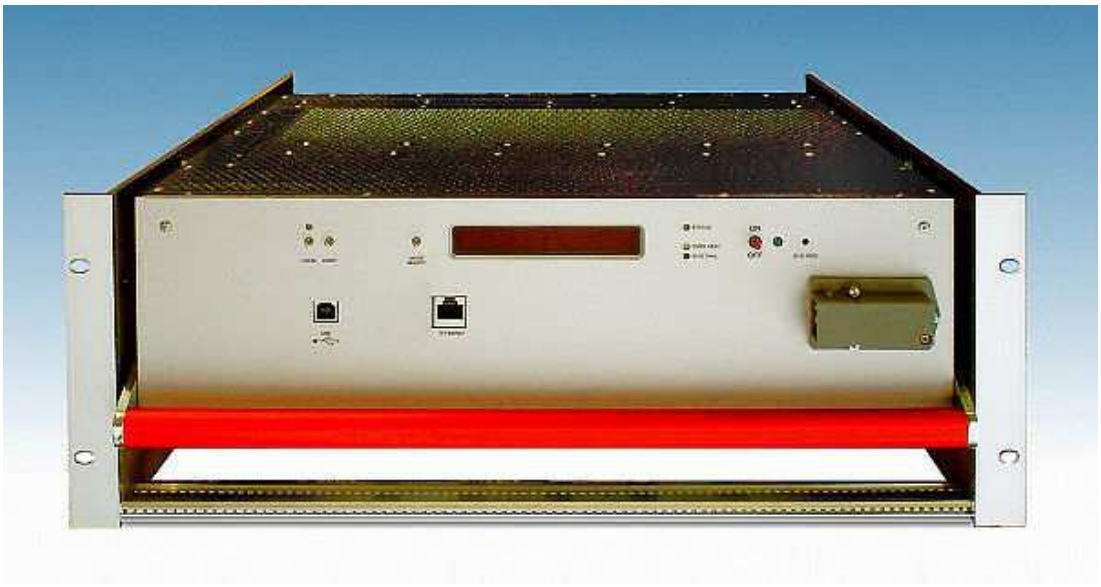

PL512/PL506

Modular Power Supply System

Technical 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.

W-Ie-Ne-R revises this product and manual without notice. Differences of the description in manual and product are possible.

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Control Cabinet

In the context of this user manual, the control cabinet must fulfill the requirements on fire-protective enclosures according to EN 60950 / IEC 60950 / UL 60950.

All devices are intended for operation in control cabinets or in closed areas. The LAN connection and all wire connections between the different system parts must be done via shielded cable with conductive connector shells, which are fixed with screws.

Furthermore, an additional fire-protective enclosure is required which must not affect proper air circulation.

Mains Voltage and Connection

The Power supplies are equipped with a “World”- mains input (rated voltage range: 100-240 VAC, frequency: 50-60 Hz, rated current: 16 A). Before connecting to the mains please double-check correspondence.

The mains input connection at the power supply side is described in chapter 2.1 (AC Mains Connection) at page 2.

Safety

After connecting the Power box to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. Any DC-On-Signal as well as a power switch at control board (if any installed) operates as a low voltage DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

Before starting any kind of work inside the power box remove the unit from mains and wait a couple of minutes with your activities! Discharge the primary DC filter-capacitors by use of a well insulated 22 ohm 10W resistor.
We recommend in case of any malfunction to send the power box to Wiener or to one of our representative for service

Declaration of Conformity

Low Voltage Directive 73/23/EEC and EMC Directive Art. 10.1 of 89/336/EEC

W-IE-NE-R

Plein & Baus GmbH

---

declare under our own responsibility that the product

PL5 / PL6, F8-12

Items: 0P00.xxxx; 0P01.xxxx; 0P04.xxxx; 0M11.xxxx; 0M21.xxxx

is in accordance with the following standards or standardized documents:

1.	**EN 60 950-1:2001** + Corr:2004-09	Niederspannungsrichtlinie [low voltage directive]
2.	**EN 61 000-6-3:2001**	Störaussendung EMA [RF emission]
	EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B	Störspannung [conducted noise]
	EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B	Störfeldstärke [radiated noise]
	EN 61 000-3-2:2001	Oberschwingungen [harmonics]
	EN 61 000-3-3:1995 +Corr:1997 +A1:2001	Spannungsschwankungen [flicker]
3.	**EN 61 000-6-2:2001**	**Störfestigkeit EMB [immunity]**
	EN 61 000-4-6:1996 + A1:2001	HF-Einströmung [injected HF currents]
	EN 61 000-4-3:1996 + A1:1998 + A2:2001	HF-Felder [radiated HF fields] incl. ”900MHz”
	EN 61 000-4-4:1995 + A1:2001	Burst
	EN 61 000-4-5:1995 + A1:2001	Surge
	EN 61 000-4-11:1994 + A1:2000	Spannungs-Variationen [voltage variations]
	EN 61 000-4-2:1995 + A1:1998 + A2:2001	ESD

Conditions:

This unit is not a final product and is foreseen for use inside a closed cabinet. The supplying of loads over long distances (>3m) needs possibly additional RF rejection hardware to get in conformity of the definition. Admitted for powering by all mains.

