IGBT BASED
DC SOLID STATE RELAY

SDI0501710

- **Latest IGBT technology generation.**
- **Ultra low drop out voltage at on-state (low power losses).**
- **Built-in protection against overvoltage and fasts transients bursts.**
- **Built-in protection against overload and shorts-circuits of the load.**
- **Built-in over-temperature protection.**
- **Pluggable control connector with spring terminals**

Nominal Control voltage	**72-96 &110VDC**
Nominal. output voltage	**750VDC**
Nom. load current with heatsink	**50ADC**

Load voltage range	Load current range	Control input voltage	Supply voltage range	Visualizations	Dimensions (WxHxD)	Weight
12 to 940VDC	0 à 50A (with heatsink)	72-96-110VDC	72-96-110VDC	3 LEDs : -SUPPLY (Green) -STATUS (Orange) -FAULT (Red)	157 x 68 x 83 (mm)	1050g

Fig. 1 INTERNAL DIAGRAM

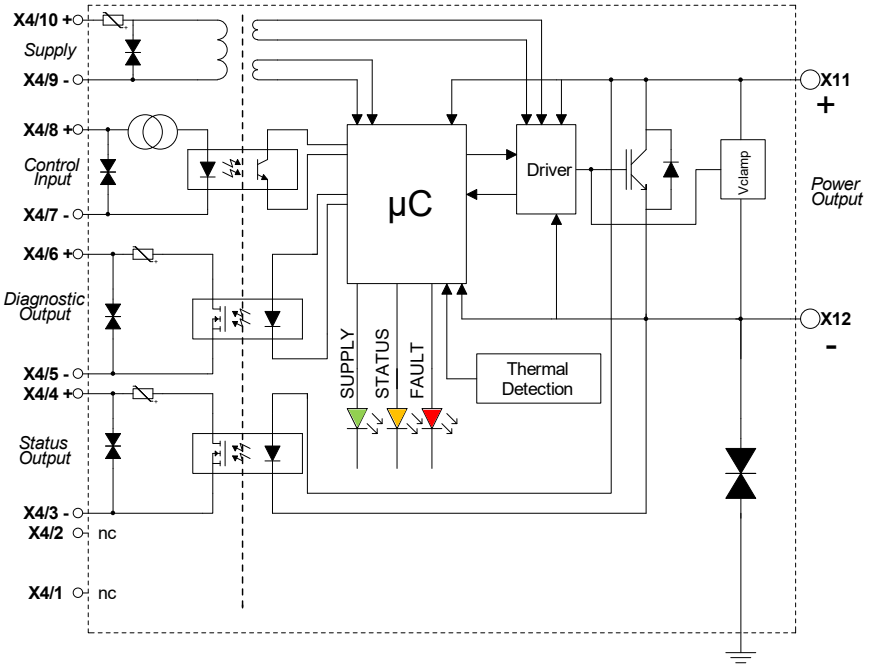
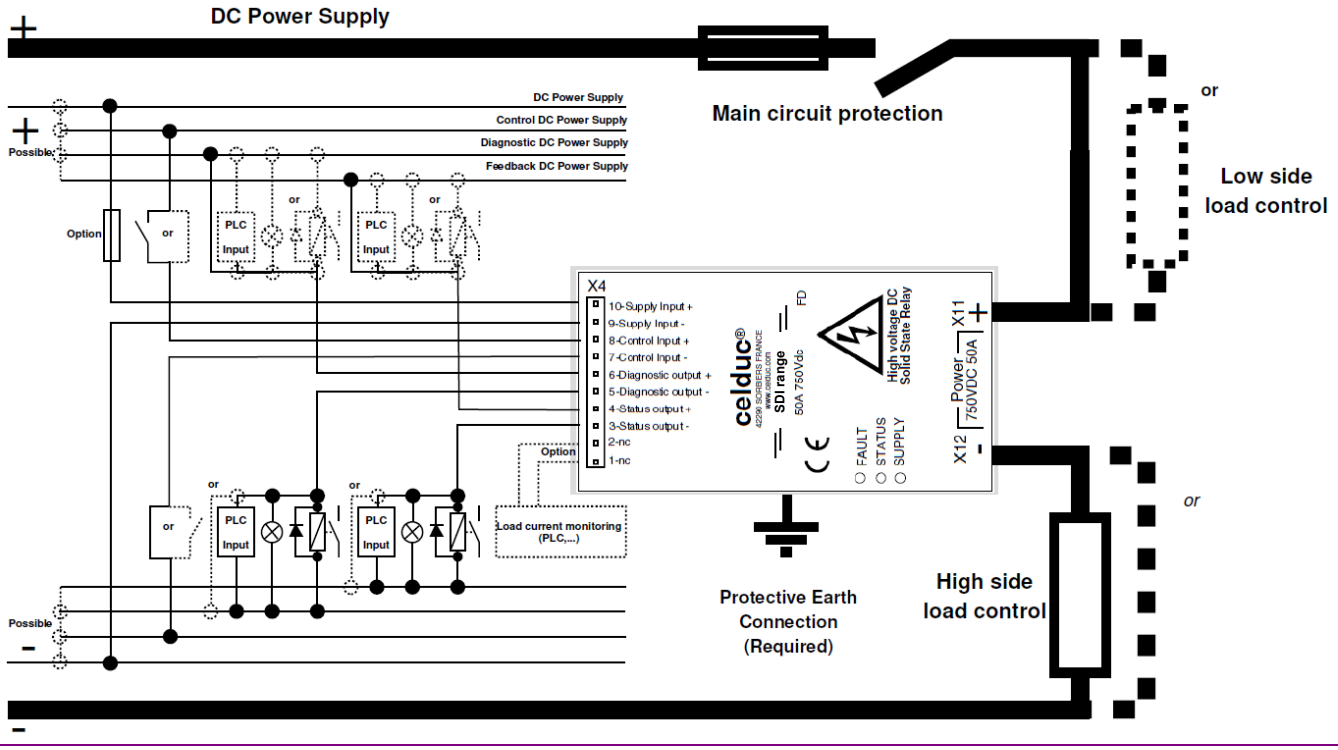


