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# TDK·Lambda CUS150M Series

## 2 x 4” 150W AC-DC Power Supplies

https://product.tdk.com/en/power/cus-m
www.emea.lambda.tdk.com/cus150m



Medical Industrial Test LED COMM Broadcast

The compact CUS150M is packaged in the industry standard 2x4” footprint. The series can deliver 150W with forced air in ambient temperatures of up to 50°C or 120W convection cooled at 40°C. Conduction cooled, the CUS150M can deliver 150W at 50°C, 100W at 70°C and 50W at 80°C. With Medical & ITE certifications, the unit can be used in both Class I & Class II (no ground wire) applications, and meets Class B Conducted and Radiated EMI. Enclosure options include baseplate, U channel, cover or top fan construction.

| Features | Benefits |
|---|---|
| • Up to 150W Utilizing Convection or Conduction Cooling | • Quiet Operation |
| • Operation in Ambient Temperatures of up to 85°C | • Suitable for High Ambient Temperature Environments |
| • 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 2 x 4 x 1.24” Size | • Space Saving in End Equipment |
| • Enclosure & Cooling Options | • Versatile Application |

## Model Selector

| Model | Nominal Output Voltage (V) | Factory Set [1] Output Voltage Capability (V) | Fan Supply (V) | Maximum Current Convection (A)[2] | Maximum Current Forced Air (A) | Maximum Power Convection (W)[2] | Maximum Power Forced Air (W) |
|---|---|---|---|---|---|---|---|
| CUS150M-12 or /B | 12 | 12 - 13.2 | 11.6 | 10 | 12.5 | 120 | 150 |
| CUS150M-12/A or /U | 12 | 12 - 13.2 | 11.6 | 12.5 | 12.5 | 150 | 150 |
| CUS150M-12/F | 12 | - | 11.6 | 12.5 | Internal fan | 150 | Internal fan |
| CUS150M-15 or /B | 15 | 15 - 16.5 | 9.8 | 8 | 10 | 120 | 150 |
| CUS150M-15/A or /U | 15 | 15 - 16.5 | 9.8 | 10 | 10 | 150 | 150 |
| CUS150M-15/F | 15 | - | 9.8 | 10 | Internal fan | 150 | Internal fan |
| CUS150M-18 or /B | 18 | 18 - 19.8 | 11.6 | 6.66 | 8.33 | 120 | 150 |
| CUS150M-18/A or /U | 18 | 18 - 19.8 | 11.6 | 8.33 | 8.33 | 150 | 150 |
| CUS150M-18/F | 18 | - | 11.6 | 8.33 | Internal fan | 150 | Internal fan |
| CUS150M-24 or /B | 24 | 24 - 26.4 | 11.6 | 5 | 6.25 | 120 | 150 |
| CUS150M-24/A or /U | 24 | 24 - 26.4 | 11.6 | 6.25 | 6.25 | 150 | 150 |
| CUS150M-24/F | 24 | - | 11.6 | 6.25 | Internal fan | 150 | Internal fan |
| CUS150M-28 or /B | 28 | 28 - 30.8 | 10.8 | 4.28 | 5.35 | 120 | 150 |
| CUS150M-28/A or /U | 28 | 28 - 30.8 | 10.8 | 5.35 | 5.35 | 150 | 150 |
| CUS150M-28/F | 28 | - | 10.8 | 5.35 | Internal fan | 150 | Internal fan |
| CUS150M-36 or /B | 36 | 36 - 39.6 | 11.6 | 3.33 | 4.16 | 120 | 150 |
| CUS150M-36/A or /U | 36 | 36 - 39.6 | 11.6 | 4.16 | 4.16 | 150 | 150 |
| CUS150M-36/F | 36 | - | 11.6 | 4.16 | Internal fan | 150 | Internal fan |
| CUS150M-48 or /B | 48 | 48 - 50 | 11.6 | 2.5 | 3.12 | 120 | 150 |
| CUS150M-48/A or /U | 48 | 48 - 50 | 11.6 | 3.12 | 3.12 | 150 | 150 |
| CUS150M-48/F | 48 | - | 11.6 | 3.12 | Internal fan | 150 | Internal fan |

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| CUS150M- | 12 | / | U | E | M |
|---|---|---|---|---|---|

Output voltage 12, 15, 18, 24, 28, 36, 48

| | |
|---|---|
| blank | open frame |
| U | U channel |
| A | U channel with cover |
| B | baseplate |
| F | U channel, cover and top mounted fan |

| | |
|---|---|
| blank | dual fuses |
| E [3] | single input fuse in line |

| | |
|---|---|
| blank | JST connectors |
| M [3] | Molex connectors |

Examples: CUS150M-24/UE CUS150M-12V5/A.

## Specifications

| Model | | CUS150M |
|---|---|---|
| **Input** | | |
| Input Voltage range | Vac | 85 - 264[4] |
| Input Frequency | Hz | 47 - 63[5] |
| Input Current (100Vac) | A | 2.2 |
| Inrush Current at 230Vac (Cold Start) | A | <65 |
| Leakage Current | uA | <250 at 230Vac 63Hz |
| Touch Current (Enclosure Leakage) | uA | <100 |
| Power Factor (115/230Vac) | - | >0.98 / 0.92 (100% load) |
| Harmonic Compliance | - | Meets IEC61000-3-2 Class A, Class C >120W output |
| No Load Power Consumption | W | <0.5 (230Vac) |
| Hold Up Time | ms | >18 |
| Efficiency | % | Up to 94 |
| Average Efficiency | % | >91 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 (Ed4), see immunity table |
| Insulation Class | - | Construction suitable for Class I or Class II installation |
| Safety Certifications and Markings | - | IEC/EN/UL/CSA62368-1, 60950-1, IEC/EN60601-1, ES60601-1, CE Mark and UKCA Mark<br>Designed to meet IEC61010-1 and EN60335-1 compliant versions are available [3] |

