THREE PHASE ANGLE CONTROLLER

SGTA4650

Proportional Analog Voltage Control Input
0-10VDC
300->510VAC
**50A AC-51**

▶ 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…).

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)	0-10VDC	4kV	Round tabs	100x73.5x39.5 (mm)	350g

Fig. 1	INTERNAL DIAGRAM
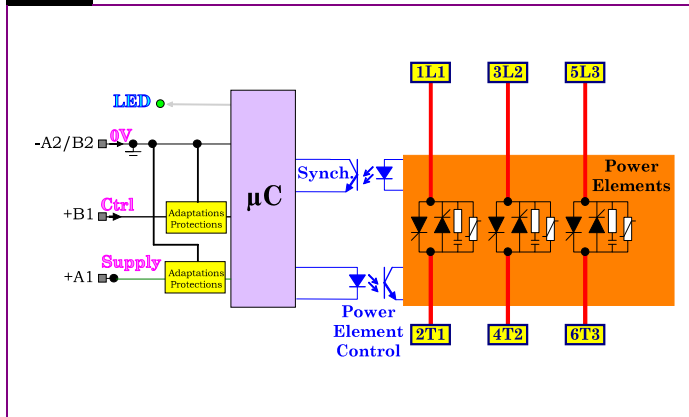
Fig. 2	TYPICAL APPLICATION

Three phase mains (300-510VAC / 40 - 65Hz)

INPUT CIRCUIT

LED (standby / control)
0-10V Analog control (+)
0-10V Analog control (-)
Power supply (-) (8-32VDC)
Power supply (+) (8-32VDC)

Load (star without neutral or delta)
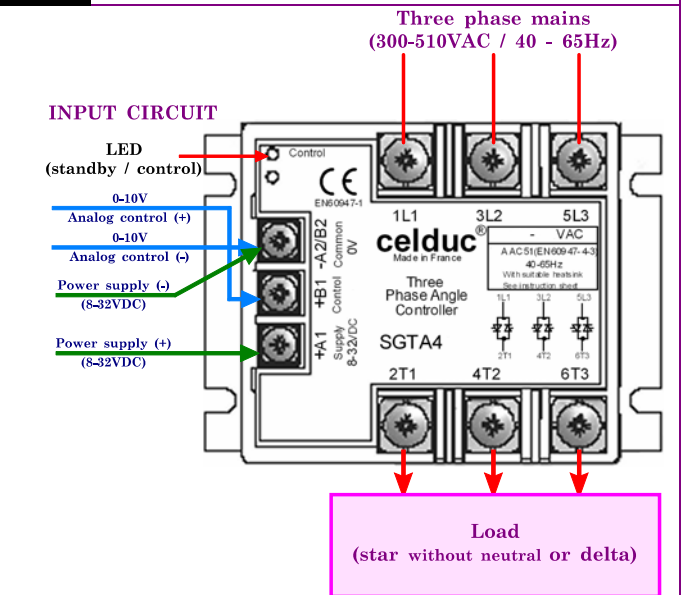
Fig. 3	PHASE ANGLE CONTROL DESCRIPTION
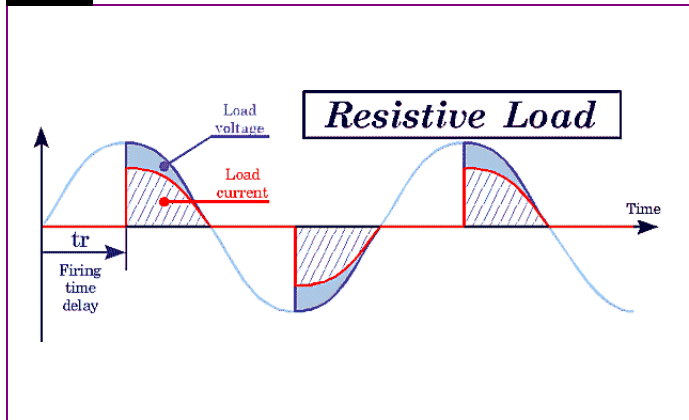
LED status		Power output status	Remarks
◯	OFF	OFF	One or several mains phase missing
⊕	Blinking Slow	OFF	Standby mode
◑	Blinking Fast	ON	Phase angle control
●	ON	ON	Full power

