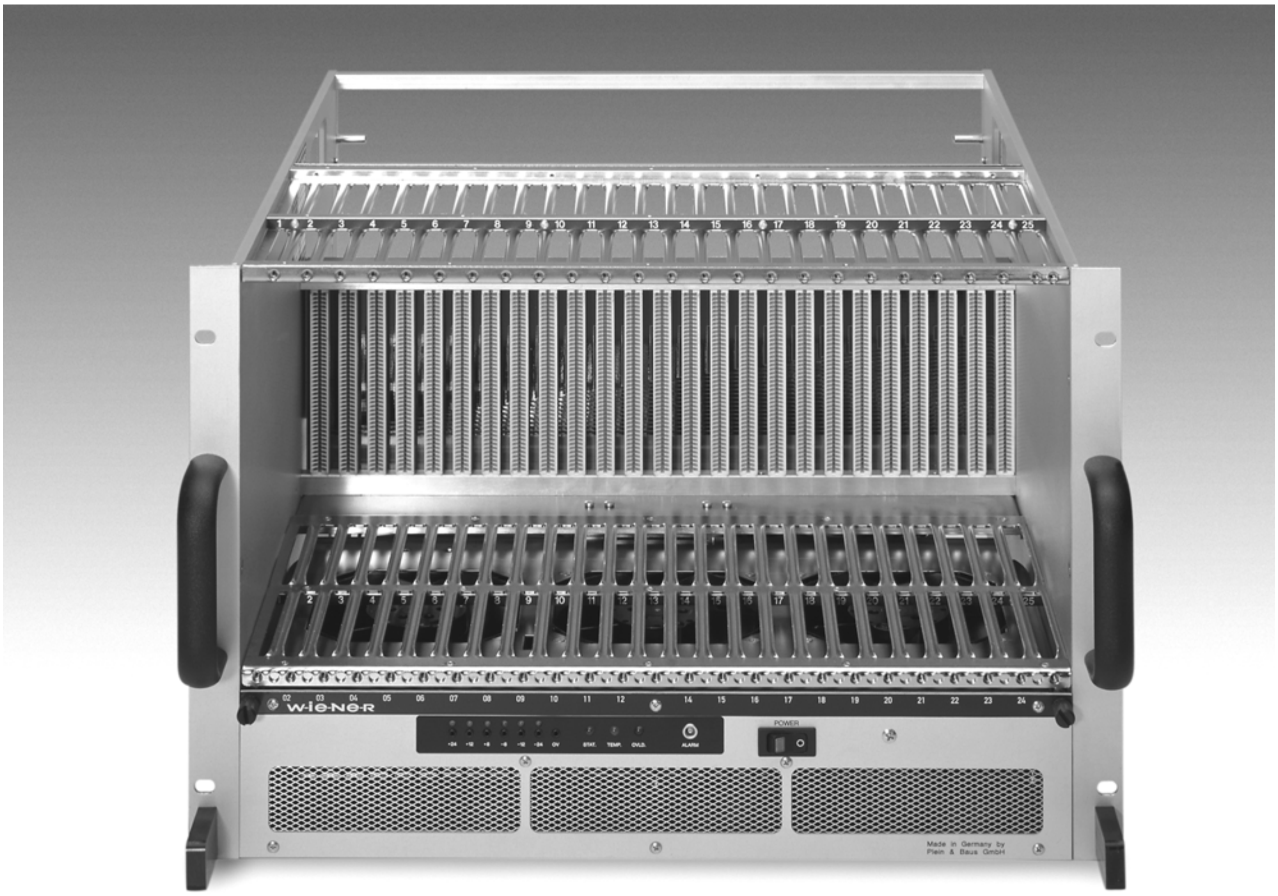

# NIM / CAMAC

# User's Manual

*00Sachnummer.A0

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# 1 General Information

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

## 1.1 NIM-CAMAC bins

### 1.1.1 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

A special construction has a reduced depth: 550mm incl. power supply.

These bins fulfill CE requirement, if they are used in combination with CE marked fan trays (CEL) and power supplies (CEP)

### 1.1.2 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 LED's 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 powersupply max. 570mm), weight: 9,2 kg

**Switches:**

| | |
|---|---|
| **POWER ON/OFF** | main switch for power supply |

**Indicators:**

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

*In combination with M monitoring only

### 1.1.3 CAMAC Bin UEC 01

The CAMAC-bin ***UEC 01*** is a 7U CAMAC-crate for 25 CAMAC-modules according to CERN-CAMAC-NOTE 46-04. The moduleconnectors 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)

A special construction is equipped with additional Y1 and Y2 lines parallel to ±6V for 80 A capability.

