10ACO_4 series

10W - Single Output AC-DC Converter - Universal input - Isolated & Regulated

AC-DC Converter 10 Watt

- **Wide input voltage range: 30-280VAC/30-400VDC**
- **Output short circuit, over-voltage protections**
- **High efficiency, high reliability**
- **Low ripple & noise, low standby power consumption**
- **Long-life low-impedance electrolytic capacitors**
- **Gild pin, customized available**

The 10ACO_4 series is one of GAPTEC's electric-meter power converter. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32 standards and are suitable for various applications requiring high isolation voltage and strict electromagnetic compatibility. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Common specifications

Short circuit protection:	Hiccup, continuous, self-recovery
Isolation (Input/Output)	Hipot test for 1min., leakage current <5 mA - 4kVAC (min)
Operating Temperature:	-25°C ~ +70°C
Storage temperature:	-25°C ~ +85°C
Storage humidity:	90% RH
Altitude:	• Operating altitude 3000 m • Storage altitude 3000 m
Soldering Temperature:	• Wave-soldering 260± 5°C; time: 5-10s • Manual-welding 360±10°C; time: 3-5s
Power Derating:	•-25°C to -10°C 3.3 %/°C •+55°C to +70°C 2 %/°C
Leakage Current (mA):	0.3Typ @Vin = 220Vac
Safety Standard:	Design refer to IEC62368-1
Safety Class:	CLASS II
MTBF:	300 K hours (<MIL-HDBK 217F @25°C)
Cooling:	Free air convection
Weight:	55g (Typ.)
Dimensions:	80.00 x 40.00 x 30.00 mm

Input specifications

Item	Test conditions	Min	Typ	Max	Units
Input Voltage Range	• AC input • DC input	30 30		280 400	VAC VDC
Input frequency		47		440	Hz
Input current	• 115VAC • 230VAC			0.3 0.1	A A
Inrush current	• 115VAC • 230VAC		25 40		A A
Hot plug	Unavailable				

Output specifications

Item	Test conditions	Min	Typ	Max	Units
Voltage accuracy			±1		%
Line regulation	Full load		±0.5		%
Load regulation	0% - 100% load		±1		%
Ripple & noise*	20MHz bandwidth (peak-to-peak value)			130	mV
Temperature coefficient				±0.02	%/°C
Stand-by power consumption	220VAC			0.2	W
Over-voltage protection**	• 5V Output • 12/13V Output	≤7.5V ≤15V			
Minimum load		10			%
Start-up Delay Time	220VAC input, Io=100%		50		ms
Hold-up time	220VAC input, Io=100%		200		ms

* The „parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

Example:
10ACO_05S4
10 = 10Watt; AC = AC-DC; O = Open frame series; 05 = 05 Vout;
S = Single output; 4 = 4kVAC isolation

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25 °C, humidity <75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above.
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

EMC specifications

Emissions	CE	CISPR32/EN55032	CLASS B	
Emissions	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
Immunity	RS	EC/EN61000-4-3	10V/m	perf. Criteria A
Immunity	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
Immunity	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B
Immunity	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
Immunity	PFM	IEC/EN61000-4-8	10A/m	perf. Criteria A
Immunity	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods	perf. Criteria B

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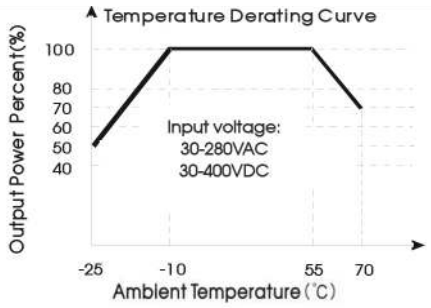
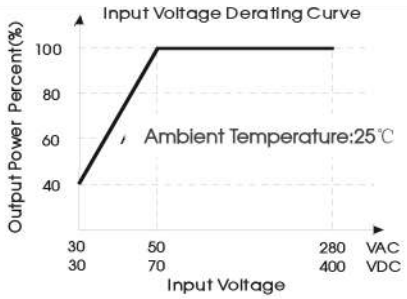
Product Selection Guide