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Data given at Tambient=25°C and subject to modification without previous notice

INPUT CHARACTERISTICS

<table>
<tr><th></th><th>CHARACTERISTIC</th><th>LABEL</th><th>VALUE</th><th>INFO.</th></tr>
<tr><td rowspan="7">ANALOG CONTROL INPUT</td><td>Label</td><td></td><td>**Control**</td><td></td></tr>
<tr><td>Terminals</td><td></td><td>+B1 & -A2/B2</td><td></td></tr>
<tr><td>Control voltage range</td><td>Uc</td><td>0-10VDC</td><td></td></tr>
<tr><td>Release and control threshold</td><td>Ucsmin</td><td>0.3VDC</td><td></td></tr>
<tr><td>Full power control threshold</td><td>Ucsmax</td><td>9.7VDC</td><td></td></tr>
<tr><td>Max. voltage (direct & reverse)</td><td>Ucmax</td><td>32VDC</td><td></td></tr>
<tr><td>Input impedance</td><td>Re</td><td>100kΩ</td><td></td></tr>
<tr><td rowspan="4">SUPPLY INPUT</td><td>Label</td><td></td><td>**Supply**</td><td></td></tr>
<tr><td>Terminals</td><td></td><td>+A1 & -A2/B2</td><td></td></tr>
<tr><td>Operating voltage range</td><td>Us</td><td>Filtered 8-32VDC</td><td></td></tr>
<tr><td>Max. consumption</td><td>Is</td><td>15mA</td><td>**See fig. 6**</td></tr>
</table>

OUTPUT CHARACTERISTICS

<table>
<tr><th></th><th>CHARACTERISTIC</th><th>LABEL</th><th>VALUE</th><th>INFO.</th></tr>
<tr><td rowspan="25">POWER CIRCUIT</td><td>Mains voltage range</td><td>Ue</td><td>**300 -> 510VAC**</td><td></td></tr>
<tr><td>Non-repetitive peak voltage</td><td>Uep</td><td>1200V</td><td></td></tr>
<tr><td>Overvoltage protection</td><td>VDR</td><td>Built-in 510V size 14 varistors</td><td></td></tr>
<tr><td>Maximum nominal current</td><td>Ithmax (AC51)</td><td>50A</td><td>**With heatsink (See fig. 8)**</td></tr>
<tr><td>Non-repetitive peak overload current (1 cycle of 10ms)</td><td>ITSM</td><td>550A</td><td>**See fig. 8**</td></tr>
<tr><td>Melting limit for choosing the protective fuses</td><td>I^2t</td><td>1500A²s</td><td>@10ms</td></tr>
<tr><td>Minimum load current</td><td>Iemin</td><td>100mA</td><td></td></tr>
<tr><td>Maximum leakage current</td><td>Ielk</td><td>7mA</td><td>@400VAC 50Hz</td></tr>
<tr><td>Load power factor</td><td>Pf</td><td>0.8->1</td><td></td></tr>
<tr><td>Mains frequency range</td><td>F</td><td>40->65Hz</td><td></td></tr>
<tr><td>Max. off-state voltage rise</td><td>dv/dt</td><td>500V/µs</td><td></td></tr>
<tr><td>Protection against fast voltage transients</td><td></td><td>Built-in RC network</td><td></td></tr>
<tr><td>Max. current rise</td><td>di/dt</td><td>50A/µs</td><td></td></tr>
<tr><td>On-state voltage drop</td><td>Ud</td><td>0.9 x Vto x Ith + rt x Ith²</td><td></td></tr>
<tr><td>On-state resistance</td><td>rt</td><td>12mΩ</td><td>@125°C</td></tr>
<tr><td>On-state voltage</td><td>Vto</td><td>0.9V</td><td>@125°C</td></tr>
<tr><td>Maximum junction temperature</td><td>Tjmax</td><td>125°C</td><td></td></tr>
<tr><td>Junction/case thermal resistance per power element</td><td>Rthjc</td><td>0.45K/W</td><td>Total = 3 power elements</td></tr>
<tr><td>Built-in heatsink thermal resistance vertically mounted</td><td>Rthra</td><td>4K/W</td><td>@ΔTra=60°C</td></tr>
<tr><td>Heatsink thermal time constant</td><td>Tthra</td><td>15min</td><td>@ΔTra=60°C</td></tr>
<tr><td>Inputs/case/power outputs insulation voltages</td><td>Uimp</td><td>4kV</td><td></td></tr>
<tr><td>Isolation resistance</td><td>Rio</td><td>1GΩ</td><td></td></tr>
<tr><td>Isolation capacitance</td><td>Cio</td><td><8pF</td><td></td></tr>
<tr><td>Storage ambient temperature</td><td>Tstg</td><td>-40->+100°C</td><td></td></tr>
<tr><td>Operating ambient temperature</td><td>Tamb</td><td>**-40->+90°C**</td><td>**See fig. 7**</td></tr>
<tr><td>Max. case temperature</td><td>Tc</td><td>**100°C**</td><td></td></tr>
</table>

