

# NIM / CAMAC

## Crates

### User Manual



### General Remarks

The only purpose of this manual is a description of the product. It must not be interpreted as a declaration of conformity for this product including the product and software.

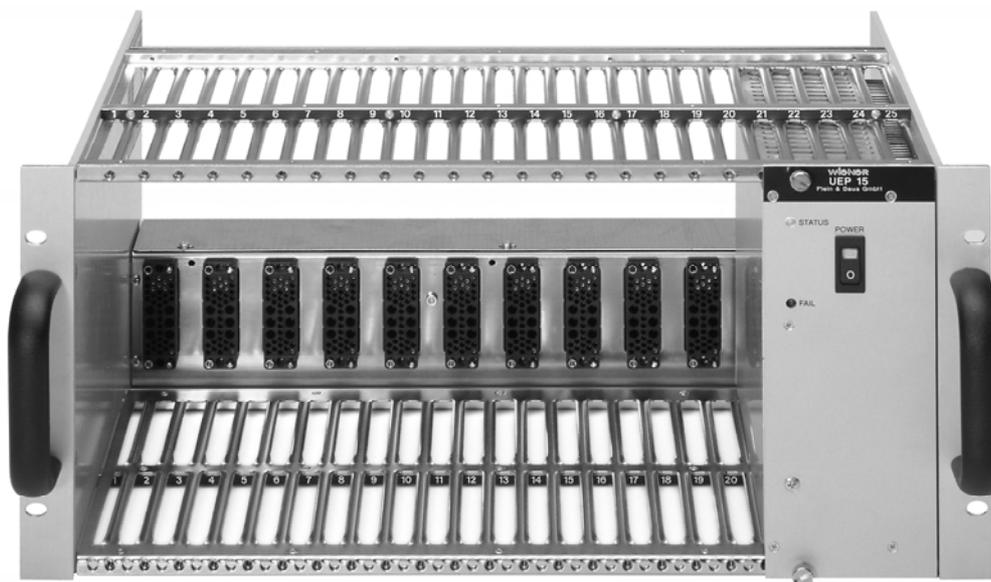
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UEN 04 equipped with UEP 15

**W-IE-NE-R**

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 dichiariamo sotto nostra esclusiva responsabilità che il prodotto  
 erklärt in eigener Verantwortung, dass das Produkt

## **NIM / CAMAC – Power Supply CEP 22M, 10M88, 10M52, 10M53, 10M66**

**Items: 0331.1xxx, 0331.2xxx**

to which this declaration relates, is in conformity with the following standards or  
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auquel cette déclaration se refait, est conforme aux normes ou aux autres  
 documents normatifs:

al quale si riferisce la dichiarazione, è conforme alle seguenti normative:

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen  
 Dokumenten übereinstimmt:

1. EN 50 081-2 (EN 50 022 Cl. B)
2. EN 50 082- 1
3. EN 60950

Conditions: Use in conformity of the definitions inside a crate, which is mounted  
 inside a closed 19" box and equipped with fully closed slots by front  
 panels. Otherwise provisions have to be foreseen by the user that  
 NIM connectors become untouchable (110VAC secondary has been  
 wired to NIM connectors!)  
 Admitted for powering by industrial mains only.

Bedingungen: Bestimmungsgemäßer Gebrauch im Crate, bei dem alle Slots mit  
 Frontplatten bestückt sind und das Bin in ein geschlossenes 19"-  
 Gehäuse eingebaut ist.  
 Zugelassen für Anschluß an industrielle Netzversorgungen.

Name and signature of authorized person  
 Nome et signature du signataire autorisé  
 Nome e firma della Persona autorizzata  
 Name und Unterschrift des Befugten

Place and date  
 Lieu et date  
 Luogo e data  
 Ort und Datum

26. Nov. 2003

Dipl. Ing. Jürgen Baus

51399 Burscheid

Director

Muellersbaum 20

[www.wiener-d.com](http://www.wiener-d.com)

Germany

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## **NIM Compact, Slot Power Supply UEP 15**

**Items: 0330.2150, 0330.9007, 0330.9007B**

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auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen  
 Dokumenten übereinstimmt:

4. EN 50 081-1 (EN 50 022 B)
5. EN 50 082- 1
6. EN 61 000-3-2, -3-3
7. EN 60 950

Conditions: Use in conformity of the definitions inside a crate, which is mounted  
 inside a closed 19" box and equipped with fully closed slots by front  
 panels. Otherwise provisions have to be foreseen by the user that  
 NIM connectors become untouchable (110VAC secondary has been  
 wired to NIM connectors!)

Bedingungen: Bestimmungsgemäßer Gebrauch im Crate, bei dem alle Slots mit  
 Frontplatten bestückt sind und das Bin in ein geschlossenes 19"-  
 Gehäuse eingebaut ist.  
 Andernfalls muß der Anwender Vorkehrungen zum  
 Berührungsschutz der NIM Stecker treffen (110VAC sec. ist auf NIM  
 Stecker geführt!)

Name and signature of authorized person  
 Nome et signature du signataire autorisé  
 Nome e firma della persona autorizzata  
 Name und Unterschrift des Befugten

Place and date  
 Lieu et date  
 Luogo e data  
 Ort und Datum

22. July 2004

Dipl. Ing. Jürgen Baus

51399 Burscheid

Director

Muellersbaum 20

[www.wiener-d.com](http://www.wiener-d.com)

Germany

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**CAMAC – Power Supply CS 236****Items: 0341.2007**

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 documents normatifs:

al quale si riferisce la dichiarazione, è conforme alle seguenti normative:

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen  
 Dokumenten übereinstimmt:

- 8. EN 50 081 – 1 (EN 50 022 B)
- 9. EN 61 000 –3 –2, 3 –3, 4 –1... 6, 4 -11
- 10. EN 50 082 – 1

Conditions: Use in conformity of the definitions inside a crate, which is mounted  
 inside a closed 19" box and equipped with fully closed slots by front  
 panels. Admitted for powering by all mains.

Bedingungen: Bestimmungsgemäßer Gebrauch im Crate, bei dem alle Slots mit  
 Frontplatten bestückt sind und das Bin in ein geschlossenes 19"-  
 Gehäuse eingebaut ist.  
 Zugelassen für Anschluß an alle Netzversorgungen

Name and signature of authorized person  
 Nome et signature du signataire autorisé  
 Nome e firma della persona autorizzata  
 Name und Unterschrift des Befugten

Place and date  
 Lieu et date  
 Luogo e data  
 Ort und Datum

11 January 2002

Dipl. Ing. Jürgen Baus

51399 Burscheid

Director

Muellersbaum 20

[www.wiener-d.com](http://www.wiener-d.com)

Germany

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## 1 General Information

All W-IE-NE-R NIM and CAMAC Crates consist of a bin, a fan tray (except UEN 03 and UEN 04) and a power supply. The NIM power supplies are (almost) always linear regulated, while the CAMAC power supplies are either in linear- (till 600W) or switching low noise technology.

