                                                                                                                                                                                      |
| Reserved         | Do Not Connect                                                                                                                                                                                      |
| C3DNA-           | C3-DNA CAN port, low.                                                                                                                                                                               |
| C3DNA+           | C3-DNA CAN port, high.                                                                                                                                                                              |
| C2L              | Auxiliary CAN port, low. Do not connect to C3DNA+ or C3DNA-.                                                                                                                                        |
| C2H              | Auxiliary CAN port, high. Do not connect to C3DNA+ or C3DNA-.                                                                                                                                       |
| Input L          | Input pin - active low (GND).                                                                                                                                                                       |
| Input H          | Input pin - active high (12V / 24V).                                                                                                                                                                |
| Output H         | Output pin - high.                                                                                                                                                                                  |
| Radio In         | For the radio rebroadcast function                                                                                                                                                                  |
| Horn: 1T         | Single Tap.                                                                                                                                                                                         |
| Horn: 2T         | Double Tap.                                                                                                                                                                                         |
| Horn: H          | Hold.                                                                                                                                                                                               |
| Momentary switch | Operates only while pressed.                                                                                                                                                                        |
| Latching switch  | Switched on by the user, remains on until switched off again                                                                                                                                        |
| Momentary input  | Triggers function only while input is active.                                                                                                                                                       |
| Latching input   | Triggers function with either the rising edge or falling edge of an input.                                                                                                                          |

## Hardware Pin Colour Guide

Hardware Pin Colour Guide Colours are referenced on the C3-DNA Toolbox tables provided with the product or online. The following guide provides information on the hardware functionality and limitations for each type of pin.

| Function | Colour                                                                            | Description                                                                                                                                                                                                                |
|----------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power    |  | Refer to wiring instructions                                                                                                                                                                                               |
| Ground   |  | Refer to wiring instructions                                                                                                                                                                                               |
| CAN-H    |  | Refer to wiring instructions                                                                                                                                                                                               |
| CAN-L    |  | Refer to wiring instructions                                                                                                                                                                                               |
| N/C      |  | No function - do not connect. Reserved for alternative functions.                                                                                                                                                          |
| ±Input   |  | Configurable input that can detect either connection to GND or connection to +ve voltage range 10-30V                                                                                                                      |
| +Input   |  | Input that can only detect connection to +ve voltage range 10-30V.                                                                                                                                                         |
| ±In/Out  |  | Multi-function pin:<br>Configurable input that can detect either connection to GND or connection to +ve voltage range 10-30V.<br>Configurable positive switched output - refer to wiring section for hardware limitations. |
| +In/Out  |  | Multi-function pin:<br>Configurable input that can detect either connection to +ve voltage range 10-30V.<br>Configurable positive switched output - refer to wiring section for hardware limitations.                      |
| Output   |  | Positive switched output - refer to wiring section for hardware limitations.                                                                                                                                               |

# Troubleshooting

The red status LED indicates that the Switch Node is in configuration mode. It is normal for this LED to briefly flash once when the Switch Node initially powers up and self-tests are performed. It is also normal for this LED to be on while the Switch Node is being reconfigured via the C3-DNA-Toolbox software. Apart from these two cases it should never be on during normal operation.

| Symptoms                                                                    | Possible Explanation                                                                                                                                                                                                                  | Solution                                                                                                |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Red Status LED remains On<br>(Device is in config mode)                     | Missing or Corrupt configuration data or firmware                                                                                                                                                                                     | Load correct configuration from C3-DNA-Toolbox                                                          |
| Red Status LED pulses every 4–6 seconds<br>(Device is repeatedly resetting) | Address Conflict – two or more devices are configured with the same address                                                                                                                                                           | Disconnect conflicting device.<br>Load correct configuration (with correct address) from C3-DNA-Toolbox |
| Outputs 1-12 turn on sequentially                                           | Device contains factory test configuration                                                                                                                                                                                            | Load correct configuration from C3-DNA-Toolbox                                                          |
| Device cannot be configured                                                 | Refer to C3-DNA-Toolbox troubleshooting guide                                                                                                                                                                                         |                                                                                                         |
| Other                                                                       | Check both power and ground connections.<br>Check for stable power with multimeter min/max-hold function.<br>Check CAN connection and polarity (yellow & blue wires).<br>Check for different operation with output plug disconnected. |                                                                                                         |

## Warranty

### Manufacturer Limited Warranty and Limitation of Liability:

Manufacturer warrants that on the date of purchase, this product will conform to Manufacturer's specifications for this product (which are available from the Manufacturer upon request). This Limited Warranty extends for sixty (60) months from the date of purchase.

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## NOTES

NOTES

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