

## ***IGBT BASED DC SOLID STATE RELAY***

### SDI0501710



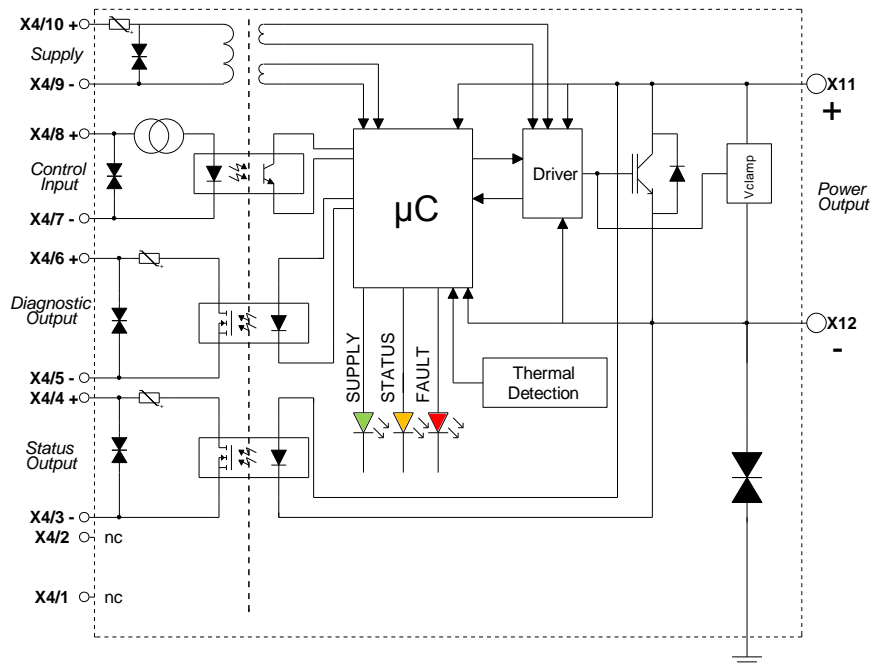
Nominal Control voltage	<b>72-96 &amp; 110VDC</b>
Nominal. output voltage	<b>750VDC</b>
Nom. load current with heatsink	<b>50ADC</b>

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

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



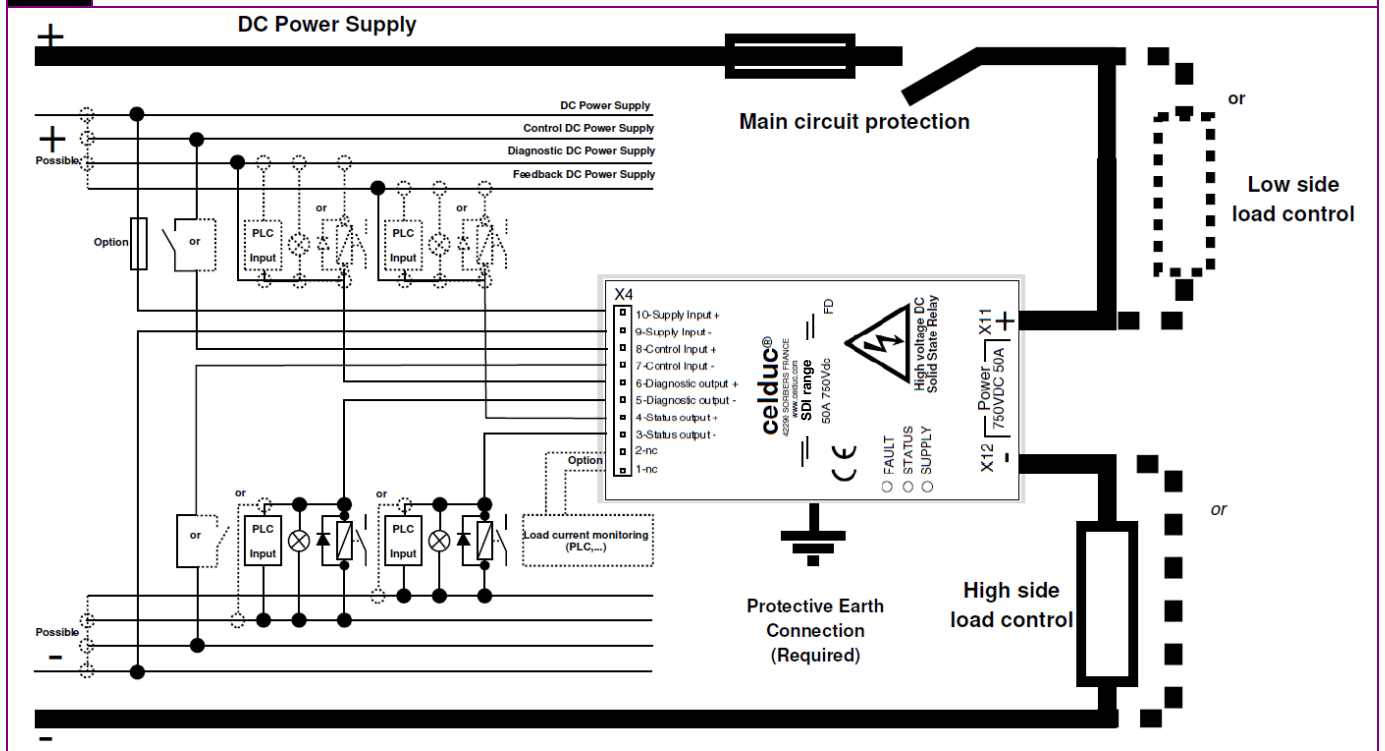
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Fig. 2