Name and signature of authorized person — Place and Date

Juergen Baus

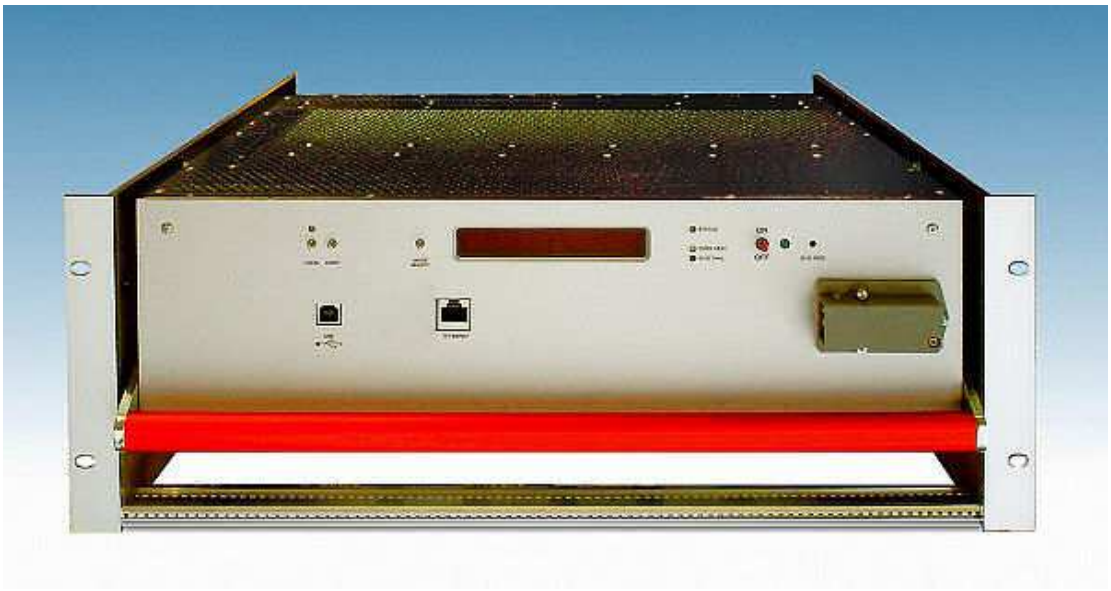
Techn. Director — Aug. 2006

Contents

Figures

Tables

1 General Information



Features

- **up to 12 independent processor controlled, potential free outputs**
- **up to 3 kW DC output power**
- **Programmable output voltage, current limit and rise/fall time**
- **Measurement of output voltages and current**
- **Fully controlled, programmable trip thresholds (min./max. sense voltage, max terminal voltage, max. current, power, temperature)**
- **PC-Control (connected to USB) with free available software**
- **Ethernet connection IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX**
- **WWW-Server integrated, full control via SNMP protocol**
- **OPC server available**
- **Three different voltage regulation modes programmable: Fast – Moderate - Slow**
- **Extremely low noise and ripple**
- **CE conform EN 50 081/82 part 2 or 1, safety in accordance with EN 60 950**
- **Sinusoidal mains current EN 61000-3-2**
- **Optional alphanumeric display**
- **Optional global interlock**
- **Optional channel-wise interlock**
- **Optional direct water cooling**
- **Optional *Power Bin*: Exchange of the power box without disconnecting the cabling to the load**

2 PL512/PL506 Power Box

The PL512/PL506 front appearance differs slightly, depending on the existing options.

Figure 2.1: PL512/PL506 Front Side with Interlock and Water-Cooled Option

Figure 2.2: PL512/PL506 Front Side with Display Option

2.1 AC Mains Connection

The AC input connections are made with the Hirschmann connector series ST.

We recommend the mating cable plug STAK3N with the locking retainer STASI3.

AC Input	Pin	Signal	Comment
	1	Phase	Cable wire color: black or brown wire
	2	Return, Neutral	Cable wire color: blue
	3	unused	
	Earth	Protective Earth	Safety Ground, Cable wire color: green / yellow

Table 1: AC Mains Input Connector Pin Assignment

2.2 Main Switch

The green illuminated rocker switch works as a global inhibit input.

- 0 Power outputs disabled
- I Switch is lighting, power outputs may be enabled by the remote control.

This switch is a logic switch only. It does not disconnect the mains supply.

With the *Alphanumeric Display Option* the switch is omitted.

2.3 USB Connector

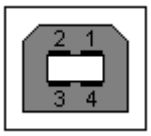
USB Socket	Pin	Signal	Comment
	1	VCC	
	2	D-	
	3	D+	
	4	GND	

Table 2: USB Connector Pin Assignment

This is the standard USB connector type B.

2.4 Ethernet Connector

RJ45 Socket	Pin	Signal	Comment
	1	TX+	
	2	TX-	
	3	RX+	
	4	GND 1	
	5	GND 1	
	6	RX-	
	7	GND 2	
	8	GND 2	

Table 3: Ethernet Connector Pin Assignment

This is the standard NIC configuration. **You need a** 1:1-cable to connect a to a HUB, or a **cross-over cable to connect to** another NIC (e.g. **a computer**). *There is no automatic signal crossing like with some routers.*

2.5 Water Cooling Connection (Optional)

The water connections are made with quick couplings series LC 6.4 mm from *Colder Products Company* (CPC). We recommend an elbow mating plug with shutoff, e.g. LCD230-04.

Consider that water inlet and water outlet are **not** exchangeable.

The safety valve may not be readjusted by the customer.

2.6 Global Reset Input (Optional)

The global reset input (POWER_INHIBIT) is provided to force all outputs to be switched off.

- connected to GND Power outputs disabled
- floating Power outputs may be enabled by the remote control

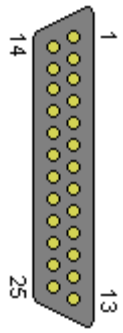
DSUB25 female	Pin	Signal	Comment
	1	NC	reserved
	14	NC	reserved
	2	NC	reserved
	15	NC	reserved
	3	NC	reserved
	16	NC	reserved
	4	NC	reserved
	17	NC	reserved
	5	NC	reserved
	18	NC	reserved
	6	NC	reserved
	19	NC	reserved
	7	NC	reserved
	20	NC	reserved
	8	NC	reserved
	21	NC	reserved
	9	NC	reserved
	22	NC	reserved
	10	NC	reserved
	23	NC	reserved
	11	NC	reserved
	24	NC	reserved
	12	NC	reserved
	25	GND	Ground of the aux. supply, connected to USB ground
	13	POWER_INHIBIT	Inhibit input

Table 4: Global Reset Connector Pin Assignment

The signals shall be connected by an isolated contact (e.g. relays), and must not be connected to other potentials.

The input has an internal 10 kΩ pull-up resistor to 5V and an input impedance of 10 kΩ.

It is possible to invert the logic of this signal by changing a jumper switch inside of the power box..

Jumper at Pin	POWER_INHIBIT Input	Functionality
1 – 2	open	power disabled (INTERLOCK)
	connected to GND	power enabled
2 – 3	open	power enabled
	connected to GND	power disabled (RESET)

2.7 Channel-Wise Interlock Input (Optional)

The channel-wise interlock inputs are provided to force a dedicated output to be switched off.

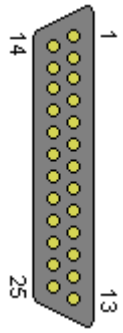
DSUB25 female	Pin	Signal	Comment
	1	Interlock U0 +	
	14	Interlock U0 -	
	2	Interlock U1 +	
	15	Interlock U1 -	
	3	Interlock U2 +	
	16	Interlock U2 -	
	4	Interlock U3 +	
	17	Interlock U3 -	
	5	Interlock U4 +	
	18	Interlock U4 -	
	6	Interlock U5 +	
	19	Interlock U5 -	
	7	Interlock U6 +	
	20	Interlock U6 -	
	8	Interlock U7 +	
	21	Interlock U7 -	
	9	Interlock U8 +	
	22	Interlock U8 -	
	10	Interlock U9 +	
	23	Interlock U9 -	
	11	Interlock U10 +	
	24	Interlock U10 -	
	12	Interlock U11 +	
	25	Interlock U11 -	
	13	reserved	

Table 5: Channel-Wise Interlock Connector Pin Assignment

Each interlock input is galvanically isolated (optocouplers). If a channel is interlocked, it is not possible to switch it on.

Signal level:

interlocked: -10 V ... +0.8 V

not interlocked: +2.2 V ... +10 V (input impedance 1 kΩ + LED, so higher input voltages can be used if an external resistor is implemented.)

2.8 Global Stop and Start Inputs (Optional)

This inputs allow to switch off the outputs channels (emergency stop) or to switch on all power supply outputs (e.g. used for maintenance) .