Type UEC01 VH, to use in combination with PS 336; mandatory for PS 336 VH types

## 1.2 Fan Trays

Except the UEN 03 Crate, all NIM and CAMAC Crates are equipped either with an UEL 01 or an UEL 03M fan tray.
The main difference between those fan tray is, that the UEL 03M provides a complete monitoring (acc. Cern spec.) and the UEL 01 a minimized monitoring to the user.

### 1.2.1 UEL 01 Fan Tray (EC Fan tray)

The UEL (CEL) 01 have three noise reduced 3 axial fans, which produce a maximum airflow of 380m³/h static pressure.

Control panel with mains on/off, mains lamp, test sockets with LED's for all 6 voltages and one for ground. All voltage bushes are overload protected by internal resistors.

Buzzer alarm and LED's for status bad, overload, overtemperature, if supported by used power supply.

Weight 4 kg

UEL (CEL) 01 unit can be operate in two different airflow modes. In the standard mode, the air is taken from the front. A bottom side air flow can be reached by removing the bottom plate and mounting an optional front cover. The max. airflow is much higher than 380m³/h and shows a good homogeneity.

### 1.2.2 UEL 03 Fan Trays (LX Fan tray)

The UEL 03M is the **W-Ie-Ne-R** standard Fan tray, which conforms the CERN specification entirely and adds some interesting features, like variable fan turning, alphanumerical display etc.

The W-Ie-Ne-R UEL 03M is a modular fan tray unit for use in NIM 01 or CAMAC crates which conform the CERN standard. Three built-in DC-fans with variable fan speed produce an air flow large is enough 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 fail functions this display can be used as a diagnostic system for trouble shooting.

If used together with the PS 336 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. Additional the unit can be prepared with an interface for crate remote control (IEC, HS CAENET, or CANbus).

Plugged into a NIM or CAMAC crate which is designed according to the CERN standard (CAMAC note 64-04 or NIM 8120/8053) from the front the UEL 03M fan tray and control unit occupies the two units of the crate below the CAMAC or NIM slots.

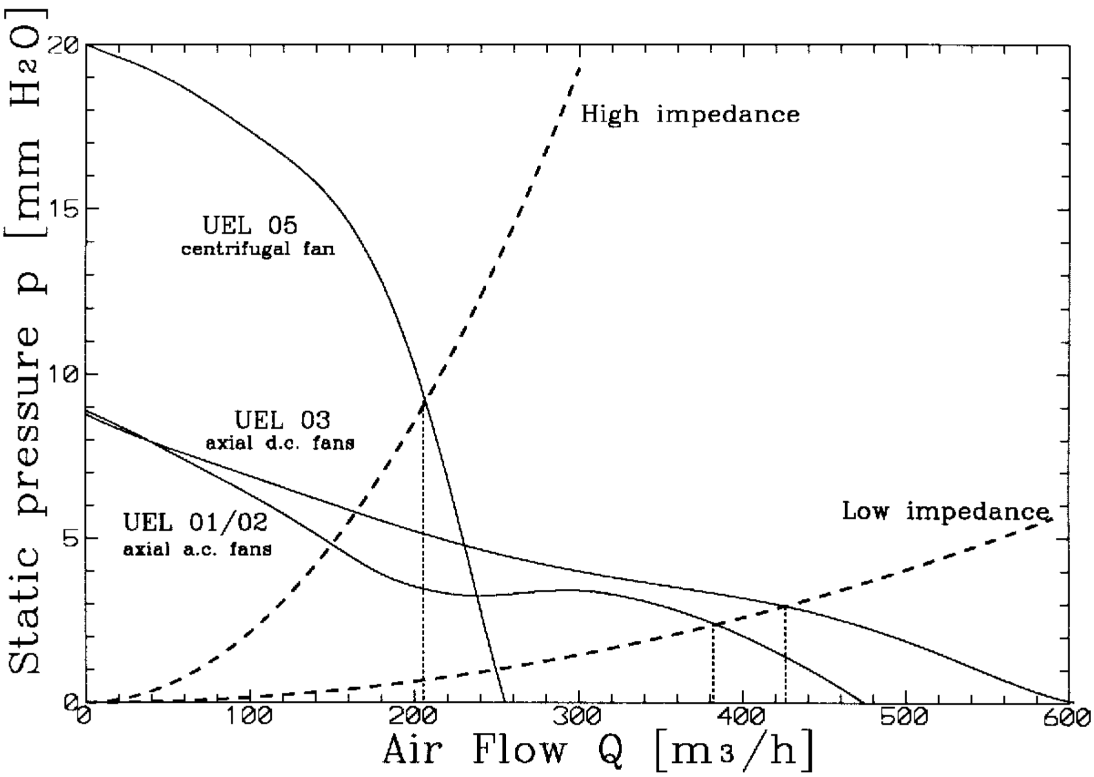
Three axial DC.-fans provide a sufficient air flow to dissipate the heat generated in the modules. The UEL 03M fan-tray can be operated in two different air inlet modes.