EXAMPLES OF WIRING DIAGRAM



SUPPLY INPUT

	CHARACTERISTIC	LABEL	VALUE	INFO.
<b>SUPPLY CIRCUIT</b>	Marking		X4/1 & X4/2	
	Nom. supply voltage	<b>Us</b>	<b>72/96/110Vdc</b>	
	Min. supply voltage	<b>Us min</b>	50.4Vdc	
	Max. supply voltage	<b>Us max</b>	137.5Vdc	
	Max. peak voltage	<b>Usp</b>	154Vdc	@pulse<1s
	Typ. operating current	<b>Is</b>	<40mA	
	Max. reverse current	<b>-Is</b>	<1μA	
	Oversvoltage protection		Transient voltage suppressor	
	Internal Overcurrent and shorts-circuits protection		Thermistor	
	Reverse polarity protection		YES	
	Under Voltage Lockout protection UVLO		YES	

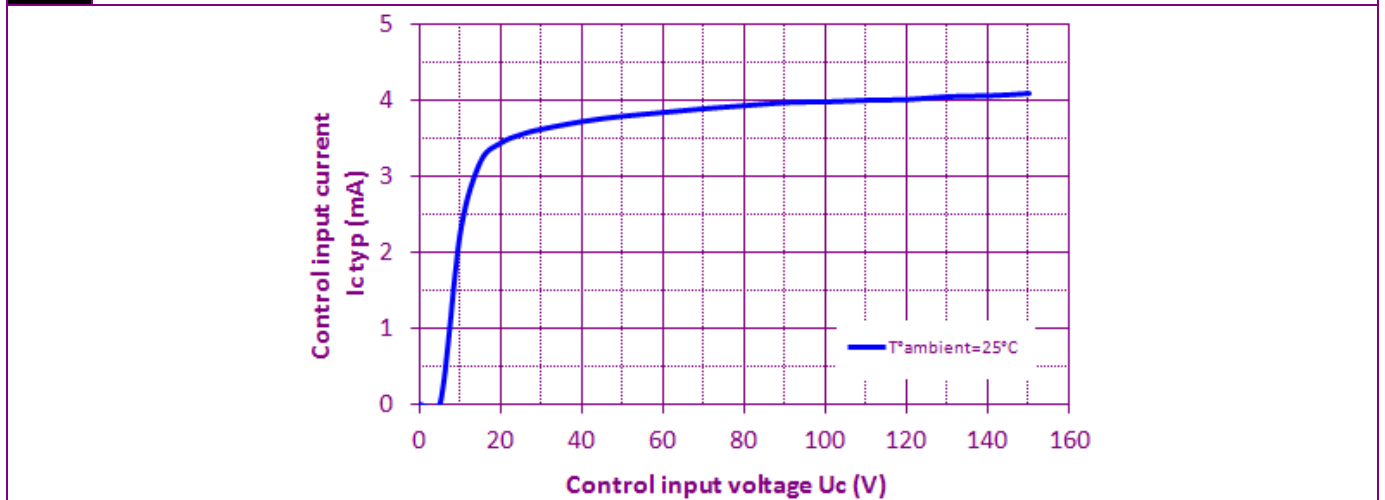
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**CONTROL INPUT**