### 1.1 NIM-CAMAC bins

#### 1.1.1 NIM Bin UEN 04

The **UEN 04** is a 5U NIM-bin for 10 (resp. 5 for the transportable version) NIM-modules. The power supply UEP 15 has to be plugged frontally in the 2(1/2) slots at the right side (slot 11, 12 +). The bin is equipped with 12 high-quality long-life NIM connectors, which are completely wired parallel (+/-6V, +/-12V, +/-24V, Ground, 115VAC, Clean Earth). The installed connector pins are made of massive brass, gold plated. The connector foreseen for connecting the power supply has additional voltage pins paralld for +/-6V.

Low voltage power lines are separately wired with large cross section from power supply connector to the middle of the NIM Module connector board to keep the voltage drop as low as possible since sense lines for voltage drop compensation are not foreseen.

Dimensions (whd): 483mm (=19") x 310mm x 340mm

#### 1.1.2 NIM Bin UEN 01

The **UEN 01** is a 7U NIM-bin for 12 high powered NIM-modules. The power supply has to be plugged in and locked from the rear side. For the fan tray unit a space of 2U high is foreseen, to bear any kind of fan units which are designed according to the relevant CERN spec. The bin is equipped with 12 high-quality long-life NIM connectors, which are completely wired parallel. The installed connector pins are made massive brass, gold plated.

Dimensions (whd): 483mm (=19") x 310mm x 525mm (with power supply max 570mm), weight 11,4 kg

#### 1.1.3 NIM Bin UEN 03

The NIM-bin **UEN 03** is a 5U NIM-bin for 12 NIM-modules according to the NIM specification. The wiring and mechanic accords to CERN spec. The frontpanel is equipped with main switch, control LEDs and test sockets for all voltages. The **UEN 03** has **no space for a fan tray**. The power supply, UEP (CEP) 10/21/22 will be mounted on its rearside. The installed connector pins are made massive brass, gold plated.

Dimensions (whd): 483mm (=19") x 222mm x 525mm (with power supply max. 570mm), weight: 9,2 kg

All bins have additional free pins paralld to  $\pm 12V$  for 26A current capability

**Switches:**

<b>POWER ON/OFF</b>	main switch for power supply
---------------------	------------------------------

**Indicators:**

<b>AC POWER</b>	main switch integrated
<b>STATUS</b>	green LED lights if all voltages are within the limits*
<b>OVERHEAT</b>	yellow LED lights if an overheat in the power supply occur
<b>OVERLOAD</b>	red LED lights if an over-current is detected

## 1.1.4 CAMAC Bin UEC 01VH

The CAMAC-bin **UEC 01 VH** is a 7U CAMAC-crate for 25 CAMAC-modules according to CERN-CAMAC-NOTE 46-04 and **with the additional Y1/Y2 (current) lines parallel to  $\pm 6V$  for 80 A capability and with the additional free pins paralld to  $\pm 12V$  for 26A max.** The module connectors have been centered by metal-guides, before touching the dataway plugs. Power supply plugged in and locked from rear side, fan tray from front side.

Dimensions (whd): 483mm (=19") x 310mm x 525mm (with power supply 570mm)

## 1.2 Fan Tray UEL 03 (LX Fan tray)

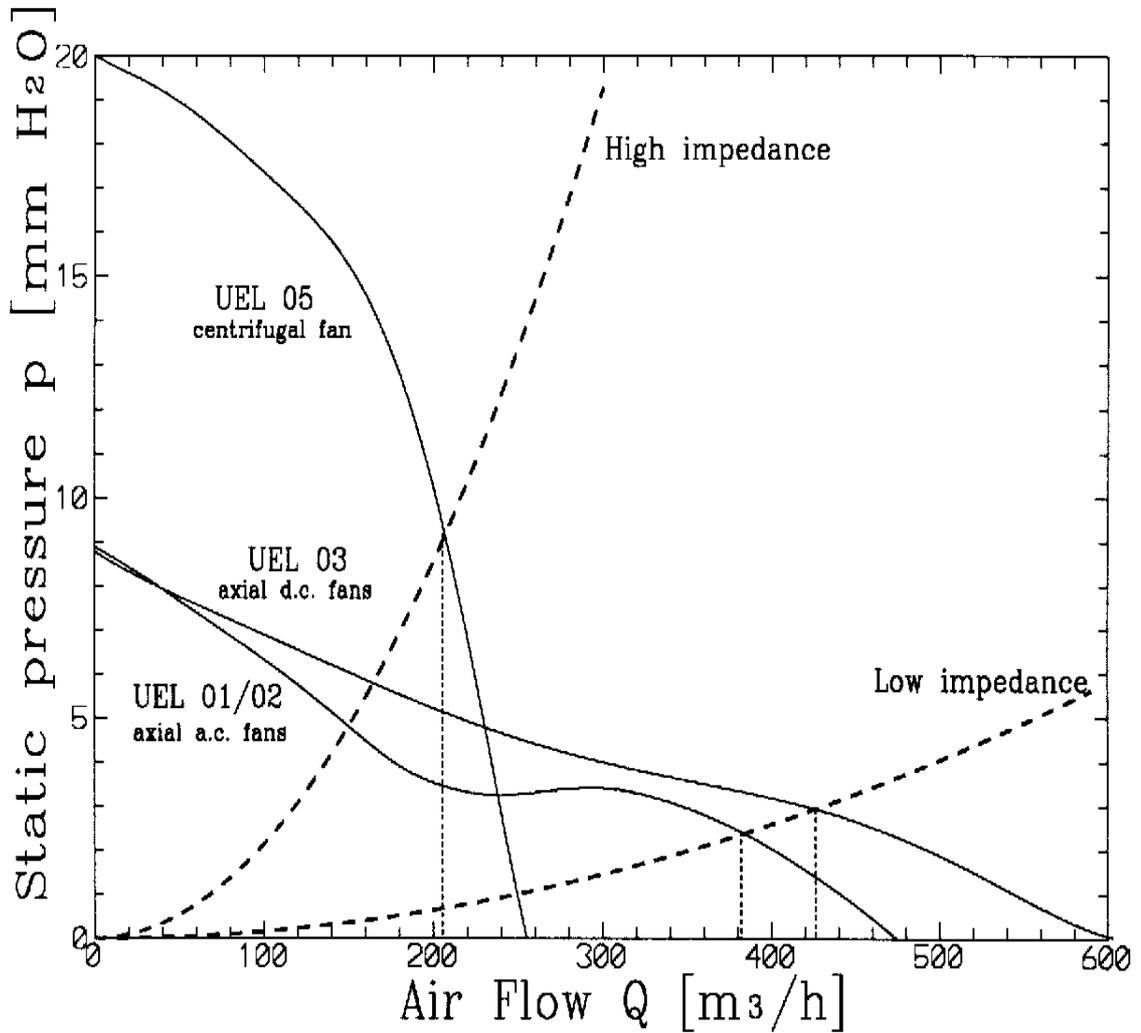
Except the UEN 03 and UEN 04 bins, all NIM and CAMAC Crates are equipped with UEL03 fan tray, which conforms the CERN specification entirely and adds some interesting features, like variable fan speed, alphanumeric display etc.