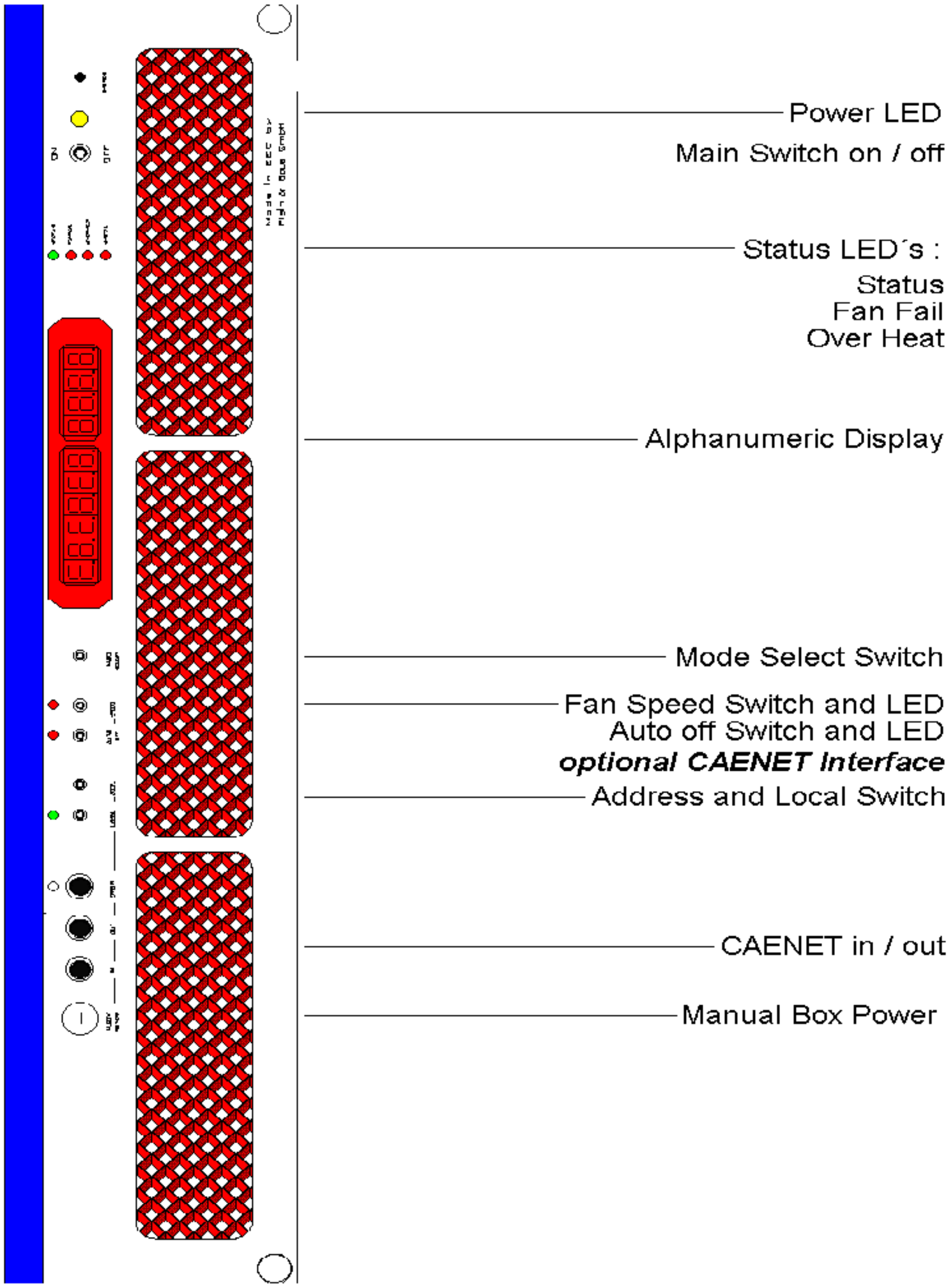
In the standard mode the air is taken from the front and then pushed upwards to the modules.

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 then 540 $m^3/h$ and shows a good homogeneity. Thus, up to 1600 W may be dissipated by the 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.

Note, that this maximum value may be diminished by empty, not covered slots.

Working with front air inlet reduces the airflow to 400 $m^3/h$ and the homogeneity is not so excellent. In this mode about 800-1000W can be cooled.






**UEL 03M frontpanel**

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

The main difference between an UEL XX and an CEL XX power supply is, that the UEL’s provide a 115 VAC and fulfil the CERN-Standard, while the CEL’s fulfill the CE standard; (No 115 VAC). Both power supplies are **linear regulated** and unless nothing else is mentioned all statements made for an UEL XX are also valid for a CEL XX.