Fig. 2 EXAMPLES OF WIRING DIAGRAM



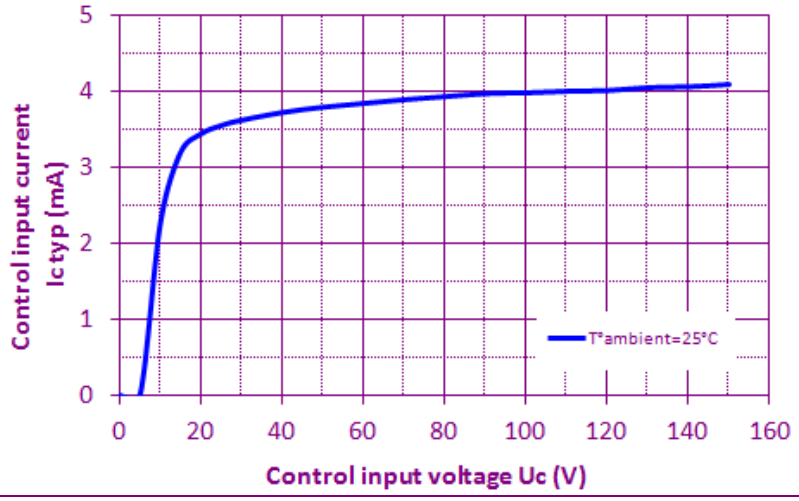
SUPPLY INPUT

	CHARACTERISTIC	LABEL	VALUE	INFO.
SUPLLY CIRCUIT	Marking		X4/10 & X4/9	
	Nom. supply voltage	**Us**	**72/96/110Vdc**	
	Min. supply voltage	**Us min**	50.4Vdc	
	Max. supply voltage	**Us max**	137.5Vdc	
	Max. peak voltage	**Usp**	154Vdc	@pulse<1s
	Typ. operating current	**Is**	<40mA	
	Max. reverse current	**-Is**	<1µA	
	Overvoltage protection		Transient voltage suppressor	
	Internal Overcurrent and shorts-circuits protection		Thermistor	
	Reverse polarity protection		YES	
	Under Voltage Lockout protection UVLO		YES	

CONTROL INPUT

INPUT CIRCUIT	CHARACTERISTIC	LABEL	VALUE	INFO.
	Marking		X4/8 & X4/7	
	Control voltage range	**Uc**	**72/96/110Vdc**	
	Current consumption	**Ic**	<5mA	See fig. 3
	Max. reverse current	**-Ic**	<1µA	
	Min. switch-on voltage	**Uc_on_min**	43.2V	
	Min. releasing voltage	**Uc_off_min**	4Vdc	
	Max. input voltage	**Ucmax**	137.5Vdc	
	Max. reverse voltage	**-Ucmax**	137.5Vdc	
	Input impedance	**Re**	Current limitation	

