

## 3 x 5" 400W AC-DC Power Supplies



The compact CUS400M is packaged in the industry standard 3x5" footprint. The series can deliver 400W with forced air or 250W when convection cooled with a 400W peak power for extended periods of time (minutes). Cooling is also assisted via conduction through the base into the equipment chassis. With Medical & ITE certifications, the units can be used in both Class I & Class II (no ground wire) applications, and meets Class B Conducted and Radiated EMI. Options include a standby voltage, signaling and multiple case options.

Features	Benefits
• 250W Convection / Conduction Cooled with 400W Peak for Extended Time Periods	• Quiet Operation
• 400W with Forced Air	• Can Utilise System Airflow or Integrated Fan
• Medical Certifications (2 x MOPP)	• Suitable for B and BF Type Medical Equipment
• Class B Conducted and Radiated EMI	• Easier System EMC Compliance
• Suitable for Class I and Class II installations	• Flexible Utilisation
• Compact 3 x 5 x 1.55" Size	• Space Saving in End Equipment
• Enclosure & Signal Options	• Versatile Application

Model Selector							
Model	Nominal Output Voltage (V)	Output Adjustment (V)	Maximum Current Convection (A)	Maximum Current Forced Air (A)	Peak Current (A) Convection cooled $\geq 115V_{ac}$ input (See derating curve section)	Maximum Power Convection (W)	Maximum Power Forced Air (W)
CUS400M-12	12	12 - 13.2	20.83	33.33	33.33	250	400
CUS400M-15	15	15 - 16.5	16.67	26.67	26.67	250	400
CUS400M-19	19	19 - 20.9	13.16	21.05	21.05	250	400
CUS400M-24	24	24 - 26.4	10.42	16.67	16.67	250	400
CUS400M-28	28	28 - 30.8	8.93	14.29	14.29	250	400
CUS400M-36	36	36 - 39.6	6.94	11.11	11.11	250	400
CUS400M-48	48	48 - 49.9	5.21	8.33	8.33	250	400

Contact sales for release dates

CUS400M-	12	/	U	M	E	X5	-
Output voltage 12, 15, 19, 24, 28, 36, 48			Blank C JST Connectors M Molex 10-63-4027 input connector N Alex locking connector p/n 8673-03N2		blank dual fuses E single input fuse in line (AC input only)	blank No options X2 5V 2.0A standby supply, remote on/off (enable), DC-OK, AC Fail X3 12V 1.0A standby supply, remote on/off (enable), DC-OK, AC Fail X5 5V 2.0A standby supply, remote on/off (inhibit), DC-OK, AC Fail X6 12V 1.0A standby supply, remote on/off (inhibit), DC-OK, AC Fail	
blank open frame with plastic baseplate C open frame with plastic baseplate and M3 threaded inserts for under side mounting U U channel chassis B open frame with metal baseplate A U channel chassis with cover F U channel chassis, cover and top fan (1)							blank Standard leakage current (<250uA) R Reduced leakage current <150uA

Example: CUS400M-15V25/FEX5 = 15.25V factory output voltage set point, U chassis, cover and fan, single fuse, X5 standby and signals

Specifications		
Model		CUS400M
<b>Input</b>		
Input Voltage range	Vac	85 - 264 (See derating curves)
Input Frequency	Hz	47 - 63
Input Current (100Vac)	A	< 5.0
Inrush Current at 264Vac, 63Hz (Cold Start)	A	<40
Leakage Current (2)	uA	<250
Touch Current (Enclosure Leakage) (2)	uA	<100
Power Factor (100Vac)	-	> 0.97 (>20% load)
Harmonic Compliance	-	IEC61000-3-2 Class A
No Load Power Consumption	W	<1.3 when output is inhibited (230Vac input). <10 without output inhibited
Hold Up Time at 115Vac Input	ms	>16 (400W load) (CUS400M-15 >12ms)
Efficiency	%	Up to 94
Average Efficiency		>87%. Measured at 25%, 50%, 75% and 100% load conditions
Conducted & Radiated EMI	-	EN55032/EN55011-B (See application notes for conditions)
Immunity	-	Compliant with EN60601-1-2:2015 (Edition 4), see immunity table
Insulation Class	-	Construction suitable for Class I or Class II installation (1)
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. IEC/EN/UL62368-1, CE Mark (LVD, EMC and RoHS)