The PS 336 XXX and the CS 336 XXX power supplies are built in the **low noise switching technology**. The PS 336 XXX fulfil the CERN standard, while the CS 336 XXX fulfill the CE standard. unless nothing else is mentioned, all statements made for a PS 336 XXX are also valid for a CS 336 XXX.

# 2 Operation, Function and Control

## 2.1 Fan tray operation and control

### 2.1.1 Function of fan tray switches and informations of the LED’s

#### 2.1.1.1 UEL 01

The UEL 01 fan tray is a simplified fan tray which conforms the CERN-Standard: The front panel is equipped with the following facilities:

**Switches:**

| | |
|---|---|
| **POWER on/off** | main switch for ventilation and power supply |

**LED indicators:**

| | |
|---|---|
| **STATUS** | green LED lights, if all voltages are within the limit* |
| **OVERTEMPERATURE** | yellow LED lights if overtemperature occurs |
| **OVERLOAD** | red LED lights, if an over current is detected. |
| **AC POWER** | main switch integrated |

*In combination with M monitoring power supply

all failure signals, except fan fail, are generated and processed by the power supply, which is installed.

#### 2.1.1.2 UEL 03M

**Switches:**

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

**LED indicators:**

| | |
|---|---|
| **AC POWER** | green large LED lights , if POWER is on |
| **STATUS** | green LED lights if all voltages are within the limits |
| **FAN FAIL** | yellow LED lights if a fan failure is recognized |
| **OVERHEAT** | yellow LED lights if an overheat in the power supply occurs |
| **FAN SPEED** | red control LED for reduced fan speed (below 3000 rpm) |
| **FAN AUTO OFF** | 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 conjunction with PS 336)

Following steps are necessary to change the factory settings (Umax, Umin, Imax)

- 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: Umax, Umin, Imax
- 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 through ‘MODE SELECT’
- Confirm setting through pushing ‘POWER OFF’

### 2.1.3 programming of the fan tray UEL 03 (In conjunction with UEP XX(CEP))

By following the steps showed at point 2.1.2 you have to change the sensitiveness of the displayed currents on the channels ±12V and ±24V:

UEP 10: 25mV/A

UEP 21/22: 50mV/A

### 2.1.4 Remote control (optional)

**W-IE-NE-R** Fan trays are optionally equipped with a CAN, IEC (IEEE) or CAENET interface connector as well as the correspondent interface . Further details see in a separate manual.

#### 2.1.4.1 CAN-bus interface operation:

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

***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, ...9 before changing the net address it will return to the previous display. To shut 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 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 is depending 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)

| Function | PG 26 | Function | PG 26 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| chassis ground | 65 | +6V return | 43-44-45-46-70 |
| 220V phase switch | 74 | -6V | 47-48-49-50-67 |
| 220V phase mains | 75 | -6V return | 51-52-53-54-71 |
| 220V neutral switch | 76 | +12V | 55 |
| 220V neutral mains | 77 | +12V return | 56 |
| 117VAC neutral | 78 | -12V | 57 |
| 117VAC phase | 79 | -12V return | 58 |
| +200V | 80 | +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 |
| Y2 sensing | 28 | Y1 current return | 8 |
| Y2 sensing return | 27 | Y2 current | 10 |
| +6V sensing | 29 | Y2 current return | 11 |
| +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 |
| Y1 | 35 | -24V current | 23 |
| Y1 return | 36 | -24V current return | 24 |
| Y2 | 37 | Y1 sensing | 25 |
| Y2 return | 38 | Y1 sensing return | 26 |
| +6V | 39-40-41-42-66 | status warning | 72 |

### 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 | -6V sensing | 30 |
| 220V neutral switch | 76 | -6V sensing return | 27 |
| 220V neutral mains | 77 | +12V sensing | 31 |
| 117 V a.c. neutral | 78 | +12V sensing return | 26 |
| 117 V a.c. phase | 79 | -12V sensing | 32 |
| +200V | 80 | -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 | | |

### 2.2.3 NIM UEN 01 Pin assignment **PG 32** to fan tray **(PG 31)**

| **Function** | **PG 32** | | |
|---|---|---|---|
| Chassis ground | h | +12V current return | R |
| 220V phase switch | AA | -12V current | S |
| 220V phase mains | BB | -12V current return | T |
| 220V neutral switch | CC | +24V current | U |
| 220V neutral mains | DD | +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 monitoring | k |
| -6V current return | N | 0V voltage warning | j |
| +12V current | P | status warning | A |

