

|                                                                                  |                                         |     |                    |           |          |
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|                                                                                  | M. Obritzhauser                         |     | Standard Programme |           |          |
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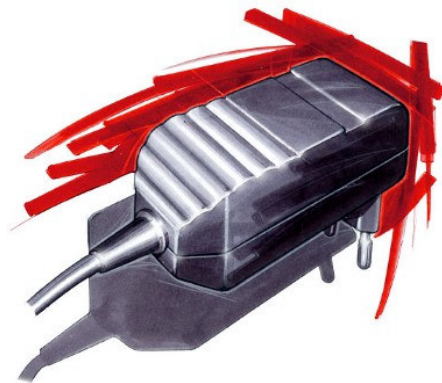
# EGSTON

## Switch Mode Power Supply

**Product Name: P2xFSW3 6W**

**Standard Programme**

|                 |                                             |
|-----------------|---------------------------------------------|
| <b>Input:</b>   | <b>90 - 264 V AC</b>                        |
| <b>Output :</b> | <b>3,0V – 24V<br/>max. 6W<br/>max. 1,2A</b> |
| <b>Type:</b>    | <b>P2xFSW3 6W</b>                           |



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## 1 REVISION HISTORY

### 1.1 Evolution

| Edition | Date       | Responsible  | Reason of change       |
|---------|------------|--------------|------------------------|
| A       | 28.05.2003 | Obritzhauser | First edition          |
| B       | 29.07.2003 | Obritzhauser | EMV Standards Revised  |
| C       | 04.02.2004 | Obritzhauser | Voltage Range Extended |
|         |            |              |                        |
|         |            |              |                        |
|         |            |              |                        |

## 2 SCOPE

This document describes a switch mode power supply unit (AC/DC) with fixed output voltage.

The unit is designed as a plug in power supply or an Desk Top Module.

|                                                                                  |                                         |  |  |                    |       |      |          |
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### 3 TECHNICAL SPECIFICATION SHEET

#### 3.1 Input Specification

| Parameter           | Key       | Min | Typ. | Max | Unit | Test Cond.   |
|---------------------|-----------|-----|------|-----|------|--------------|
| Input Voltage       | $U_{IN}$  | 90  |      | 264 | V    | AC           |
| Input Current       | $I_{IN}$  | 3   | 145  | 175 | mA   |              |
| Input Frequency     | $f_{IN}$  | 47  |      | 63  | Hz   |              |
| Efficiency          | $\eta$    | 65  |      | 80  | %    | at full load |
| Switching Frequency | $f_{sw}$  |     | 40   |     | kHz  |              |
| Stand-by power      | $P_{stb}$ |     | 400  |     | mW   | Without load |

##### Input Voltage

If the input voltage is out of operating range, the power supply does not meet the full specification. Above the specified upper limit of the input voltage the unit can get damaged. Below the specified lower limit of the input voltage the unit does not meet the specification.

##### Efficiency Under Load

The efficiency is defined as the ratio between the output power and input power.

#### 3.2 Safety and Environmental Conditions

| Sec | Parameter             | Key | Min  | Typ. | Max | Unit             | Test Cond. |
|-----|-----------------------|-----|------|------|-----|------------------|------------|
|     | Dielectric Strength   |     | 4,24 |      |     | kV <sub>DC</sub> |            |
|     | Operating Temperature |     | -5   |      | 40  | °C               |            |
|     |                       |     | 23   |      | 104 | °F               |            |
|     | Storage Temperature   |     | -30  | 25   | 80  | °C               |            |
|     |                       |     | -22  | 77   | 176 | °F               |            |
|     | Humidity              |     |      |      | 95  | %                |            |

|                                                                                  |                                         |  |                    |           |      |          |
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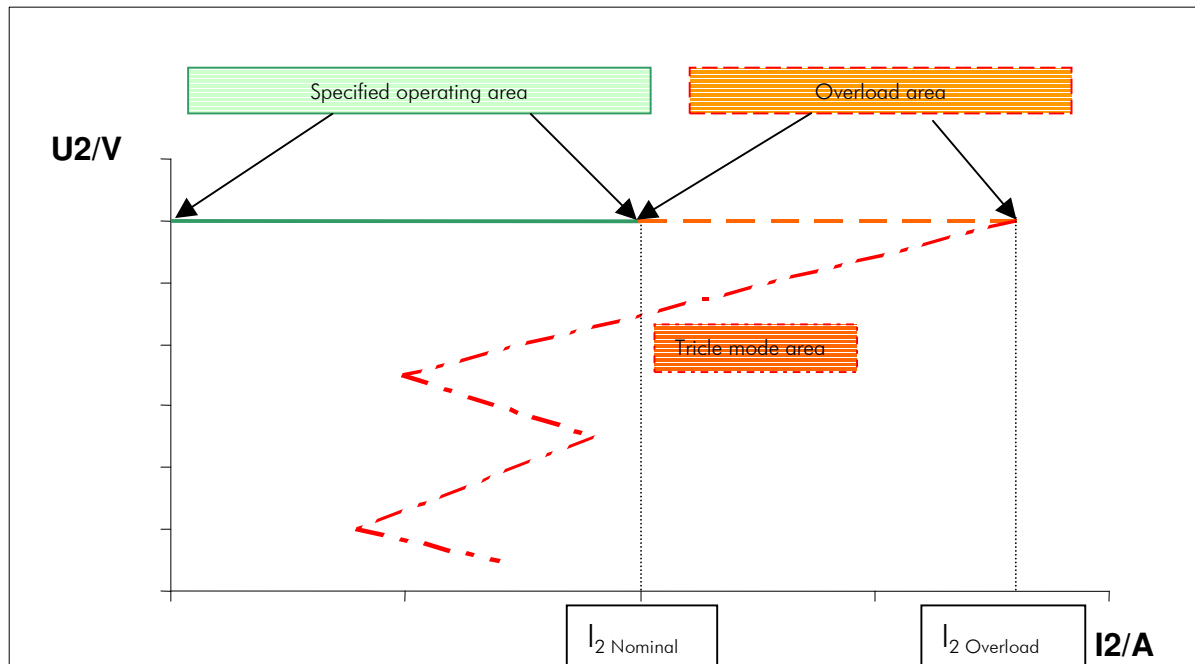
### 3.3 Output Specification