Immunity				
Test	Standard	Test Level	Criteria	Notes (the power stated below is total power (main power + fan output))
ESD	IEC61000-4-2	3	A	-
Radiated Susceptibility	IEC61000-4-3	3	A	Includes proximity field requirements of IEC60601-1-2:2015
Electrical Fast Transient Burst	IEC61000-4-4	4	A	(AC Port, 5kHz and 100kHz)
Surge	IEC61000-4-5	3	A	-
Conducted Susceptibility	IEC61000-4-6	3	A	-
Magnetic fields	IEC61000-4-8	4	A	-
Voltage Dips and Input Interruptions	IEC61000-4-11 Class 3 Industrial, incl EN55024	0% for 1/2 cycle	A	-
		0% for 1 cycle	A	-
		40% for 10/12 cycles	A/B	A up to 100W, B above 100W
		70% for 25/30 cycles	A/B	A up to 270W, B above 270W
		80% for 250/300 cycles	A/B	A up to 300W, B above 300W
		0% for 250/300 cycles	B	-
	IEC60601-1-2:2015	0% for 1/2 cycle	A	Customer to consider essential performance of end equipment
		0% for 1 cycle	A	-
		70% for 25/30 cycles 0% for 250/300 cycles	A/B B	A up to 270W, B above 270W -
	IEC61000-6-2	0% for 1 cycle	B	-
		40% for 10/12 cycles	C	-
		70% for 25/30 cycles	C	-
0% for 250/300 cycles		C	-	
IEC61204-3	0% for 1/2 cycle	B	-	
	0% for 1 cycle	B	-	
	70% for 25/30 cycles	C	-	
	0% for 250/300 cycles	C	-	
Ringwave Test	IEC61000-4-12	3	A	-
Voltage Fluctuations	IEC61000-4-14	Class 3	A	-

Notes:

(1) Class II construction and /F safety files - Contact sales for release dates

See website for detailed specifications, test methods and installation manual

Specification parameters apply at 25°C ambient temperature unless otherwise stated.

Specifications		
Model		CUS400M
<b>Output</b>		
Line Regulation	%	0.5 (85 - 264Vac)
Load Regulation	%	1.0 (0 - 100% load)
Ripple & Noise	%	<1
Temperature Coefficient	%/°C	±0.02
Minimum Load	-	No minimum load required
Overcurrent Protection	%	101 to 170. Hiccup mode, automatic recovery
Overvoltage Protection	-	Latching (unit shutdown), cycle AC input to reset
Overtemperature Protection	-	Latching (unit shutdown), cycle AC input to reset
Remote Sense	-	0.5V total compensation Voltage at output terminals must remain within the range specified in the model selector
Remote On/Off	-	Opto-isolated. Inhibit: High = OFF, Low = ON, Enable: High = ON, Low = OFF
DC Good	-	Opto isolated, >20ms after output good
AC Fail	-	Opto isolated, 5ms warning before DC loss
Fan Supply	-	12.3V 0.3A (at 400W load)
Parallel Operation	-	Not possible
Series Operation	-	Possible, see installation manual. Maximum two units of the same model number
<b>Environmental</b>		
Operating Temperature (-30°C start-up)	°C	-20°C to +70°C, derate linearly above 50°C to 50% load
Storage Temperature	°C	-40°C to +85°C (70°C maximum for fan version /F)
Operating Humidity (non condensing)	%RH	5 - 95%RH (15 - 90%RH for /F fan version)
Cooling	-	Convection cooling or forced air (0.3m/s required for 400W output at 115Vac input)
Altitude	m	5,000m. Operating, transportation and storage
Withstand Voltage (For 1 minute)	Vac	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	MΩ	>100MΩ at 25°C & 500Vdc
Vibration (Operating)	-	2G, 10-200Hz for 1 hour. Conforms to EN60068-2-6, IEC68-2-6, MIL-STD-810G
Shock	-	30G, 11ms half sine. Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, MIL-STD-810G
<b>Other</b>		
Weight (max)	g	440g (open frame version with plastic baseplate), /B: 495g, /C: 445g, /U: 530g, /A: 550g, /F: 605g
Size (WxLxH)	mm	Open frame version with plastic baseplate: 77.5 x 128 x 39.5
	in	Open frame version with plastic baseplate: 3 x 5 x 1.55
Connectors	-	Input: JST VAR-2, Output: M4 screws, Fan: Molex 51191-0200, Signals: Molex 51110-1051
Warranty	yrs	5

Notes:

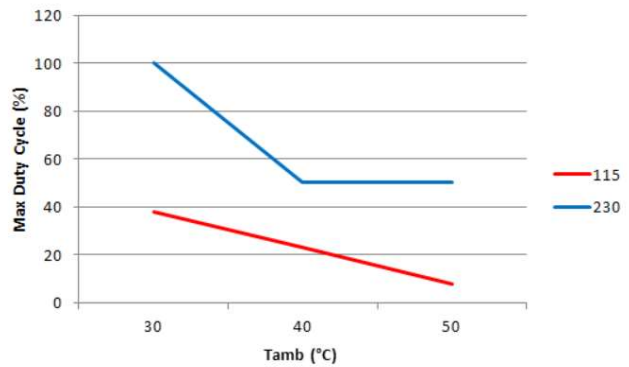
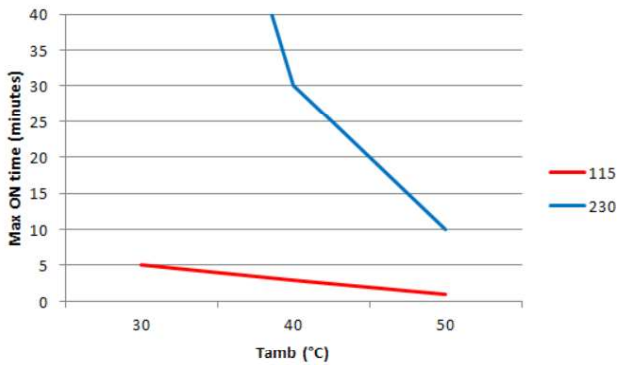
(1) Class II construction and /F safety files - Contact Sales for release dates

(2) Applies to standard leakage version

See website for detailed specifications, test methods and installation manual

Specification parameters apply at 25°C ambient temperature unless otherwise stated.