## 2.3 Power Supply UEP (CEP) 10-21-22

### 2.3.1 Regulator boards UEP 10/21/22

The 6 control circuits for the ±6V, ±12V, ±24V are of the similar design. Therefore the +24V channel may be representative:

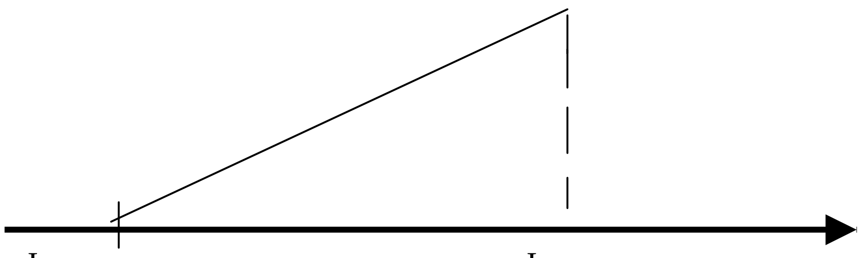
The powertransistor T16 on the rear side heat sink are controlled by the amp U101, RGL 03- followed by 2 driving transistors Q 101, Q102 connected to an auxiliary voltage UH. Set point for the voltage control loop is derived from reference element D108 biased sense and sense return lines, while the output DC level is measured through the divider R119, R120 with voltage adjust pot R134.

Resistors R124 and R125 connect sense lines to the power path. In case of a failure (example: broken lines) uncontrolled voltage levels are avoided.

All outputs are short circuit protected by means of an electric circuit providing a fold back characteristic. This circuit works as follows:

The voltage drop across R110 is a value of output current. If this current increases above a certain level, defined by pot R136, Q105 becomes non conducting. In consequence Q104 begins to draw current from the voltage regulation loop an transistor Q101, Q102 and further the output power transistors reduce the output current. The output voltage of the power supply begins to drop. This drop reduces the bias of Q105 and due to this feedback output voltage and current of the supply shift along the fold back characteristic.

Voltage U




This procedure comes to an end at output voltage U = (nearly) 0 and I = $I_{short}$.
The parameters $I_{knee}$ and $I_{short}$ may be adjusted at R136 and R135.

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: R117 and R 217 are of the same resistance. Therefore the diode D103 clamps the bases of Q107 and Q207 to nearly ±0.35V and both transistors are non conducting. Any nonsymmetrical output voltage shifts this bias to nonsymmetrical levels, one transistor becomes conductive and acts on the voltage control loop until both outputs are nearly symmetrical to the ground.

The total regulator circuit comprises 3 integrating control loops for:

output voltage

fold back characteristic

dual tracking

To avoid difficulties when servicing this circuit it is recommended to open jumper B3. The regulator boards are enabled through U103/203 when the soft start relay in HSP01 board has to be switched on (by 100Hz signal on UBW control board.)

### 2.3.2 Monitoring and alarming signals (UEP 10/21/22)

In case of over temperature a yellow LED lights and a buzzer sounds; Mains are switched off.

In case of overload a red LED lights and a buzzer sounds.

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

### 2.3.3 Temperature sensors

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

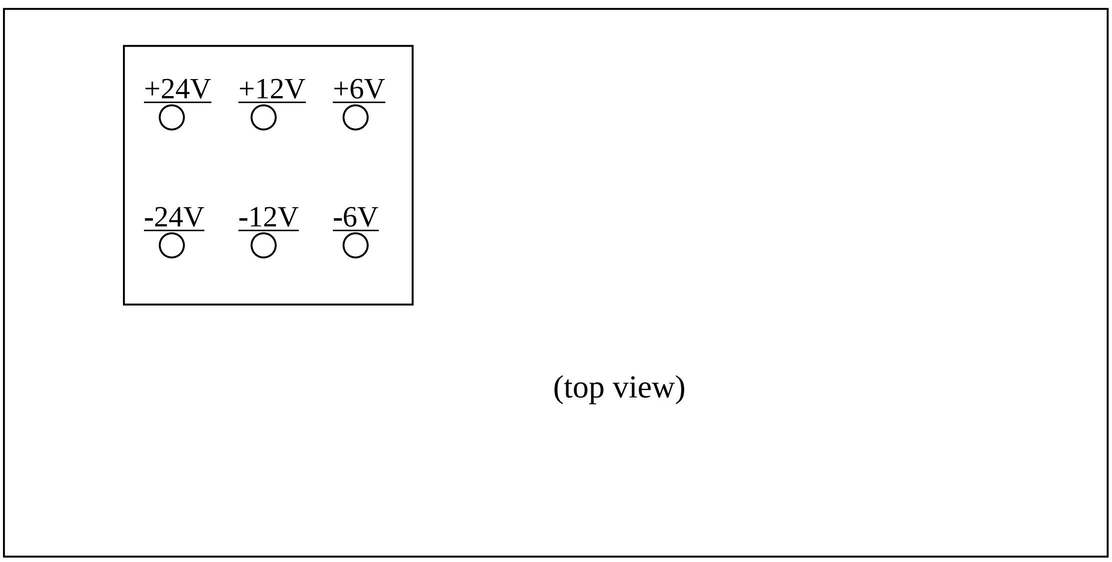
### 2.3.4 Adjustment

First all DC outputs should be checked, if necessary calibrated. If available the PCB monitoring board should be extended with an adapter board (extender card) to avoid accidental short circuits caused by measuring probes.