| Parameter                | Key                      | Min | Typ.       | Max      | Unit                         | Test Cond.                        | Available on request     |
|--------------------------|--------------------------|-----|------------|----------|------------------------------|-----------------------------------|--------------------------|
| Output Voltage           | $U_2$                    | 3   |            | 24       | V                            | 0 – 1,2 A                         |                          |
| Output voltage tolerance | $T_{U2}$                 |     |            | 3        | %                            | at PCB                            | 1%<br>Cable compensation |
| Output Current           | $I_{2 \text{ Nominal}}$  | 1,2 |            |          | A                            |                                   | Current regulation       |
| Max. Overload current    | $I_{2 \text{ Overload}}$ |     | 250<br>150 |          | % of $I_{2 \text{ Nominal}}$ | $U_{IN} = 264V$<br>$U_{IN} = 90V$ |                          |
| Output Power             | $P_2$                    |     | 6          |          | W                            |                                   |                          |
| Ripple Voltage           | $U_{2,rms}$              |     |            | 50<br>50 | mV <sub>rms</sub>            | $U_{IN} = 264V$<br>$U_{IN} = 90V$ |                          |

The unit is not long time overload proof. If the unit is powered longer than 1 min in overload conditions (current range between  $I_{2 \text{ Nominal}}$  and  $I_{2 \text{ Overload}}$ ), the device can be damaged.

|                                                                                  |                                         |  |  |                    |       |      |          |
|----------------------------------------------------------------------------------|-----------------------------------------|--|--|--------------------|-------|------|----------|
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### 3.3.1 Output template



#### Specified operating area:

At an output current from 0A to  $I_{2\text{ Nominal}}$  the unit fulfills all specified data.

#### Overload area:

At an output current from  $I_{2\text{ Nominal}}$  to  $I_{2\text{ Overload}}$  the power supply delivers the specified output voltage  $U_2$ .

The unit is not long time overload proof. If the unit is powered longer than 1 min in overload conditions, the device can be damaged.

#### Trickle mode area:

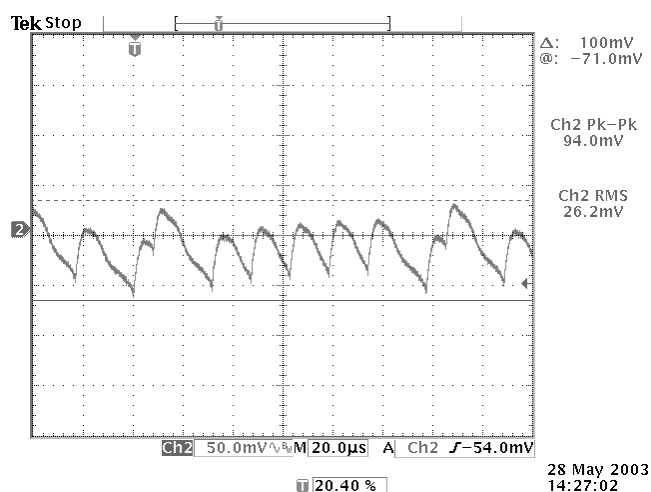
If the power demand would be higher than  $I_{2\text{ Overload}}$  or the power supply works in short circuit the output voltage and current can not be defined (this parameters are not stable). The wattage of the SMPS is de-rated. In this mode the unit can not be damaged. After removing this conditions the unit fulfills the specification.

|                                                                                   |                                       |  |                    |           |
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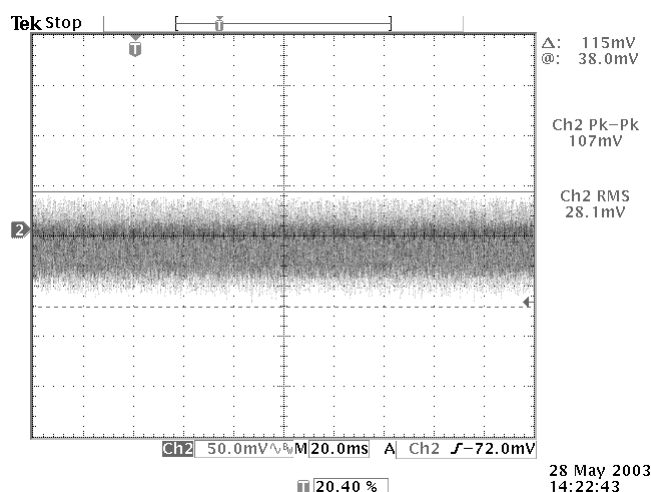
### 3.3.2 Output Ripple Voltage

The output ripple voltage is measured with an oscilloscope 20Mhz band limited at a representative 12V sample.