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## Immunity

| Test | Standard | Test Level | Criteria | Notes (the power stated below is total power (main power + fan output)) |
|---|---|---|---|---|
| ESD | EN61000-4-2 | 4 | A | - |
| Radiated Susceptibility | EN61000-4-3 | 3 | A | Includes proximity field requirements of EN60601-1-2:2015 |
| Electrical Fast Transient Burst | EN61000-4-4 | 4 | A | (AC Port, 5kHz and 100kHz) |
| Surge | EN61000-4-5 | 3 | A | - |
| Conducted Susceptibility | EN61000-4-6 | 3 | A | - |
| Magnetic fields | EN61000-4-8 | 4 | A | - |
| Voltage Dips and Input Interuptions | EN61000-4-11 Class 3 Industrial, incl EN55024 (100Vac) | 0% for 1/2 cycle | A | - |
| | | 0% for 1 cycle | A/B | A up to 125W, B above 125W |
| | | 40% for 10/12 cycles | B | - |
| | | 70% for 25/30 cycles | A | - |
| | | 80% for 250/300 cycles | A | - |
| | | 0% for 250/300 cycles | B | - |
| | EN61000-4-11 Class 3 Industrial, incl EN55024 (240Vac) | 0% for 1/2 cycle | A | - |
| | | 0% for 1 cycle | A/B | A up to 125W, B above 125W |
| | | 40% for 10/12 cycles | A/B | A up to 120W, B above 120W |
| | | 70% for 25/30 cycles | A | - |
| | | 80% for 250/300 cycles | A | - |
| | | 0% for 250/300 cycles | B | - |
| | EN60601-1-2:2015 (100Vac) | 0% for 1/2 cycle | A | - |
| | | 0% for 1 cycle | A/B | A up to 125W, B above 125W |
| | | 70% for 25/30 cycles | A | - |
| | | 0% for 250/300 cycles | B | - |
| | EN60601-1-2:2015 (240Vac) | 0% for 1/2 cycle | A | - |
| | | 0% for 1 cycle | A/B | A up to 125W, B above 125W |
| | | 70% for 25/30 cycles | A | - |
| | | 0% for 250/300 cycles | B | - |
| Ringwave Test | EN61000-4-12 | 3 | A | - |
| Voltage Fluctuations | EN61000-4-14 | Class 3 | A | - |
| SEMI F47 Line Dip | SEMI F47 | - | - | Consult factory |

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## Specifications

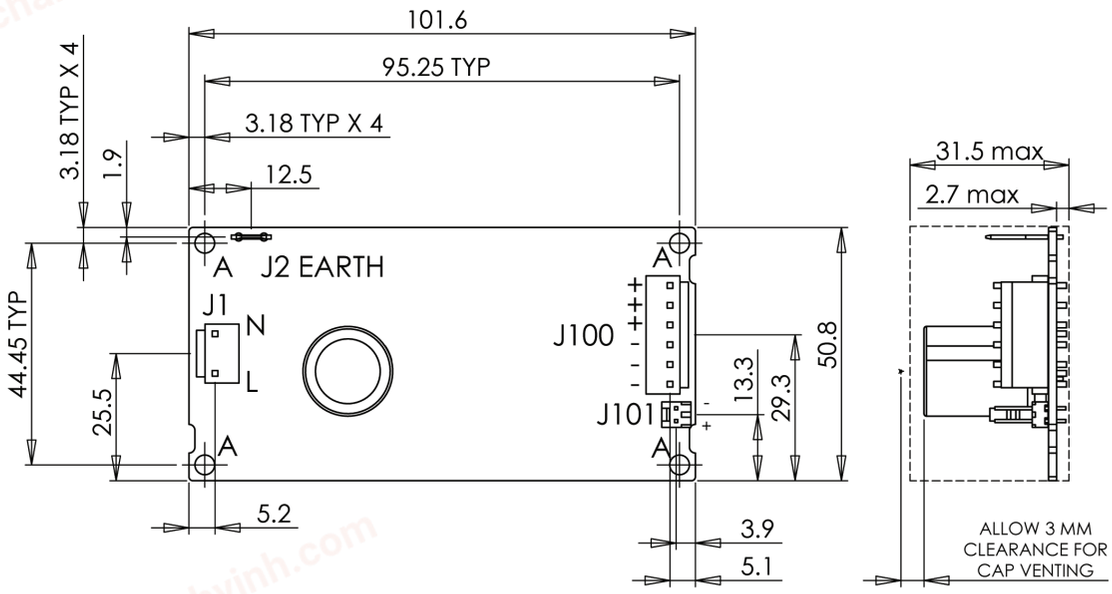
| Model | | CUS150M |
|---|---|---|
| **Output** | | |
| Line Regulation | % | ≤0.5 (90 - 264VAC) |
| Load Regulation | % | ≤1 (0 - 100% load) |
| Ripple & Noise | % | <1 of nominal output for operating temperatures above 0°C<br>At -20°C: 12V model <4, 15V & 18V model <3, other models <2 |
| Temperature Coefficient | %/°C | ±0.02 |
| Minimum Load | - | No minimum load required |
| Overcurrent Protection | % | 110 to 170. Hiccup mode, automatic recovery |
| Overvoltage Protection | - | 115-140% of standard output voltage for each model, 48V model max 60V.<br>Latching (unit shutdown), cycle AC input to reset |
| Remote Sense | - | None |
| Fan Supply | - | 10 - 12V (see model selector), 0.5A, +14/-6% regulation |
| Parallel Operation | - | Not possible |
| Series Operation | - | Please contact Technical Sales for guidance |
| **Environmental** | | |
| Operating Temperature (-30°C start-up) | °C | -20 to +85 (70 maximum for fan version /F), see derating curves below |
| Storage Temperature | °C | -40 to +85 (70 maximum for fan version /F) |
| Operating Humidity (non condensing) | %RH | 5 - 95 (15 - 90 for /F fan version) |
| Cooling | - | Convection, conduction or forced air cooling. See derating curves below |
| Altitude | m | 5,000 |
| Withstand Voltage (For 1 minute) | Vac | Input to Ground 1,500 (1xMOPP), Input to Output 4,000 (2xMOPP),<br>Output to Ground 1,500 (1xMOPP) |
| Isolation Resistance | MΩ | >100 at 25°C, 70%RH & 500VDC |
| Vibration (non operating) | - | 2G, 10-500Hz for 1 hour |
| Shock (non operating) | - | 30G, 11ms half sine |
| **Other** | | |
| Weight | g | Open frame: 185, /A: 260, /B: 225, /F: 270, /U: 245 |
| Size (WxLxH) | mm | Open frame version: 50.8 x 101.6 x 31.5 |
| Size (WxLxH) | Inches | Open frame version: 2 x 4 x 1.24 |
| Connectors | - | Input: JST B2P3-VH, Output: JST B6P-VH, Fan: Molex 22-04-1021 |
| Warranty | yrs | 5 |

