THREE PHASE ANGLE CONTROLLER

SGTA4653

- Adapted to three phase star (without neutral) or delta connected loads (other wiring configurations on demand)
- Very low initial value regarding competition
- Small housing.
- Large mains frequency and voltage range.
- Fully opto-isolated full cycle three phase, phase angle controller (balanced currents, less harmonics, ...)
- Lot of possible options on demand (ramps, additional settings...).

Proportional Analog Voltage Control Input :

Potentiometric

300->510VAC

50A AC-51

Mains Voltage	Mains Frequency	Max AC-51 Current	Control Input	In / Out / Case Insulation	Type of connections	Dimensions (WxHxD)	Weight
300 to 510VAC	40 to 65Hz	50A (with heatsink)	Potentiometric	4kV	Round tabs	100x73.5x39.5 (mm)	350g

Fig. 1 INTERNAL DIAGRAM

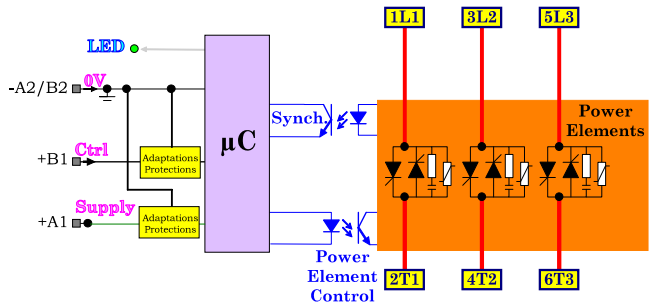


Fig. 2 TYPICAL APPLICATION

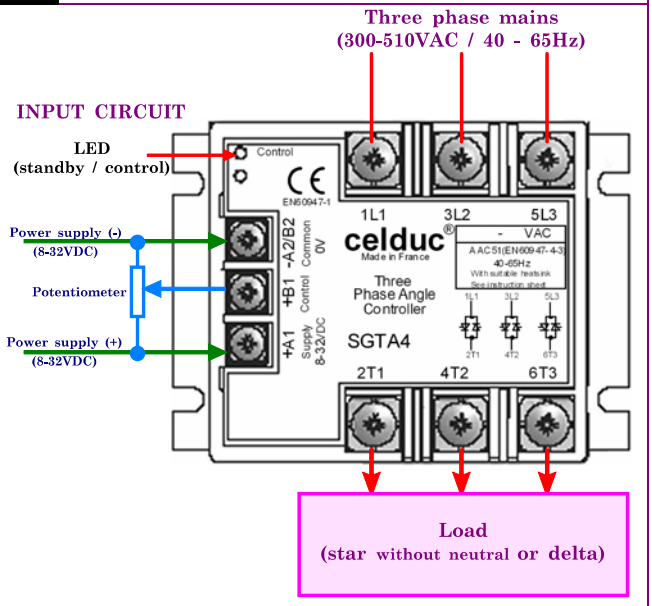
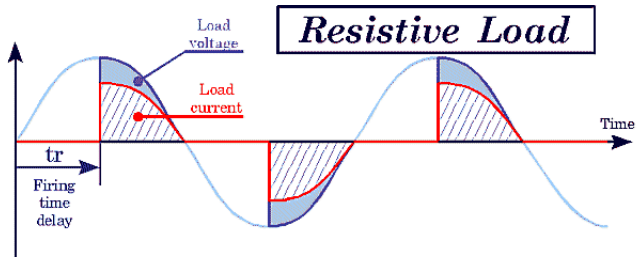


Fig. 3 PHASE ANGLE CONTROL DESCRIPTION



LED status		Power output status	Remarks
○	OFF	OFF	One or several mains phase missing
⊕	Blinking Slow	OFF	Standby mode
◒	Blinking Fast	ON	Phase angle control
●	ON	ON	Full power