#### 3.3.2.1 Measurement at 230V input voltage and 0,5A load



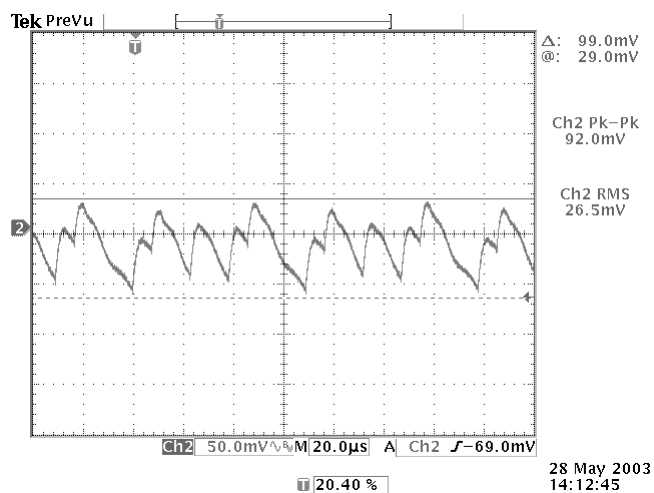
Ripple Voltage at switching frequency measured at a temperature of +25°C



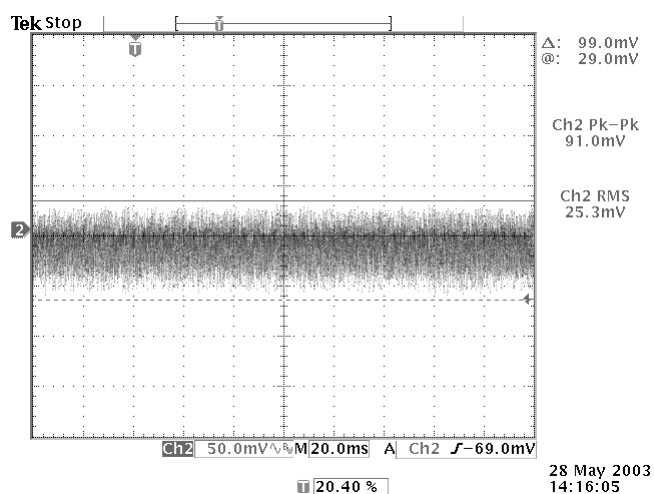
Ripple Voltage at mains frequency measured at a temperature of +25°C

|                                                                                   |                                       |  |                    |           |
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|                                                                                   |                                       |  | 04                 | C         |

### 3.3.2.2 Measurement at 120V input voltage and 0,5A load



Ripple Voltage at switching frequency measured at a temperature of +25°C



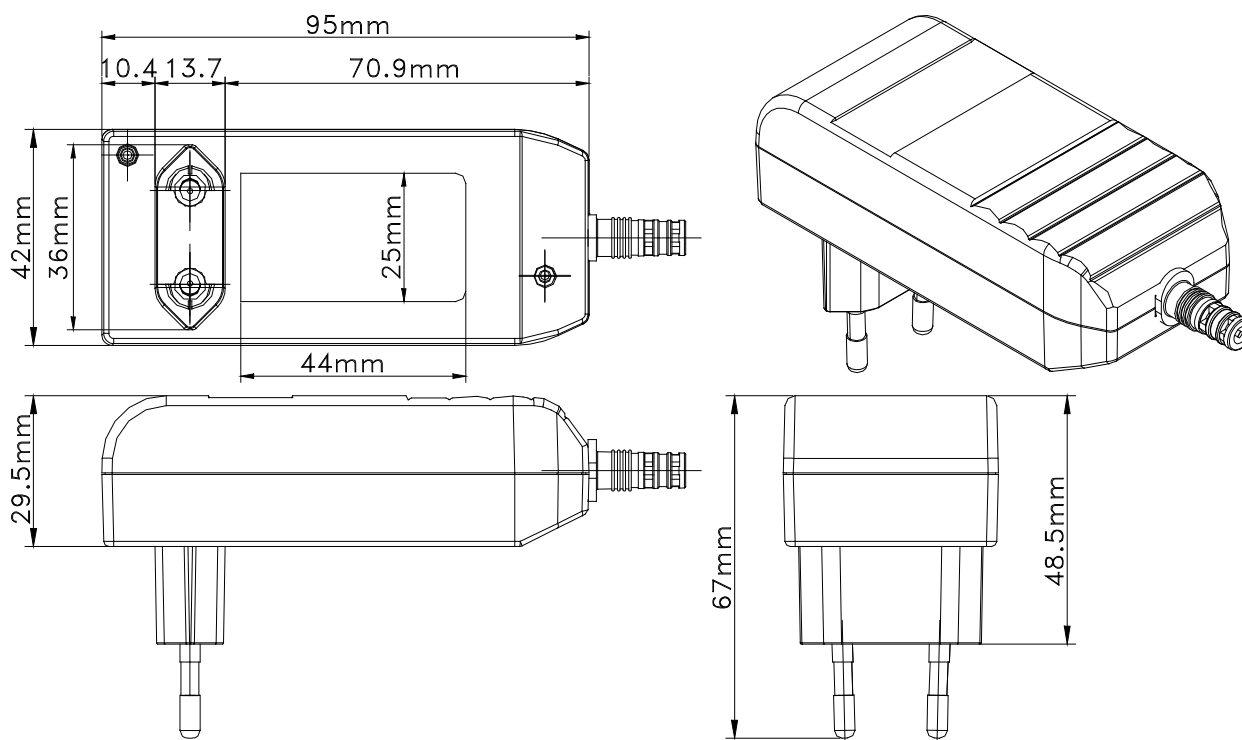
Ripple Voltage at mains frequency measured at a temperature of +25°C