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

Fig. 3

CONTROL INPUT CHARACTERISTICS



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**POWER OUTPUT**

CHARACTERISTIC	LABEL	VALUE	INFO.
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 <sup>(*1)</sup>	
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	@Ie=50A
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%	

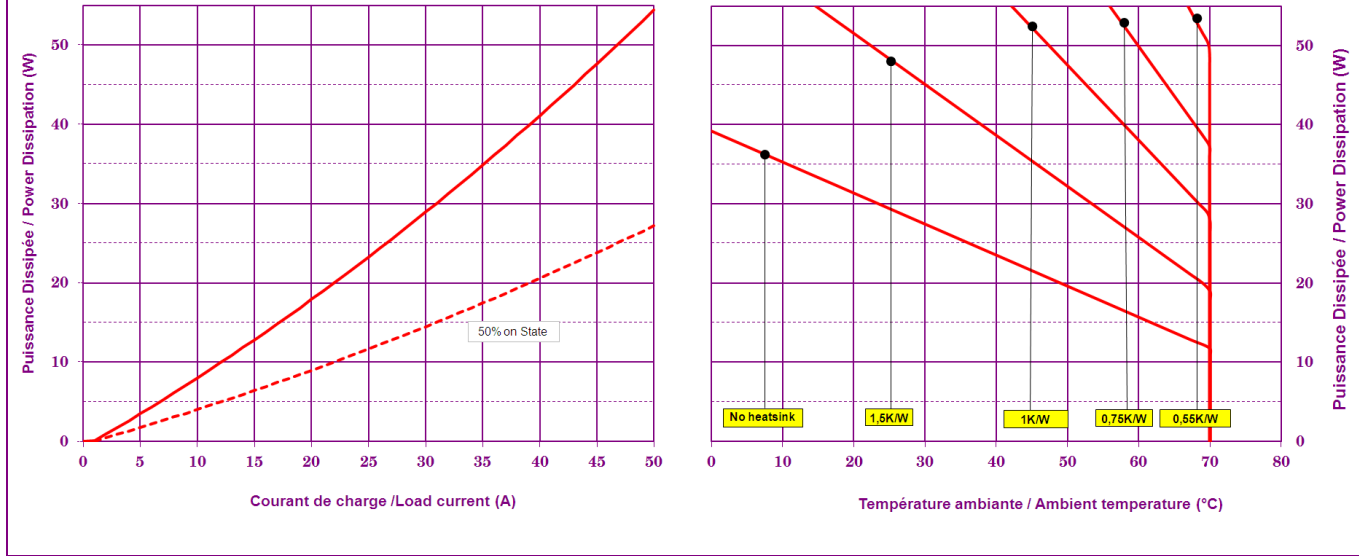
(\*1) To have a good diagnostic operation, we recommend a minimum load current of 2Amps.