INPUT CHARACTERISTICS

	CHARACTERISTIC	LABEL	VALUE			INFO.
ANALOG CONTROL INPUT	Label		**Control**			
	Terminals		+B1 & -A2/B2			
	Control voltage range	**Uc**	0-Us			
	Release and control threshold	**Ucsmin**	0.03 x Us			
	Full power control threshold	**Ucsmax**	0.97 x Us			
	Max. voltage (direct & reverse)	**Ucmax**	32VDC			
	Potentiometer value		2kΩ min.	10k typ.	25k max.	
	Input impedance	**Re**	100kΩ			
SUPPLY INPUT	Label		**Supply**			
	Terminals		+A1 & -A2/B2			
	Operating voltage range	**Us**	Filtered 8-32VDC			
	Max. consumption	**Is**	15mA (+ Potentiometer current)			**See fig. 6**

OUTPUT CHARACTERISTICS

	CHARACTERISTIC	LABEL	VALUE	INFO.
POWER CIRCUIT	Mains voltage range	**Ue**	**300 -> 510VAC**	
	Non-repetitive peak voltage	**Uep**	1200V	
	Overvoltage protection	**VDR**	Built-in 510V size 14 varistors	
	Maximum nominal current	**Ithmax (AC51)**	50A	**With heatsink (See fig. 8)**
	Non-repetitive peak overload current (1 cycle of 10ms)	**ITSM**	550A	**See fig. 8**
	Melting limit for choosing the protective fuses	**I²t**	1500A²s	@10ms
	Minimum load current	**Iemin**	100mA	
	Maximum leakage current	**Ielk**	7mA	@400VAC 50Hz
	Load power factor	**Pf**	0.8->1	
	Mains frequency range	**F**	40->65Hz	
	Max. off-state voltage rise	**dv/dt**	500V/µs	
	Protection against fast voltage transients		Built-in RC network	
	Max. current rise	**di/dt**	50A/µs	
	On-state voltage drop	**Ud**	0.9 x Vto x Ith + rt x Ith²	
	On-state resistance	**rt**	12mΩ	@125°C
	On-state voltage	**Vto**	0.9V	@125°C
	Maximum junction temperature	**Tjmax**	125°C	
	Junction/case thermal resistance per power element	**Rthjc**	0.45K/W	Total = 3 power elements
	Built-in heatsink thermal resistance vertically mounted	**Rthra**	4K/W	@ΔTra=60°C
	Heatsink thermal time constant	**Tthra**	15min	@ΔTra=60°C
	Inputs/case/power outputs insulation voltages	**Uimp**	4kV	
	Isolation resistance	**Rio**	1GΩ	
	Isolation capacitance	**Cio**	<8pF	
	Storage ambient temperature	**Tstg**	-40->+100°C	
	Operating ambient temperature	**Tamb**	**-40->+90°C**	**See fig. 7**
	Max. case temperature	**Tc**	**100°C**	

GENERAL INFORMATION

CONNEC -TIONS	Connections		Power	Input	
	Type		Round tabs		
	Screwdriver (advised)		Philips™ Nr2	Philips™ Nr1	
	Tightening torque (advised)		1.8Nm	0.8Nm	

MISC.	Housing		UL94V0	
	Mounting		Panel – 4 x M4, 1.5Nm	
	Noise level		No Noise	
	Weight		350g	

STANDARDS

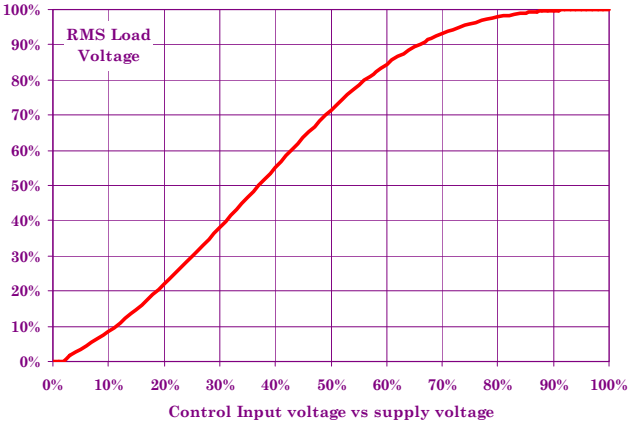
GENERAL	Standards		EN60947-4-3	
	Protection level		IP00	
	Protection against direct touch		No	
	CE marking		Yes	
	UL, cUL and VDE approvals		Pending	