GENERAL INFORMATION

CONNEC-TIONS			Power	Input	
	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	

E.M.C. IMMUNITY	TYPE OF TEST	STANDARD	LEVEL	EFFECT
	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)
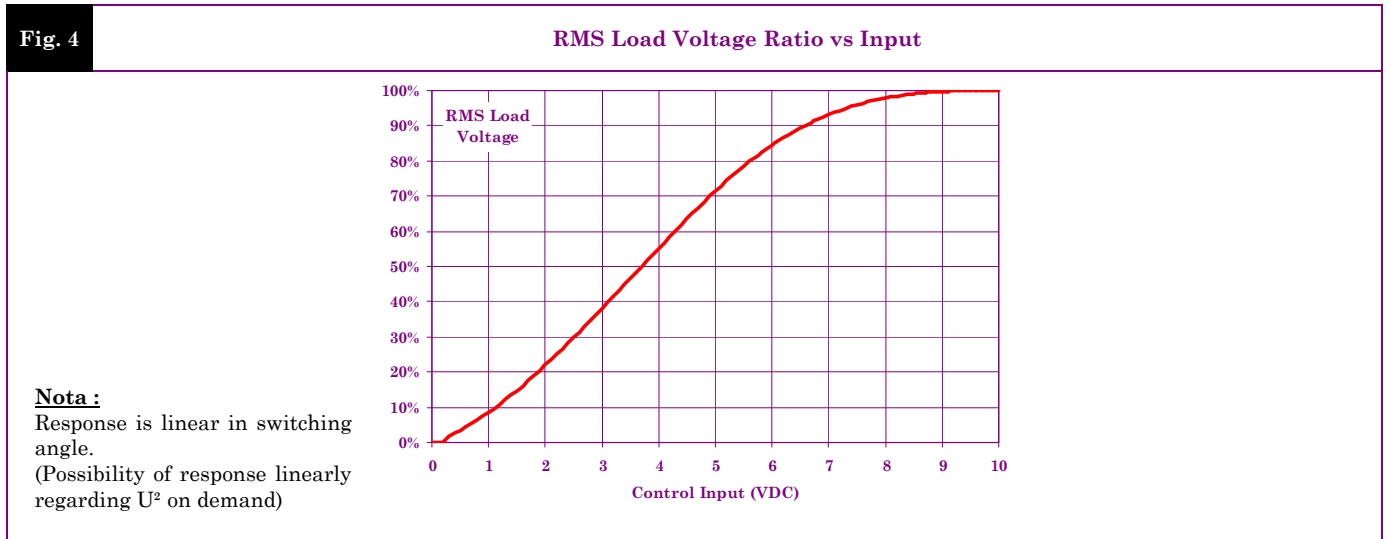
CHARACTERISTIC CURVES