Fig. 3 CONTROL INPUT CHARACTERISTICS



POWER OUTPUT

	CHARACTERISTIC	LABEL	VALUE	INFO.
POWER CIRCUIT	Nom. power voltage	Ue	**750Vdc**	
	Min. power voltage	Uemin	12Vdc	
	Max permanent voltage	Umax1	940Vdc	
	Non-permanent voltage	Umax2	1000Vdc	@pulse<5min
	Repetitive peak voltage	Umax3	1270V	@pulse<20ms
	Max. nominal currents	Ice	50A	**See fig. 4** Values with heatsink
	Min. nominal currents	Ice min	0.1A(*1)	
	Non-repetitive IGBT peak overload current	Icepeak	300A	**See fig. 8**
	Max. leakage current	Icelk	15µA	
	On-state voltage	VCEsat	1.08V	**See fig. 5** @Ie=50A
	Reverse voltage (internal diode)	-Ut	1.12V	**See fig. 6** @Ie=50A Tj=125°C
	Max. inductive load (load + line length)		5mH	**See fig. 9** @Ie=50A Tjmax=125°C
	Overvoltage protection		Activ Clamp Protection	
	Shorts-circuits/Overload protection		Automatic Desaturation detection	
	Nominal desaturation current detection	Ice desat	225A	@Tj=25°C
	Min Desaturation detection time		7µs	
	Max. single pulse avalanche energy	Eep	20J	@tpulse=1ms
	Max. repetitive pulse avalanche energy	Eep	5J	@Ie=50A
	Typ. output capacitance	Cout	1.65nf	@Uc=0
	IGBT junction/case thermal resistance	Rthjc	0.054K/W	**See fig. 7**
	Reverse diode junction/case thermal resistance	Rthjc	0.11K/W	**See fig. 7**
	Built-in heatsink thermal resistance vertically mounted	Rthra	2.4K/W	@ΔTra=65°C
	Heatsink thermal time constant	Tthra	30min	@ΔTra=65°C
	Maximum junction temperature	Tjmax	105°C	@Ie=50A
	Storage temperature	Tstg	-40->+85°C	
	Operating temperature	Tamb	**-40->+70°C**	
	Ambient humidity	Hr	**5 à 95%**	

(*1) To have a good diagnostic operation, we recommend a minimum load current of 3Amps.

Fig. 4 POWER DISSIPATION AND LOAD CURRENT LIMIT VS TEMPERATURE

Please refere to the installation notice for precautions about mounting the device on a heatsink.