The W-IE-NE-R UEL 03 can be used in all NIM or CAMAC crates which are strongly in conformity with the CERN standards. Three built-in DC-fans with variable fan speed produce a sufficient air flow to dissipate the heat produced by the plugged in NIM or CAMAC modules. The micro-processor based fan tray unit is equipped with an alphanumeric display to inform about voltages, currents, temperatures, power and fan speed. In case of malfunctions this display can be used as a diagnostic system for trouble shooting. If used together with the PS 236 W-Ie-Ne-R high power CAMAC power supply, software controlled current limits can be defined by the help of the front panel display and switches. Additionally the unit can be equipped with an interface for crate remote control (IEC, HS-CAENET, or CANbus).

The fan-tray can be operated in two different air inlet modes.

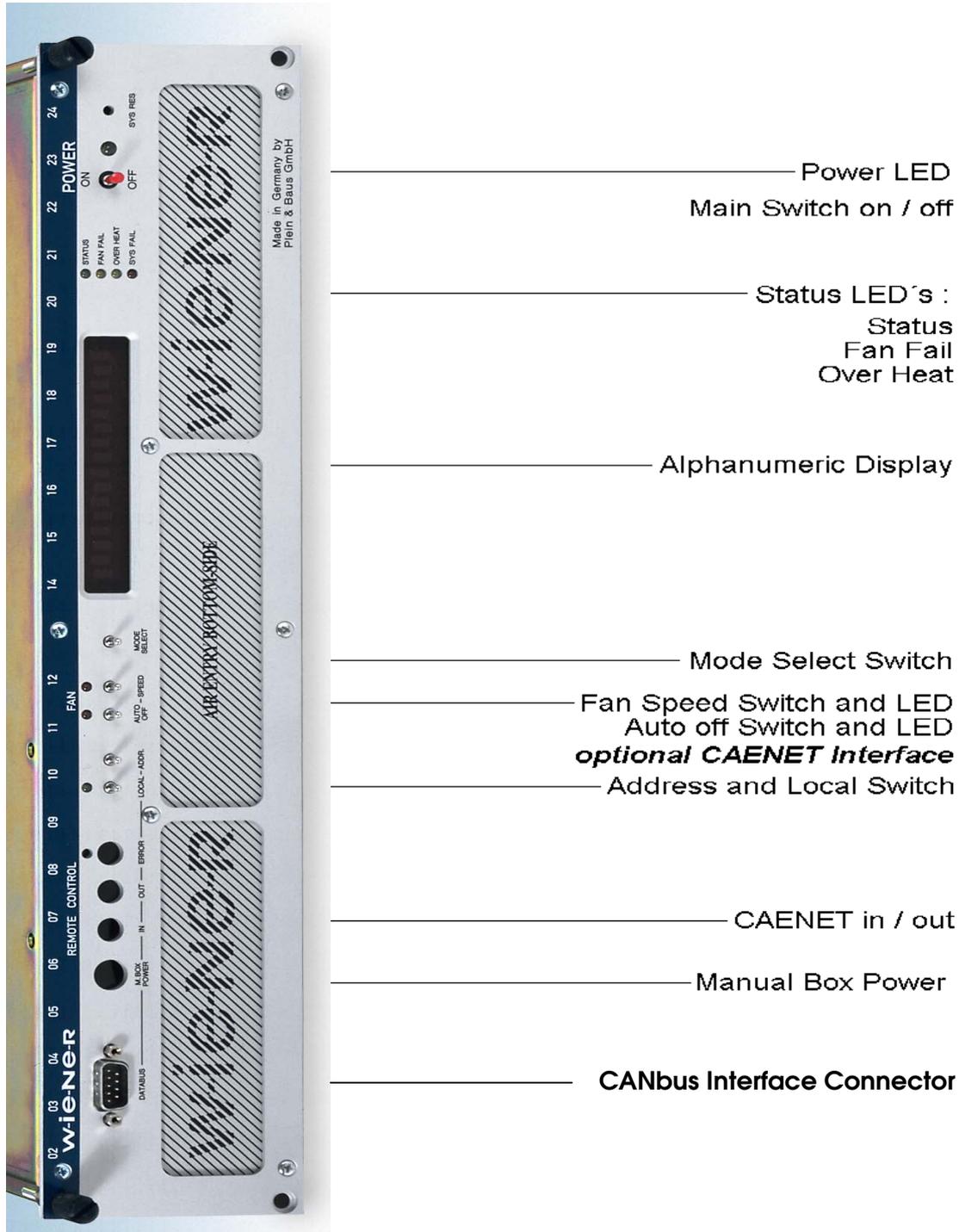
In the standard mode the air is taken from the front and then pushed upwards to the modules.

A bottom side air inlet for full cooling efficiency can be reached by removing the bottom plate of the fan-tray and mounting an optional front cover. The maximal air flow reached in this mode is greater than  $540 \text{ m}^3/\text{h}$  and shows a good homogeneity. Thus, up to 1650 W may be dissipated by this air flow. As depicted in fig. 1 the maximum air flow as well as the static pressure depends on the air resistance given by the plugged in modules.

**Fig. 1**

The graphs “UEL 01, 02, 05” concerns former fan tray models which are no longer in current production.