Fig. 5   INPUT CHARACTERISTIC

Input Control Current Ic (µA)

Setting Area

Input Control Voltage Uc (V)
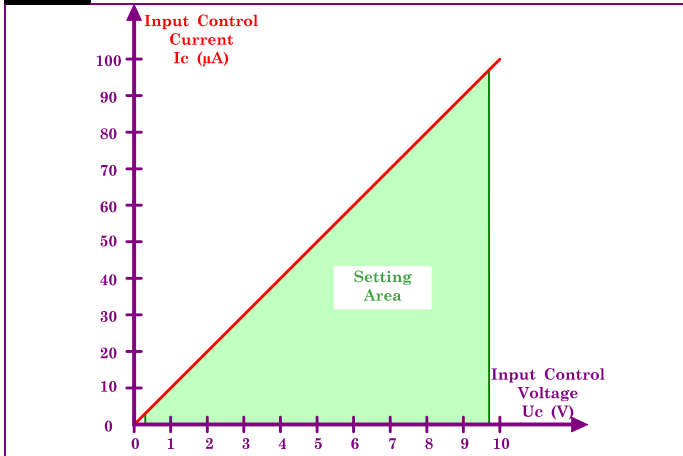
Fig. 6   POWER SUPPLY CHARACTERISTIC

Supply current consumption (mA)

Operating Area

Supply Voltage Us (V)
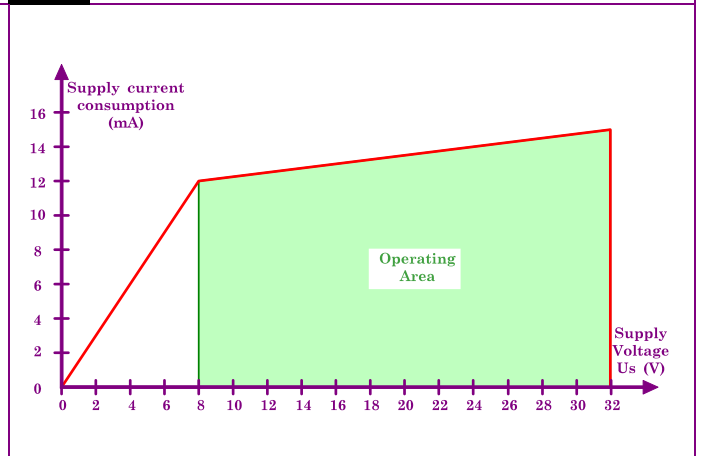
Fig. 7   POWER DISSIPATION AND LOAD CURRENT VS AMBIENT TEMPERATURE

Permanent current Ie AC51 (ARMS)

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

Power dissipated (W)