Notes:
See website for detailed specifications, test methods and installation manual.
Specification parameters apply at 25°C ambient temperature unless otherwise stated.
(1) Output voltage is factory set and not user adjustable. Not applicable for /F (internal fan) version.
Non-standard output versions may be subject to minimum order quantities and variations to specification. For all non-standard output voltage settings please consult Sales.
(2) Please see curves below for ambient temperature ratings.
(3) Subject to Minimum Order Quantities. Please contact Sales
(4) Derate linearly to 90% load from 90 to 85VAC input.
(5) For operation at 440Hz please consult Technical Sales.

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## Outline Drawing CUS150M Open Frame Unit




OPEN FRAME UNIT

DIMENSION TOLERANCES: 0.00 ±0.2 0.0 ±0.4

(CONNECTOR PART NUMBERS ALSO IN APPLICATION NOTE)

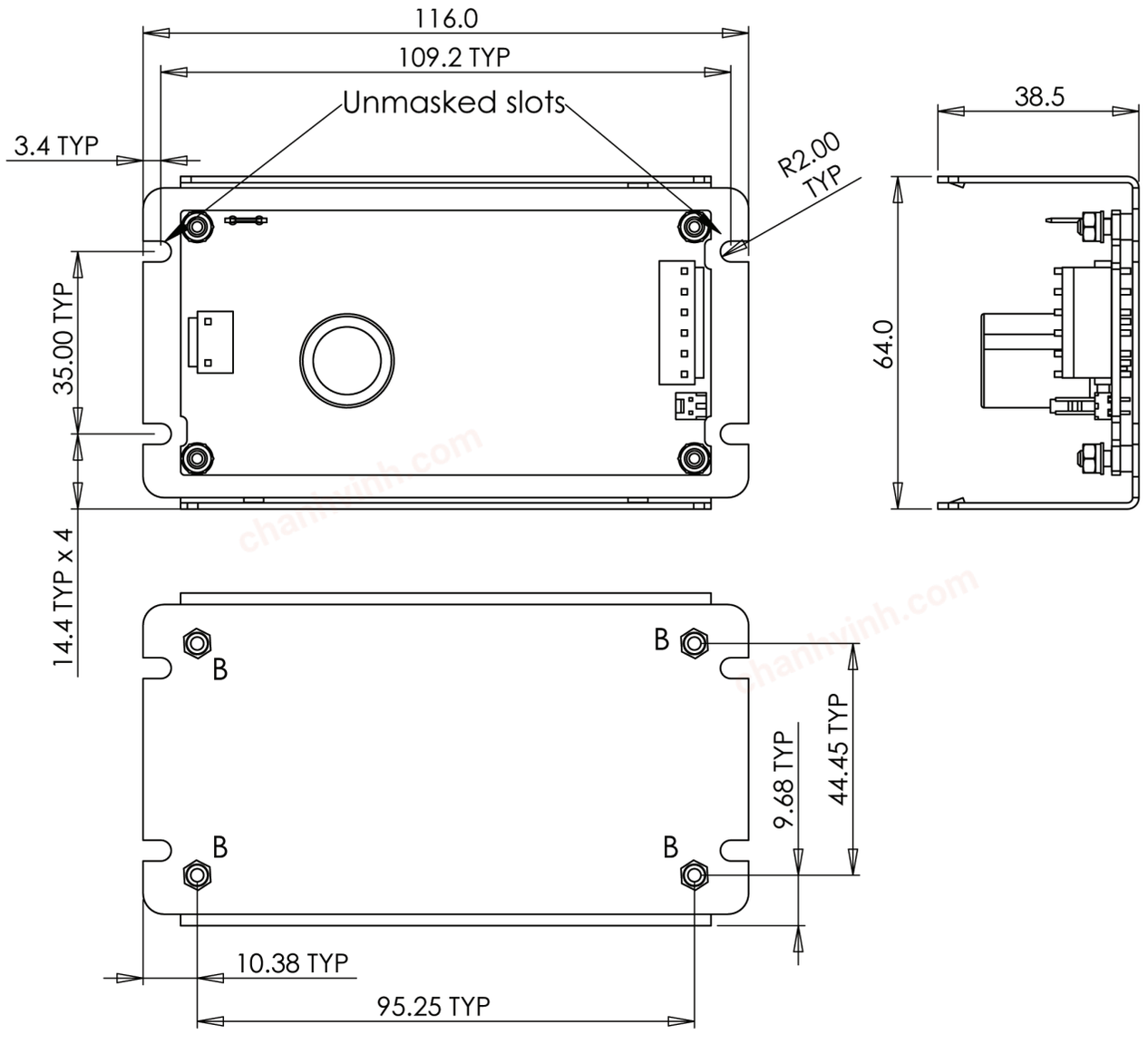
| REF DES | MANUFACTURER | CONNECTOR TYPE | MATING HOUSING | CRIMP |
|---|---|---|---|---|
| J1 | JST | B2P3-VH | VAR-2 | 20-18AWG - SVA-41T-P1.1 |
| J1 M-option | Molex | 10-63-4027 | 09-50-1031 | 08-70-1031 |
| J2 | Tyco | 62490 | 22-18AWG - 2-520407-2<br>16-14AWG - 3-520408-2 | 22-18AWG - 2-520407-2<br>16-14AWG - 2-520408-2 |
| J100 | JST | B6P-VH | VHR-6N | 22-18AWG - SVH-21T-P1.1<br>20-16AWG - SVH-41T-P1.1 |
| J100 M-option | Molex | 09-65-2068 | 09-50-1061 | 08-70-1031 |
| J101 | Molex | 22-04-1021 | 51191-0200 | Series 50802 |

