/// Plug-in railway converter module

Rugged plug-in relays for extreme reliability, within long endurance applications and harsh environments

CDA
DC-DC converter module
Part of D-platform

Features

- Ultra wide input range 12…160 VDC
- Dual outputs 5-24 VDC nominal power up to 6 W
- High efficiency over the entire range
- Soft start
- Galvanic isolation 2K VDC
- Intergrated LC input filter
- Permanent short circuit protection
- No optocoupler for high reliability, magnetic feedback

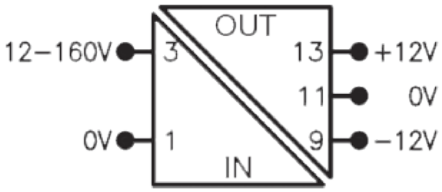
Description

The CDA converter module is a DC-DC converter with ultra wide input range of 12-160VDC and dual outputs. Total power dissipation is maximum 6W with an efficiency of up to 88%.

The CDA convertor module has a D-platform relay housing and can be plugged into all D-platform relay sockets.

Compact design, choice of different outputs and a wide range of sockets makes the CDA converter module an easy and flexible solution to use.

Connection diagram



Application

The CDA module is designed for demanding rolling stock applications.

Approvals

EN 50155
EN 50121-3-2
IEC 61373
IEC 60255-5

Converter module
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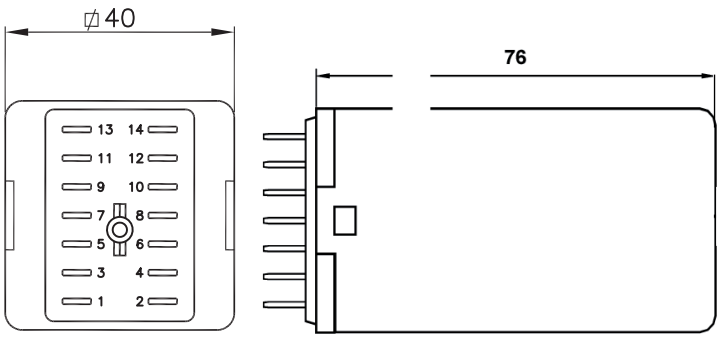
Voltage options

Input range (VDC)	Output (VDC)
12-160	2 x 5
12-160	2 x 12
12-160	2 x 15
12-160	2 x 24

Other output voltages available on request.

Dimensions (mm)



Sockets

		Mounting			
		Surface / Wall	Rail	Panel / Flush	PCB
Terminal connection	Screw	V23	V23	-	-
	Screw - wide terminals	V22 BR	V23 BR	-	-
	Spring clamp	V29	V29	V33	-
	Faston	-	-	V31	-
	Crimp	-	-	V26	-
	Solder tag	-	-	V3	-
	PCB	-	-	-	V32

For more information see the respective datasheets

Over 10 million Mors Smitt relays in use in rail transport applications worldwide!

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Technical characteristics

Input range (VDC)	Output (VDC)	Current per output	Reference
12-160	2 x 5	0.60 A	CDA DC/DC 6 W 2x5
12-160	2 x 12	0.25 A	CDA DC/DC 6 W 2x12
12-160	2 x 15	0.20 A	CDA DC/DC 6 W 2x15
12-160	2 x 24	0.125 A	CDA DC/DC 6 W 2x24

Using various parallel or series connections of outputs, and the 80/110% trim capability, allows to cover almost the complete range of output voltages from 4V to 52V as shown in the table below.

Reference	Parellel connection (VDC)	Series connection (VDC)
CDA DC/DC 6 W 2x5	4 - 5.5	8 - 11
CDA DC/DC 6 W 2x12	9.6 - 13.2	19.2 - 26.4
CDA DC/DC 6 W 2x15	12 - 16.5	24 - 33
CDA DC/DC 6 W 2x24	19.2 - 26.4	38.4 - 52.8

Electrical characteristics

Data are valid at +25 °C unless otherwise specified.

Parameter	Conditions	Limit or typical	Units	Dual output
Input				
Nominal input voltage	Full temperature range	Nominal	VDC	48
Permanent input voltage range (Ui)	Full temperature range Full load	Min - Max	VDC	12-60
Undervoltage lock-out (UVLO)	Turn-on voltage (pin Uvlo open) Turn-off voltage (pin Uvlo open)	Maximum Maximum	VDC VDC	11.8 10.8
Start up time	Ui nominal within 3 ms Nominal output Full load : resistive	Maximum	ms	30
Reflected ripple current	Ui nominal, full load at switching freq. BW = 20MHz	Maximum	% Inom	TBD
No load input power	Ui nominal No load	Maximum	W	TBD
Standby input power	Ui nominal	Maximum	W	TBD