1.2.1 UEL 03M frontpanel, operating and monitoring functions



### 1.3 UEP / CEP and PS / CS power supplies

The difference between an UEP XX and an CEP XX power supply is, that the UEPs fulfill the CERN-Standard, while the CEP's fulfill the CE standard, what concerns the AC-mains interconnection of power supply and fan tray. Both types are **linear regulated** and unless nothing else is mentioned all statements made for an UEP XX are also valid for a CEP XX.

CEP power supplies are compatible to CEL fan trays only!

The PS 236 XXX and the CS 236 XXX power supplies are designed in **low noise switching technology**. The PS 236 XXX fulfills the CERN standard and the CS 236 XXX the CE standard. Unless nothing else is mentioned, all statements made for a PS 236 XXX are also valid for a CS 236 XXX.

#### 1.3.1 UEP 15 NIM Power Supply

The UEP 15 is a 2 1/2 NIM size plug-in power supply for use in NIM compact /portable bins UEN 04 with all 6-DC voltages and 115VAC 0,2A with a maximum of 150W continuous power output.

UEP 15 is fully CE compliant. Monitoring and control is simpler designed and is equipped with a cut-off protection for overload and overtemperature as well as over- and undervoltage.

The front panel is equipped with the mains switch and control LEDs for status and failure. The power distribution is done within the NIM bin UEN 04 by parallel wiring of the NIM connectors. UEP 15 is also able to work in any NIM bin at any slot to power the other paralalled NIM connectors.

Do not use this slot power supply in a NIM bin, when any other power supply is connected to that concerned NIM bin!

### 1.4 Power supply cooling

UEP/CEP 10Mxx, UEP 15 and PS/CS 236 are equipped with sufficient long life DC blower to provide perfect cooling of the unit to avoid overheating under all specified conditions. UEP/CEP 22M is designed for convection cooling. With the help of forced cooling air (by extern situated blower) the output performance of UEP 22M can be boosted up to 400W.

## 2 Operation, Function and Control

### 2.1 Fan tray operation and control

#### 2.1.1 Function of fan tray switches and information of the LEDs

##### Switches:

<b>POWER ON/OFF</b>	main switch for ventilation
<b>MODE SELECT</b>	selection switch to choose items and values for fan tray and power supply and control
<b>FAN SPEED</b>	push button for stepwise in-or decrease fan speed
<b>FAN AUTO OFF</b>	If this switch is used, the crate will still be powered, even if there is a fan failure.

##### LED indicators:

<b>AC POWER</b>	green large LED lights , if POWER is on
<b>STATUS</b>	green LED lights if all voltages are within the limits
<b>FAN FAIL</b>	yellow LED lights if a fan failure is recognized
<b>OVERHEAT</b>	yellow LED lights if an overheat in the power supply occurs
<b>FAN SPEED</b>	red control LED for reduced fan speed (below 3000 rpm)
<b>FAN AUTO OFF</b>	red control LED for “only warning after fan failure” mode (DC off after failure disabled)

### 2.1.2 Programming of the fan tray UEL 03 (In connection with PS 236)

Following steps are necessary to change the factory settings ( $U_{max}$ ,  $U_{min}$ ,  $I_{max}$ )

- Crate must be switched on
- Choose the channel with the lever-switch ‘MODE SELECT’
- Hold simultaneously the lever-switch ‘MODE SELECT’ and ‘POWER’ in top position and wait about 10 seconds.
- Choose with ‘MODE SELECT’ what you want to change:  $U_{max}$ ,  $U_{min}$ ,  $I_{max}$
- Bring lever ‘POWER ON’ in top position for about 10 seconds.
- Change the value through ‘MODE SELECT’
- Push lever ‘POWER OFF’ down to confirm the new value
- Push lever ‘POWER OFF’ down to come back to the normal working status.

If you want to change the ‘AUTO POWER ON/OFF’ function following steps are necessary:  
Crate must be switched on

Use lever-switch ‘MODE SELECT’ until ‘POWER’ is displayed.

- Hold simultaneously the lever ‘MODE SELECT’ and ‘POWER’ in top position and wait about 10 seconds.

Change setting by ‘MODE SELECT’

Confirm setting by pushing ‘POWER OFF’

### 2.1.3 Programming of the fan tray UEL 03 (In connection with UEP XX(CEP))

By following the steps shown at point 2.1.2 you have to change the sensitivity of the displayed currents on the channels  $\pm 12V$  and  $\pm 24V$  (while 6V channels have 10mV/A):

UEP 10M88: 25mV/A (10M52: 5mV/A at +6V/65A, 10M53: 5mV/A at -6V/65A)

UEP 10M66: 10mV/A

UEP 22M: 50mV/A

## 2.1.4 Remote control (optional)

**W-IE-NE-R** Fan trays are optionally equipped with a CANbus, IEC (IEEE) or H.S.-CAENET interface connector as well as the correspondent interface . For further details see separate manual 00183.A0.

### 2.1.4.1 CAN-bus interface operation:

If equipped with the optional CAN-bus interface the front panel offers additional elements for network operation:

**UEL (CEL) 03 SWITCHES**

ADDR	CAN-bus crate address
LOCAL	not used

**LED – INDICATORS**

LOCAL	green large LED lights when net is OK
-------	---------------------------------------

The 9-pin Sub-D connector for CAN-bus interfacing is prepared according to CiA DS 102-1:

Pin	Line	Comment
1	-	reserved by CiA
2	CAN_L	CAN_L bus line (dominant low)
3	GND	Ground
4	-	reserved by CiA
5	-	reserved by CiA
6	-	
7	CAN_H	CAN_H bus line (dominant high)
8	-	reserved by CiA (failure signal)
9	-	

To change the CAN-bus address the ADDR switch has to be pressed. The address can be selected within the range 1 ... 127. The chosen net address is displayed on the fan tray display. If the display has been showing another parameter (voltage, fan speed, ...) before changing the net address it will return to the previous display. To close the crate for remote control the position „CANBUS DISABLED“ has to be chosen.

Within the **W-IE-NE-R** CAN-bus protocol a broadcast call to all connected crates is possible (see CAN-BUS Interface report) . The address for this general call is factory prepared to 127 however it can be changed by the following procedure:

1. Select display channel „GENERAL CALL“ with *MODE SELECT* switch.
2. Switch up or down the ADDR switch to change the value.

If the crate has to be disabled for general call the position „GENERAL CALL OFF“ has to be selected.