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

0.55K/W   0.3K/W   0.2K/W   0.1K/W
0.7K/W
0.9K/W
1.2K/W
4K/W

Ambient temperature (°C)
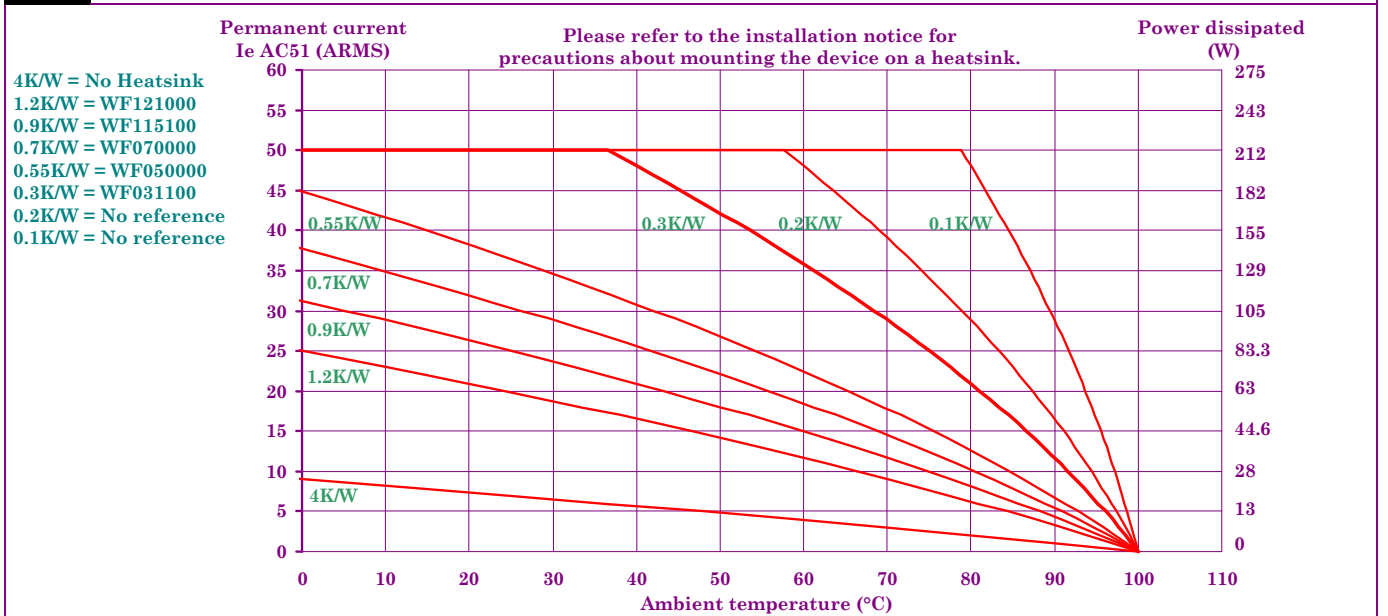
Fig. 8   CURRENT OVERLOAD CHARACTERISTIC (ITSM PER POWER ELEMENT)