NOTE:
A - 4 OFF FIXING HOLES ø3.96 TO ACCOMMODATE M3 SCREWS

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## Outline Drawing CUS150M/U (U Channel) Option




DIMENSION TOLERANCES: 0.00 ±0.2 0.0 ±0.4

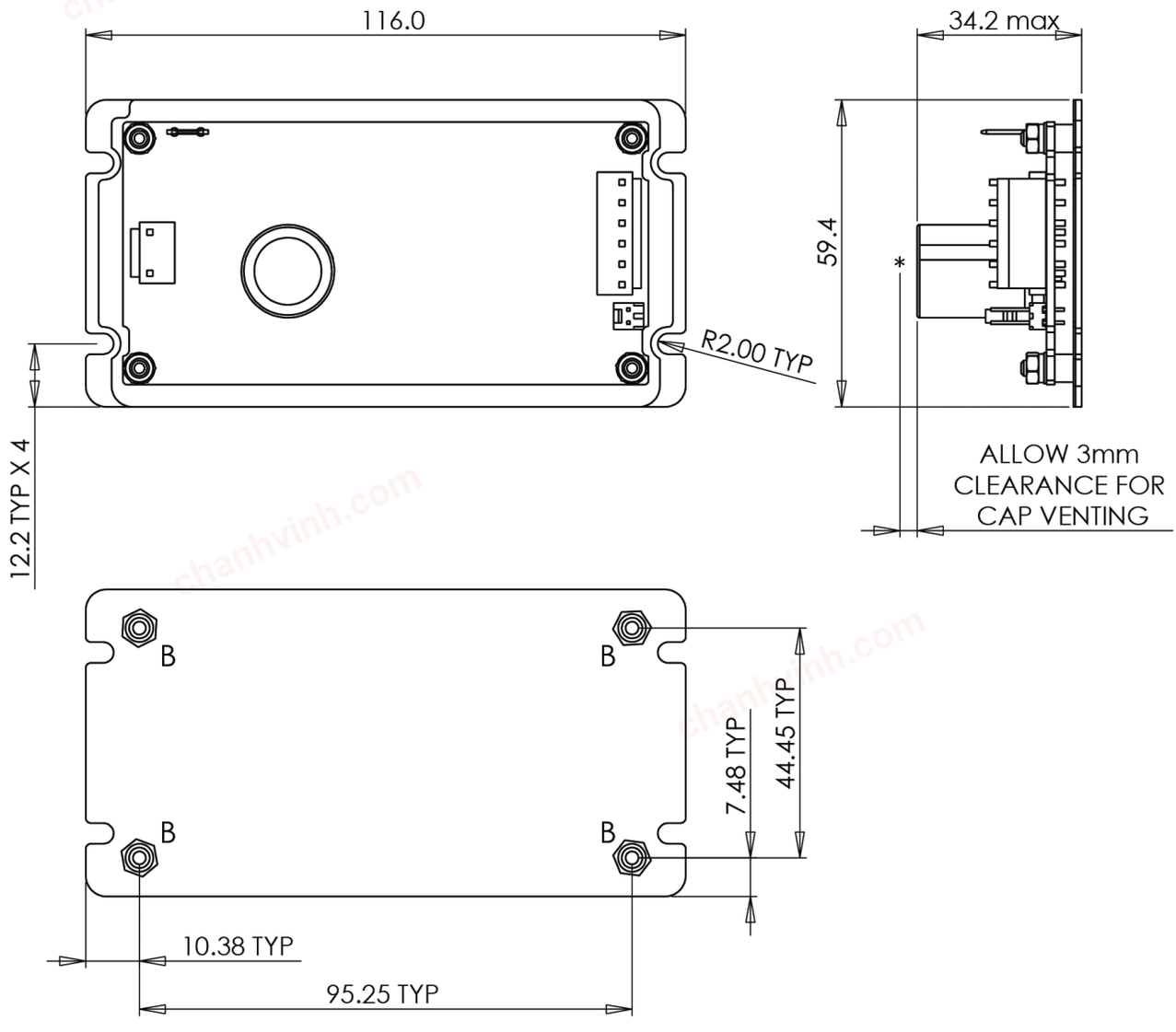
NOTE: B - 4 OFF M3 FIXING - max thread penetration 4.25 mm

RECOMMENDED TORQUE - M3 - 0.5 - 0.6 Nm

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## Outline Drawing CUS150M/B (Baseplate) Option