	TYPE OF TEST	STANDARD	LEVEL	EFFECT
E.M.C. IMMUNITY	E.S.D. (Electrostatic discharges)	EN61000-4-2	8kV (air) 4kV (touch)	No effect
	Radiated electromagnetic fields	EN61000-4-3	10V/m	No effect
	Fast transients bursts	EN61000-4-4	2kV direct coupling on the power side 2kV coupling by clamp on the input side	No effect
	Electric chocks	EN61000-4-5	1kV direct coupling differential mode (input and output) 2kV direct coupling common mode (input and output)	No effect
	Voltage drop	EN61000-4-11	-	

E.M.C. EMISSION	Radiated and conducted disturbances	NFEN55011	The conducted or radiated disturbances generated by solid-state relays depend on the wiring and load configuration. The test method recommended by the European standards and concerning electromagnetic compatibility leading to results far from reality, we decided to advise our customer in order to adapt their filtering scheme to their application. **Please contact us if you are concerned about E.M.C.**	

TRANSFERT CHARACTERISTIC

Fig. 4 — **RMS Load Voltage Ratio vs. Input**



Nota :
Response is linear in switching angle.
(Possibility of response linearly regarding U² on demand)

CHARACTERISTIC CURVES

Fig. 5 INPUT CHARACTERISTIC

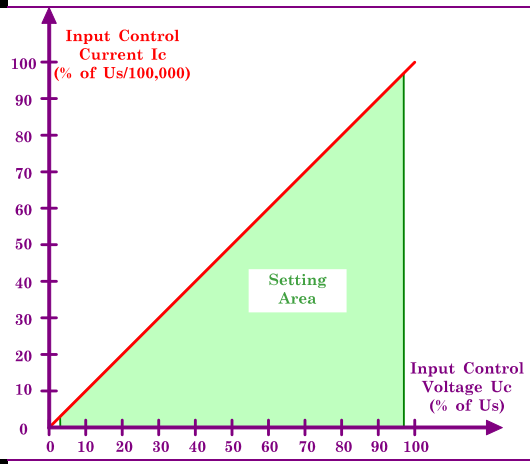


Fig. 6 POWER SUPPLY CHARACTERISTIC

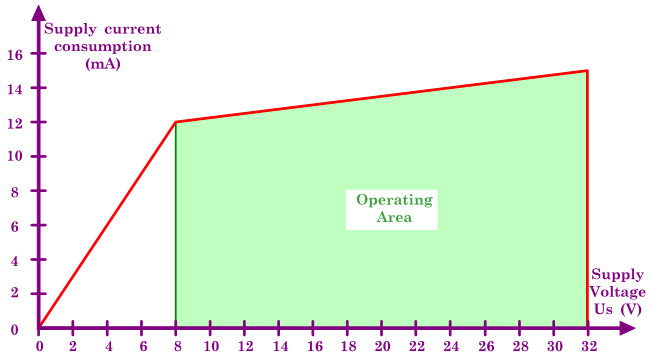


Fig. 7 POWER DISSIPATION AND LOAD CURRENT VS AMBIENT TEMPERATURE

4K/W = No Heatsink
1.2K/W = WF121000
0.9K/W = WF115100
0.7K/W = WF070000
0.55K/W = WF050000
0.3K/W = WF031100
0.2K/W = No reference
0.1K/W = No reference