|                                                                                   |                                         |  |  |                    |           |      |          |
|-----------------------------------------------------------------------------------|-----------------------------------------|--|--|--------------------|-----------|------|----------|
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## 3.4 Mechanical Parameters

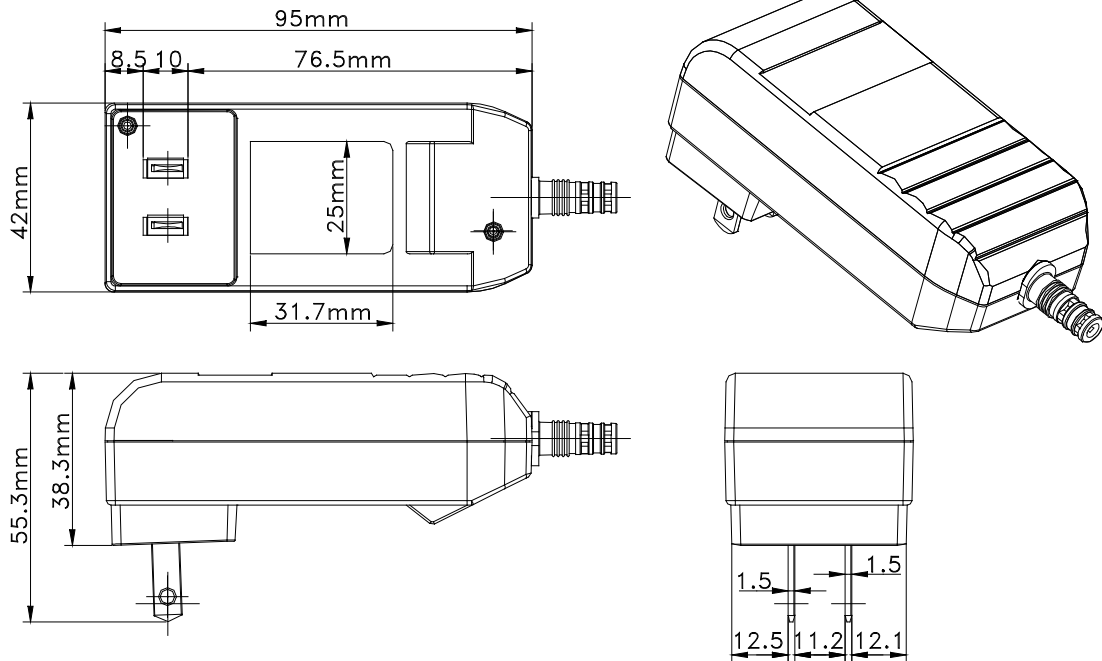
### 3.4.1 Housing dimension

#### 3.4.1.1 Euro housing

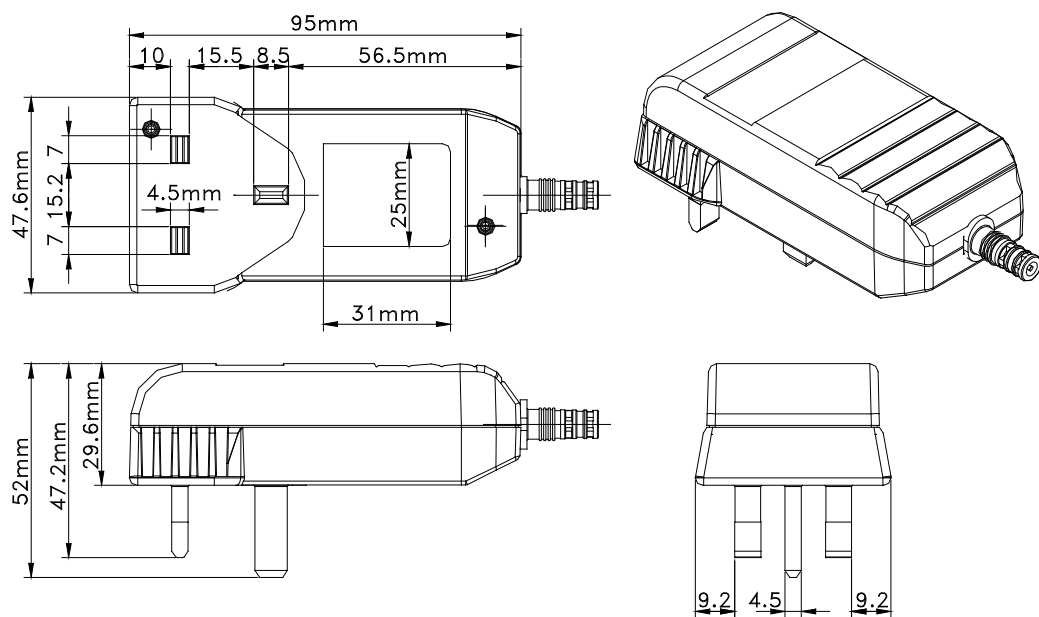


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### 3.4.1.2 US Housing



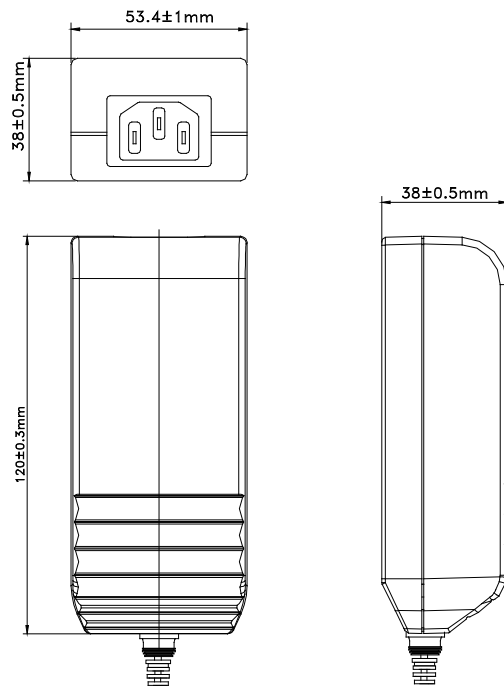
### 3.4.1.3 UK Housing



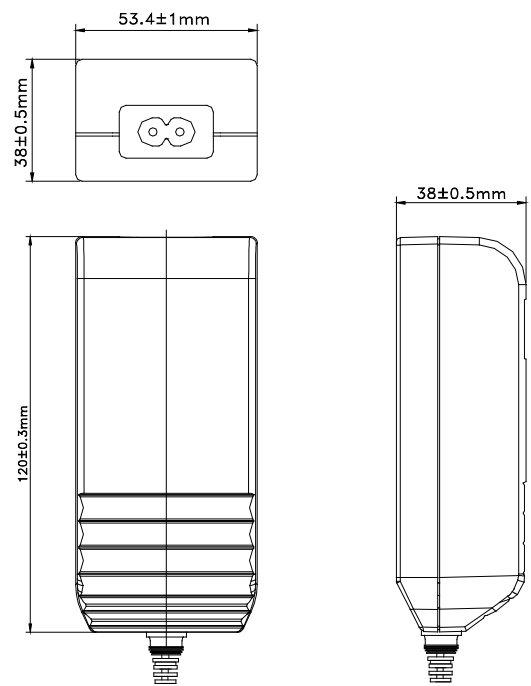
|                                                                                   |                                         |     |                    |            |          |
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### 3.4.1.4 Desk Top Housing

With IEC 320 C14 Primary Plug



With IEC 320 C8 primary Plug



### 3.4.2 Housing Material

|                   | 6W<br>UK,EURO,US        | 12W<br>UK,EURO,US       | 24W<br>UK,EURO,US       | DESKTOP                 |
|-------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Material          | PA6,V0 Technyl<br>C50H2 | PA6,V0 Technyl<br>C50H2 | PA6,V0 Technyl<br>C50H2 | PA6,V0 Technyl<br>C50H2 |
| Flammability rate | V0                      | V0                      | V0                      | V0                      |

|                                                                                   |                                         |  |                    |            |      |          |
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### 3.5 Cable And Connector

According customer's requirements.

### 3.6 Marking on the housing

#### 3.6.1 Plug In Devices

##### 3.6.1.1 EU/UK devices

Laser marking  
Product name  
Input parameters  
Output parameters  
Product code  
Safety Instructions

 Conformity Mark with the EU low voltage directive and EMC directive

 ENEC Mark

 GS Mark

|                                                                                  |                                         |  |                    |            |      |          |
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### 3.6.1.2 US devices

Laser marking  
Product name  
Input parameters  
Output parameters  
Product code  
Safety Instructions



Conformity Mark with the EU low voltage directive and EMC directive



GS Mark



UL Mark for Canada and the United States

### 3.6.2 Desktop Devices

Laser marking  
Product name  
Input parameters  
Output parameters  
Product code  
Safety Instructions