If power supplies with suffix “M” have been used, the first step should be to check the references against **TP 8** (See Drawing 1065440), if the input of the window discriminators has to be balanced. The positive outputs may be adjusted by R1 (+24V), R2 (+12V), R3(+6V) to an output of the op amps of 0V±0.005V. Measurement has to be done via testpoints TP14/11/9 against TP8. The negative voltages are inverted by U7.1/U7.2 and U8.1 and adjusted by R4 (-24V), R5 (-12V), R6 (-6V) to 0Voutput of U 3.1, U 5.2 and U 5.1 (TP6/3/2 against TP8). An op amp output swing of ±1V reach the threshold points of the window discriminators which generate by low output level ‘bad’ status. In follow of this output for status LED becomes low level (off) and flip-flop U17.1 gets a reset trigger after a small delay of R59/C9. The status-bit relay K 1 switch in pos 4-1. The fan tray buzzer will be activated by U16.1 and Q2.
Condition for proper working of adjusted discriminators is an absolute value of 3V at TP8, 4V at TP10, 2V at TP12, each ±5% against ground (TP1).

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

frontside of UEP 10

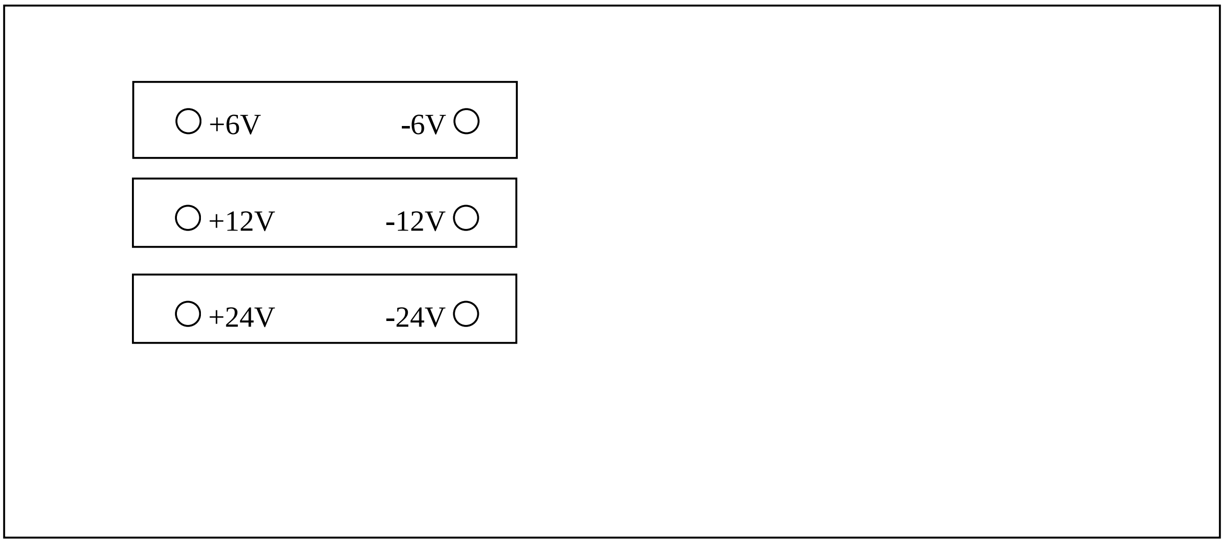


backside of UEP 10

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

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

frontside of UEP 21/22




backside of UEP 10

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

### 2.3.7 Pin assignment **PG 28** for ***M***-power supplies to monitor (**PG 29**)

| | | | |
|---|---|---|---|
| **Power failure monitor** | **12** | **-12V current monitor** | **32** |
| **0V signal** | **8** | **-12V current return monitor** | **33** |
| **Status monitor** | **11** | **+24V current monitor** | **13** |
| **Status return monitor** | **23** | **+24V current return monitor** | **14** |
| **Inhibit** | **26** | **-24V current monitor** | **19** |
| **Disable** | **28** | **-24V current return monitor** | **20** |

| | | | |
|---|---|---|---|
| **Rearming +5V input** | **35** | **+6V monitor** | **3** |
| **Rearming +5V return** | **34** | **-6V monitor** | **4** |
| **+6V current monitor** | **15** | **+12V monitor** | **2** |
| **+6V current return monitor** | **16** | **-12V monitor** | **5** |
| **-6V current monitor** | **17** | **+24V monitor** | **1** |
| **-6V current return monitor** | **18** | **-24V monitor** | **6** |
| **+12V current monitor** | **30** | **0V monitor** | **9** |
| **+12V current return monitor** | **31** | | |