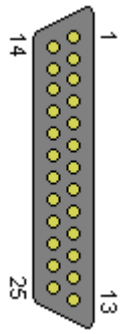
DSUB25 female	Pin	Signal	Comment
	1	NC	reserved
	14	NC	reserved
	2	NC	reserved
	15	NC	reserved
	3	NC	reserved
	16	NC	reserved
	4	NC	reserved
	17	NC	reserved
	5	NC	reserved
	18	NC	reserved
	6	NC	reserved
	19	NC	reserved
	7	NC	reserved
	20	NC	reserved
	8	NC	reserved
	21	NC	reserved
	9	NC	reserved
	22	NC	reserved
	10	NC	reserved
	23	NC	reserved
	11	NC	reserved
	24	NC	reserved
	12	STOP	reserved
	25	GND	Ground of the aux. supply, connected to USB ground
	13	START	Inhibit input

Table 6: Global Stop and Start Connector Pin Assignment

The signals shall be connected by a dry contact (e.g. relay), and must not be connected to other potentials.

The input has an internal 330 Ω pull-up resistor to 5V and an input impedance of 1 kΩ.

Signal	Functionality
STOP	If this signal is connected to GND (dry contact close), all power supply outputs are switched off. This functionality has priority over all other functions, it is not possible to switch outputs on in this state
START	If this signal is connected to GND (dry contact close), all power supply outputs are switched on. They will only be switched off in case of an emergency switch off caused by the supervision logic of the power supply. If this signal is not connected (dry contact open), power supply outputs may be switched on/off via SNMP or with the display control.

2.9 Alphanumeric Display (Optional)

This option allows the setup and display of some power supply items with toggle switches.

2.9.1 LED Description

- Power LED (green, 5mm) may be — Lighting if the PL512/PL506 is operating. Channels on.
- Status LED (green, 3mm) — Lighting if the main processor is working properly .
- Overheat (yellow) — Lighting if the operating temperature inside of the power supply is too high.
- SYS FAIL (red) — Processor malfunction.

2.9.2 Function of the Switches

After the PL512/PL506 has been switched on by pushing the “Power” switch up, the main operation modes can be selected by pushing the “Mode Select” switch up or down.

Many main operating modes do have one or more submenus, which can be accessed by a special procedure.

You will use the following switches of the PL512/PL506:

Symbol	Description	Remarks
P▲	Push “Power” switch up (ON)	**Main power supply is off:** Switch the power supply on. All power channels are off. **Display shows a switched off channel:** Switch this channel on. **Submenu:** OK button. Used to enter the selected submenu, request to change a value, accept the changes.
P▼	Push “Power” switch down (OFF)	**Display shows a switched off channel:** Switch the main power supply and all channels off. **Display shows a switched on channel:** Switch this channel off. **Submenu:** CANCEL button. Used to leave a submenu, discard the changes.
M▲	Push “Mode Select” switch up	**Main operating mode:** Select the next operating mode. **Submenu:** Change the selected item to the next possible state.
M▼	Push “Mode Select” switch down	**Main operating mode:** Select the previous operating mode. **Submenu:** Change the selected item to the previous possible state.

The following example describes the detailed steps to enter a sub menu and change the IP gateway address.

Description	Switch	Display [1]
switch the crate on	P▲	`U0  5.01V  1.2A`
select the requested main operation mode	M▲ or M▼ (until right mode is displayed)	`TCPIP: no link`
enter submenu	M▲(push and hold), P▲	`Config: Wait`
	hold both switches up	`Config: Wait...`
	after 4 seconds you can	`Config: Ready !`
	release the switches	`TCPIP Address` `192.168.91.80`
Select submenu "TCPIP Gateway"	M▲ or M▼ (until right menu is displayed)	`TCPIP Gateway` `192.168.91.94`
Enter this menu	P▲	`192.168.91.94`
Change the value	M▲ or M▼	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Ready, back to submenu selection	P▲	`TCPIP Gateway` `196.168.91.94`
Ready, leave submenu	M▼	`TCPIP: no link`

2.9.3 Main Operating Modes and Associated Submenus

Operating Mode	Submenu	Display
Display voltage and current of the selected output channel		`U0  5.01V  72.A`
Display the TCP/IP connection state Possible values & symbols are: no link (no cable connected) 10M (connected to 10M network) 100M (connected to 100M network) HD (half duplex) FD (full duplex) ↓, ↑, ↕ (Frame received, transmitted, both)		`Ethernet 100M FD`

1 Display: Two lines: displayed alternating, alternate background color: blinking

Operating Mode	Submenu	Display
	Change the TCP/IP address	`TCPIP Address 192.168.91.80`
	Change the TCP/IP subnet mask	`TCPIP SubnetMask 255.255.255.224`
	Change the TCP/IP gateway address	`TCPIP Gateway 192.168.91.94`
	Allow writes (e.g. switch on/off) via the web server	`HTTP:read/write`
	Change TCP/IP negotiation settings	`TCPIPnegotiation AutoNegotiation`
	Display of the ethernet hardware address (MAC). This address is written at the type plate, too.	`TCPIP MAC Addres 0050-C22D-C231`
	Change the TCP/IP port of the web server	`HTTP Port 80`
	Change the TCP/IP port of the SNMP server	`SNMP Port 161`
	Restore the default SNMP settings (community strings)	`SNMP Default No`

2.10 Power Output and Sense Connections PL512

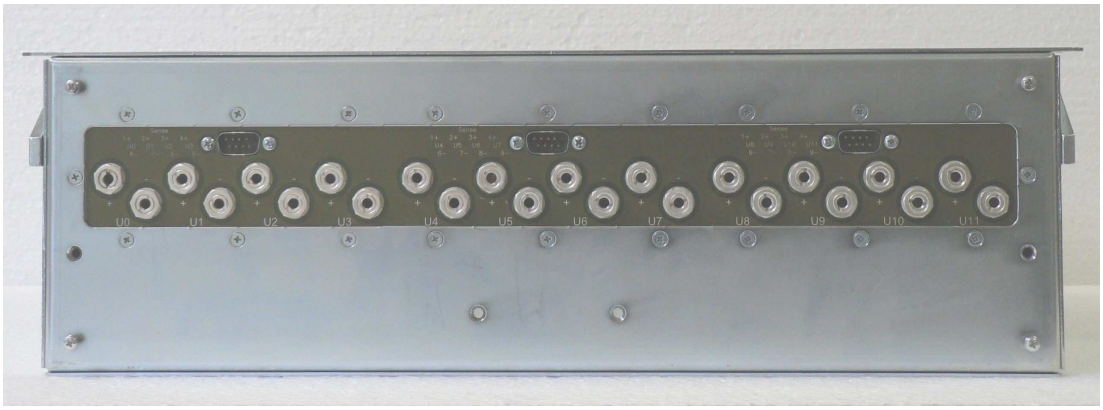


Figure 2.3: PL512 Rear Side (Power Output Connections)

The low voltage DC output at the rear side of the power supply is provided by 4 mm sockets The channels are arranged from left to right starting with U0. Positive output is up and negative output is down.

The sense lines are routed to three DSUB connectors (four channels each).