Conformity Mark with the EU low voltage directive and EMC directive



ENEC Mark



GS Mark



UL Mark for Canada and the United States

|                                                                                  |                                       |     |                    |            |          |
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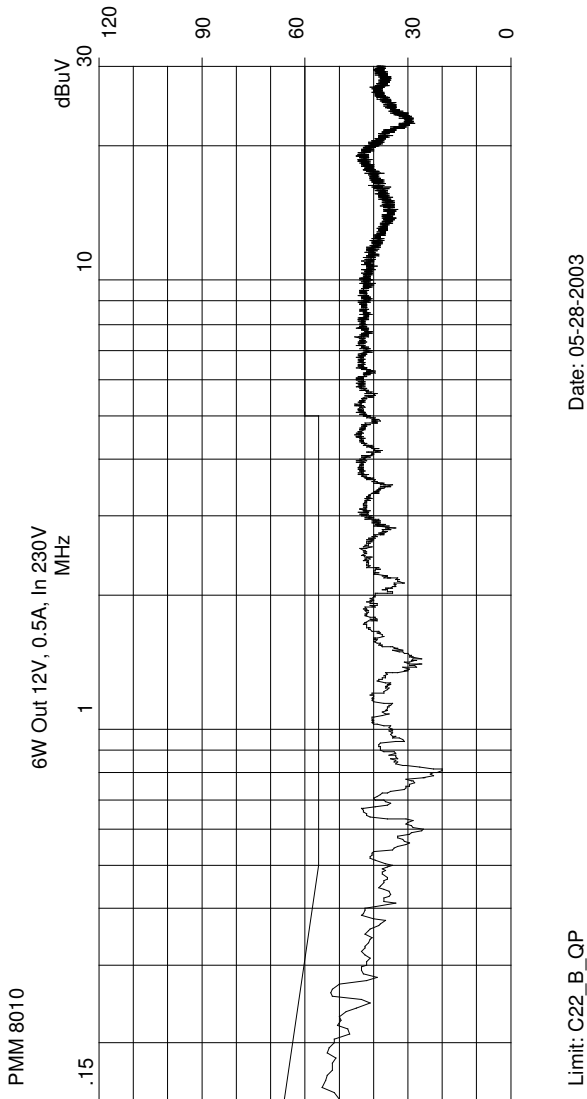
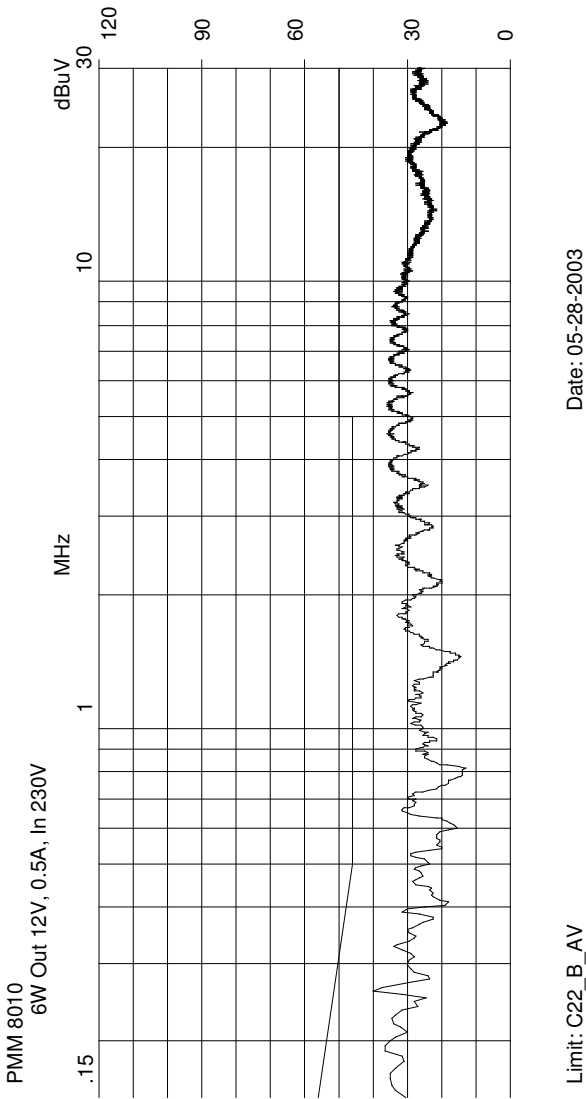
## 4 EMC

The units meet the following EMC requirements:

### 4.1 Emission with representative 12V device:

Test passed according to EN55022 Class B.

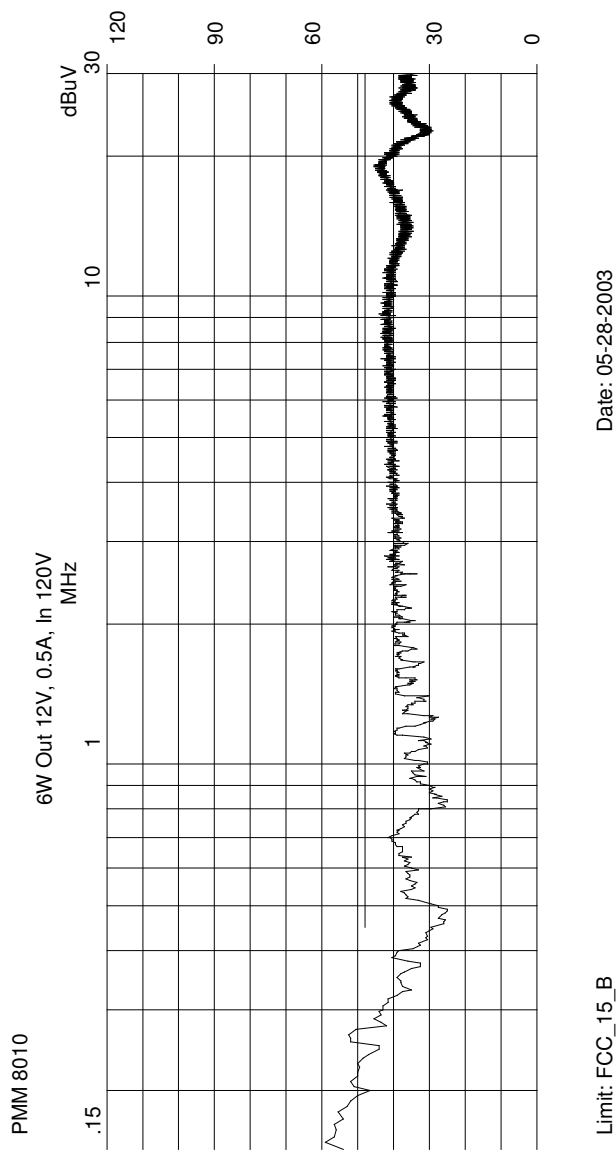
Primary: 230V AC, Secondary: 12V / 500mA , Temperature: 25°C, Load connected to ground, Peak and Average Measurement.