## 2.4 Power supply PS (CS) 336

The CAMAC power supply of the 336 series are micro-processor controlled power supplies, designed in the high density **W-Ie-Ne-R**-cavity technology, which provides an **extremely low** noise output voltage.

The PS 336 is produced according to the ***CERN*** Specification, while the CS 336 is designed according to the CE rules. The predominate 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 feed to the rear side of the fan tray, where it is fixed by a cable gland.

The power box includes a power factor corrected mains input module (PFC) with mains filters, fuse, softstart-circuit, primary switching regulators and PG 27 connector. The AC input voltage range is 92-264 V / 47-63 Hz, whereby the input is protected by a slow blow fuse 10A/250V.

The PFC module works according to EN 61000-3, EN 61000-2.

A solid state relay connects the power supply to AC mains after finishing the soft start routine. DC on/off will be made by the POWER ON/OFF switch mounted at the fan tray front panel.

The EN 50 081 for generic emissions as well as the EN 50 082 for immunity standards, in particular EN 55 011 RFI rejection (incl. VDE 0871 class B) and EN 55 022 electromagnetic compatibility is accomplished. 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.

Therefore the CS 336 power supplies can fulfil the CE rules comprehensively and will CE marked for use at industrial power nets as well as for all power nets if PFC is installed. The PS 336 features the same topics but does not fulfil the EN 60 950.

The power packs are readily replaceable. The maximum output power is 1650W if mains voltage is>210VAC.

The above rated currents are the nominal values. Limits are programmable at least to 110% of nominal currents. These limits can be set to lower values by user if a UEL 03 fan tray has been used.

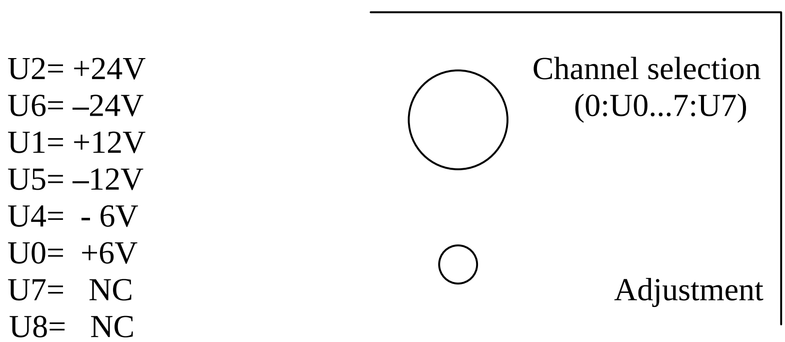
Turning on the power supply all voltages reach the nominal values nearly simultaneously within 50ms ±2.5ms whereby the voltages versus time curve shows a monotonic behavior. The start-off time which corresponds to a value of 10% of the nominal voltages after ±2.5ms.

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

The 336 series are showing an excellent long time stability. Under constant conditions the maximum voltage drift is lower than 10mV or 0.1% within 24 hours or 1% within 6 months. The temperature coefficient of the output voltage is less than $2*10^{-4}$/K.

### 2.4.1 Adjustment

All output voltages can be adjusted manually with potentiometers or switches on the power supply top.




### 2.4.2 Pin assignment **PG 28** for ***M***-power supplies to monitor (**PG 29**)

see diagram below 2.3.7

## APPENDIX A: Technical details UEP 10

Linear regulated data UEP 10 (600W):

| | |
|---|---|
| Input: | 230V +10-15%, 48-63 Hz, inrush current limited to <15A, mains filter, fuse protection |
| 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: | < $5*10^{-5}$/K |
| Thermal protection: | overheating protection by thermal sensors (3 fold), |
| Current limit: | adjusted to rated current |
| Characteristics: | short circuit protected by fold back characteristic, short circuit current < 3A resp. 1A, reverse bias diodes. |
| Voltage: | overvoltage protection (crow bar), ±6V, ±12V, ±24V<br>calibrated at ±7.3V, ±14.5V, ±28.5V |
| Options for power supplies type M: | equipped 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** |
|---|---|---|---|---|---|---|---|
| UEP 10/88 | 45A | 45A | 8A | 8A | 8A | 8A | 0.5A |
| CEP 10/88 | 45A | 45A | 8A | 8A | 8A | 8A | XXXXXX |
| UEP 10/52 | 65A | 32A | --------------------- | | 6A | 6A | 0.5A |
| CEP 10/52 | 65A | 32A | --------------------- | | 6A | 6A | XXXXXX |
| UEP 10/53 | 32A | 65A | --------------------- | | 8A | 8A | 0.5A |
| CEP 10/53 | 32A | 65A | --------------------- | | 8A | 8A | XXXXXX |
| UEP 10/66 | 20A | 20A | 15A | 15A | 4A | 4A | 0.5A |
| CEP 10/66 | 20A | 20A | 15A | 15A | 4A | 4A | XXXXXX |