## Peak Power Rating Curves. U chassis configuration, convection cooled on metal baseplate



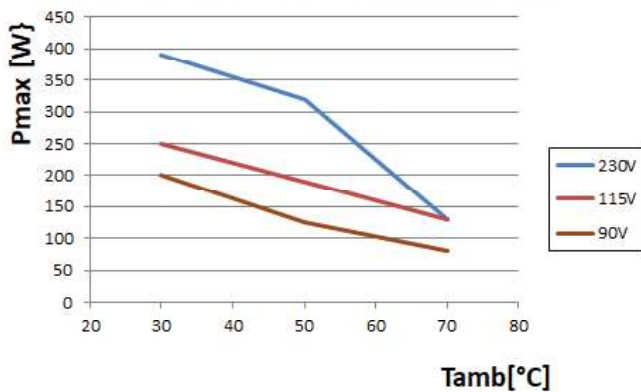
Ambient Temperature (°C)	AC Line Input (Vrms)	Maximum ON time (minutes)	Maximum Duty Cycle (%)	Maximum achievable output power
30	85	18	47	250W peak power
30	115	5	38	400W peak power
30	230	∞	100	400W Continuous
40	230	30	50	400W peak power
50	85	0	0	No peak rating
50	115	1	8	400W peak power
50	230	10	50	400W peak power

The curves below are guidelines only. The actual performance should be tested in the application.

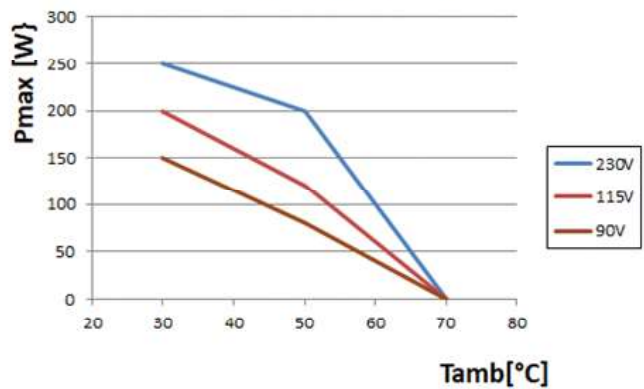
See application notes for all mechanical formats.