DIMENSION TOLERANCES: 0.00 ±0.2 0.0 ±0.4

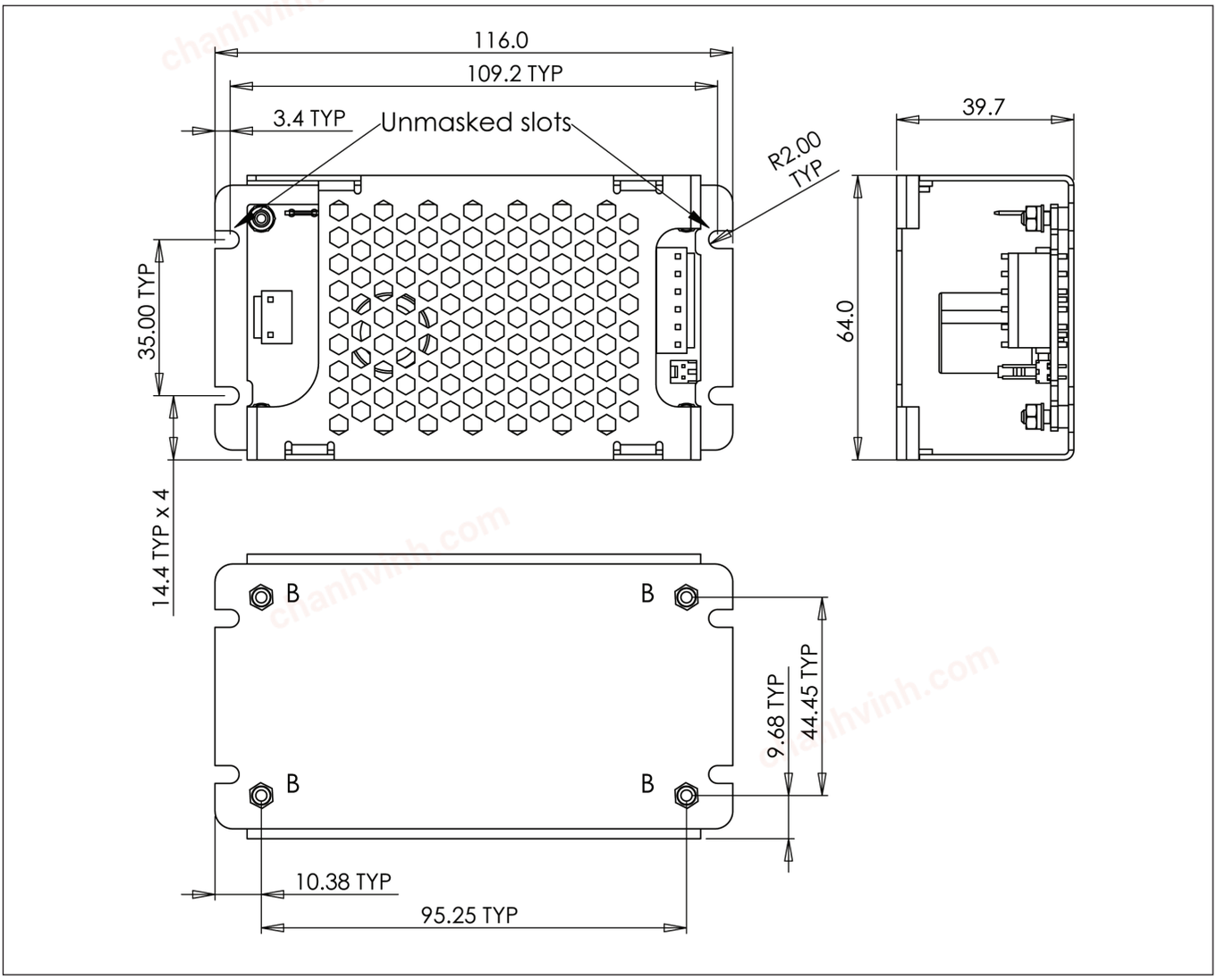
NOTE: B - 4 OFF M3 FIXING - max thread penetration 4.25 mm