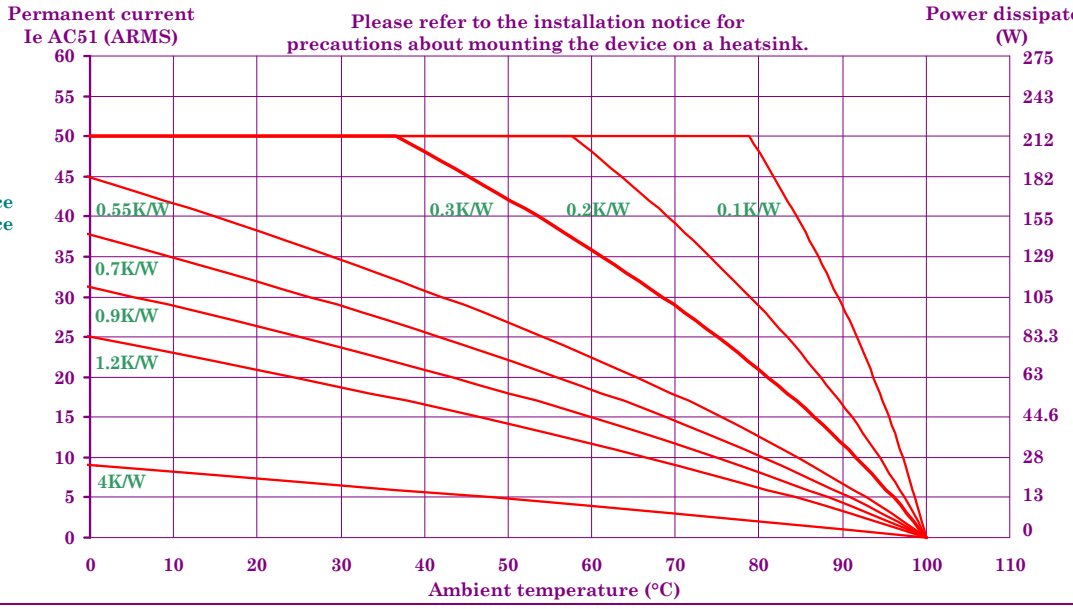
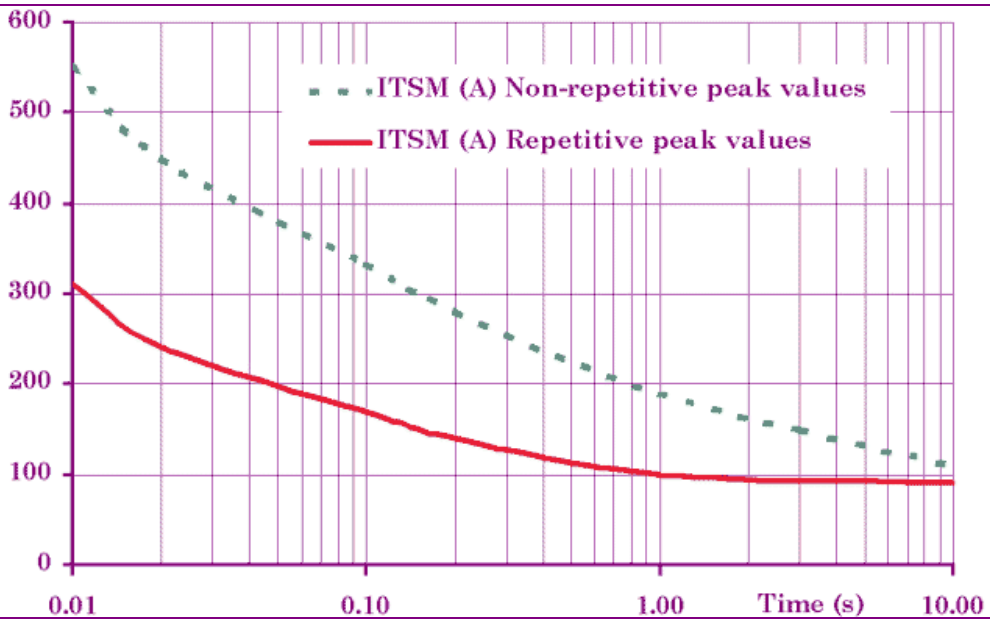