|                                                                                   |                                         |  |                    |            |      |          |
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Test passed according to FCC15 Class B.

Primary: 120V AC, Secondary: 12V / 500mA , Temperature: 25°C, Load connected to ground, Peak Measurement



|                                                                                  |                                         |  |                    |            |      |          |
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## 4.2 Immunity To Flicker

Test according to EN 61000-3-2

## 4.3 Immunity to Fast Transients (Burst)

Test according to EN61000-4-4

Input Line: 2.0kV – 5/50 ns – 5.0 kHz

Output Line: 2.0kV – 5/50 ns – 5.0 kHz

## 4.4 Immunity to Radiated Electromagnetic Field

Test according to EN 61000-4-3

Test characteristic: 80 – 1000 MHz; 80% AM (1kHz), 3V/m

## 4.5 Immunity to Electrostatic Discharge

Test according to EN 61000-4-2

Test characteristic: Contact discharge 6kV

Air discharge 8kV

## 4.6 Surge Capability

Test according to EN61000-4-5

Test characteristic: line to line: 1kV Surge

line to earth: 2kV Surge

## 4.7 Immunity to conducted disturbances

Test according to EN 61000-4-6

Test characteristic: 150kHz – 80 MHz; 80% AM (1kHz), 3V

## 4.8 Immunity to voltage dips, short interruptions and voltage variations

Test according to EN 61000-4-11

Test criterion C

|                                                                                  |                                         |  |                    |            |      |          |
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## 5 RELIABILITY

### 5.1 MTBF

at 240V input voltage  $\geq 1.900.000$  hours

at 100V input voltage  $\geq 2.400.000$  hours

MTBF calculation according SN 29500 at 40°C ambient temperature

### 5.2 Maintainability

The power supply is not to be repaired.

|                                                                                  |                                         |  |                    |            |      |          |
|----------------------------------------------------------------------------------|-----------------------------------------|--|--------------------|------------|------|----------|
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|                                                                                  | Document prepared and responsible for   |  |                    |            |      |          |
|                                                                                  | M. Obritzhauser                         |  | Standard Programme |            |      |          |
|                                                                                  | Responsible for technical data          |  | Day                | Month      | Year | Revision |
|                                                                                  | M. Obritzhauser                         |  | 04                 | 02         | 04   | C        |

## 6 SAFETY

The units pass the following tests:

### 6.1 Dielectric Strength

The input isolation test voltage is 3kV 50/60 Hz, sinusoidal waveform. Test duration is 2 seconds for 100% test, 1 minute 4,24KV DC or lot-test..

### 6.2 Over-current Protection

The unit is not long time over-current proof. If the unit is powered longer than 1 min in overload conditions, the device can be damaged.

### 6.3 Single Component Failure

A single component failure does not cause any damage to persons or ambient (fire, explosions, etc).

### 6.4 Short Circuit

The power supply is designed with a short circuit protection. A shortened output does not cause any damage to persons or ambient (fire, explosions, etc.) After removing this conditions the unit fulfills the specification.

|                                                                                  |                                         |  |                    |            |      |          |
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|                                                                                  | M. Obritzhauser                         |  | Standard Programme |            |      |          |
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## 7 APPROVALS AND TEST STANDARDS

### 7.1 Test Standards

EN 60 950  
 UL 1310  
 EN 61000-6-1  
 EN 55022  
 EN 55011  
 EN 55014-1  
 EN 61204-3

### 7.2 Approvals

#### 7.2.1 EU/UK devices



Conformity with the EU low voltage directive and EMC directive



ENEC



GS

|                                                                                   |                                         |  |                    |            |      |          |
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|                                                                                   | Document prepared and responsible for   |  |                    |            |      |          |
|                                                                                   | M. Obritzhauser                         |  | Standard Programme |            |      |          |
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|                                                                                   | M. Obritzhauser                         |  | 04                 | 02         | 04   | C        |

