

**Firma / Company**

**FRIWO Gerätebau GmbH**

Gerätetyp / Type: OF150-24  
 Artikelnr. / Part-No.: 1893247  
 Zeichnungsnr. / Drawing-No.: 15.3226.500-02  
 Datum / Date: 06.05.2010

Sachbearbeiter Verkauf / Contact Sales: Frederick Balzer  
 Sachbearbeiter Mechanik / Contact Mech. Eng.: Angela Chen  
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 Freigabe App. / Approved App. PRFFR  
 Freigabe / Approved KSTMM

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We may ask you to return one signed copy of the specification for our records as having your approval. Unless you do not enter your objection to the latest specification issue without delay, your acceptance and release for production on the basis of this specification is deemed to be given.

Kundenfreigabe / Customer Release:

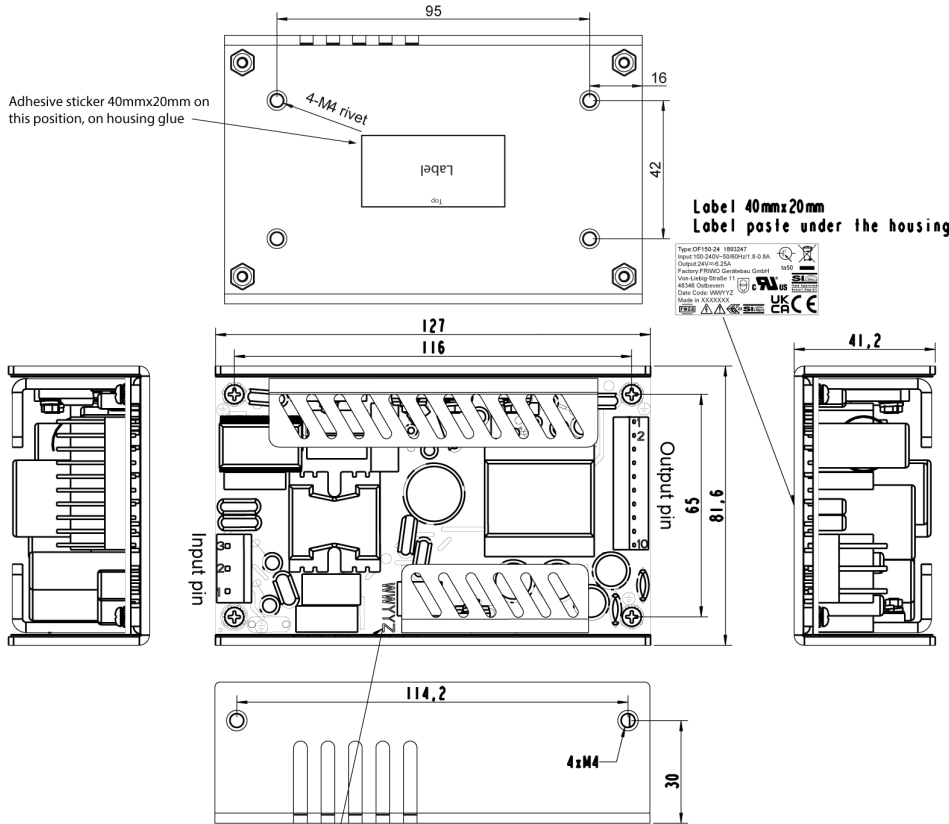
Datum / Date:

Unterschrift / Signature:

Index / Rev.	Datum / Date	Name	Einzelheit / Detail
Ⓚ	2018/6/29	Brokhage	Label for housing updated,see point 1.
Ⓛ	2018/10/25	Brokhage	Label for housing updated,see point 1.Point 3 added.Operating a ...
Ⓜ	2019/2/20	Brokhage	Atmospheric pressure and altitude added,see point 5.DoC updated ...
Ⓝ	2021/10/27	Brian	PCR P003800897,MR2021-4-11841: Update with new UKCA sign, see point 1.0. Hide Declaration of conformity

**1 Gehäuse / Housing:**

Gehäusetyp / housing type:



**Label 40mmx20mm**  
**Label paste under the housing**

Type: OF150-24 1893247  
 Input: 100-240V~50/60Hz/1.8-0.8A  
 Output: 24V~6.25A  
 Factory: FRIWO Gerätebau GmbH  
 Von-Liebig-Straße 11  
 48346 Ostbevern  
 Date Code: WWYYZ  
 Made in: XXXXXX