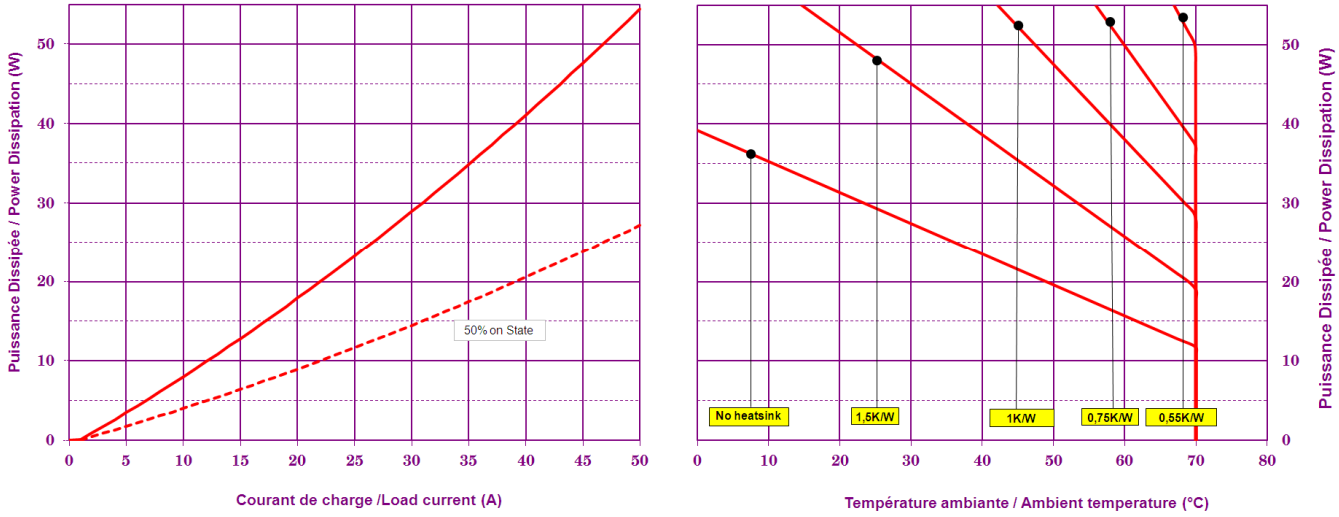


Fig. 5 IGBT DROP OUT VOLTAGE

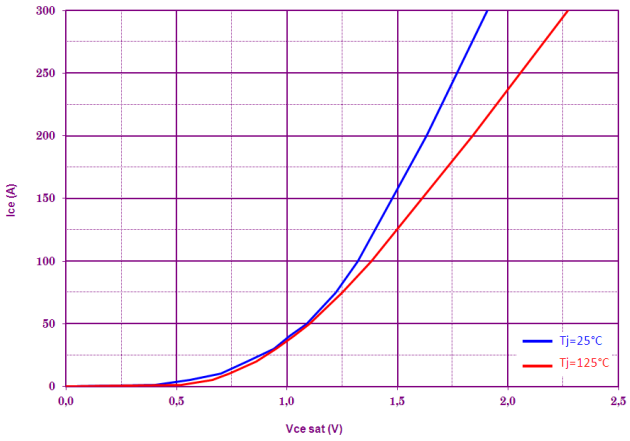


Fig. 6 REVERSE DIODE DROP OUT VOLTAGE

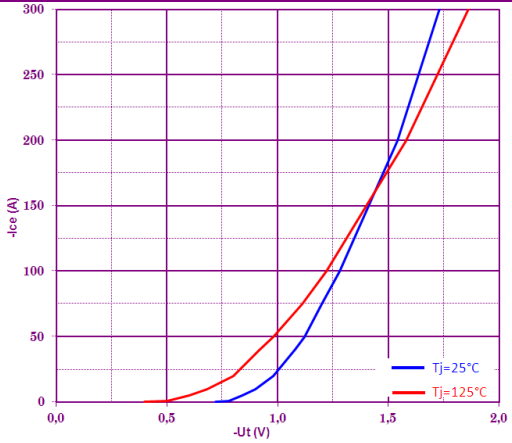


Fig. 7 POWER ELEMENT TRANSCIENT THERMAL IMPEDANCE vs. PULSE DURATION

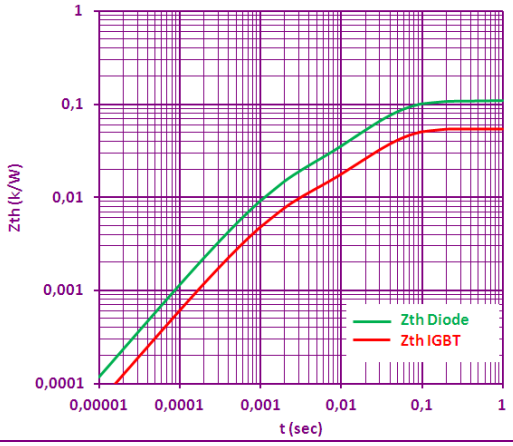


Fig. 8 ON-STATE PEAK OVERLOAD CURRENT vs. PULSE DURATION

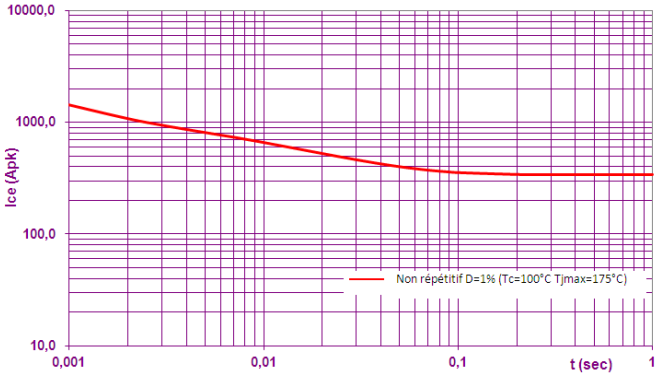


Fig. 9 MAXIMUN TOTAL INDUCTANCE (LOAD+LINE) ADMISSIBLE BY THE IGBT

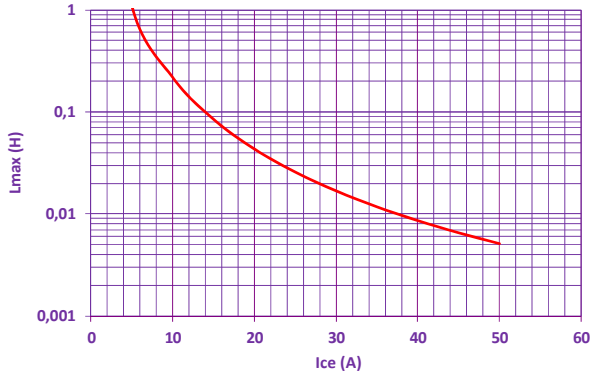
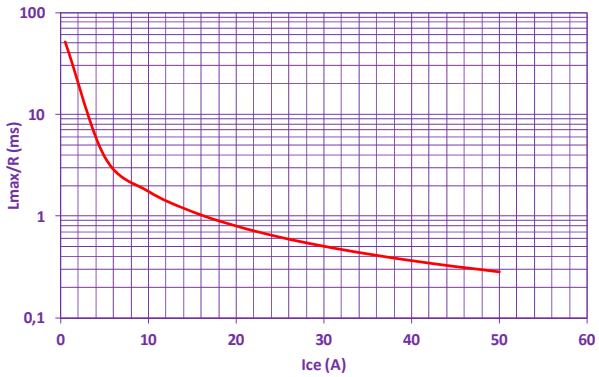


Fig. 10 MAXIMUN TIME CONSTANT WITH RL INDUCTIVE LOAD



DIAGNOSTIC & STATUS OUTPUTS

DIAGNOSTIC & STATUS OUTPUTS

CHARACTERISTIC	LABEL	VALUE	INFO.
Marking		X4/6 & X4/5 (Diagnostic Output) X4/4 & X4/3 (Status Output)	
Type of contact		Semiconductor (Photo-MOS) NO Contact (“Opened" without activation or supply)	
Nominal switching voltage		**72/96/110Vdc**	
Max. switching voltage		137.5Vdc	
Min. switching voltage		16.8Vdc	
Max. switching current		50mA	
Min. switching current		0.1mA	
Max. on-state resistance	**Rds_on**	35Ω	
Overvoltage protection		Transient voltage suppressor	
Overload and shorts-circuits protection		Thermistor	