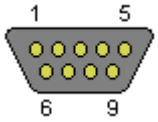
SUB9 male	Pin	Left Connector (U0..U3)	Middle Connector (U4..U7)	Right Connector (U8..U11)
	1	U0 Sense +	U4 Sense +	U8 Sense +
	6	U0 Sense -	U4 Sense -	U8 Sense -
	2	U1 Sense +	U5 Sense +	U9 Sense +
	7	U1 Sense -	U5 Sense -	U9 Sense -
	3	U2 Sense +	U6 Sense +	U10 Sense +
	8	U2 Sense -	U6 Sense -	U10 Sense -
	4	U3 Sense +	U7 Sense +	U11 Sense +
	9	U3 Sense -	U7 Sense -	U11 Sense -
	5	not connected	not connected	not connected

Table 7: Sense Connector Pin Assignment

2.11 Power Output and Sense Connections PL506

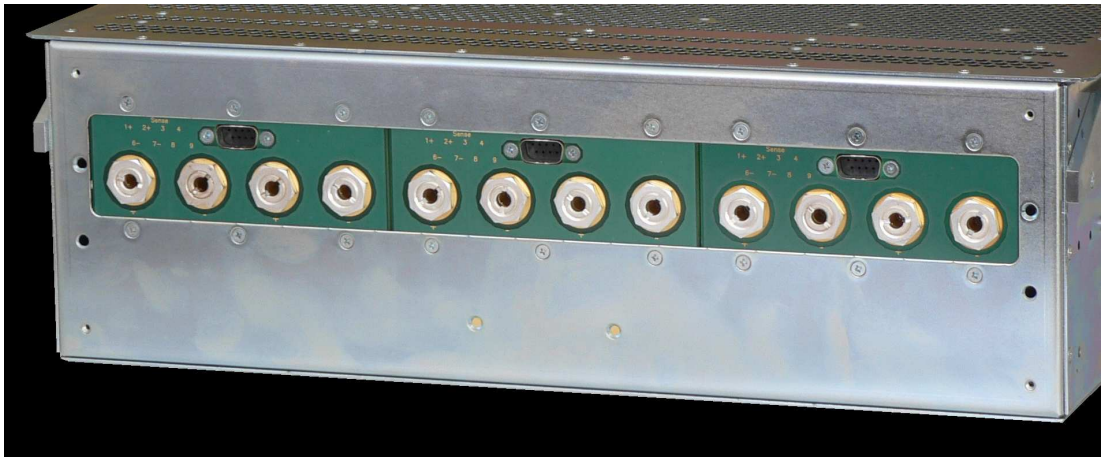


Figure 2.5: PL512 Rear Side (Power Output Connections)

The low voltage DC output at the rear side of the power supply is provided by 6 mm or 8mm sockets . The channels are arranged from left to right starting with U0. Positive output is up and negative output is down.

The sense lines are routed to three DSUB connectors (2 channels each).

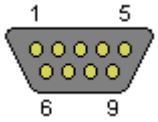
DSUB9 male	Pin	Left Connector (U0..U3)	Middle Connector (U4..U7)	Right Connector (U8..U11)
	1	U0 Sense +	U2Sense +	U4 Sense +
	6	U0 Sense -	U2Sense -	U4 Sense -
	2	U1 Sense +	U3Sense +	U5 Sense +
	7	U1 Sense -	U3Sense -	U5 Sense -
	3	not connected	not connected	not connected
	8	not connected	not connected	not connected
	4	not connected	not connected	not connected
	9	not connected	not connected	not connected
	5	not connected	not connected	not connected

Table 8: Sense Connector Pin Assignment

3 PL512/PL506 Control and Setup via USB

The PL512/PL506 can be controlled with the MUSEcontrol software. Without the *Display* option this is the only way to change the network (TCP/IP) settings.

The USB interface is primarily intended to be used to configure the power supply. The Ethernet connection is designated for remote control and monitoring.

Requirements

- X86-Computer with USB connection (USB2 recommended)
- Microsoft Windows XP

Features

- Setup of the TCP/IP network parameters
- Global overview of all power supply channels
- Detailed configuration of the power supply channels
- Save and reload of configuration data

3.1 Installation

The installation software (MUSEcontrol-x.x.x.x.msi) is free available at the download area of our website (www.wiener-d.com → Support → Downloads).

Please install the software before connecting the power supply to the USB. The necessary USB-driver is included in the installation.

After downloading and executing the software Windows may complain that the supplier of the software could not be verified. Ignore this warning and select "Execute".

Next the MUSEcontrol Setup Wizard welcome screen is displayed. Click "Next", accept the license agreement and take a look at the ReadMe notes.

Now you may change the default installation folder and start the installation.

Now connect the PL512/PL506 with your mains supply and use an USB cable to connect the computer with the PL512/PL506.

The computer will detect the new connected hardware and ask to connect to Windows Update. Select "No" and click "Continue".

Then accept the "Automatic install the software" selection by clicking "continue".

Now the USB driver software be installed. To access your power supply, execute the "WIENER USB Power Supply Control" application via your start menu.

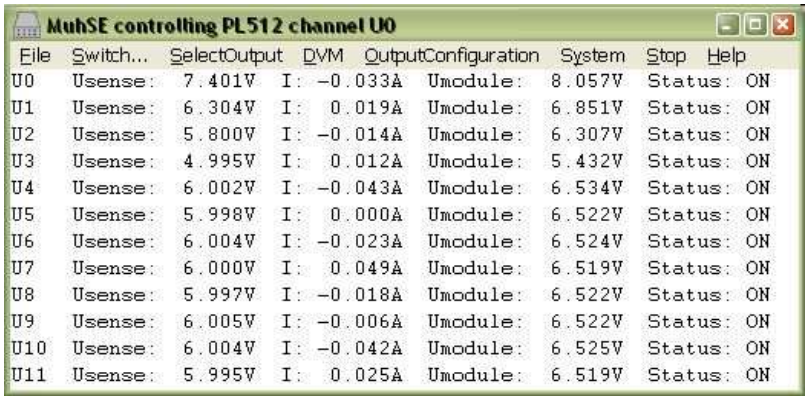
3.2 The Main Window

After starting the application the main window shows a channel overview.

The measured sense voltage (Usense), current (Imodule) and terminal voltage (Umodule) and a global status of each channel are displayed.

Clicking with the left mouse button at a channel toggles the power state (OFF → ON or ON → OFF).

Clicking with the right mouse button opens the output configuration menu of this channel.



3.3 Description of the Menu Items

- File » Read Power Supply Configuration from File

  Opens the Read Power Supply Data From File Dialog.
- File » Save Power Supply Configuration to File

  Saves the complete power supply configuration to disk.
- Switch » All On
- Switch » All Off

  Switches all power supply channels on or off.
- Switch » Group 1 On
- Switch » Group 1 Off
- Switch » Group 2 On
- Switch » Group 2 Off

  This are commands to demonstrate the grouping functions of the PL512/PL506. The default factory setting is group 1 for channels 0..5 and group 2 for channels 6..11.
- SelectOutput

Select the next existing channel for the other dialogs. The current channel is displayed at the title bar.

- DVM

  Opens a large window showing the measurement data of one channel.

- OutputConfiguration

  Opens the Output Configuration Dialog.

- OutputCalibration

  This dialog is reserved for service personal.