According to the CAN bus specification the data transfer speed depends on the net length as given within the following table:

Max. Distance	Bit Rate	Type
10 m	1.6 Mbit/s	high- speed
40 m	1.0 Mbit/s	
130 m	500 kbit/s	
270 m	250 kit/s	
530 m	125 kbit/s	
620 m	100 kbit/s	low-speed
1300 m	50 kbit/s	
3300 m	20 kbit/s	
6700 m	10 kbit/s	
10.000 m	5kbit/s	

To adjust the net speed for a given net length select the bit rate according to this table and set on the crates:

1. Select display channel „SPEED“ with *MODE SELECT* switch.
2. Switch up or down the ADDR switch to select the required rate.

## 2.2 NIM-CAMAC Bin technical details

### 2.2.1 CAMAC Bin UEC 01 Pin assignment **PG 26** to power supply (**PG27**)

chassis ground	65	+6V return	43-44-45-46-70
220V phase switch	74	-6V	47-48-49-50-67
220V phase mains	75 (not CE versions)	-6V return	51-52-53-54-71
220V neutral switch	76	+12V	55
220V neutral mains	77 (not CE versions)	+12V return	56
117VAC neutral	78	-12V	57
117VAC phase	79	-12V return	58
+12V*	80 (+200V)	+24V	59
+200V return	82	+24V return	60
power failure	1	-24V	62
overload warning	2	-24V return	63
overheat warning	3	0V monitor	5
buzzer warning	4	Y1 current	7 (N.C.)
Y2 sensing	28 (N.C.)	Y1 current return	8 (N.C.)
Y2 sensing return	27 (N.C.)	Y2 current	10 (N.C.)
+6V sensing	29	Y2 current ret	11 (N.C.)
+6V sensing return	26	clean earth	64
-6V sensing	30	+6V current	12
-6V sensing return	27	+6V current return	13
+12V sensing	31	-6V current	14
+12V sensing return	26	-6V current return	15
-12V sensing	32	+12V current	16
-12V sensing return	27	+12V current return	17
+24V sensing	33	-12V current	18
+24V sensing return	26	-12V current return	20
-24V sensing	34	+24V current	21
-24V sensing return	27	+24V current return	22
+6V*	35 (Y1)	-24V current	23
+6V*	36 (Y1 return)	-24V current return	24
-6V*	37 (Y2)	Y1 sensing	25 (N.C.)
-6V	38 (Y2 return)	Y1 sensing return	26 (N.C.)
+6V*	39-40-41-42-66	status warning	72
		-12V*	73

2.2.2 NIM UEN 01/03 Pin assignment **PG 26** to power supply (**PG27**)

Function	PG 26		
chassis ground	65	+6V sensing	29
220V phase switch	74	+6V sensing return	26
220V phase mains	75 (not CE versions)	-6V sensing	30
220V neutral switch	76	-6V sensing return	27
220V neutral mains	77 (not CE versions)	+12V sensing	31
117 V a.c. neutral	78	+12V sensing return	26
117 V a.c. phase	79	-12V sensing	32
+12V *	80 (+200V)	-12V sensing return	27
+200V return	82	+24V sensing	33
power failure	1	+24V sensing return	26
overload warning	2	-24V sensing	34
overheat warning	3	-24V sensing return	27
buzzer warning	4	+6V	39-40-41-42-66
0V monitor	5	+6V return	43-44-45-46-70
clean earth	64	-6V	47-48-49-50-67
+6V current	12	-6V return	51-52-53-54-71
+6V current return	13	+12V	55
-6V current	14	+12V return	56
-6V current return	15	-12V	57
+12V current	16	-12V return	58
+12V current return	17	+24V	59
-12V current	18	+24V return	60
-12V current return	20	-24V	62
+24V current	21	-24V return	63
+24V current return	22	status warning	72
-24V current	23	0V signal	5
-24V current return	24	-12V *	73

\* special pin out as an extension to Cern spec. version.

2.2.3 UEN 01 / UEC 01 Pin assignment **PG 32** to fan tray (**PG 31**)

Chassis ground	h	+12V current return	R
220V phase switch	AA	-12V current	S
220V phase mains	BB (not CE versions)	-12V current return	T
220V neutral switch	CC	+24V current	U
220V neutral mains	DD (not CE versions)	+24V current return	V
117V a.c. neutral	EE	-24V current	W
117V a.c. phase	FF	-24V current return	X
+200V	HH	+6V	a
overload warning	B	-6V	b
overheat warning	C	+12V	c
buzzer warning	D	-12V	d
+6V current	K	+24V	e
+6V current return	L	-24V	f
-6V current	M	0V voltage monitor.	k
-6V current return	N	0V voltage warning	j
+12V current	P	status warning	A

### 3 Power supplies, Function and adjustments

All Power Supplies will be shipped with proper adjusted DC output voltages as company settings. Readjustments for linear regulated power supplies can be done via corresponding voltage trimmer. Since all power supplies have been equipped with window comparators with min. and max. threshold for the “Status Good” signal. Threshold exceeding activates trip off. While the status window for 22M and 10Mxx types are fix (+/-3% window), it is adjustable with UEP 15 and PS/CS236. All types except UEP 15 are outfitted with crowbar over voltage protection, also with adjustable response threshold as well as with sense lines for each DC output.

#### 3.1 Power Supply UEP 15

When all six DC voltages are in their limits, the green “Power On” LED is active. If one or more DC outputs exceed the status window thresholds a cut off relay will disconnect the transformer from AC mains. The relay locks and the red failure LED starts to light.

**The red failure LED is recessed mounted to prevent any mechanical damage of it's body since it is operated at mains potential !**

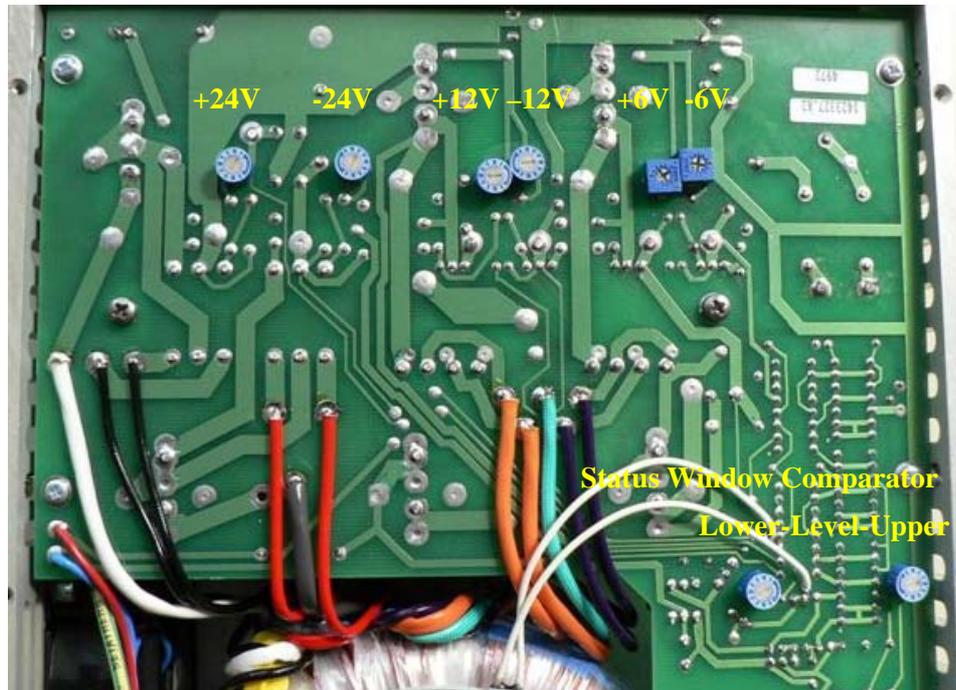
Release of the locking circuit after fault clearance by switch off or disconnect from mains for approximately 10 seconds.