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**Fig. 4**

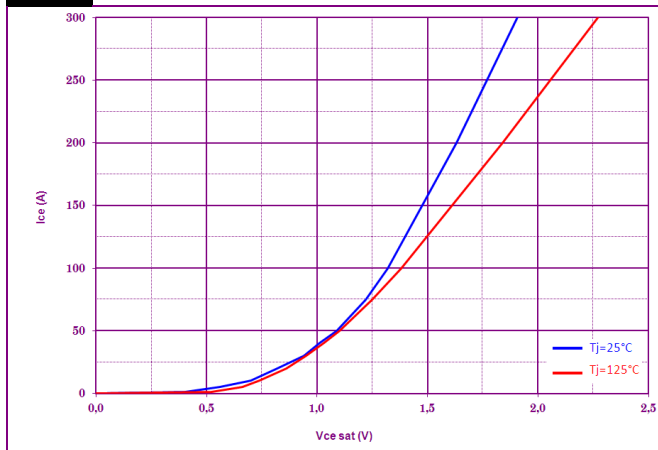
**POWER DISSIPATION AND LOAD CURRENT LIMIT VS TEMPERATURE**

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



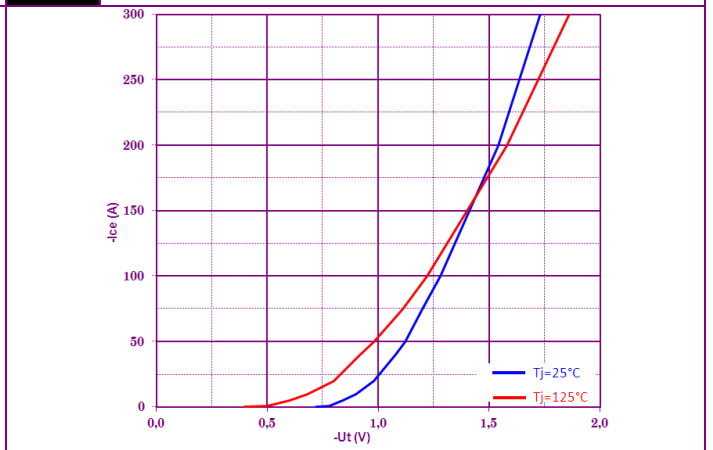
**Fig. 5**

**IGBT DROP OUT VOLTAGE**



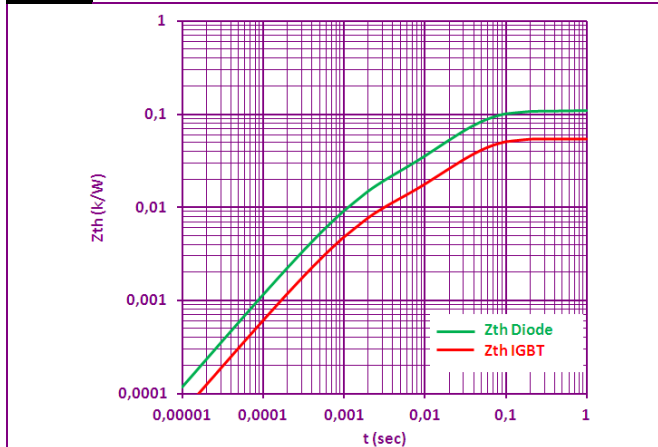
**Fig. 6**

**REVERSE DIODE DROP OUT VOLTAGE**



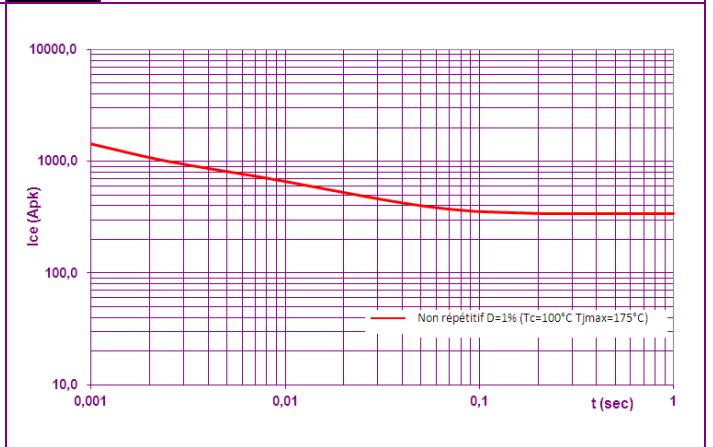
**Fig. 7**

**POWER ELEMENT TRANSIENT THERMAL IMPEDANCE vs. PULSE DURATION**



**Fig. 8**

**ON-STATE PEAK OVERLOAD CURRENT vs. PULSE DURATION**



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**DIAGNOSTIC & STATUS OUTPUTS**