Fig. 8 CURRENT OVERLOAD CHARACTERISTIC (ITSM PER POWER ELEMENT)



DIMENSIONS AND ACCESSORIES

Fig. 9 DIMENSIONS

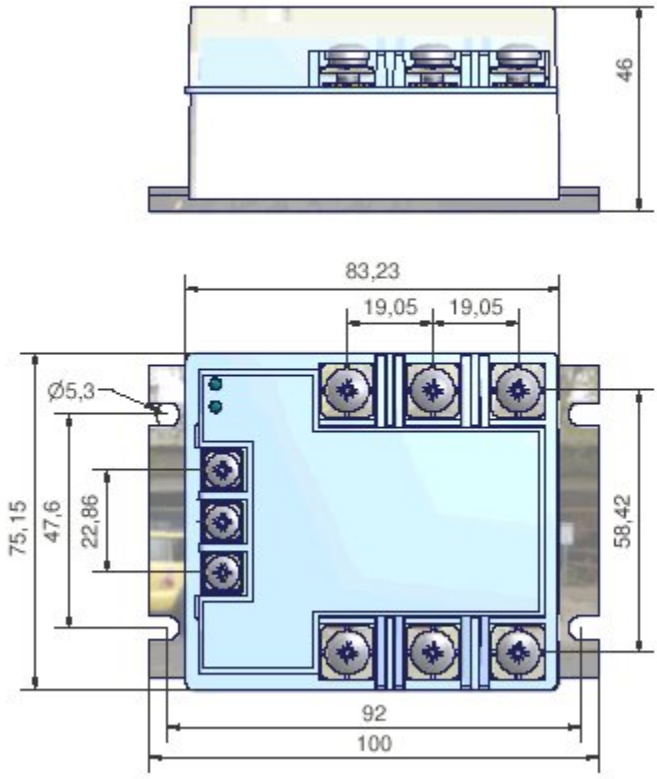
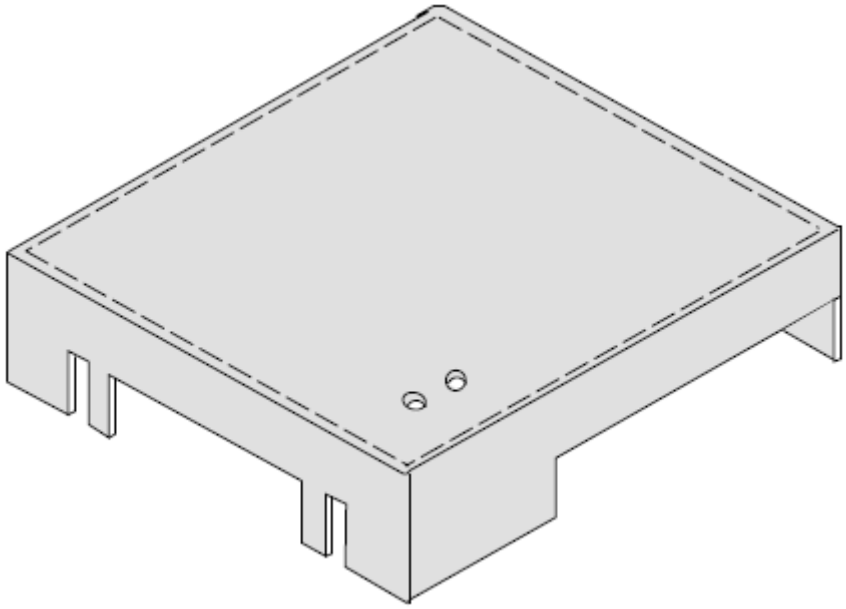


Fig. 10 ACCESSORIES



Protective cover 1K199000

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