## Output Power vs Ambient Temperature - Open Frame Unit

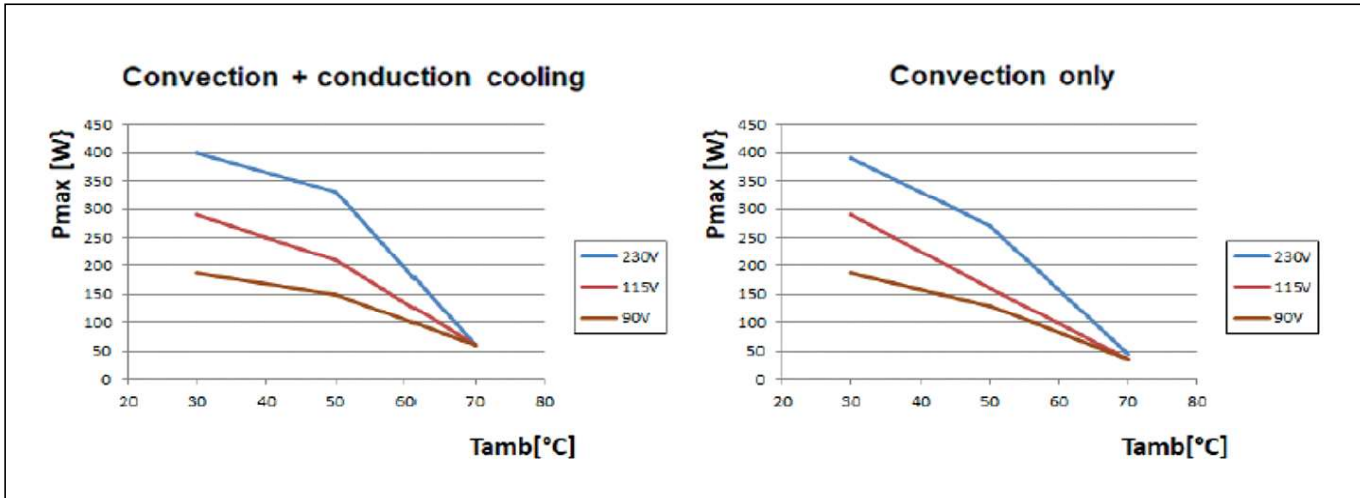
### Convection + conduction cooling



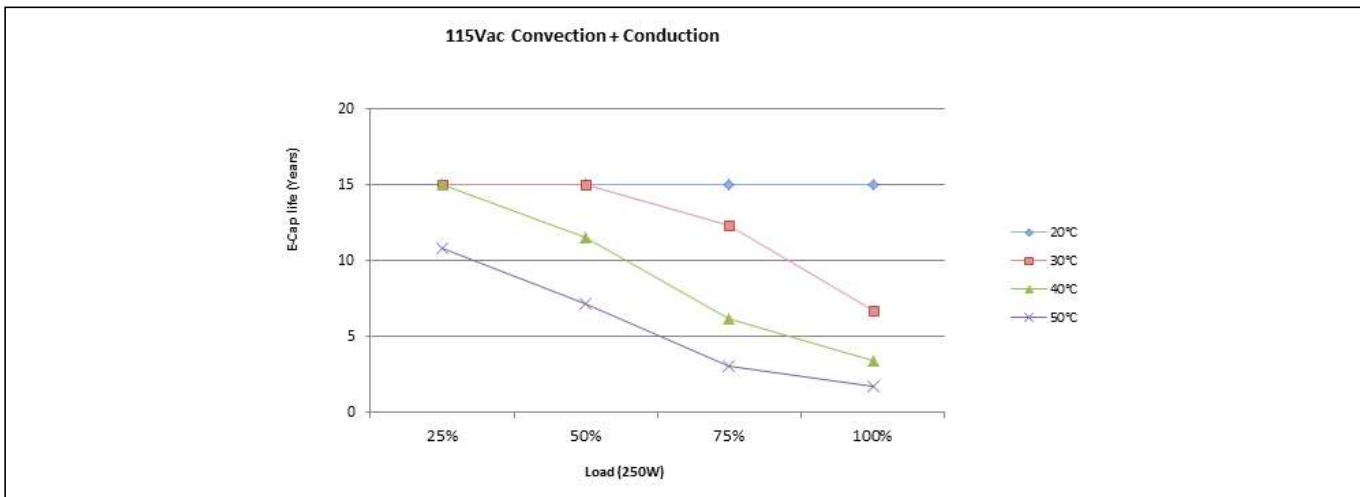
### Convection only



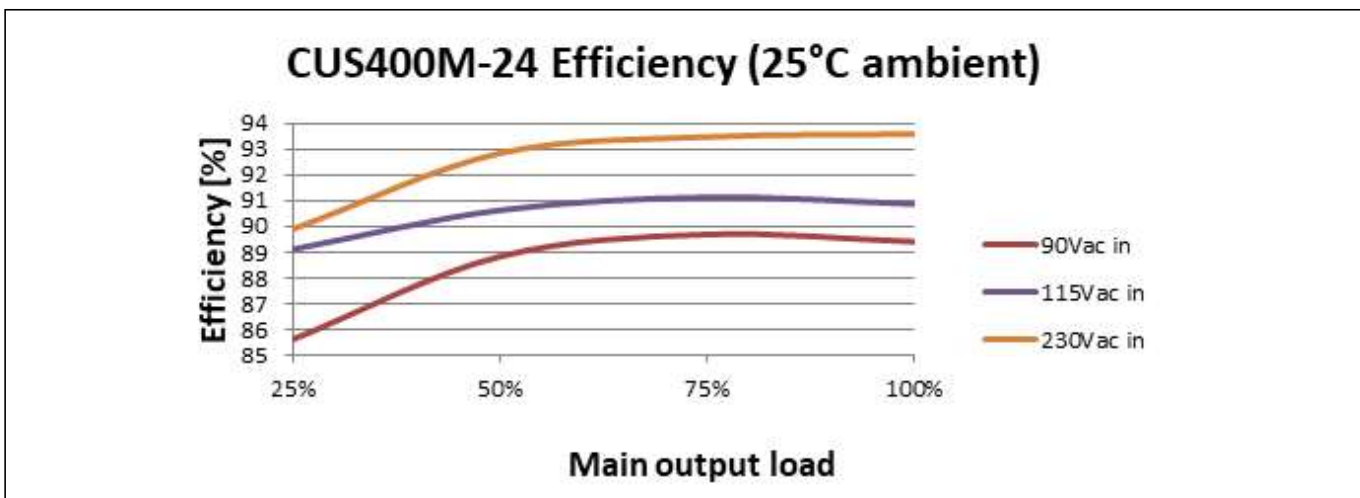
## Output Power vs Ambient Temperature - U chassis configuration