RECOMMENDED TORQUE - M3 - 0.5 - 0.6 Nm

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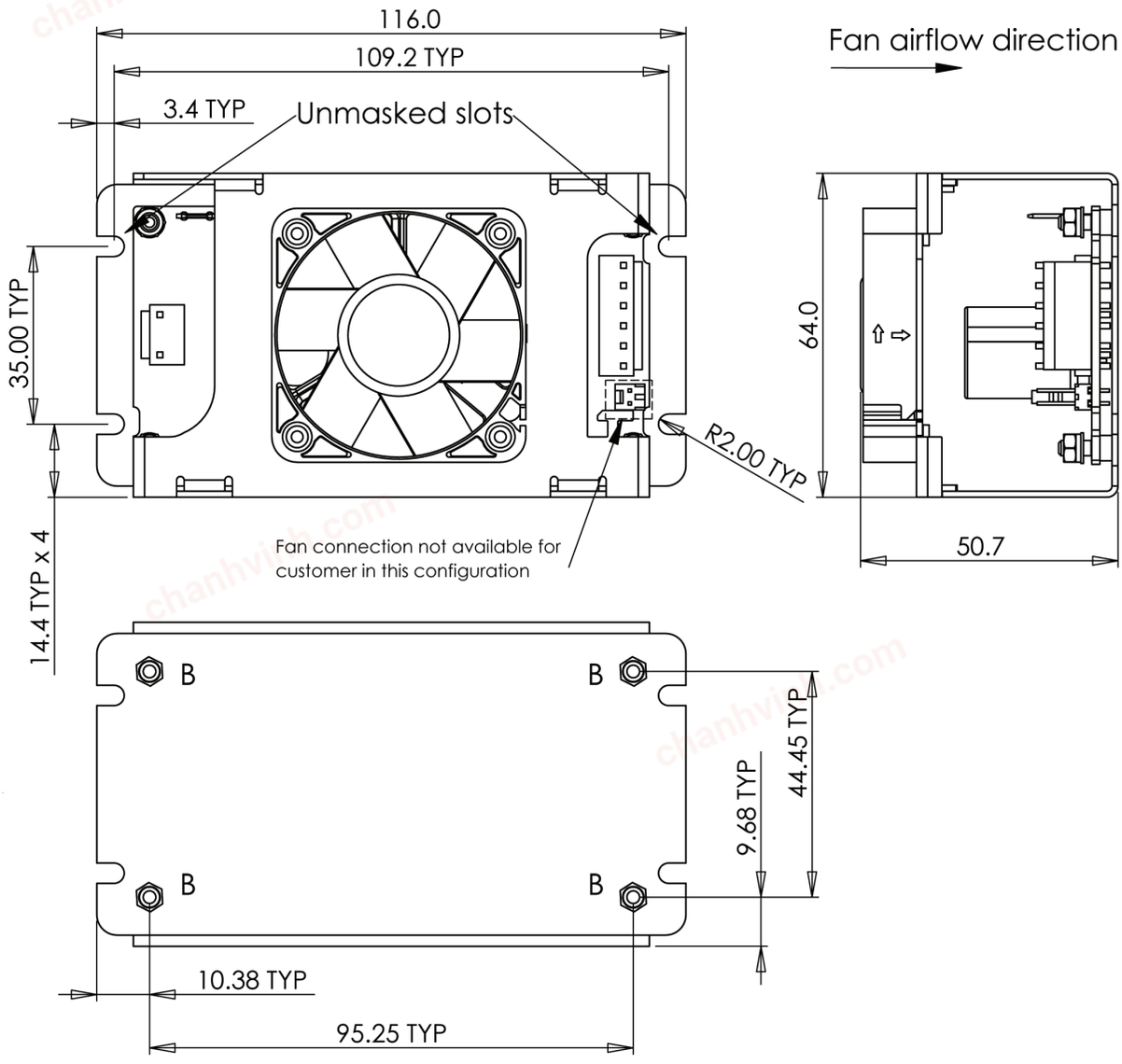
## Outline Drawing CUS150M/A (U Channel with Cover) Option



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## Outline Drawing CUS150M/F (U Channel with Cover & Top Mounted Fan) Option




DIMENSION TOLERANCES: 0.00 ±0.2 0.0 ±0.4

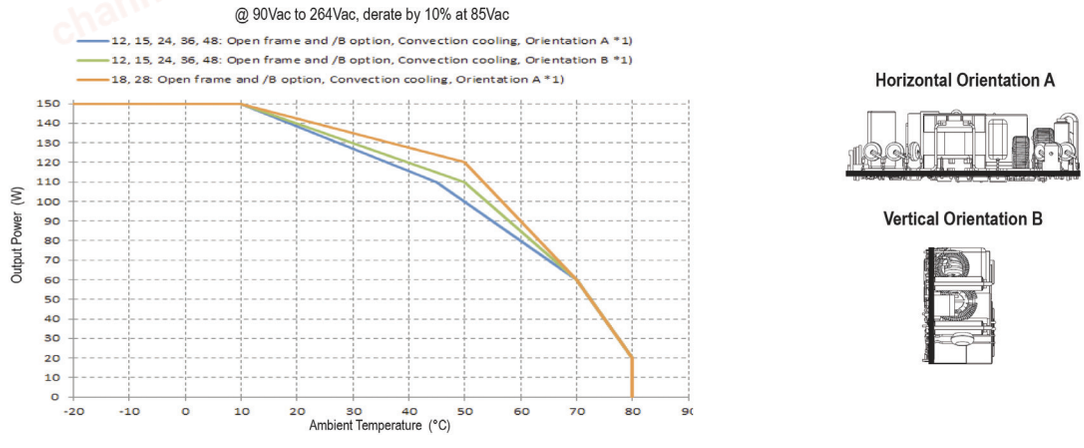
NOTE: B - 4 OFF M3 FIXING - max thread penetration 4.25 mm

RECOMMENDED TORQUE - M3 - 0.5 - 0.6 Nm

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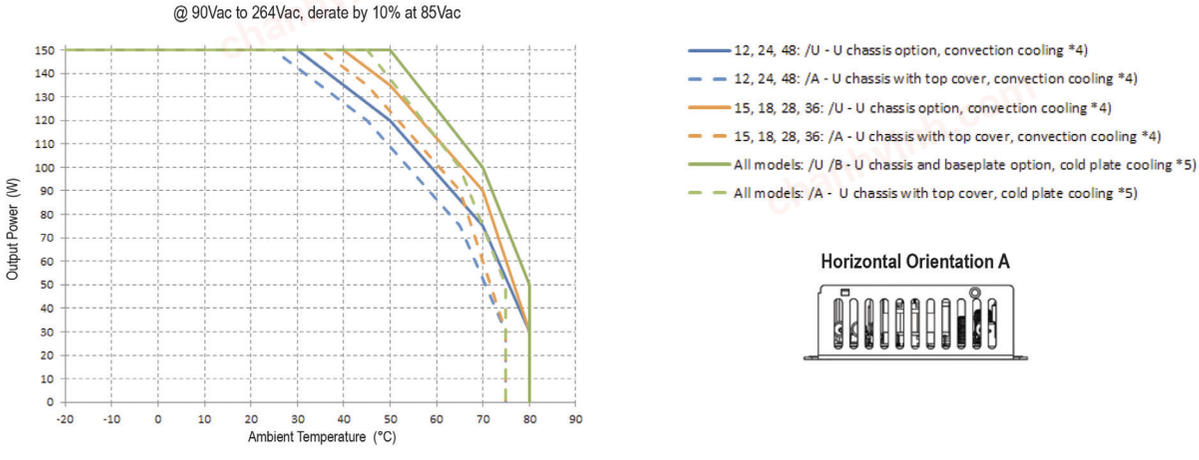