- System » Configuration

  Opens the Global and Network Configuration Dialog.

- System » Firmware Update

  Allows to update the firmware of the main processor.

- Stop

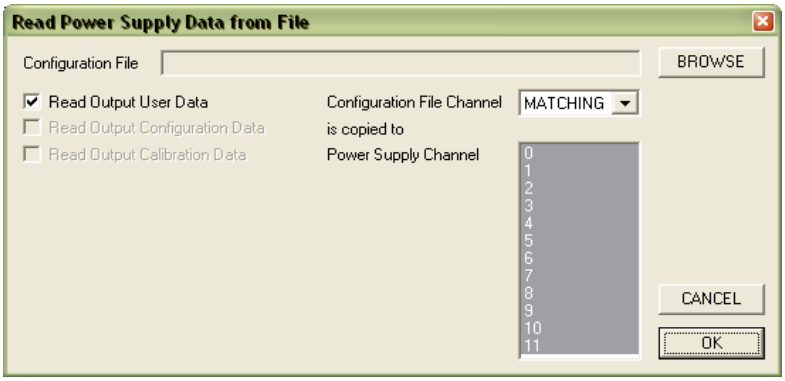
- Start

  Allow to interrupt and resume the communication with the PL512/PL506.

- Help » Info

  Here you have access to the version number of the software.

3.3.1 Read Power Supply Data From File Dialog



This dialog can be used to copy a XML configuration file from disk to the PL512/PL506.

It is possible to copy each configuration file channel to its corresponding power supply channel (e.g. U0 → U0, U1 → U1, ...) or to copy one configuration file channel to multiple power supply channels.

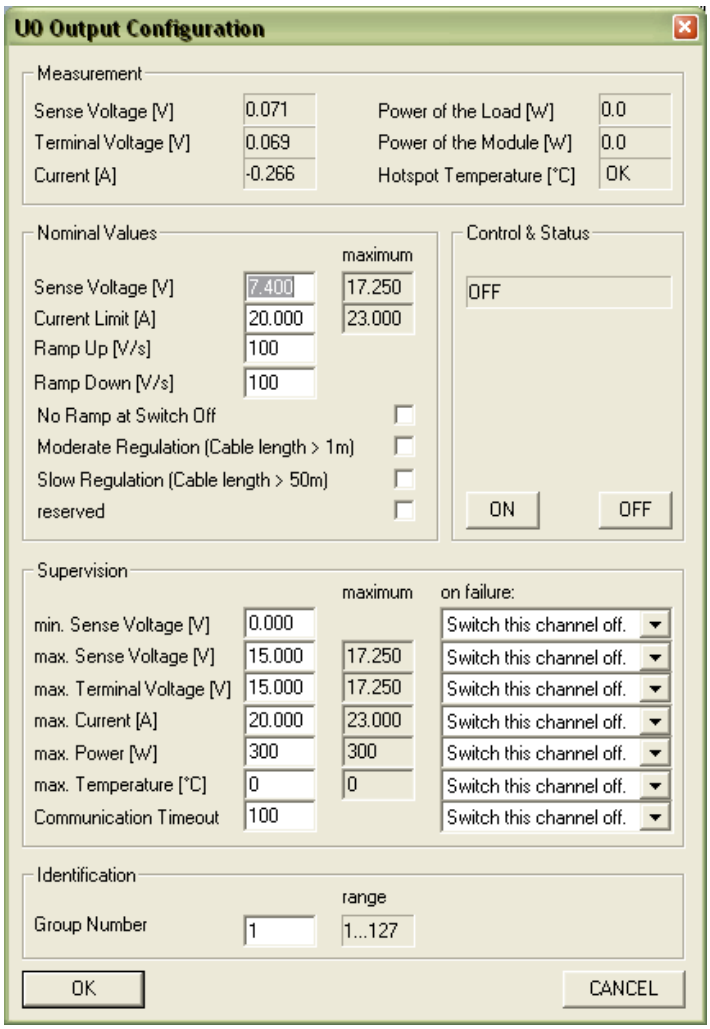
3.3.2 Output Configuration Dialog

This dialog allows the detailed configuration of each power supply channel.

The *Measurement* group shows the measured sense voltage, terminal voltage and current. The sense voltage is the voltage at the sense lines, which are connected to the load. Terminal voltage means the voltage at the terminals of the PL512/PL506.

Depending on the used modules, an analog or digital value of the most critical point of the power module is displayed.

The power of the load and the output power of the module are calculated values.



In the *Nominal Values* group the nominal values of the output voltage, the maximum current which the power supply will source before it switches into constant-current mode, and the voltage rise and fall rates are entered.

If the *No Ramp at Switch Off* check box is checked, the *Ramp Down* value is only used if the nominal voltage is changed. If the voltage is set to 0, the channel ramps down to zero and than switches off. But using the *OFF* button to switch off cuts off the output voltage immediately.

The voltage regulation parameters can be modified with the *Moderate Regulation* check box. If unchecked, the standard (PI) regulator is used. This is the fastest regulation, but may start ringing with wires to the load longer than 1 meter.

In this situations the advanced (PID) regulator of the *Moderate Regulation* should be used.

If the load is connected with really long or high-inductance cable, the *Slow Regulation* check box should be checked additionally. This increases the time constant of the I-Regulator.

The *Control and Status* group has buttons to switch the channel on or off. In case of any errors they are displayed here, too.

The *Supervision* group contains all items which the microcontroller can observe. In case of exceeding a limit, a dedicated action can be assigned to each item.

It is possible to

- ignore the failure (not possible at max. terminal voltage, max power and max. temperature: the power supply has to protect itself)
- switch this channel off
- switch all channels with the same group number off
- switch all channels of the power supply off

The Identification group contains just a single item, the group number of the channel.

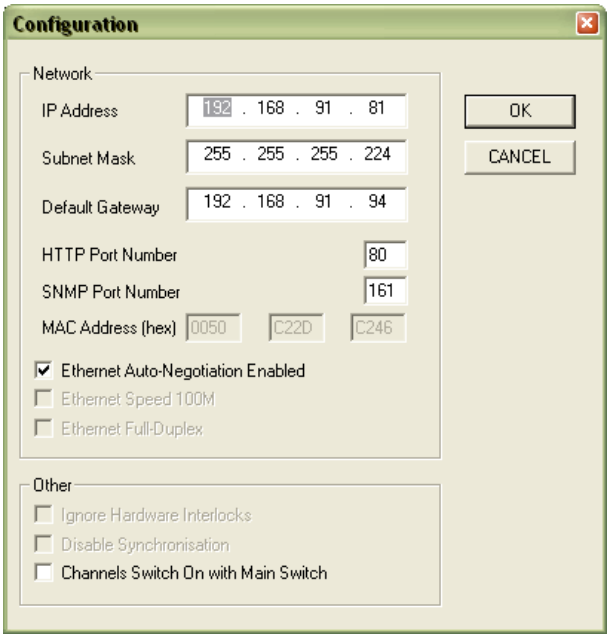
Many SNMP network commands can address a single channel (identified by the channel number) or a group (identified by the group number), so it is possible to access different channels with only one network message.