## Electrolytic Capacitor Life ( CUS400M-12 Open Frame Unit Convection and Conduction Cooled)

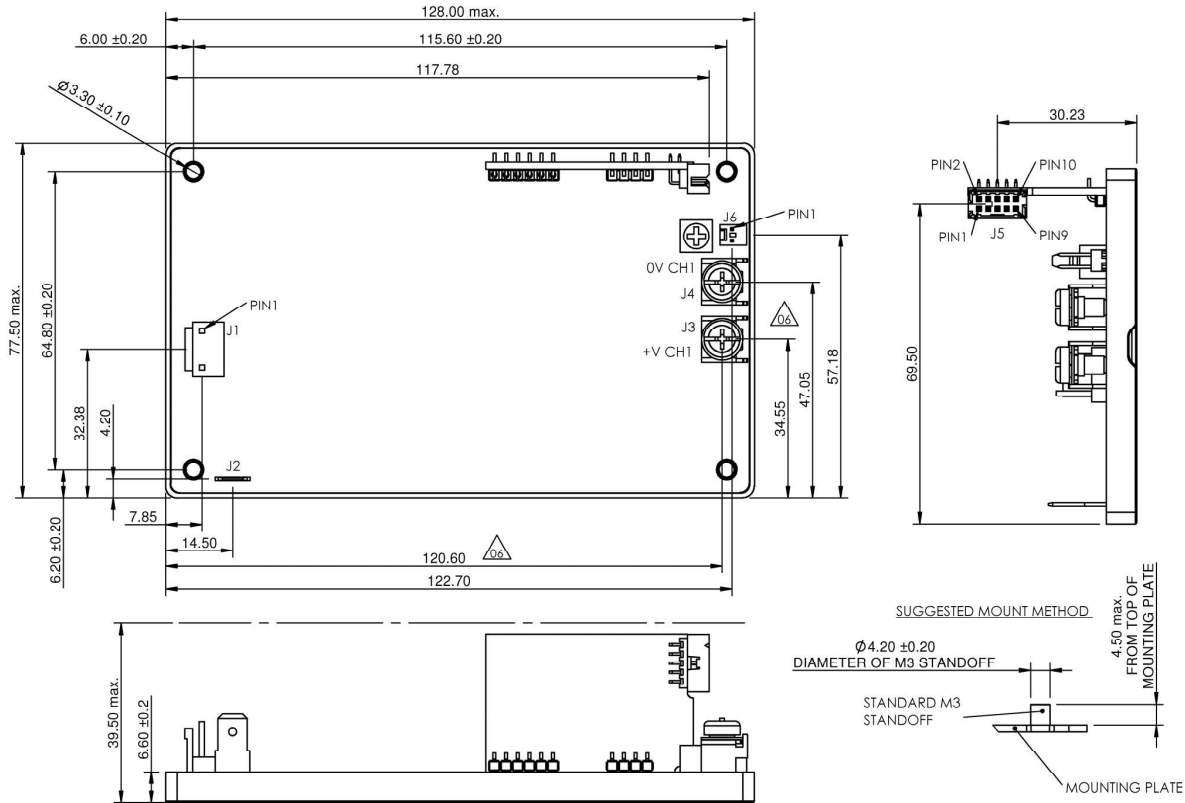


## Efficiency (CUS400M-24)



## Mechanical Specification

### Outline Drawing CUS400M Open Frame Unit



#### J5 OPTION ONLY

PIN	CONNECTION
1	0V STANDBY (1)
2	REMOTE ON/OFF -
3	+V STANDBY
4	+ SENSE
5	REMOTE ON/OFF +
6	- SENSE
7	AC FAIL-COLLECTOR
8	DC OK COLLECTOR
9	AC FAIL-EMITTER
10	DC OK EMITTER

#### CONNECTORS

CONNECTOR	MANUFACTURER	HOUSING	CRIMP PIN
J1	JST	VAR_2	SVA-41T-P1.1
J2	TYGO	N/A	2-520407-2
J3 & J4	MOLEX	N/A	TAG 19073-0165
J5	MOLEX	51110-1051	50394
J6	MOLEX	51191-0200	50802

#### J1

PIN	CONNECTION
1	NEUTRAL
2	NOT CONNECTED
3	LIVE

#### J6

PIN	CONNECTION
1	+V FAN
2	0V FAN (2)