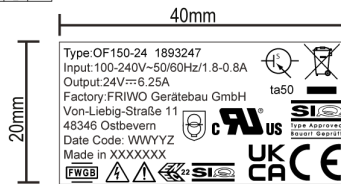
UL US  
 CE  
 UK  
 CA  
 CE

Date Code: W=Week; Y=Year;  
 Z=Factory code  
 (without/ohne mark =  
 FRIWO Gerätebau GmbH Germany)

Falls das Netzteilmodul ohne das U-Profil betrieben werden soll, bitte beachten: Vor Inbetriebnahme des Netzteils müssen die vier mit dem Erdungssymbol gekennzeichneten Montagelöcher mit einer ausreichend niederohmigen (<=0,1 Ohm) Verbindung versehen werden.  
 In case, the power supply shall be used without the U-bracket, please note: Before first use, the four mounting holes with "PE" symbol must be connected by a sufficiently low impedance (<= 0.1 Ohm) connection.

Item	Molex connector type or equivalent	Mating connector type or equivalent	Molex connector type or equivalent
Input	0010634037	0009503051	
Output	0026604100	0009503101	

Output pin	1	2	3	4	5	6	7	8	9	10	Input pin	1	2	3
	+	+	+	+	-	-	-	-	-	-		PE	L	N



Printing: Black letter on white base  
 Material: copperplate paper with bright/shining surface (UL, CSA approval)  
 Coating: Acrylic adhesive backing  
 To be manufactured by UL/CSA qualified vendor  
 Storage temperature: -20 degC ~ +70 degC  
 The thickness of label is 0.12 +/- 0.02mm  
 Datumscode/date-code "WWYYZ"  
 W=Woche/week Y=Jahr/year Z=Fertigungsstätte/Factory code  
 (Note: without mark = FRIWO Gerätebau GmbH)  
 Made in XXXXXX =  
 Made in Germany or  
 Made in Poland

## 2 Verpackung / Packaging

### 2.1 Einzelverpackung / Individual packaging:

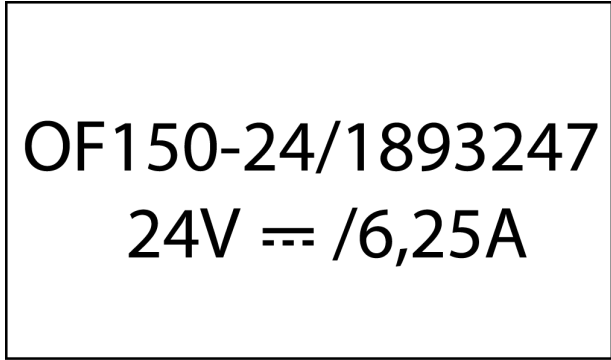
Fächersteg/ Divider:	11.3083.056-20
Zwischenlagen/ Underliner:	13.0002.056-03
ESD Beutel/ ESD bag:	1815232 (152mmx254mm)

Paste label (40x20mm) on ESD bag to close the ESD bag

OF150-24/1893247 24V $\approx$ /6,25A
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**2.2** Sammelverpackung / bulk packaging: 28 er UMKARTON / Carton 28

Paste label (85x50mm) on master carton next to the standard label



**2.2.1** Aussenabmessungen / Outer dimensions: 433mm x 338mm x 196mm

**2.3** Anzahl der Geräte pro Umkarton / amount of units per master carton: 18

**2.4** Gewicht pro Stück / weight per unit: 475 g

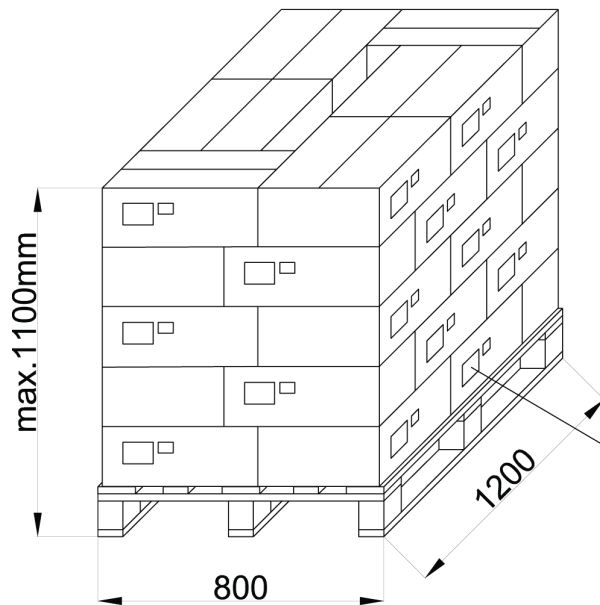
**2.5** Lagertemperatur / storage temperature: -20°C - +70°C / 10 to 95 rel. hum.