- - - ITSM (A) Non-repetitive peak values
——— ITSM (A) Repetitive peak values

Time (s)
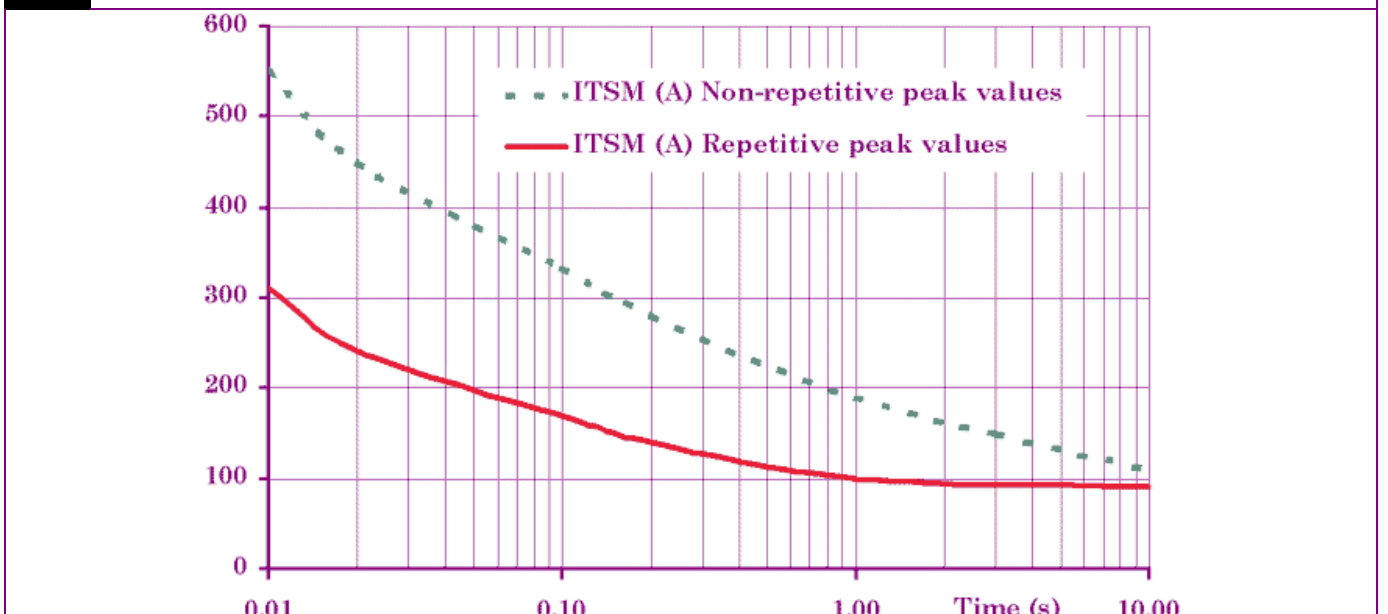
DIMENSIONS AND ACCESSORIES

Fig. 9	DIMENSIONS
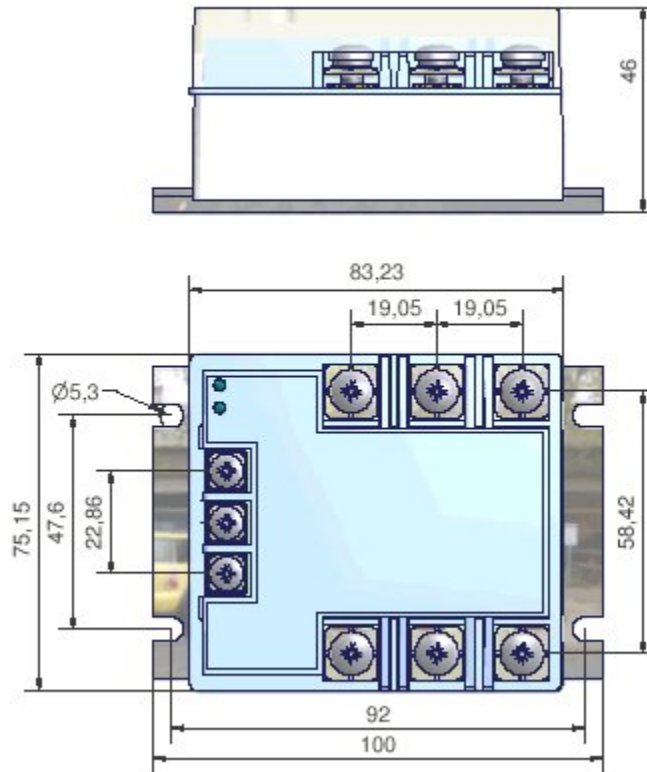
Fig. 10	ACCESSORIES
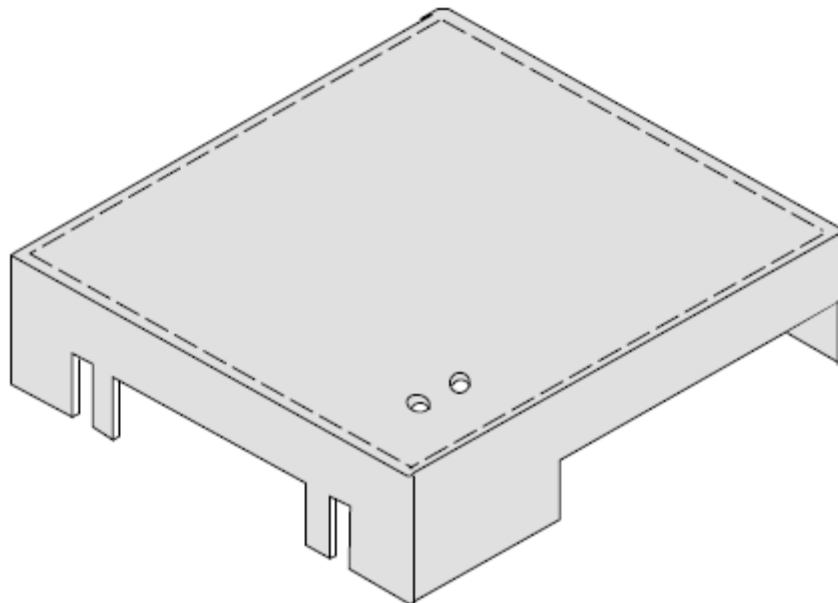
Protective cover 1K199000

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