#### J2 - EARTH

J3	+V CH1
J4	0V CH1

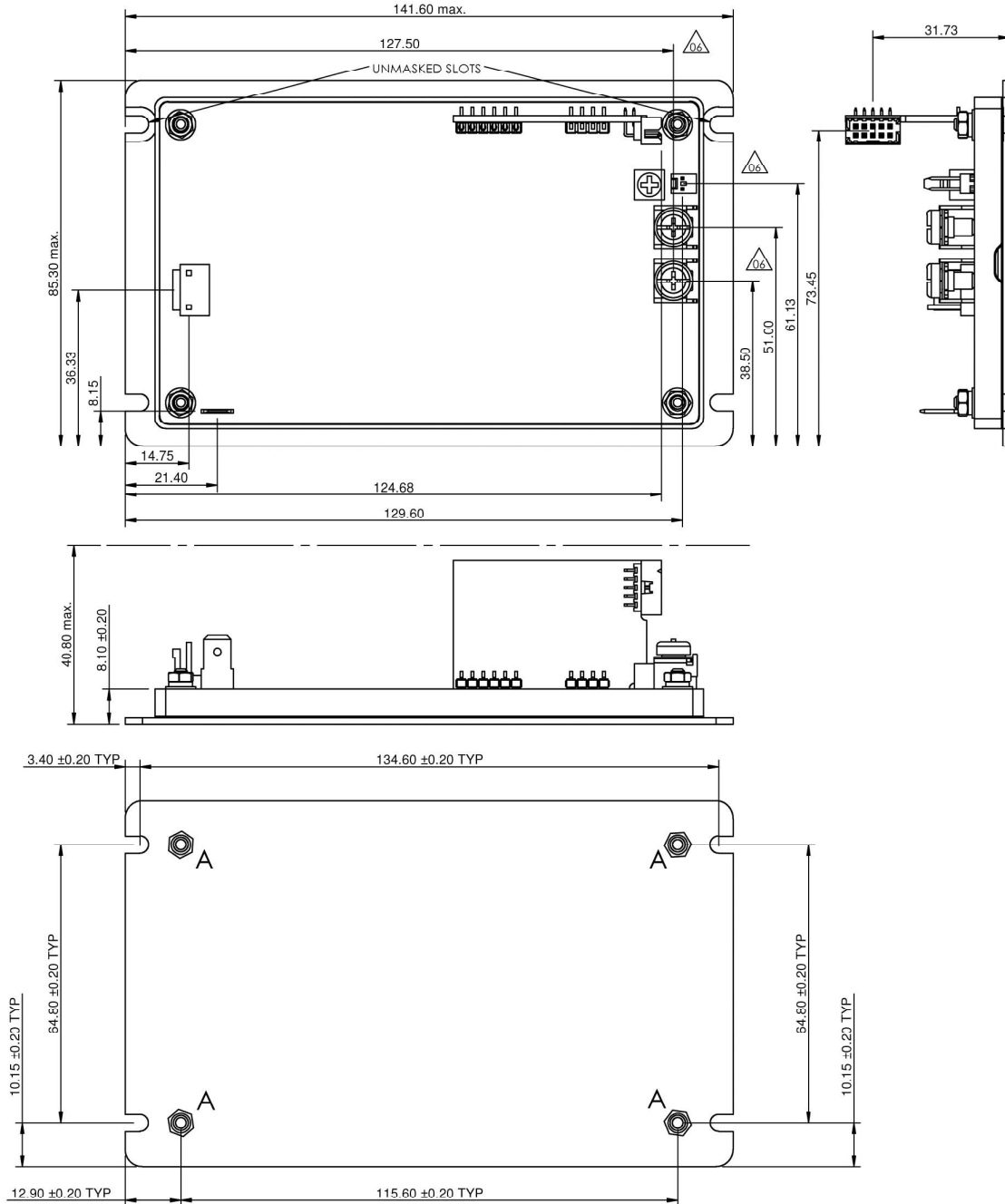
#### NOTE:

- '0V STANDBY' AND '0V CH1' ARE ISOLATED
- '0V FAN' AND '0V CH1' ARE INTERNALLY CONNECTED

ALL UNSTATED TOLERANCES +/-0.5mm  
 ALL UNSPECIFIED DIMENSIONS IN mm.

## Mechanical Specification

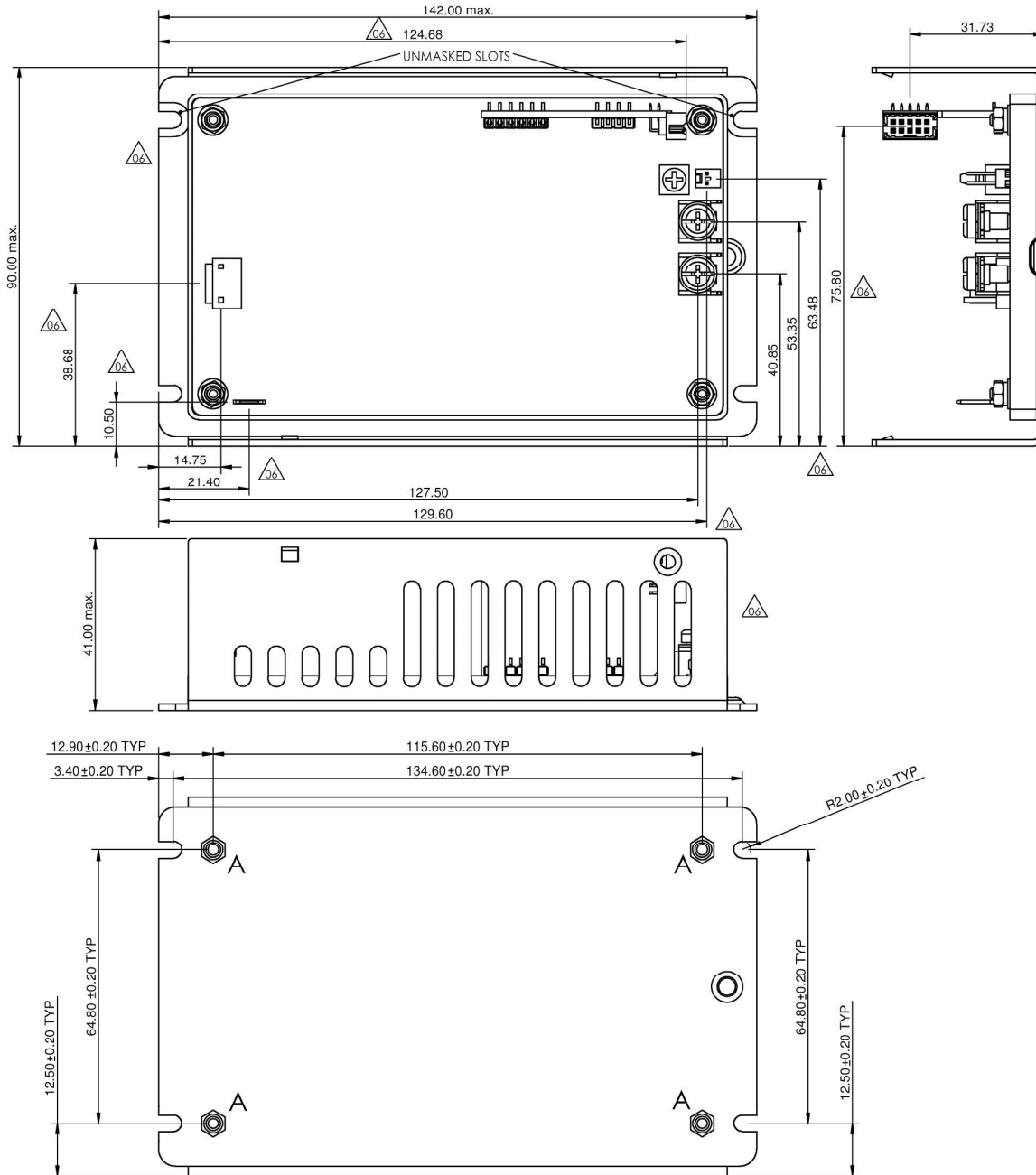
### Outline Drawing CUS400M Open Frame Unit with Baseplate