DIAGNOSTIC & STATUS OUTPUTS	CHARACTERISTIC	LABEL	VALUE	INFO.
	Marking		X4/5 & X4/6 (Diagnostic Output) X4/3 & X4/4 (Status Output)	
	Type of contact		Semiconductor (Photo-MOS) NO Contact ("Opened" without activation or supply)	
	Nominal switching voltage		<b>72/96/110Vdc</b>	
	Max. switching voltage		137.5Vdc	
	Min. switching voltage		16.8Vdc	
	Max. switching current		50mA	
	Min. switching current		0.1mA	
	Max. on-state resistance	<b>Rds_on</b>	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 <sup>(*)</sup>	<90°C				Closed	Open
1	1	YES	SHORT-CIRCUIT <sup>(*)</sup>	<90°C				Closed	Open
1	0	x	≠0A	x				Closed	Closed
1	x	x	x	>90°C				Open	Closed

**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

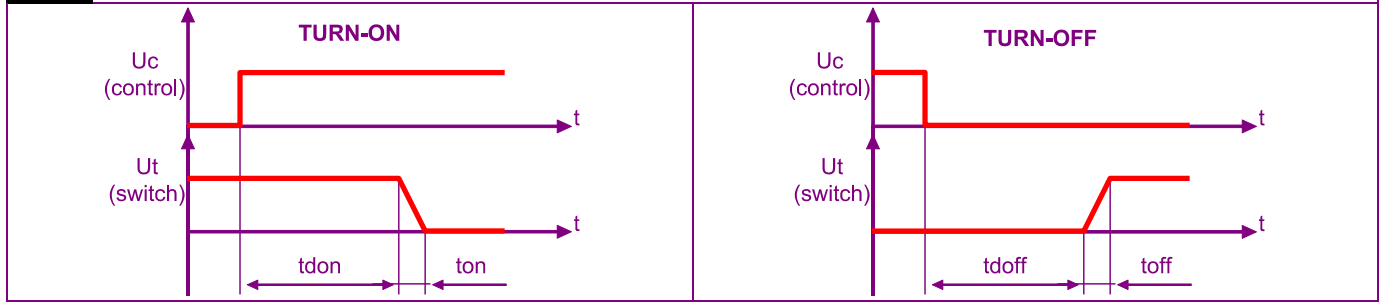
<sup>(\*)</sup> After four Short-circuits and/or overload detection, the relay will be block for safety, this mode is indicated by a flashing chaser of leds, in this case the diagnostic output would be closed and the Status output would be open, to cancel this fault, you should reset the product with supply input (pin X4/1+ et X4/2-).

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**TIME CHARACTERISTICS**

Fig. 2

TIME DIAGRAM



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

**GENERAL INFORMATION**

	Connections	Power	Control	
<b>WIRING</b>	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	1x1.5mm <sup>2</sup> max	
	Plastic material housing	WELLAMID 6600 PA66 HWV0CP		
Mounting	4 screws M5		See mounting sheet	
Noise level	No audible noise			
Weight	1050g			

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**STANDARDS**

<b>GENERAL</b>	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

<b>INSULATION</b>	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 <sup>(*3)</sup>	

(\*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).

<b>E.M.C. IMMUNITY</b>	TYPE OF TEST	STANDARD	RESULTS	TESTS STANDARD
	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

<b>E.M.C. EMISSION</b>	Radiated and conducted disturbances	EN50121-3-2	PASS	EN55011
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<b>OTHERS</b>	Fire & smoke protection	EN45545-2	HL2 with requirement R22	
	Mechanical test Shocks and Vibrations	EN61373	PASS	