Approval	Model	Output Power [W]	Nominal Output Voltage and Current [Vo/Io]	Efficiency at 220VAC [%, typ]	Max. Capacitive Load (µF)
---	10ACO_05S4	6W	5V/1.20A	71	6000
---	10ACO_12S4	6.6W	12V/0.55A	77	2000
---	10ACO_15S4	6.5W	13V/0.50A	77	1500

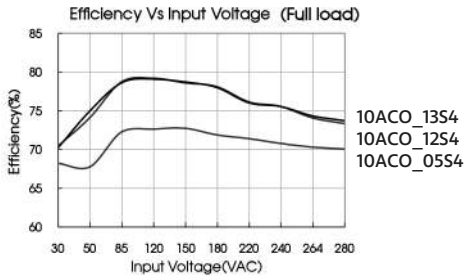
Product Characteristic Curve

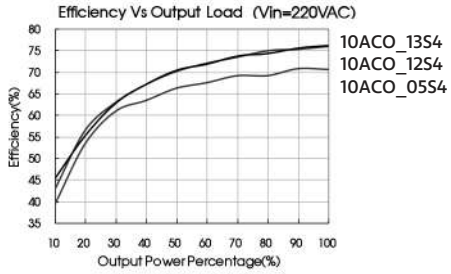




Note:
① With an AC input between 30-50VAC and a DC input between 30-70VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE

Efficiency





Typical application

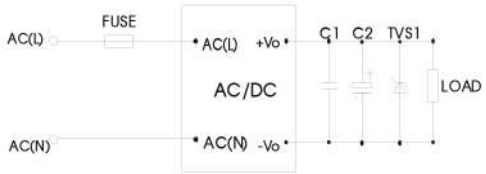
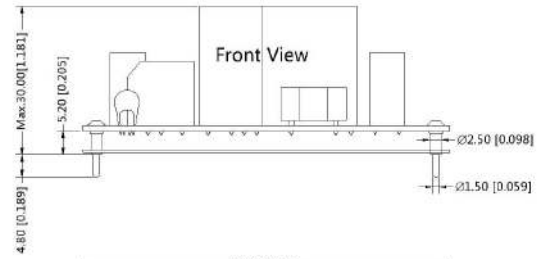


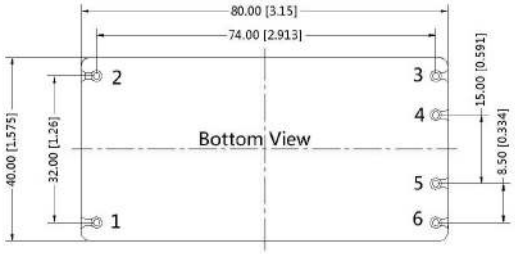
Fig. 1

Part no.	C1 (µF)	C2 (µF)	TVS1
10ACO_05S4	1	680	SMBJ7.0A
10ACO_12S4	1	100	SMBJ20A
10ACO_13S4	1	100	SMBJ20A

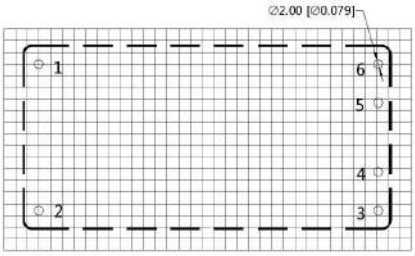
Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

Dimensions and Recommended Layout





Note:
1. Unit: mm[inch]
2. General tolerances: ±0.50[±0.020]
3. FR-4,1.6mm thick double sided glass fiber PCB
4. 0.40mm black MYLAR insulating sheet material



Note: Grid 2.54*2.54mm

Pin	Name	Function
1	AC(L)	AC voltage line wire(L wire) or DC voltage positive
2	AC(N)	AC voltage neutral wire(N wire) or DC voltage negative
3	NC	NC
4	No Pin	No Pin
5	OUT1-	The first output voltage negative(-)
6	OUT1+	The first output voltage positive (+)