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Parameter	Conditions	Limit or typical	Units	dual outputs
Output				
Output voltage	Full temperature range Ui min. to max. 75% load	Nominal Nominal Nominal Nomnal	VDC VDC VDC VDC	2 x 5 2 x 12 2 x 15 2 x 24
Set point accuracy	Ambient temperature : +25 °C Ui nominal, 75% load	Maximum	%	± 2
Total output power with both outputs	Full temperature range Ui min. to max.	Maximum	W	6
Output current per output 5 V output 12 V output 15 V output 24 V output	Full temperature range Full load Ui min. to max.	 Nominal Nominal Nominal Nominal	 A A A A	 0.6 0.25 0.2 0.125
Unbalanced output	Minimum load on V01 for VO2 proper operation	Typical	W	2
Ripple output voltage ** 5 V output 12 V output 15 V output 24 V output	Ui nominal Full load BW = 20MHz	 Maximum Maximum Maximum Maximum	 mVpp mVpp mVpp mVpp	 100 240 300 520
Output regulation * (Line + load + thermal)	Ui min. to max. 0% to full load	Maximum	%	± 1.5
Cross load output regulation	Ui min. to max. V01 at nominal load V02 from 25% to full load	Minimum	%	± 2
Output voltage trim	As a function or output voltage	Minimum	%	80
Maximum admissible capacitive load 5 V output 12 V output 15 V output 24 V output	Ui nominal Full load Per output	Maximum Maximum Maximum Maximum Maximum	% µF µF µF µF	110 680 330 220 110
Efficiency	Ui nominal Full load	Typical	%	up to 88

Parameter	Conditions	Limit or typical	Specifications
Isolation			
Electric strength voltage (Case not connected)	Input to output (60 sec)	Basic	2000 VDC
Isolation resistance	Input to output 500 VDC	Minimum	200 MOhm
Safety	Designed to meet the En 60950 requirements.		

Characteristics	Protection device	Parameter	Parameter
Protection functions			
Input undervoltage lock-out (UVLO)	Turn-on, turn-off circuit with hysteresis cycle	Automatic recovery	Turn-on nominal Turn-off nominal
Output current limitation protection (OCP)	Straight line current limitation	Automatic recovery	Typical 130%

Characteristics	Standards	Levels
Surge Susceptibility EN 61000-4-5 & EN 50155		
Spikes	EN 61000-4-5	Level 4 with 4 000 V waveform 50 µs, impedance 2 Ohm
Line to line	EN 50155	Level 1 800 V waveform 50 µs, impedance 100 and 5 Ohm Level 8 400 V waveform 0.1 µs, impedance 100 Ohm
Spikes	EN 61000-4-5	Level 4 with 4 000 V waveform 50 µs, impedance 12 Ohm
Line to earth	EN 50155	Level 1 800 V waveform 50 µs, impedance 100 and 5 Ohm Level 8 400 V waveform 0.1 µs, impedance 100 Ohm

Environmental characteristics

Environmental	EN 50125-1 and IEC 60077-1
Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-25 °C...+70 °C
Humidity	95% (condensation is permitted temporarily)
Protection	IEC 60529, IP40 (relay on socket) (with option K: IP50)
Fire & smoke	NF F 16-101, NF F 16-102, EN 45545-2
Insulation materials	Cover: polycarbonate Base: polyester

Railway compliancy

EN 50155	Electronic equipment used on rolling stock for railway applications
EN 50121-3-2	Electromagnetic compatibility for railway applications
IEC 61373	Rolling stock equipment - Shock and vibration test
IEC60255-5	Electromagnetic compatibility for railway applications

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Mounting possibilities/sockets

 V3	 V22BR	 V23	 V23BR	 V26
 V29	 V31	 V32	 V33	

Surface/wall mounting

338000302	V22BR	Screw socket, wall mount, front connection (9 mm terminals)
338000580	V23	Screw socket, wall mount, front connection (7.5 mm terminals)
338000610	V29	Spring clamp socket, wall mount, front dual connection (2.5 mm^2)

Rail mounting

338000580	V23	Screw socket, rail mount, front connection (7.5 mm terminals)
338000402	V23BR	Screw socket, rail mount, front connection (9 mm terminals)
338000610	V29	Spring clamp socket, rail mount, front dual connection (2.5 mm^2)

Panel/flush mounting

338100100	V3	Solder tag socket, panel mount, rear connection
328400100	V26	Crimp contact socket, panel mount, rear connection, A260 crimp contact
338000560	V31	Faston connection socket, rear dual connection (6.3 mm)
338000570	V33	Spring clamp socket, flush mount, rear dual connection (2.5 mm^2)

PCB mounting

338000561	V32	PCB soldering socket

For more details see datasheets of the sockets

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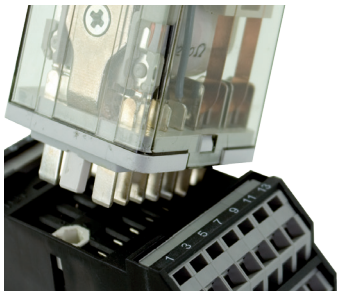
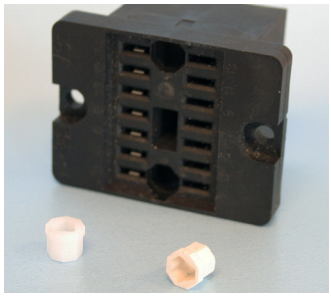
Mechanical keying module and socket (optional)