## Output Power vs Ambient Temperature (Open Frame & /B Units)



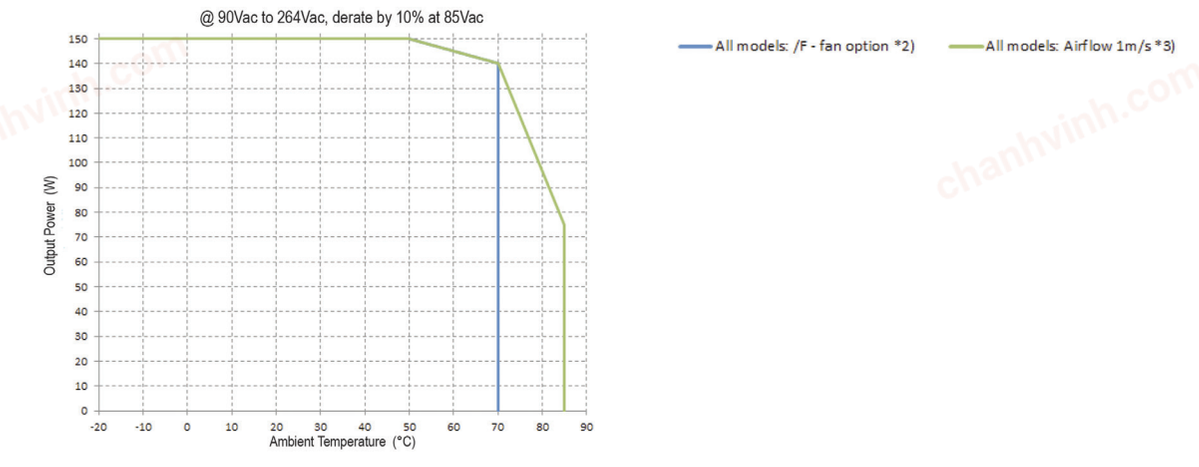

Note (*1) 50mm above surface, see instruction manual for maximum component temperatures.

## Output Power vs Ambient Temperature (/U, /A and /B versions)




Note (*4) 50mm above surface, orientation A, no additional cold plate. See application note.
Note (*5) U chassis or Baseplate fixed on a cold plate (system chassis). See application note.

## Output Power vs Ambient Temperature (/F version and Open Frame with Airflow)

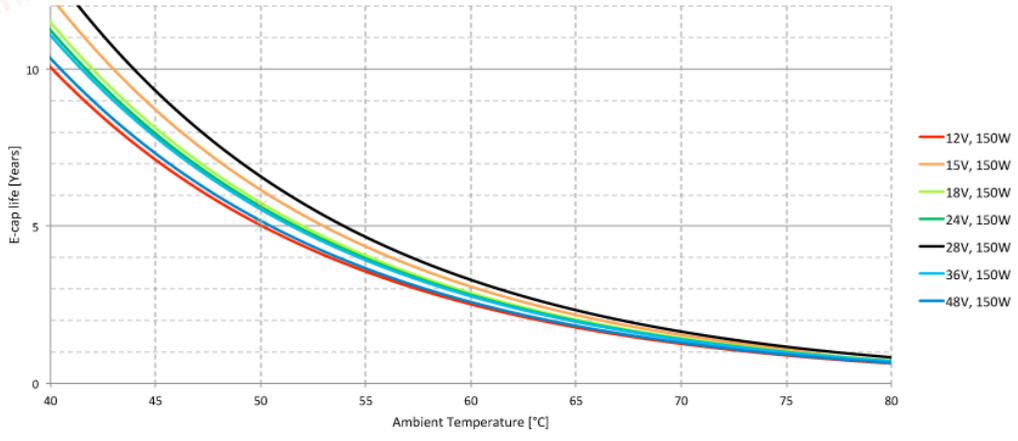



Note (*2) Limited by fan specification to maximum of 70°C. Note (*3) See application note.

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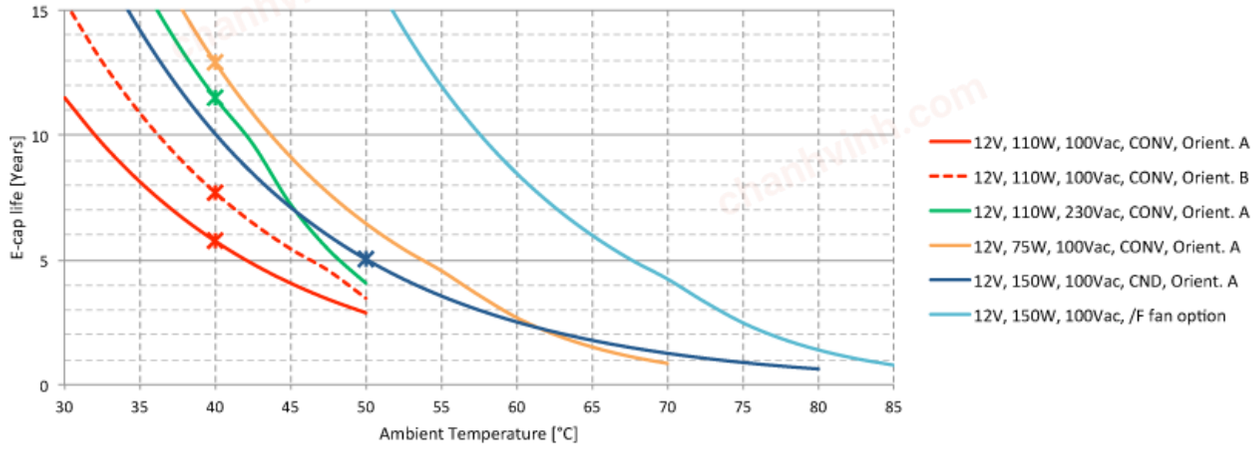