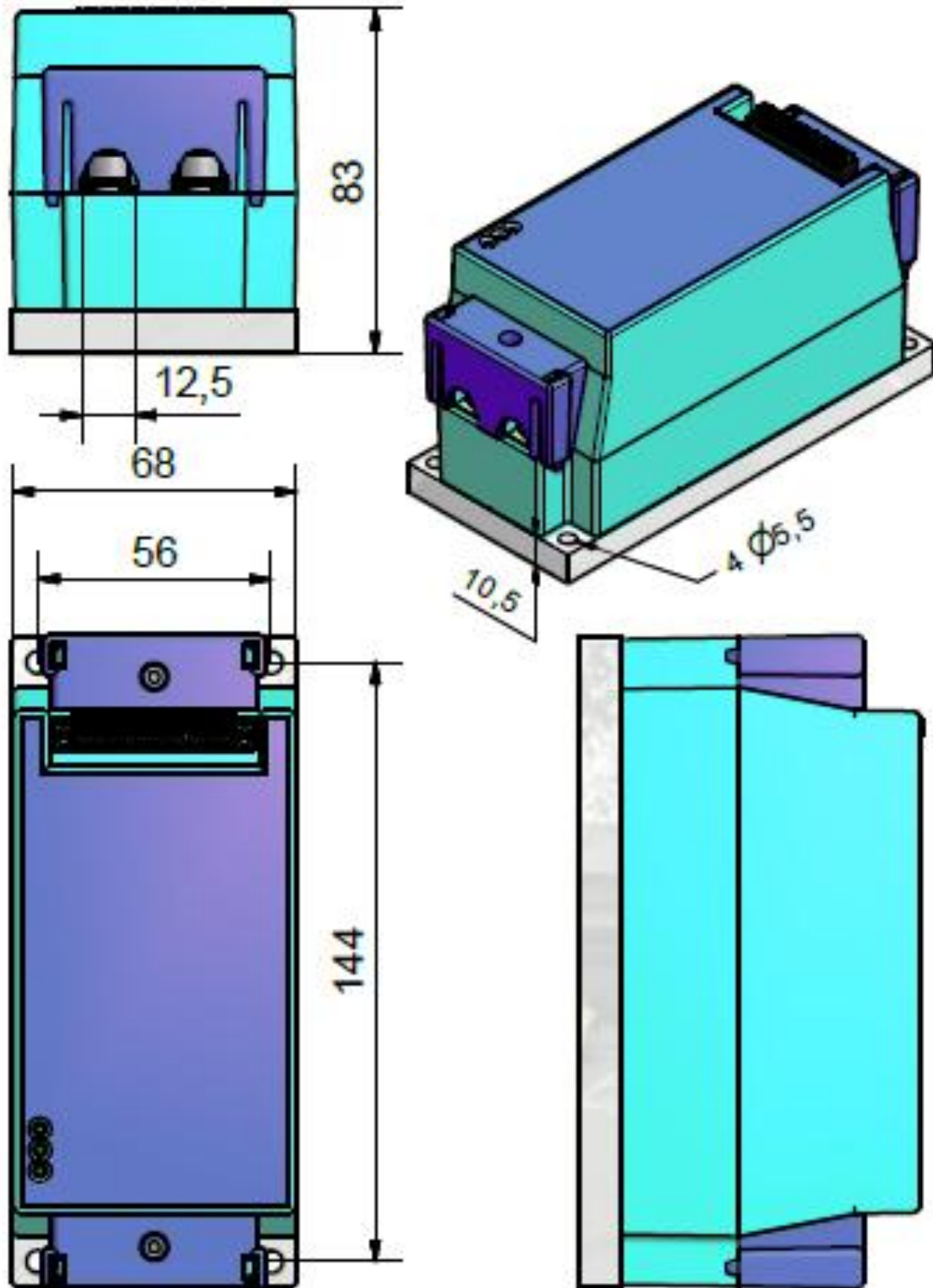
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***DIMENSIONS***

Fig. 8

DIMENSIONS (in mm)



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**CONNECTIONS-WIRING**

**CONTROL CONNECTOR**

X4/1

X4/10

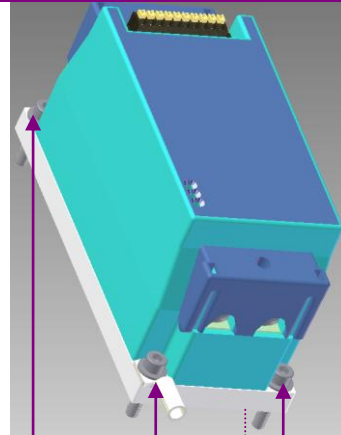
==>Spring connector  
« PUSH IN »