Reverse polarity protection		YES	

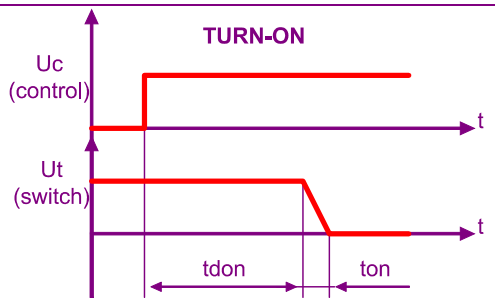
SUPPLY INPUT	CONTROL INPUT	MAIN VOLTAGE	LOAD CIRCUIT	RELAYS BASEPLATE TEMPERATURE	SUPPLY LED	STATUS LED	FAULT LED	DIAGNOSTIC OUTPUT	STATUS OUTPUT
0	x	x	x	x	○	○	○	Open	Open
UVLO	x	x	x	x	◧	○	○	Open	Open
1	0	YES	OK	<90°C	●	○	○	Open	Open
1	1	YES	OK	<90°C	●	●	○	Open	Closed
1	0	NO	OK	<90°C	●	○	◨	Closed	Open
1	1	NO	OK	<90°C	●	●	◨	Closed	Closed
1	0	YES	BREAKING	<90°C	●	●	◨	Closed	Open
1	1	YES	BREAKING	<90°C	●	●	◨	Closed	Closed
1	1	YES	OVERLOAD (*2)	<90°C	●	○	◨	Closed	Open
1	1	YES	SHORT-CIRCUIT (*2)	<90°C	●	○	◨	Closed	Open
1	0	x	≠0A	x	●	●	◓	Closed	Closed
1	x	x	x	>90°C	●	○	●	Closed	Open

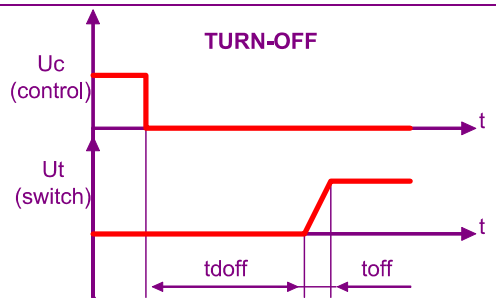
LEGEND:
◨ Flashing ton=0,1s toff=0,1s
◨ Flashing ton=0,1s toff=2s
◓ Flashing ton=1s toff=1s
◧ Flashing ton=0,1s toff=0,1s

(*2) After four Short-circuits and/or overload detection, the relay will be block for safety, this mode is indicaded by a flasing chaser of leds, in this case the diagnostic output would be closed and the Status output would be open, to cancel this fault, you should reset the product with supply input (pin X4/10 et X4/9).