## CUS150M E-Cap Life vs Ambient Temperature



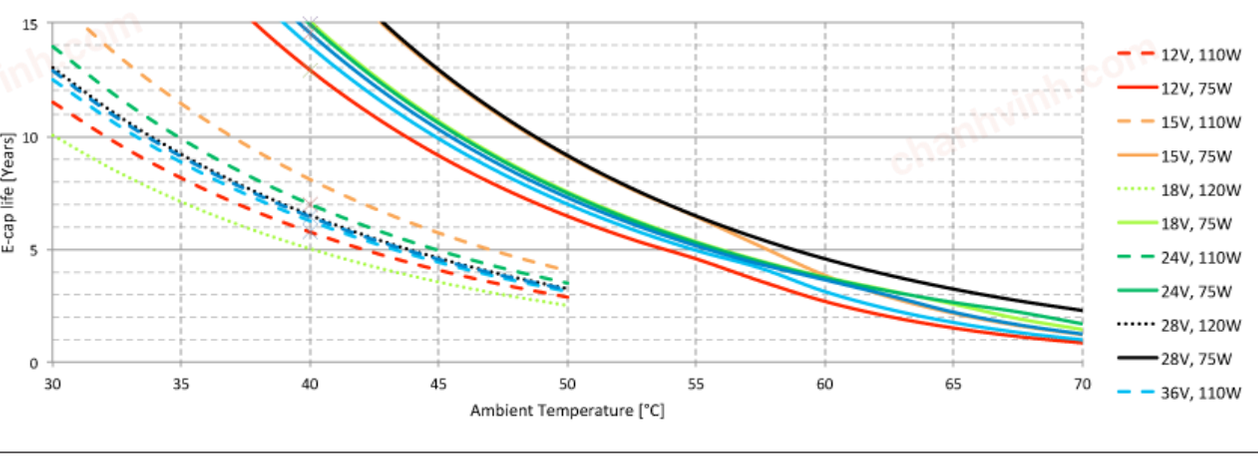

All models: Conduction cooling 150W, 100Vac, measured at 50˚C, other points are calculated

## CUS150M E-Cap Life vs Ambient Temperature 12V model: Additional Cooling Options




Notes: CONV: Convection Cooling, CND: Conduction Cooling

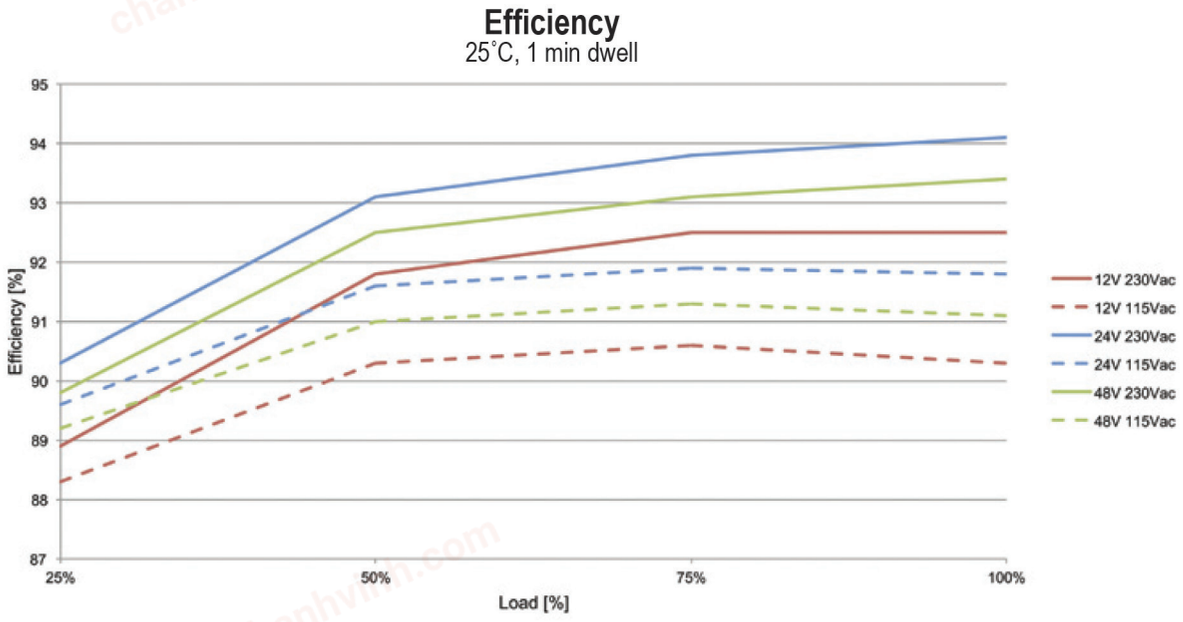
## CUS150M E-Cap Life vs Ambient Temperature 12, 15, 24, 36, 48: conv 110W, 75W, 18, 28: conv 120W, 75W



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## CUS150M Efficiency Graph




## Critical component maximum allowable temperature table

| Circuit reference | Description | Maximum temperature (˚C) |
|---|---|---|
| 1 | Common mode choke | 110 (130) |
| L2 | PFC choke | 125 (130) |
| L3 | Differential mode choke | 125 (130) |
| C1 | Film capacitor | 105 |
| C2, C110 | Electrolytic capacitors | 86 (105) |
| C6, C102, C104, C105 | Electrolytic capacitors | 92 (105) |
| C3 | X capacitor | 100 |
| C5, C100, C101, C103 | Y capacitor | 105 |
| TX100 | Transformer winding | 110 |
| XU101, XU102 | Opto-coupler | 100 (110) |
| XD8 | Diode | 130 |
| J1 | Input connector | 105 |
| J100 | Output connector | 105 |

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