**2.6** Verpackungsvorschriften / packaging specification:

**Master Packing**

Notes:

- 1) 18 pcs per carton
- 2) 6 cartons per layer
- 3) 5 layers on pallet
- 4) total 540 pcs per stack



Pro Karton 1 Standard Aufkleber und 1 Aufkleber 1830988 auf der Längsseite des Kartons kleben/  
 Paste per Carton 1 standard Label and 1 label 1830988 on the long side of the carton.

### **3 Allgemeine Prüfbedingungen / General test conditions**

- 3.1** In einem Bereich der Umgebungstemperatur von 0°C bis +70°C bei 10% bis 95% relativer Luftfeuchte, keine Betauung und einen Luftdruck von 70kPa bis 106kPa muss die einwandfreie Funktion des Gerätes gewährleistet sein.

Within an ambient temperature range from 0°C to +70°C at 10% to 95% relative humidity, no condensation and an atmospheric pressure of 70kPa to 106kPa the faultless function of the unit must be guaranteed.

**4 Elektrische Prüfbedingungen / electrical tests**

**4.1** Alle nachstehend aufgeführten Werte werden bei +20°C Raumtemperatur und nach 15 Minuten Einschaltdauer gemessen.

All values listed below are measured at an ambient temperature of +20°C and after 15 minutes of operation.

**4.2** Eingangsdaten / Input data:

**4.2.1** Nenneingangsspannung / 100-240V AC ±10%  
 Nominal input voltage : 100-240V AC ±10%

**4.2.2** Nenneingangsfrequenz / 47-63Hz ±6%  
 Nominal input frequency: 47-63Hz ±6%

**4.2.3** Leistungsfaktor/ ≥0.9  
 Power Factor:

**4.2.4** Leerlaufleistungsaufnahme bei UE / 115V AC,230V AC : ≤ 0.5W  
 Stand-by power consumption at UIn: 115V AC,230V AC : ≤ 0.5W

**4.3** Ausgangsdaten / Output data:

Messaufbau siehe / <http://www.friwo.de>  
 Measuring setup see:

**4.3.1** Ausgangsspannung / UA: 24V DC +5% / -5% UBr : ≤ 240mVss  
 Nominal output voltage: Uout: 24V DC +5% / -5% UBr : ≤ 240mVpp

Ripple voltage test:100nF ceramic capacitor and 47uF aluminum electrolytic capacitor should be parallel at output terminal, and the oscilloscope with 20MHz bandwidth is required.

**4.3.2** Nennausgangsstrom / Nominal output current: IA : 6250mA  
Iout : 6250mA

**4.3.3** Wirkungsgrad / Average efficiency:  $\geq 87\%$ (Energy Star level 'V')

**4.3.4** Überstromschutz/Over current protection

Steigt der Ausgangsstrom auf 7,5 A bis 9,5 A an, spricht der Überstromschutz an. Das Netzteil bleibt in diesem Betriebszustand bis die Überlastung beendet ist. Danach arbeitet das Netzteil normal weiter.

If the PSU output current rise to 7.5A~9.5A, the PSU will occur over-current protection and bouncing, until the over-current removed, PSU will work normally again.