3.3.3 Global and Network Configuration Dialog

In the *Network* group box you enter the TCP/IP network settings (IP address, subnet mask and default gateway). You have to use the parameters of your local network here. Please contact your network administrator for details.

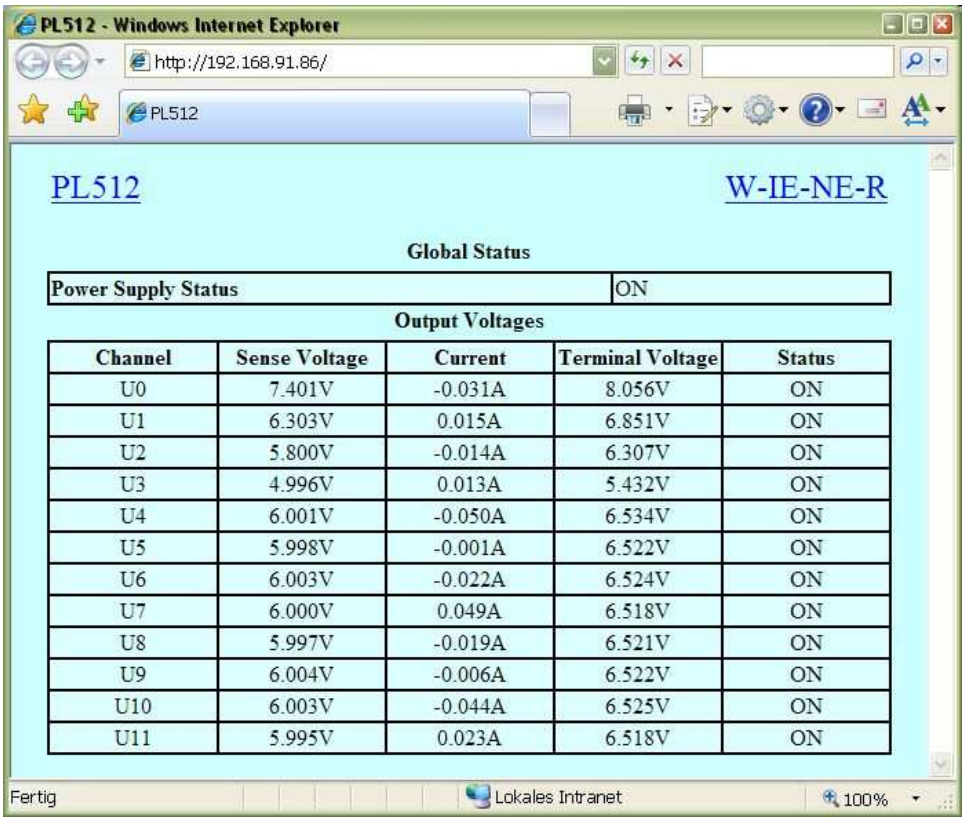
HTTP and SNMP port numbers should only modified if you know what you do. Setting any port to 0 disables the server.

If the “Channels Switch On with Main Switch” check box in the *Other* group box is checked, all output channels are switched on if the main switch is switched on.



4 Web Server

The PL512/PL506 has a built-in web-server which allows the monitoring of the power supply with a standard web browser.



5 SNMP Control

The SNMP (Simple Network Management Protocol) is generally used to monitor and control computers and network routers.

WIENER claimed a specific part of the SNMP namespace and implemented power supply specific items there. Protocol version 1 and 2c is implemented.

The tree view of the implemented items is appended in 7 SNMP OID Tree.

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

If you are new to SNMP the www.Net-SNMP.org website is a good start.

6 OPC Server

A server according to OPC Data Access V2.05 is optional available.

OPC (**O**LE for **P**rocess **C**ontrol) allows fast and secure access to data and information under Windows operating systems. As an industry-spanning, multi-vendor software interface, OPC minimizes connection and maintenance overheads.

This server, running on a Computer with the Microsoft Windows XP operating system, enables access to all controllers which are connected to the network (TCP/IP). It is possible to

- access from any OPC Client application to the data of one or more servers
- encapsulating the properties specific to the server and type of communication
- commissioning support due to automatic scanning of the network and registration of communication stations
- restricting access rights by the underlying Microsoft DCOM.

The details of the OPC server can be found in the manual delivered with the OPC server software.

7 Power Bins PBN506/PBN512

For easy exchange of the PL512/PL506 Power Box the special bins PBN506/PBN512 are provided: The low voltage/high current cabling is connected to M5 threaded bolts (MULTICONTACT). The arrangement is the same as at the power box: Starting from left with U0, and positive outputs up – negative outputs down.

Each sense lines of four output channels are connected to an eightfold pluggable terminal row.

If remote sensing is not used, the sense lines can be connected to the power outputs with jumpers.

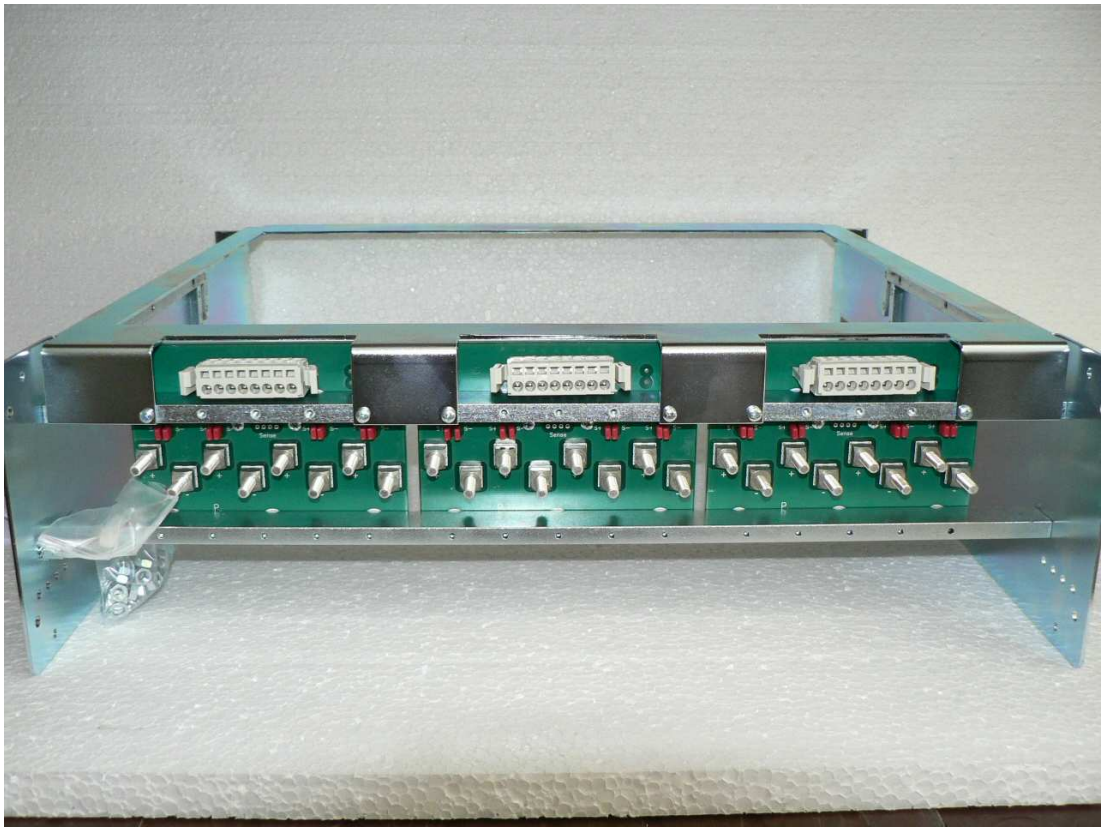


Figure 7.1: PBN512 -3U RATO Power Bin

Figure 7.2: PBN506 -3U RASO Power Bin (with PL506 Power Supply inserted)