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

| | | |
|---|---|---|
| example: | +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 21 /22**

Linear regulated data UEP 21(200W)/UEP 22(300W)

| | |
|---|---|
| Input: | 230V (or 115V) +10%-15%, 48-63Hz, inrush current limited to < 15/30A |
| Derating: | full power at 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% 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: | $<5*10^{-5}$/K |
| Thermal protection: | overheating protection by thermal sensors (3 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. |
| Voltage: | calibration range ±5% rated voltage, dual tracking for all ±DC outputs overvoltage protection (crow bar), ±6V, ±12V, ±24V calibrated at ±7.3V, ±14.5V, ±28.5V |
| Options for power supplies type M: | 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** |
|---|---|---|---|---|---|---|---|
| UEP 21 | 8A | 8A | 3A | 3A | 2A | 2A | 0.5A |
| CEP 21 | 8A | 8A | 3A | 3A | 2A | 2A | XXXXXXX |
| UEP 22 | 17A | 17A | 3.4A | 3.4A | 3.4A | 3.4A | 0.5A |
| CEP 22 | 17A | 17A | 3.4A | 3.4A | 3.4A | 3.4A | XXXXXXX |

## APPENDIX C: Technical details UEP 21 /22

Data PS (CS) 336

| | |
|---|---|
| Input: | World range 92...264VAC/10A, 47-63Hz |
| Inrush current: | limited by soft start to max 16A |
| Power factor: | ***CE*** 0,99 nominal EN 61 000-3,-2 |
| Isolation, safety: | ***CE*** versions only: EN 60950, ISO 380, UL 1950, VDE 0805, CSA 22.2950 |
| Regulation static:<br>(6V, 12V, 24V): | < 25mV (±100% load, ±15% mains)<br>< 0.1% (±100% load, ± 15% mains) |
| Regulation dynamic:<br>(6V, 12V, 24V): | < 100mV (±25% load)<br>< 0.7% (±25% load) |

| Recovery time ±25% load: | within ±1% | within 0.1% |
|---|---|---|
| 6V / 65/80A: | 0.2ms | 0.5ms |
| 12V, 24V/10A: | 0.0ms | 1.0ms |

| | |
|---|---|
| sense compensating range: | min. 0.5V |
| Noise and ripple (PARD): | inside aUEC01 bin: <10mV$_{pp}$ (0-20MHz) <3mVrms |

**EMI**

| | | |
|---|---|---|
| RFI-rejection (emission): | ***CE*** | EN 50081-1 EN 50022 B (VDE 0871B) |
| EMC (immunity): | ***CE*** | EN 50082-1 |

| | |
|---|---|
| Operation temperature: | 0...50° without derating |
| Storage: | -30°C up to 85°C |
| Temp.-coefficient: | < 0.2%/10K |
| Stability (const. conditions): | 10mV or 0.1% / 24 hours, 50mV or 1% / 6 month |
| Temperature limits: | heat sinks 110°C, ambient 70°C |
| Current limits: | 115% of nominal value (variable limits) |
| Overvoltage crow bar protection: | trip off adjusted to 125% nom. voltage, each output |

| | |
|---|---|
| DC off: | <5ms if >+2% -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 (UEL 03 front panel via network) |
| Voltage rise characteristics: | monotone and synchrony, complementary outputs with dual trecking |

The following modules are available:

| Output Type PS/CS | 6V | -6V | 12V | -12V | 24V | -24V | Mains **230VAC** output | Mains **115VAC** output | Mains **100VAC** output |
|---|---|---|---|---|---|---|---|---|---|
| 336H | 65A | 65A | | | 10A | 10A | 1250W | 900W | 750W |
| 336H12 | 65A | 65A | 10A | 10A | 10A | 10A | 1500W | 900W | 750W |
| 336VH | 80A | 80A | | | 10A | 10A | 1400W | 900W | 750W |
| 336VH12 | 80A | 80A | 10A | 10A | 10A | 10A | 1650W | 900W | 750W |

The Type H and VH use the Y1/Y2 with +6V/-6V in parallel to distribute 80A.