### 3.1.1 Changing of default settings, recalibration

UEP 15 allows to adjust the six DC output voltages and the Limits of the status window.

Current limits are given by the used voltage regulators.

The trim points are accessible after removing



### 3.1.2 UEP 15 and CANbus Remote Monitor

On request UEP 15 can be outfitted with a CANbus interface. The functions are limited to On/Off and monitoring of DC voltages only.

## 3.2 Power Supply UEP (CEP) 10Mxx –22M

### 3.2.1 Regulator boards UEP 10/22

The six control circuits for the  $\pm 6V$ ,  $\pm 12V$ ,  $\pm 24V$  are of the similar design.

All outputs are short circuit protected by means of an electric circuit providing a fold back characteristic. Due to the additional status control the unit will trip off normally in case of overload. The foldback behavior becomes active only when:

1. The status window circuit is faulty
2. The status window circuit is readjusted
3. The control circuit is disabled (PG 28 M- monitoring, pin 28)

Dual tracking:

For some applications of the power supply it is important that during turn on or turn off transients opposite voltages have the same absolute value. This feature is

achieved by a small additional circuit which clamps the deviation to nearly  $\pm 0.3V$ . Any higher nonsymmetrical output voltage shifts this bias of the regulator to nonsymmetrical levels and the voltage control circuit will regulate both outputs nearly symmetrical to the ground.

The total regulator circuit comprises 3 integrating control loops for:

output voltage

fold back characteristic

dual tracking

### 3.2.2 Monitoring and alarming signals (UEP 10/21/22/52/53/55/65)

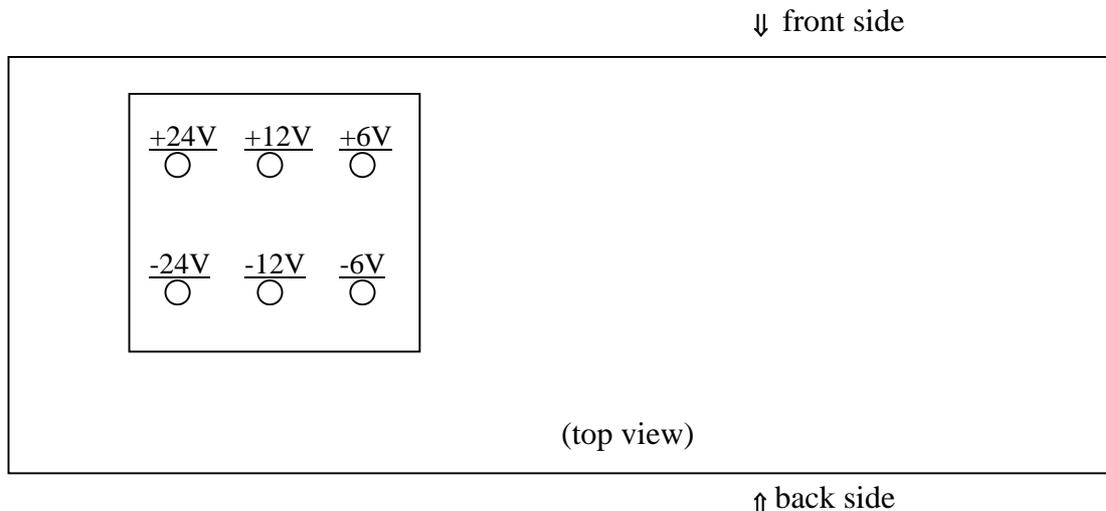
In case of over temperature at fan tray or bin controller a yellow LED lights, in case of overload a red LED lights. In both cases a buzzer warns the user; Inside the power supply the power transformer will be disconnected from mains by a locking relay. The unit can be restarted after fault clearance by switch off or disconnect from mains for a couple of seconds or by feeding 5V to the rearming input at PG 28 connector.

Temperature warning is a **special option** which operates the over temperature LED before the max. temp. level is reached.

### 3.2.3 Temperature sensors

All linear regulated power supplies of 10M and 22M series are controlled with 4 independent temperature sensors. Two are placed at the top of the heat sink, one is placed on the control board and one sensor is inside the transformer. If one of this four sensors exceeds the maximum temperature-level, the temp. off function will interrupt the AC mains circuit.

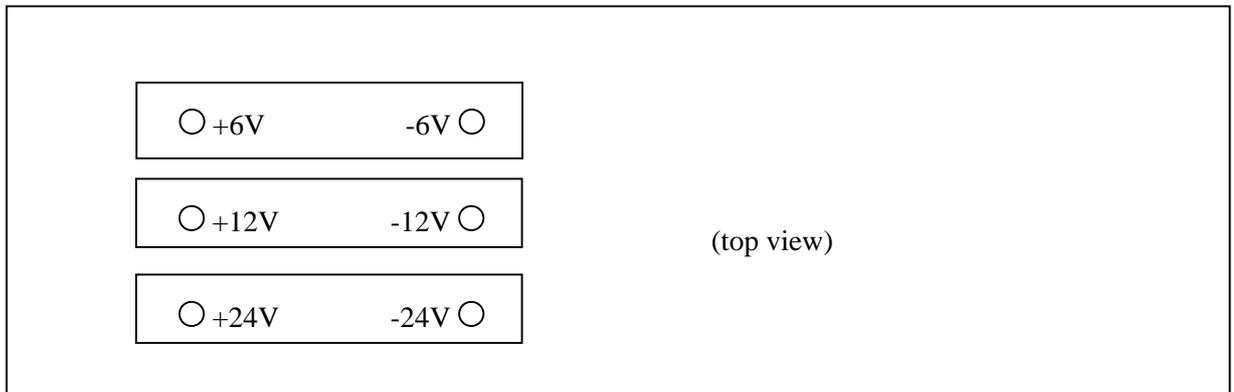
### 3.2.4 Calibration of output voltage (UEP 10, 52, 53, 66)