Appendix A: Data Sheet

Rated Input Voltage:	106 – 230 V AC, +/- 15% variation allowed	
Rated Input Current:	16 A	
Sinusoidal:	**CE**	EN 60555, IEC 555 pow. fact. 0,98 (230VAC) 50/60 Hz
Inrush current:		16 A, cold unit
Output Insulation (SELV)	**CE**	EN 60950 , ISO 380, VDE 0805, UL 1950, C22.2.950

DC Output power with different input voltages at the rated current (16A), calculated with typical efficiency of 75%

115VAC / 1.380Wnom, 1580Wpeak **230VAC / 2.760W, 3170Wpeak**

Regulation fast remote sense circuit (short sensed distance, sense connected to output at the PBN506/PBN512 power bin):

Static:	MDC/M 2-8 V / 30–60 V	< 15 mV	(+/-100% load, +/- full mains range)
	MDC/M other voltages	< 0.05 %	(+/-100% load, +/- full DC input range)
Dynamic (0.5 m wire):	MDC/M 2-8 V	< 100 mV	(50 % - 75 % load change)
	other	< 0.7 %	(50 % - 75 % load change)
Recovery Time:	MDC/M 2-8V	1%: 0.2 ms 0.1%: 0.5 ms	(50 % - 75 % load change)
	MDC/M 5-16V, 7-24V	1%: 0.0 ms 0.1%: 1.0 ms	(50 % - 75 % load change)
	MDC/M 30-60V	1%: 0.5 ms 0.1%: 1.0 ms	(50 % - 75 % load change)
Conditions	Current slope <1000A/ms, 20mF per 100A parallel to load		

Regulation slow remote sense circuit (long sensed distance):

Static:	MDC/M 2-8V/ 30-60V	< 15 mV	(+/-100% load, +/- full mains range)
	Other	< 0.05 %	(+/-100% load, +/- full mains range)
Dynamic:	Dynamic deviation depends on current slope resp. filter capacitors at load side only 30m cable to load, 0,3mF capacitance at load side, 1V drop at nominal load, 10% - 90 % load change with 3ms slope (50A output= 13,33A/ms) leads to less than 10% temporary output voltage deviation		
Recovery Time (40m wire, 5V at load side, U_{drop} < 2 V:	MDC 2-7V, 2-8V	10%: <15 ms 1%: <25 ms	(50 % - 75 % load change)
	Other	10%: <15 ms	(50 % - 75 % load change)

1%: < 33 ms

DC Output Characteristics:

Sense compensation range:	Limited to < 10V or nominal voltage (whichever is lower).		
Regulation mode:	The voltage at the sense connection point is regulated.		
Floating range:	500 V test voltage		
Noise and ripple:	Voltage < 8 V Voltage > 8 V	< 10 mV_{PP} < 15 mV_{PP}	(0.5 m wire, 0–20 MHz)
		< 3 mV_{PP} < 1.5 mV_{RMS}	(10 m wire, 0-300 MHz)
Conditions at the load:	Parallel (X) 330µF and 1µF ceramic, 100nF HF- conducting to case (Y) each line		

Emission:	CE EN 50081-1 (EN 55 022-B)
Immunity:	CE EN 50082-1 or 2
Operating temperature:	10 °C – 40 °C
Storage Temperature:	- 30 °C - + 85 °C (cooling water must be completely removed, else +3 °C - +85 °C)
Temp.- Coefficient:	< 0.2% / 10K
Stability (constant conditions)	<5mV or 0.1% within 24 h, <25mV or 0.3% within 6 months
Current limiting:	Programmable
Status control / DC Off (trip off):	Tripping global, group- or channel wise programmable (after overload, overheat , overvoltage, undervoltage)
Interlock input:	optional
Efficiency (per Module):	65% 2V/ -81% >5V/ -85% >7V -87% >12V/ -90% >48V at nominal input voltage
M T B F, cooled by:	Conditions: 3kW DC output with 80% efficiency (600W internal power dissipation: WORST CASE)
Water, 30°C inflow:	ca. 120,000 h , put through > 50l/h for <10°C DT of cooling water. Minimum differential pressure >0.5 bar, abs. max. pressure <15 bar
Forced Air, 30°C entrance:	ca. 90,000 h , put through > 153m3/h for <15°C DT of cooling air, ambient air pressure 1 bar. Adequate airflow is roughly 1,4m/s. Values for air cooled units are valid for new ones. Abrasive dust, corrosion, etc. can limiting the heat transfer to the cooling air during lifetime. Higher operating temperature is the consequence. Increasing of internal temperature at the most critical points of 10°C will reduce the MTBF by 50% Lower operating temperatures will increase the MTBF accordingly, independent of cooling medium.

Communication	Ethernet 10/100M, USB 2	

Measurement Accuracy (typical values)

Voltage	± 0.1% of the maximum output voltage of the channel	
Current	**MDC (single module)**	± 1%
	MDC (paralleled)	± 1%
	MDH	± 1 %
Construction features, Accessories:	3 U box with extraction lever:	max. 6 modules, up to 3 kW / 3,6kW output power
	Connections / plugs:	24 female pins 80A, parallel used for higher currents, 3 x 9pin Sub D for sensing (each for 4 channels)
	Dimensions (w, h, d)	434 mm x 132 mm x 325 mm
	Weight:	31,5 kg
Accessories:	19" Power Bins PBN506/PBN512 for plug in PL506/PL512 power supplies power contacts with threated bolts and sense terminals at rear side.	
	Types PBN506 -4U PBN512 -4U :	4U x 450mm mounting depth, 1 U air baffle, strain relief, cooling air entry front- or bottom side, for 3U – Box
	Special power bins / 19" assembly with 3U and 6U (for two PL506/PL512 boxes) available. 450mm mounting depth	

Appendix B: Ordering Information

Standard	**0P11.**xxxx
Special versions for CERN	**0M11.**xxxx

The left side of the ordering number is not descriptive, it is randomly assigned to the requested module & options configuration. Up to six power modules may be used inside of one power box.