### 7.2.2 US devices

 Conformity with the EU low voltage directive and EMC directive



GS



UL for Canada and the United States

### 7.2.3 Desktop Devices

 Conformity with the EU low voltage directive and EMC directive



ENEC



GS



UL for Canada and the United States

|                                                                                  |                                         |  |                    |            |      |          |
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|                                                                                  | Document prepared and responsible for   |  |                    |            |      |          |
|                                                                                  | M. Obritzhauser                         |  | Standard Programme |            |      |          |
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## 8 ORDERING INFORMATION

|           |                              |                                                                                                                        |
|-----------|------------------------------|------------------------------------------------------------------------------------------------------------------------|
|           | <b>POWER CLASS</b>           | <b>6 Watt</b>                                                                                                          |
| <b>P</b>  | <b>SUPPLY TYPE</b>           | <b>P = New Generation Power Supply</b>                                                                                 |
| <b>2</b>  | <b>OPERATION TEMP. RANGE</b> | <b>2 = -5°C to +40°C</b>                                                                                               |
| <b>E</b>  | <b>PRIMARY CONNECTOR</b>     | <b>E = Euro plug</b><br><b>U = US/Japan/Canada Plug</b><br><b>G = United Kingdom Plug</b><br><b>D = Desktop Module</b> |
| <b>F</b>  | <b>CABLE CONNECTION</b>      | <b>F = Fixed</b>                                                                                                       |
| <b>S</b>  | <b>APPLICATION</b>           | <b>S = Standard</b><br><b>M = Medical</b><br><b>H = Household</b>                                                      |
| <b>W</b>  | <b>WIDE INPUT RANGE</b>      | <b>W = 90V-264V</b>                                                                                                    |
| <b>3</b>  | <b>OUTPUT STABILITY</b>      | <b>3 = 3%</b>                                                                                                          |
| <b>6W</b> | <b>HOUSING DIMENSION</b>     | <b>6W</b>                                                                                                              |
| <b>6V</b> | <b>OUTPUT VOLTAGE</b>        | <b>3V-24V</b>                                                                                                          |
| <b>1A</b> | <b>OUTPUT CURRENT</b>        | <b>1200mA max.</b>                                                                                                     |

|                                                                                  |                                         |  |  |                    |       |      |          |
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|                                                                                  | Document prepared and responsible for   |  |  |                    |       |      |          |
|                                                                                  | M. Obritzhauser                         |  |  | Standard Programme |       |      |          |
|                                                                                  | Responsible for technical data          |  |  | Day                | Month | Year | Revision |
|                                                                                  | M. Obritzhauser                         |  |  | 04                 | 02    | 04   | C        |

## 9 PACKAGING AND WEIGHT

|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
|------------------------------|----|----|---------------------------------|----|-----|---------------------|------|-----|--------------------|-----|---------------|--------------------|--|---------------|--------------|--|-----------|-------------------|--|--|--------------------|--|--|------------------|--|--|---------------|--|--|--------------|--|--|-------------|--|--|
| Cable with connector 5.5/2.1 |    |    |                                 |    |     |                     |      |     |                    |     | 38 g          |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| Instruction Manual           |    |    |                                 |    |     |                     |      |     |                    |     | 3.6 g         |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| Euro pallet empty (wooden):  |    |    |                                 |    |     |                     |      |     |                    |     | 21 kg         |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| SINGLE PACKAGING             |    |    | PS 1.5m cable+connector 5.5/2.1 |    |     | Single carton empty |      |     | Single carton full |     |               | Packing case empty |  |               | Packing unit |  |           | Packing case full |  |  | Cartons per pallet |  |  | Euro pallet full |  |  | Single carton |  |  | Packing case |  |  | Euro pallet |  |  |
|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| P2                           | EU | 6W | 120                             | 13 | 137 | 180                 | 50   | 7.1 | 27                 | 213 | 126x68.5x43.5 |                    |  | 351x260x226   |              |  | 1200x800x |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| P2                           | US | 6W | 120                             | 13 | 137 | 180                 | 50   | 7.1 | 27                 | 213 | 126x68.5x43.5 |                    |  | 351x260x226   |              |  | 1200x800x |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| P2                           | Uk | 6W | 120                             | 16 | 140 | 180                 | 50   | 7.2 | 18                 | 151 | 136x76x50.5   |                    |  | 388x280x260.5 |              |  | 1200x800x |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
|                              |    |    |                                 |    |     |                     |      |     |                    |     |               |                    |  |               |              |  |           |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |
| Unit                         |    |    | g                               | g  | g   | g                   | Pcs. | kg  | Pcs.               | kg  | mm            |                    |  | mm            |              |  | mm        |                   |  |  |                    |  |  |                  |  |  |               |  |  |              |  |  |             |  |  |

|                                                                                  |                                         |  |                    |            |      |          |
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|                                                                                  | M. Obritzhauser                         |  | 04                 | 02         | 04   | C        |

## 10 SPECIALS FEATURES:

Following Specials can be offered on request

### 10.1 Output voltage tolerance 1%

The output voltage can be adjusted with a tolerance of  $\pm 1\%$ .

### 10.2 Visual operation Display (green LED)

When the green led is shining the output voltage is delivered.

### 10.3 Current regulation

The secondary voltage will be reduced when the selected output current is reached.

The max. Current which can be selected is 80% of  $I_{2\text{ Nominal}}$ .

The current regulation can be delivered at the secondary voltage range from 5 to 24V.

### 10.4 Pluggable secondary cable

Only available at Egston Standard - Plug In Powersupplies.

### 10.5 Customer specific secondary Plug

### 10.6 Australian Primary plug

### 10.7 Print module

The power supply is built in a housing which can be soldered on to a PCB.