TIME CHARACTERISTICS

Fig. 2 TIME DIAGRAMS





TIME CHARACT.	CHARACTERISTIC	LABEL	VALUE	INFO.
	Turn on time	**ton**	1ms	Rload=20Ω Lload=5mH Ue=750Vdc
	Turn on delay	**tdon**	1.5ms	
	Turn off time	**toff**	300µs	Rload=20Ω Lload=5mH Ue=750Vdc
	Turn off delay	**tdoff**	1.5ms	
	Max. On-Off frequency	**F(on-off)**	1Hz	

GENERAL INFORMATION

WIRING	Connections		Power	Control	
	Type		M6 Hexagonal screw	Cage spring with manual lever plug	
	Tightening torque		3.75Nm	By pushing with DIN 5264 Screwdriver 0.4x2.5	
	Recommended wiring type		round tabs, eyelet type, M6	1x1.5mm2 max	

	Plastic material housing		WELLAMID 6600 PA66 HWV0CP	
	Mounting		4 screws M5	See mounting sheet
	Noise level		No audible noise	
	Weight		1050g	

STANDARDS

GENERAL	Standards		EN50155	
	Temperature class		TX	
	Protection level		IP00	
	CE marking		Yes	
	UL, cULUS and VDE approvals		Possible on request	
	Reliability		MTTF = 118 years MTTFd ≥ 24 years	ISO13849-1 @40°C/750Vdc and 50A

INSULATION	Standards		EN50124-1	
	Overvoltage categories		OV4 @72-96Vdc OV3 @110Vdc	
	Pollution Degree		PD2	
	Rated impulse voltage between Input and Power outputs	**Uni**	8kV	
	Rated insulation voltage between Input and Power outputs	**Unm**	0.9kV	
	Rated impulse voltage between different signals of X4 connector (supply, control input, Diagnostic output and Status output)		2.5kV	
	Rated impulse voltage between Power output and ground (Aluminum baseplate)		4kV(*3)	

(*3) Warning: The rated impulse voltage test can damage the reliability of some components, we invite you to do this insulation test with reduced voltages (1500Vpk).