**4.3.5** Ausgangs-Kurzschluss-Schutz/Output short protection

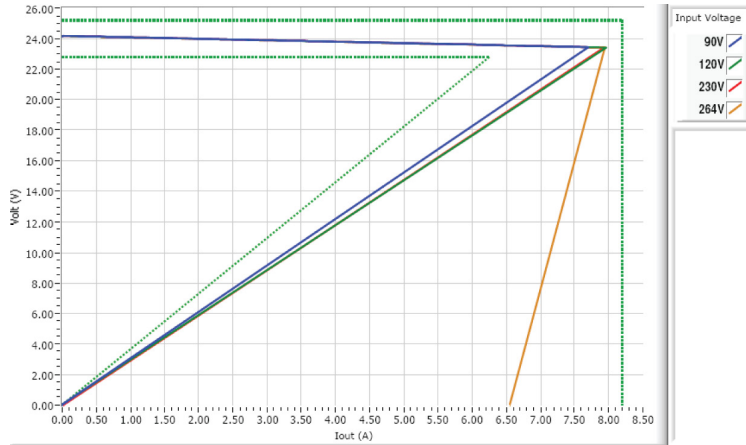
Bei kurzgeschlossenem Ausgang spricht der Kurzschlusschutz an. Nach Entfernen des Kurzschlusses arbeitet das Netzteil normal weiter.

If the PSU output shorted, unit will enter bouncing, until the short circuit removed, PSU will work normally again.

**4.3.6** Betriebstemperatur/Operating temperature

0 – 70°C (Volllast bis 40°C, danach Abnahme der Leistung bis auf 50% bei 70°C)  
0 - 70°C(Full load to 40°C, derate to 50% load at 70°C).

**4.3.7 Ausgangskennlinie / Output characteristic:**





**5 Sicherheitsanleitung / Safety details:**

Sicherheitsaufbau nach / Safety-standard acc. to :	EN60601, EN60950, EN61558
Schutzklasse / Protection class :	I
Trennung (prim.-sek.) / Separation (prim.-sec.) :	Galvanisch durch Wandler Galvanic by transformer
Kriech- und Luftstrecken / Creepage distance and clearance :	≥ Kr : 8mm, Lu : 5mm ; Cr : 8mm, Cl : 5mm
Erdableitstrom / Earth leakage current:	≤ 500 µA
Gehäuseableitstrom / Enclosure leakage current :	≤100 µA
Atmosphärischer Druck / Atmospheric pressure :	79,0 - 106,0 kPa
Betriebshöhe / Operating altitude :	≤2000
Gemessen nach / According to : siehe / see <a href="http://www.friwo.de">www.friwo.de</a>	
Hochspannungstest / High-voltage test :	
Primär zu sekundär / primary to secondary:	≥ 4 KV AC
Primär zur Erde / primary to earth :	≥ 1.5 KV AC
Sekundär zu Erde / secondary to earth :	≥ 500V AC
Anwendungsbereich / Range of application :	Einrichtungen für Informationstechnik , einschließlich elekt- rische Büromaschinen "und Medizintechnik" Information technology Equipment including technical of- fice "and professional healthcare"
Umgebungstemperatur / Ambient temperature range :	0°C bis +70°C, bis zu +70°C mit 50% Leistungsabsenkung 0°C to +70°C ,derate 50% load at 70°C.

**6 Links & Miscellaneous**

EMC-specification

**6.1** Noise-suppressed:acc. to EN55024 ,55022/B and FCC part15 B.

Suggest that the length of output wire is not in excess of 0.5m.

**6.2** Harmonic current emissions ass.to IEC61000-3-2

**6.3** Immunity to electrostatic discharge (ESD): acc. to IEC61000-4-2

Discharge characteristic	Test level	Assessment criteria Uin 120Vac	Assessment criteria Uin 230Vac
Air discharge	±8kV	B	B
Contact discharge	±6kV	B	B

**6.4** Immunity to radiated electromagnetic field: acc. to IEC61000-4-3  
 Test characteristic: 80 - 2.5GHz; 80% AM (1 kHz)

Test level	Assessment criteria
10V/m	A

**6.5** Immunity to fast electric transients (burst): acc. to IEC61000-4-4

Coupling	Test level	Assessment criteria Uin 120Vac	Assessment criteria Uin 230Vac
AC - input	±2kV	B	B

**6.6** Surge capability: acc. to IEC61000-4-5

Surge voltage	Assessment criteria Uin 120Vac	Assessment criteria Uin 230Vac
±1KV(Line to line)	B	B
±2KV(Line to earth)	B	B

**6.7** Power frequency(50/60Hz) magnetic field.acc.to IEC61000-4-8

Test level	Assessment criteria
3A/m	A

**6.8** Immunity to voltage dips, short interruptions and voltage variations.  
 Test acc. to IEC61000-4-11  
 Test performed at  $U_{in} = 120Vac/230VAC$

Test level %Un	Voltage dips and short interruptions %Un	Duration time of voltage Dips (in half sine)	Test result Uin 120Vac	Test result Uin 230Vac
0	100	0.5	B	B
		(5s)	B	B
40	60	5	B	B
70	30	25	B	B

- 6.9**
- a. Agreed operational behaviour within the specified limits.
  - b. Time limited functional diminishment of malfunction during the tests is permitted. The function is self-reactivated by the unit following completion of the tests.
  - c. Malfunction is permitted. The function can be reactivated either by reconnection to the mains or by operator intervention.