Voltages can be set by using the trim-pots on the top of the power supply

## 3.2.5 Calibration of output voltage (UEP 21/22)

⇓ front side



⇑ back side

Voltages can be set by using the trim-pots on the top of the power supply

3.2.6 Pin assignment **PG 28** for *M*-power supplies

Power failure monitor	12	-12V current monitor (N.C.)	32
0V signal	8	-12V current return monitor (N.C.)	33
Status monitor	11	+24V current monitor (N.C.)	13
Status return monitor	23	+24V current return monitor (N.C.)	14
0V = Inhibit (DC-off)	26	-24V current monitor (N.C.)	19
0V = Disable	28	-24V current return monitor (N.C.)	20
Rearming +5V input	35	+6V monitor	3
Rearming +5V return	34	-6V monitor	4
+6V current monitor (N.C.)	15	+12V monitor	2
+6V current return monitor (N.C.)	16	-12V monitor	5
-6V current monitor (N.C.)	17	+24V monitor	1
-6V current return monitor (N.C.)	18	-24V monitor	6
+12V current monitor (N.C.)	30	0V monitor	9
+12V current return monitor (N.C.)	31		

3.3 Power supply **PS (CS) 236, 3U max. 1900W**

The CAMAC power supply of the new 236 series is entirely micro-processor controlled designed in the very high density **W-IE-NE-R**- cavity technology, which provides an **extremely low** noise output voltage. Due to these low noise figures the PS/CS 236 can be used trouble free for NIM application, too, in combination with the special outfitted UEN01 VH bin.

The PS 236 considers *CERN* Specification, while the CS 236 is designed according to the CE rules. The predominant detail is the wiring of the mains between power supply and fan tray, which has to be outfitted either as *CERN* – version (=PS types) or as *CE*- version (=CS types).

CE types feature a separate powercord, plugged on top of the power supply box and to the rear side of the fan tray, where it is fixed by a cable gland.

EMC compatibility is accomplished by meeting the EN 50 022, EN 61000-6-3 for generic emissions as well as the EN 61000-6-2 for immunity. The insulation performs the EN 60 950, ISO 380, VDE 0805 (SELV)! Furthermore are considered UL 1950, UL 1012, UL 478, C 22.2.950, C 22.2.220/234.

The power packs are readily replaceable. The maximum output power is 1900W if mains voltage is >150VAC.

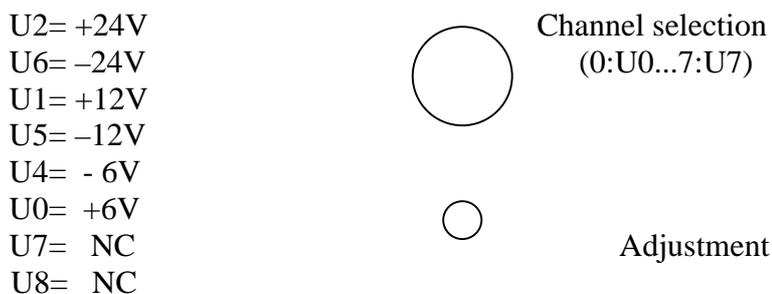
Turning on the power supply all voltages reach the nominal values nearly simultaneously within 50ms  $\pm$ 2.5ms whereby the voltages versus time curve shows a monotonic behavior. During any trip off the outputs will be discharged by the crowbars to a value of 10% of the nominal voltages within 2,5ms.

By the help of the remote sense lines an output voltage compensation of at least 0.5V at full load is possible.

### 3.3.1 Adjustment

All output voltages can be adjusted manually using the rotary switches on the power supply top. It has to be considered that the programmed “Status-Window” with  $U_{\min}$  and  $U_{\max}$  must be set accordingly. Otherwise over- or under-voltage will lead to DC trip off.

Programming features see above 2.12



### 3.3.2 Pin assignment **PG 28** for PS / CS 236

See diagram below 2.4.6

PS / CS 236 units are standardized with fully M-type monitoring facilities.

**APPENDIX A: Technical details UEP 10M88, 10M52, 10M53, 10M66**

Input:	230VAC <sub>nom</sub> +10-15%, 48-63 Hz, inrush current limited to <15A, with mains filter and fuse protection
	Type 10M88B 115VAC <sub>nom</sub> , Type 10M88J 100VAC <sub>nom</sub> ,
Derating:	600W output up to 42°C, with a derating of 2%/K up to 60°C
Noise and ripple:	full load < 0.6mV eff, <3mVpp, 1mV at 80% rated power
Regulation load:	10 to 100% Uout < 0.05%, line ±10% Uout < 0.02%
Recovery time: load change 10% to 100%	< 0.15 ms
Output impedance:	static < 0.2mOhm, dynamic at 100kHz < 0.3 Ohm
Temperature error:	< 5*10 <sup>-5</sup> /K
Thermal protection:	overheating protection by thermal sensors (4 fold),
Current limit:	adjusted to rated current
Characteristics: short circuit protected by fold back characteristic, short circuit current < 3A resp. 1A, reverse bias diodes.	
DC off:	<5ms if >+/-3% deviation from nominal values (status window), after overload, overvoltage, undervoltage, fan fail and overheat.
DC Outp. Voltages:	calibration range >±5% rated voltage, dual tracking for all ±DC outputs overvoltage protection (crow bar), ±6V, ±12V, ±24V default calibration ±7.3V, ±14.5V, ±28.5V
M-monitoring:	with status-signal and status-relay, rearming and inhibit input, power-fail-signal, remote monitoring acc. to CERN-CAMAC-note 46-04

Output voltages, currents and total power:

Outputs	+6V	-6V	+12V	-12V	+24V	-24V	115 VAC	Max Power
UEP 10M88	45A	45A	8A	8A	8A	8A	0.5A	600W
CEP 10M88	45A	45A	8A	8A	8A	8A	0,5A	600W
UEP 10M52	65A	32A	-----	-----	6A	6A	0.5A	650W
CEP 10M52	65A	32A	-----	-----	6A	6A	0,5A	650W
UEP 10M53	32A	65A	-----	-----	8A	8A	0.5A	650W
CEP 10M53	32A	65A	-----	-----	8A	8A	0,5A	650W
UEP 10M66	20A	20A	15A	15A	4A	4A	0.5A	600W
CEP 10M66	20A	20A	15A	15A	4A	4A	0,5A	600W

Note: The total Power consumption of the same polarity (+ or -) should not exceed 400W.