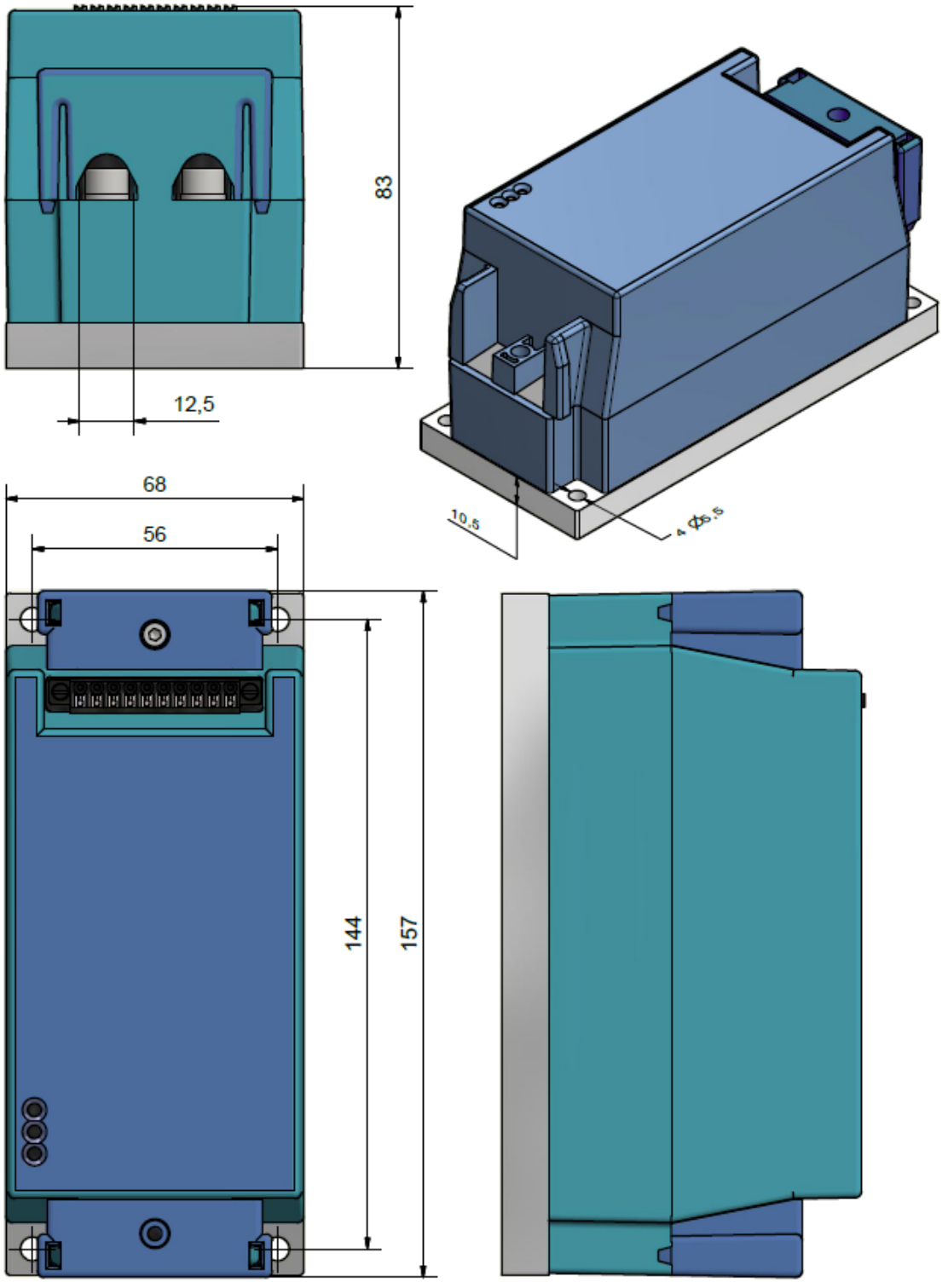
	TYPE OF TEST	STANDARD	RESULTS	TESTS STANDARD
E.M.C. IMMUNITY	E.S.D. (Electrostatic discharges)	**EN50121-3-2**	PASS	**EN61000-4-2**
	Radiated electromagnetic fields	**EN50121-3-2**	PASS	**EN61000-4-3**
	Fast transients bursts	**EN50121-3-2**	PASS	**EN61000-4-4**
	Electric chocks	**EN50121-3-2**	PASS	**EN61000-4-5**
	Radio-frequency fields	**EN50121-3-2**	PASS	**EN61000-4-6**

E.M.C. EMISSION	Radiated and conducted disturbances	**EN50121-3-2**	PASS	**EN55011**

OTHERS	Fire & smoke protection	**EN45545-2**	HL2 with requirement R22	
	Mechanical test Shocks and Vibrations	**EN61373**	PASS	

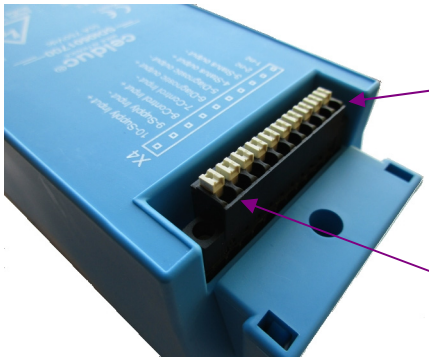
DIMENSIONS

Fig. 8 DIMENSIONS (in mm)

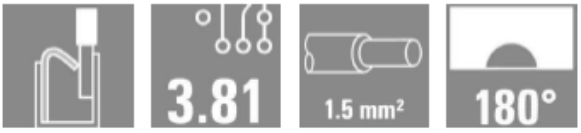


CONNECTIONS-WIRING

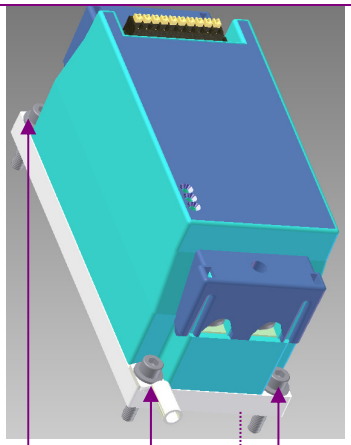
CONTROL CONNECTOR



==>Spring connector
« PUSH IN »