3.81

1.5 mm<sup>2</sup>

180°

**GROUND WIRING**



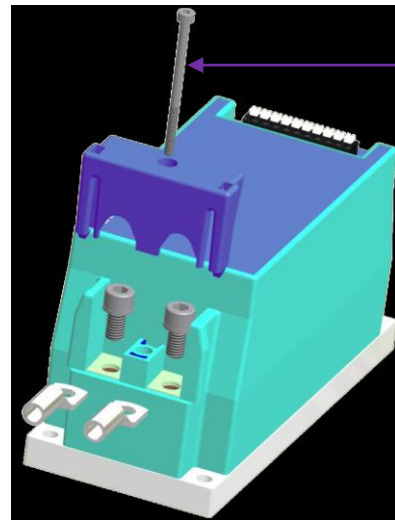
The Ground-wiring of the product with the rest of installation is made by screwing directly to the relay baseplate with one of the 4 holes (M5).  
Fastening screws and round terminals (power, ground...) are not supplied with the product.

**POWER WIRING**

X12 -

X11 +

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

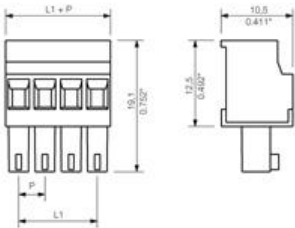
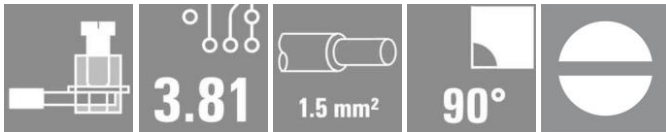


Locking of plastic covers by screws CHC M3  
Maximum tightening torque: 1.0Nm

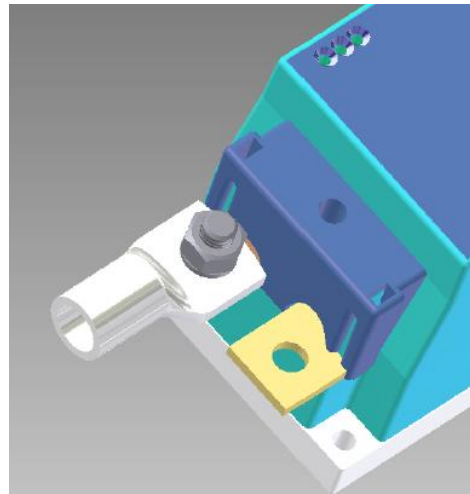
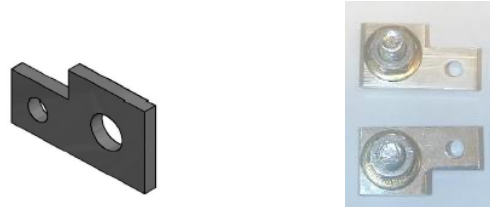
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**OPTIONS**

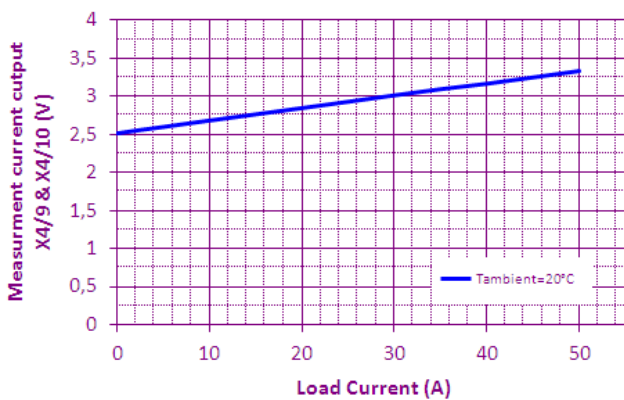
Control connector with screws :



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...).