NOTE:  
 A 4 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.25mm,  
 MAXIMUM TORQUE 0.5 - 0.6 Nm.  
 ALL UNSTATED TOLERANCES +/-0.5mm.

## Mechanical Specification

### Outline Drawing CUS400M/U (U Channel) Option



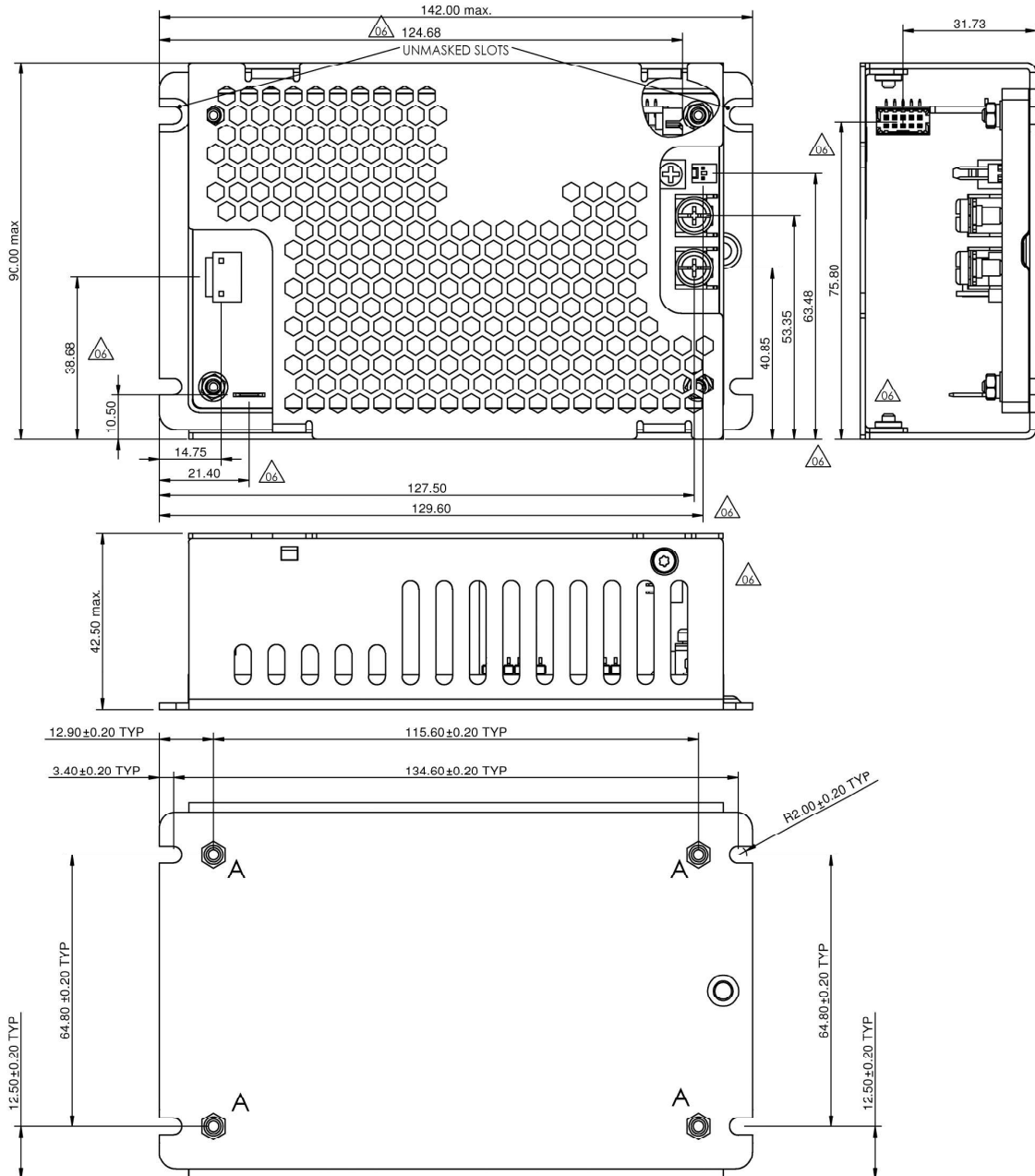
**NOTE:**

A 4 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.25mm,  
 MAXIMUM TORQUE 0.5 - 0.6 Nm.  
 ALL UNSTATED TOLERANCES +/-0.5mm.