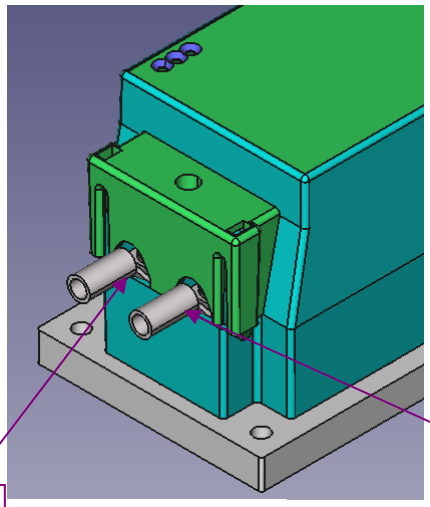


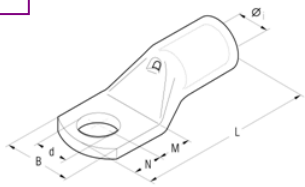
GROUND WIRING



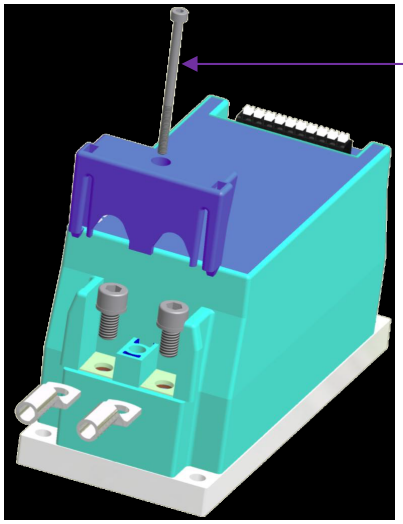
The Ground-wiring of the product with the rest of installation is made by screwing directly to the relay baseplate with one of the 4 holes (M5).
Fastening screws and round terminals (power, ground…) are not supplied with the product.

POWER WIRING





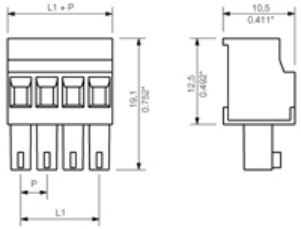
B max=12mm
d min=6.2mm
N max=7mm



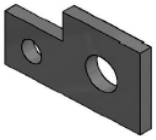
Locking of plastic covers by screws CHC M3
Maximum tightening torque: 1.0Nm

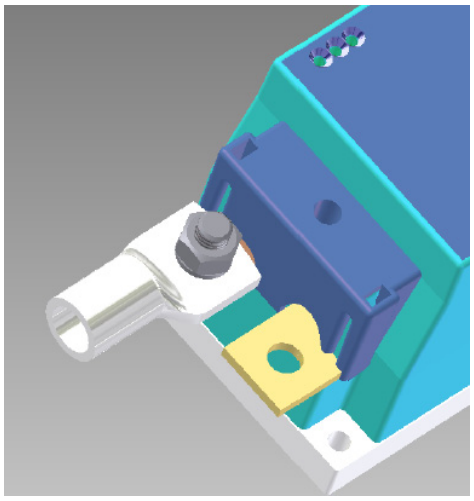
OPTIONS

Control connector with screws :

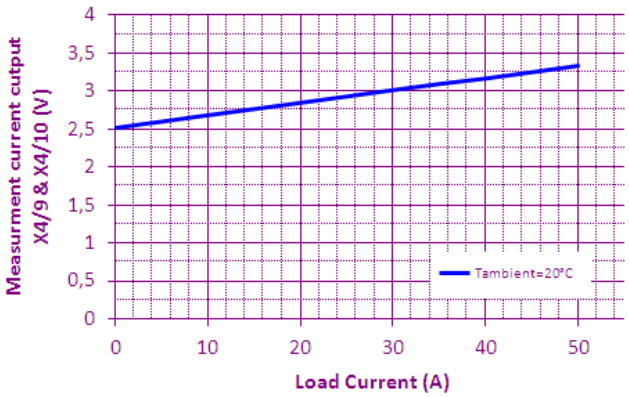


Connection kit for large cable ends :





Possibility of current measurement output (isolated) on signal connector (pin X4/9 and X4/10):



Please consult our website for other accessory references (Heatsink, mounting adaptors, thermal grease...).

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