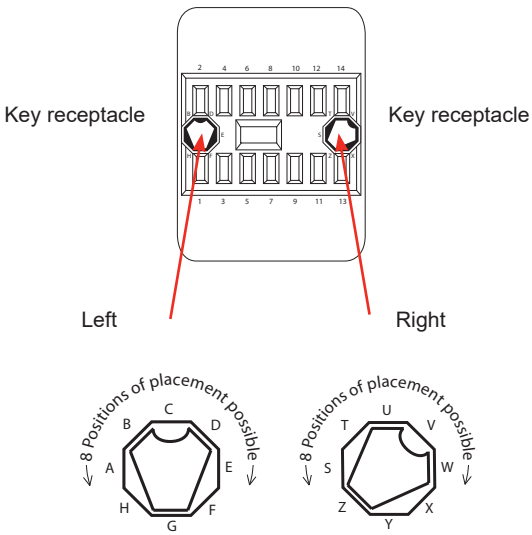
Function:
- To prevent wrong installation
- To prevent damage to equipment
- To prevent unsafe situations

Using keyed modules and sockets prevents a relay is inserted in a wrong socket. For example it prevents that a 24 VDC module is put in a 110 VDC circuit. Positive discrimination is possible per different function, coil voltage, timing, monitoring, safety and non-safety.

The D module socket keying option gives 8 x 8 = 64 possibilities. Upon ordering the customer simply indicates the need for the optional keying. Mors Smitt will assign a code to the relay and fix the pins into the module. The sockets are supplied with loose key receptacles. Inserting the keys into the socket is very simple and self explaining.

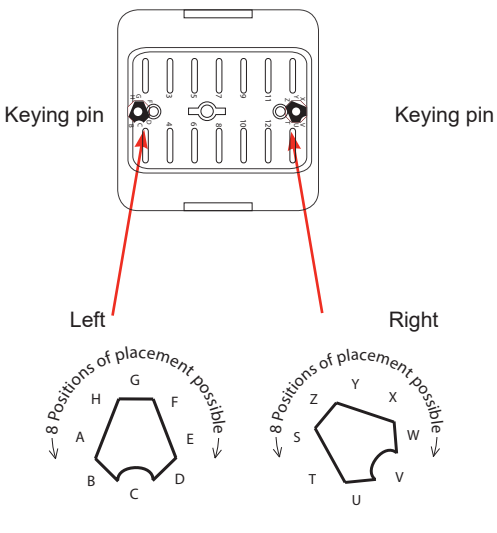
Remark: Sockets and module shown are examples.

Top view socket



Example keying position G-Z on socket

Bottom view module



Example keying position G-Z on relay

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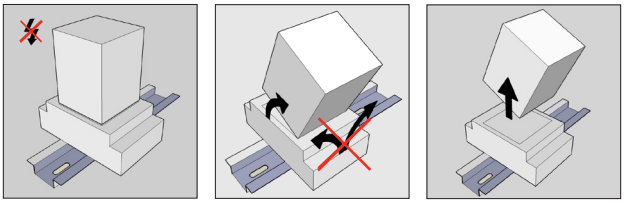
Instructions for use

Installation

Before installation or working on the module: disconnect the power supply first (no hot swapping)! Install socket and connect wiring according to the terminal identification. Plug module into the socket ensuring there is no gap between the bottom of module and the socket. Reverse installation into the socket is not possible due to the mechanical blocking snap-lock feature. Check to ensure that the coil connection polarity is not reversed. Modules can be mounted tightly together to save space. When rail mounting is used, always mount the socket in the direction of the UP arrow, to have proper fixation of the socket on the rail.

Warning!
- Never use silicon in the proximity of the modules
- To remove modules from the socket, employ up and down lever movements.



Inspection / maintenance

If the module doesn't work after inspection, replace the module unit with a similar model. Do not attempt to open the module cover or try to repair. The modules have tamper proof seals fitted and once broken, warranty is void.

Most module defects are caused by installation faults such as overvoltage, spikes/transients, high/short current far exceeding the module specifications. When returning the modules for investigation, please provide all information on the RMA form. Send defective modules back to the manufacturer for repair or replacement. Normal wear and tear or external causes are excluded from warranty.

RMA procedure: www.morssmitt.com/rma country selector.htm

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Ordering scheme

CDA DC-DC 6 W			
Coil voltages	2 x 5		2 x 5 VDC
	2 x 12		2 x 12 VDC
	2 x 15		2 x 15 VDC
	2 x 24		2 x 24 VDC
Keying code		CS	2 x 5
		CT	2 x 12
		CU	2 x 15
		CV	2 x 24

Example: CDA DC-DC 6 W 2 x 12 code CT

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