## Mechanical Specification

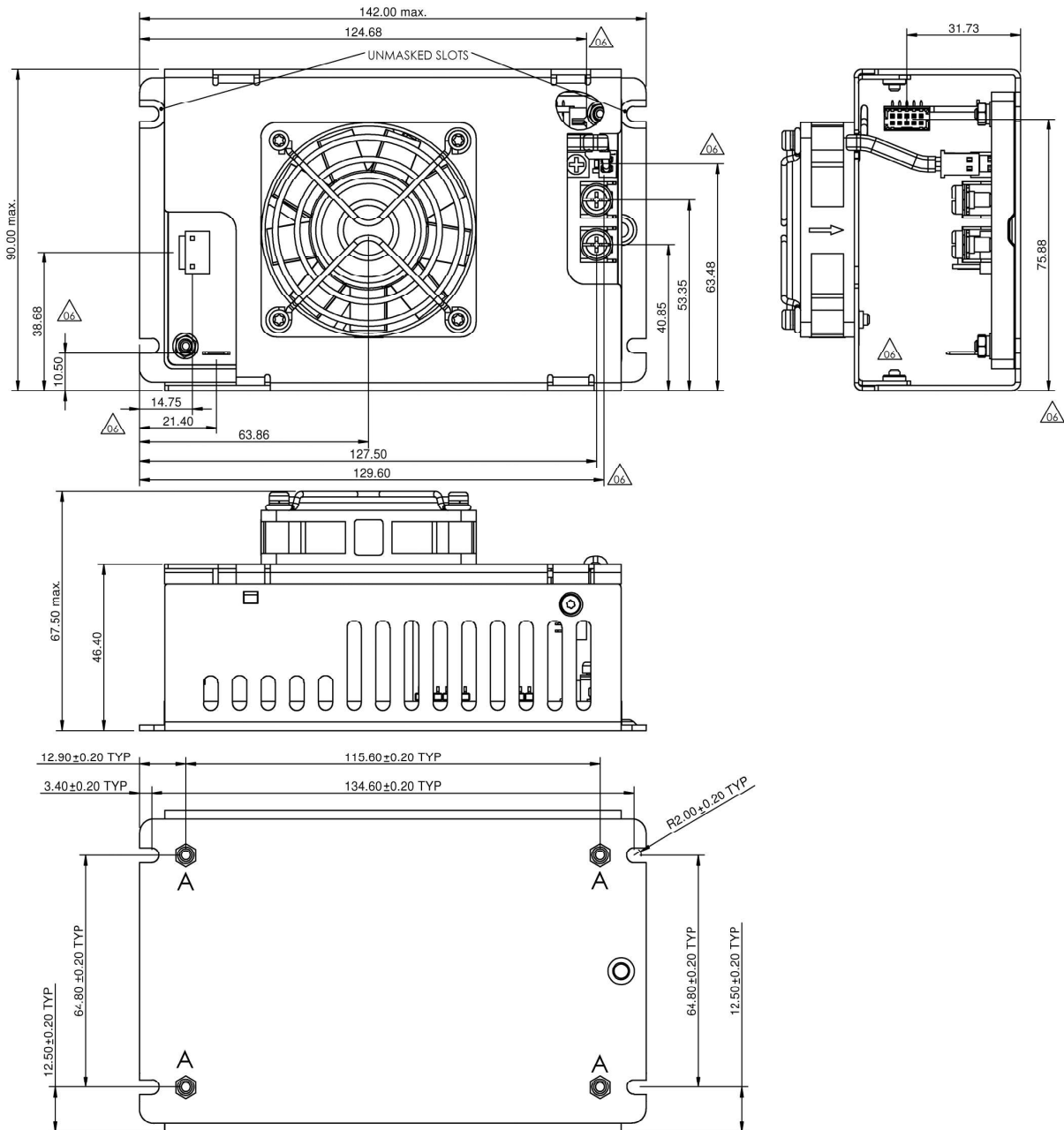
### Outline Drawing CUS400M/A (U Channel with Cover) Option



NOTE:  
 A 4 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.25mm,  
 MAXIMUM TORQUE 0.5 - 0.6 Nm.  
 ALL UNSTATED TOLERANCES +/-0.5mm.

## Mechanical Specification

### Outline Drawing CUS400M/F (U Channel, Cover and Fan) Option



NOTE:  
 A 4 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.25mm,  
 MAXIMUM TORQUE 0.5 - 0.6 Nm.  
 ALL UNSTATED TOLERANCES +/-0.5mm.



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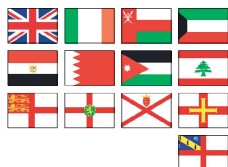
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