Example 10M88 :	+6V/45A=270W	+6V/40A=240W
	+12V/8A= 96W	+12V/4A= 48W
	+24V/8A=192W	+24V/4A= 96W
	not allowed: Σ=558W	allowed: Σ=384W

## APPENDIX B: Technical details UEP 22 M

Input:	230V (or 115V) +10%-15%, 48-63Hz, inrush current limited to < 15/30A  Type 22M <b>B</b> 115VAC <sub>nom.</sub> Type 22M <b>J</b> 100VAC <sub>nom.</sub>
Derating:	300W full power up to 50°C, derating 2%/K up to 60°C
Noise and ripple:	full load < 0.6mV eff, < 3mVpp, 1mV at 80% rated power
Regulation:	10 to 100% U <sub>out</sub> < 0.05%, line ±10% U <sub>out</sub> < 0.02%
Recovery time:	load change 10% to 100% < 0.15 ms
Output impedance:	static < 0.2mOhm, dynamic at 100kHz < 0.3 Ohm
Temperature error:	<5*10 <sup>-5</sup> /K
Thermal protection:	overheating protection by thermal sensors (4 fold),
Current limit:	adjusted to 115% of rated current, adjusting range ±20%
Characteristics:	short circuit protected by fold back characteristic, short circuit current < 3A, reverse bias diodes.
DC off:	<5ms if >+/-3% deviation from nominal values (status window), after overload, overvoltage, undervoltage, fan fail and overheat.
DC Outp.Voltages:	calibration range >±5% rated voltage, dual tracking for all ±DC outputs overvoltage protection (crow bar), ±6V, ±12V, ±24V default calibration        ±7.3V, ±14.5V, ±28.5V
M-monitoring	status-signal and status-relay, rearming and inhibit input, power-fail-signal, remote monitoring acc. to CERN-CAMAC-note 46-04

### Output voltages, currents and total power

Outputs	+6V	-6V	+12V	-12V	+24V	-24V	115 VAC	Max. Power
UEP 22M	17A	17A	3.4A	3.4A	3.4A	3.4A	0.5A	300W
CEP 22M	17A	17A	3.4A	3.4A	3.4A	3.4A	0,5A	300W

**APPENDIX C: Technical details PS 236**

Input:	World range 92...265VAC/≤16A, 47-63Hz	
Inrush current:	limited by soft start to max 16A	
Power factor:	<b>CE</b> 0,99 nominal EN 61 000-3,-2	
Isolation, safety:	<b>CE</b> EN 60950, ISO 380, UL 1950, CSA 22.2950	
Regulation static: (6V, 12V, 24V):	< 15mV (±100% load, ±15% mains) < 0.05% (±100% load, ± 15% mains)	
Regulation dynamic: (6V, 12V, 24V):	< 100mV (±25% load) < 0.7% (±25% load)	
Recovery time ±25% load:	<u>within ±1%</u>	<u>within 0.1%</u>
6V / 80A:	0.2ms	0.5ms
12V, 24V/10A:	1.0ms	
Sense compensating range:	min. 0.5V	
Noise and ripple (PARD):	inside a UEC01 bin: <10mV <sub>pp</sub> (0-20MHz) <3mVrms	
<b>EMI</b>		
RFI-rejection (emission):	<b>CE</b> EN 50022-1 (B)	EN 61000-6-3
EMC (immunity):	<b>CE</b>	EN 61000-6-2
Operation temperature:	0...50° without derating	
Temperature limits:	heat sinks cut off 110°C, ambient 70°C	
Storage:	-30°C up to 85°C	
Temp.-coefficient:	< 0.2%/10K	
Stability (const. conditions):	10mV or 0.1% / 24 hours, 25mV or 0,3% / 6 month	
Overvoltage crow bar:	trip off adjusted to 125% nom. voltage, each output	
DC off:	<5ms	if >+3% -5% deviation from nominal values, after overload, overvoltage, undervoltage, fan fail and overheat. Output capacitors will be discharged by crow bars. Trip off points adjustable, processor controlled.
Efficiency:	80%	
Current limits:	adjustable to any lower level, max. 115% of nom values (UEL 03 front panel or via network)	
Voltage rise characteristics:	monotonic and synchronic, rise time 50ms	

Output PS/CS	6V	-6V	12V	-12V	24V	-24V	at <u>230VAC</u> max.	<u>115VAC</u> max.	<u>100VAC</u> max.
236	80A	80A	20A	20A	10A	10A	1900W	1500W	1300W

## APPENDIX D: Technical Details of UEP 15

Dimensions:	width 2 1/2 NIM, height 183 mm, depth 249 mm
Weight:	7.5 kg
Mains Input:	CE 100/115 / 210/240 VAC (+-10%), 48 - 63 Hz, intern, taps , EN61 000 –3-2 soft start circuit, mains filter, fuse protection
Isolation:	CE input-output EN60950, ISO 380, VDE 0805, UL1950, C22.2.950
Derating:	continuous full power at 40°C, derating 2 %/K up to 60°C
Regulation:	load 10 to 100% < 0.2% for 6V, <0.1% for 12V / 24V line +/-10% $\Delta U_{out} < 0.02\%$
Recovery time :	load change 10 % to 100%: < 0.15ms
Output impedance:	static < 1.5 mOhm dynamic < 0.5 Ohm
Noise and ripple:	+/-6V: 3mVpp, +/-12V: 5mVpp, +/-24V: 10mVpp
Temperature error:	< 2 ×10 <sup>-4</sup> /K
DC off:	if >+/-3% deviation from nominal values (status window) due to overload, overvoltage and undervoltage, overheat .
Thermal protection:	overheating protection by thermal switches for each regulator and for transformer
Current characteristics:	current limits fixed constant current in over current mode reverse bias diodes.
Voltage characteristics:	calibration range +/- 5 % rated voltage, adjustment points behind left side panel over and undervoltage protection for all outputs (+/- 0.3%)

### Output voltages, currents and total power

Outputs	+6V	-6V	+12V	-12V	+24V	-24V	115 VAC	Max Power
UEP 15	5A	5A	3A	3A	1,5A	1,5A	0.2A	150W
UEP 15 as	5A	5A	3A	3A	3A	0,5A	0,2A	150W