## 7 Installation instructions

### 7.1 Rating

Type : OF 150-24

Rated voltage : AC 100-240V

Nominal Current : Max 1.8A

Rated frequency : 50/60 Hz

Class : I

Protection against electric shock : By means of appropriate installation

Output voltages and currents DC24V/6,25A (SELV)

Max. ambient temperature for rated output power : 40°C

Max. operating relative humidity : 95%,no condensation.

Storage : -20 to +70°C

Units should be allowed to warm-up under non-condensing conditions before application of power.

Remark : the end-use product shall provide an adequate enclosure to prevent access to the power supply and have an adequate enclosure for protection against the spread of fire.

### 7.2 Classification

Protection against electric shock = Class I,mains grounded input ( protective earth must be connected to mains supply network ).

Protection against moisture:

Have not been evaluated for use in the presence of a flammable anaesthetic mixture with air,oxygen,or nitrous oxide.This evaluation is to be made on the end equipment by the OEM.

Do not connect as direct power source to patient circuits.






Not to be used as single power source within critical life support systems,without prior request to FRIWO Geratebau GmbH and receipt of confirmation in writing from FRIWO Geratebau GmbH.

Ask for Application Engineering Support from FRIWO Geratebau GmbH.

### 7.3 Temperatures

The maximum operating temperatures of certain safety components, as defined in the applicable safety standards, must not be exceeded after installation to preserve the intended safety.The output power,ambient air temperature and the availability,amount,direction and/or restriction of airflow influence the temperatures of these components.

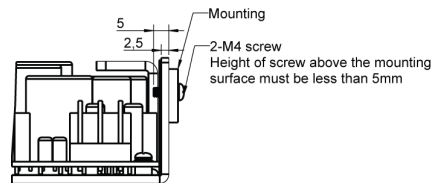
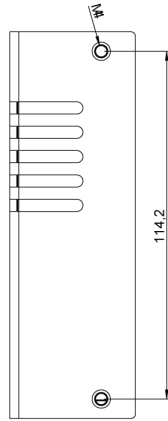
**8 Explanation of symbols**

EXPLANATION OF SYMBOLS	
	Alternating Current
	Direct Current
	Attention, Consult Accompanying Documents
	Attention, Dangerous Voltages
	Earth (Ground)

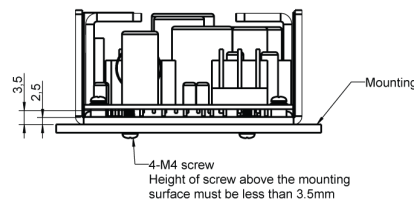
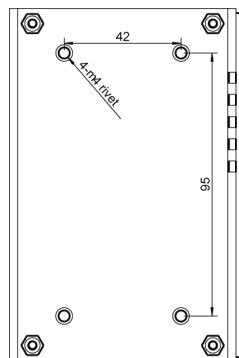
- 8.1 Fusing**  
Fuses for both Line and Neutral are provided in the power supply. Replace only with same type and rating of use.
- 8.2 Caution**  
Read instruction manual before connecting to mains.
- 8.3 Warning! Risk of fire!**  
A blown internal fuse is an indication of catastrophic failure of circuit component(s). Refer to fuse marking on the supply for rating.
- 8.4 Warning! Shock Hazard!**  
Dangerous voltages are present on some components, printed wiring traces and heatsinks.

**9 Installation method**

**9.1 Assembly on side**



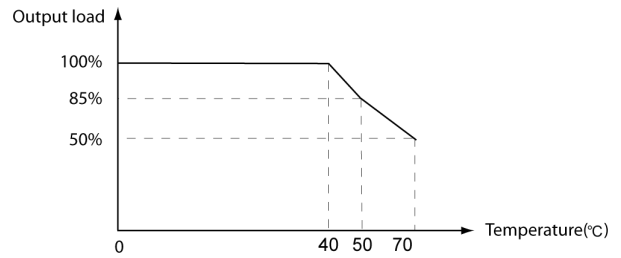
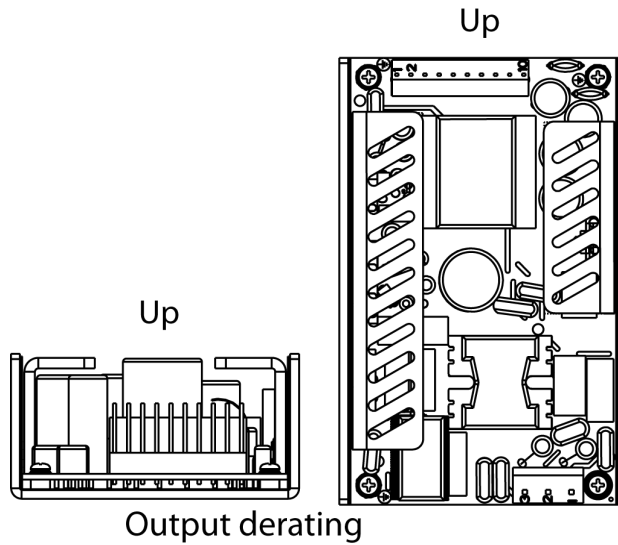
**9.2 Assembly on front**



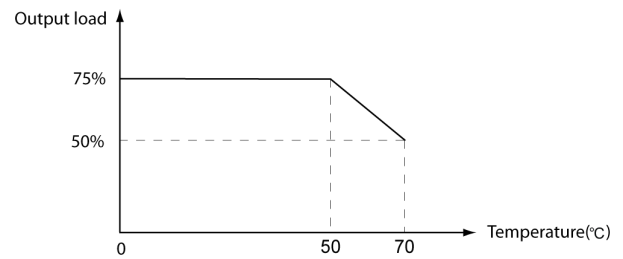
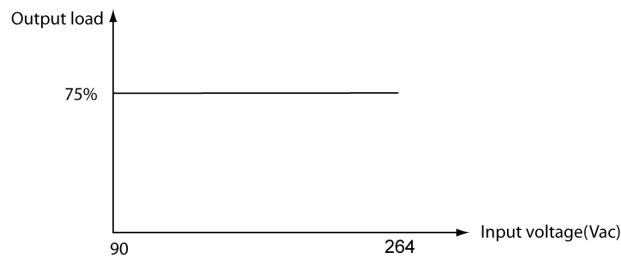
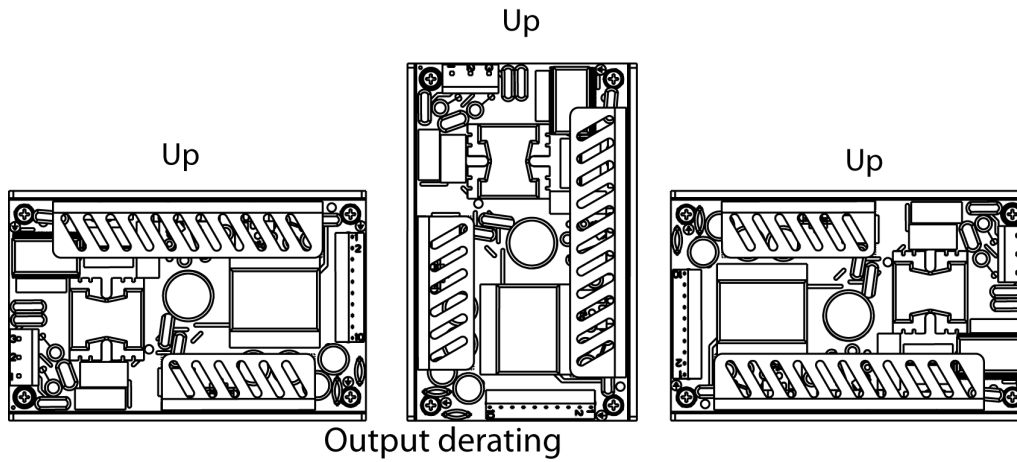
## 10 Installation positions versus output derating

Need to check all safety components' temperatures do not exceed the limits.

### 10.1 Ideal installation positions:



**10.2** Acceptable installation positions(See output derating below):





**10.3** Unacceptable installation position:**UP**