The following modules are possible (external ventilation necessary):

Module Type	Channels per Module	Optimal Voltage Range	Peak Output Current	Continuous Output Power
MDC	2	2V ... 7V/8V	2*55A	2*300W
MDC	2	5/7V ... 15/16V	2*22A	2*300W
MDC	2	7V ... 24 V	2*11.5A	2*250W
MDC	2	30V ... 60V	2*6.6A	2*300W

The following modules can be used without external ventilation (integrated fans):

Module Type	Channels per Module	Optimal Voltage Range	Peak Output Current	Continuous Output Power
MDH	2	2V ... 7V/8V	2*30A	2*210W
MDH	2	5/7V ... 15/16V	2*20A	2*250W
MDH	2	7V...24V	11.5A	2*275W
MEH	1	2...7V	115A	550W
MEH	1	6...10V	80A	550W
MEH	1	7...16V	46A	550W
MEH	1	12...30V	23A	550W
MEH	1	30...60V	13.5A	550W

All power modules can be ordered with different sense regulation characteristics:

- Fast — Fastest regulation, but may be instable if connected to cables longer than 1 m.
- Moderate — This is the standard configuration for cable length up to 30 m
- Slow — This is used for much longer cables

Available Power Bins:

	Ordering Number
Power Bin (MARA) 3U	0B15.1200
Power Bin (MARA) 6U, for two power boxes	0B14.2400

Appendix C: SNMP OID Tree

Only a small part of general SNMP OIDs is implemented. This is the tree view:

```
+--iso(1)
   |
   +--org(3)
      |
      +--dod(6)
         |
         +--internet(1)
            |
            +--directory(1)
            |
            +--mgmt(2)
            |  |
            |  +--mib-2(1)
            |     |
            |     +--system(1)
            |     |  |
            |     |  +-- -R-- String    sysDescr(1)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- ObjID     sysObjectID(2)
            |     |  +-- -R-- TimeTicks sysUpTime(3)
            |     |  +-- -RW- String    sysContact(4)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysName(5)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysLocation(6)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- INTEGER   sysServices(7)
            |     |  |        Range: 0..127
```

This is the tree view of the wiener-specific SNMP namespace. It could be generated with the command „snmptranslate -w 80 -Tp WIENER-CRATE-MIB::wiener“. Because it's a general definition, usable for different types of crates, some items may be not implemented in the real hardware. Here the not relevant parts are omitted.

The wiener OID is located at iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

```
+--crate(1)
   |
   +--system(1)
   |  |
   |  +-- -RW- EnumVal   sysMainSwitch(1)
   |  |        Values: OFF(0), ON(1)
   |  +-- -R-- BitString sysStatus(2)
   |  |        Values: mainOn(0), mainInhibit(1), localControlOnly(2),
   |  |                inputFailure(3), outputFailure(4), fantrayFailure(5),
   |  |                sensorFailure(6), VmeSysfail(7),
   |  |                plugAndPlayIncompatible(8)
   |  +-- -RW- EnumVal   sysVmeSysReset(3)
   |           Values: TRIGGER(1)
   |
   +--input(2)
   |
   +--output(3)
   |  |
   |  +-- -R-- INTEGER   outputNumber(1)
   |  |        Range: 0..255
   |  |
   |  +--outputTable(2)
   |  |  |
   |  |  +--outputEntry(1)
   |  |     |  Index: outputIndex
   |  |     |
   |  |     +-- ---- EnumVal   outputIndex(1)
   |  |     |        Values: U0(1), U1(2), U2(3), U3(4), U4(5), U5(6), U6(7),
   |  |     |                U7(8), U8(9), U9(10), U10(11), U11(12)
   |  |     +-- -R-- String    outputName(2)
```

```
|  |     |        Textual Convention: DisplayString
|  |     |        Size: 1..4
|  |     +-- -RW- INTEGER   outputGroup(3)
|  |     |        Range: 0..127
|  |     +-- -R-- BitString outputStatus(4)
|  |     |        Values: outputOn(0), outputInhibit(1),
|  |     |                outputFailureMinSenseVoltage(2),
|  |     |                outputFailureMaxSenseVoltage(3),
|  |     |                outputFailureMaxTerminalVoltage(4),
|  |     |                outputFailureMaxCurrent(5),
|  |     |                outputFailureMaxTemperature(6),
|  |     |                outputFailureMaxPower(7),
|  |     |                outputFailureTimeout(9),
|  |     |                outputCurrentLimited(10), outputRampUp(11),
|  |     |                outputRampDown(12)
|  |     +-- -R-- Opaque    outputMeasurementSenseVoltage(5)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- Opaque    outputMeasurementTerminalVoltage(6)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- Opaque    outputMeasurementCurrent(7)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- EnumVal   outputMeasurementTemperature(8)
|  |     |        Values: OK(-128), FAILURE(127)
|  |     +-- -RW- EnumVal   outputSwitch(9)
|  |     |        Values: OFF(0), ON(1)
|  |     +-- -RW- Opaque    outputVoltage(10)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- INTEGER   outputAdjustVoltage(11)
|  |     |        Range: -128..127
|  |     +-- -RW- Opaque    outputCurrent(12)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- INTEGER   outputSupervisionBehavior(15)
|  |     |        Range: 0..65535
|  |     +-- -RW- Opaque    outputSupervisionMinSenseVoltage(16)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxSenseVoltage(17)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxTerminalVoltage(18)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxCurrent(19)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxSenseVoltage(21)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxTerminalVoltage(22)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxCurrent(23)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxPower(24)
|  |              Textual Convention: Float
|  |              Size: 7
|  |
|  +-- -R-- INTEGER   groupsNumber(3)
|  |        Range: 1..255
|  |
|  +--groupsTable(4)
|     |
|     +--groupsEntry(1)
|        |  Index: groupsIndex
|        |
|        +-- ---- EnumVal   groupsIndex(1)
|        |        Values: ALL(0)
|        +-- --W- EnumVal   groupsSwitch(9)
|                 Values: UNDEFINED(-1), OFF(0), ON(1)
|
+--communication(5)
|  |
|  +--snmp(1)
|     |
|     +--snmpCommunityTable(1)
```

```
|     |  |
|     |  +--snmpCommunityEntry(1)
|     |     |  Index: snmpAccessRight
|     |     |
|     |     +-- ---- EnumVal   snmpAccessRight(1)
|     |     |        Values: public(1), private(2), admin(3), guru(4)
|     |     +-- -RW- String    snmpCommunityName(2)
|     |              Size: 0..14
|     |
|     +-- -RW- INTEGER   snmpPort(2)
|
+--powersupply(6)
|  |
|  +-- -R-- String    psSerialNumber(2)
|  |        Textual Convention: DisplayString
|  |        Size: 0..255
|  +-- -R-- INTEGER   psOperatingTime(3)
|  +-- -RW- String    psDirectAccess(1024)
|           Size: 1..14
|
```

Appendix D: Parallel Connection of Output Channels

A set of six current bars (4-fold) will be delivered by each power bin in a companion-assembly-pack.

How to use the current bars

If the power supply has channels with more than one contact pair, use the current bars to connect each option. For best operation it is necessary to connect the parallel outputs together as near as possible at the power supply site. For 200A (4-fold) the current bars can be used as they are, for 3-fold or dual paralleling they have to be cut accordingly.

4-fold : 200A (order number : 1480753.A1)

3-fold : 150A

2-fold : 100A

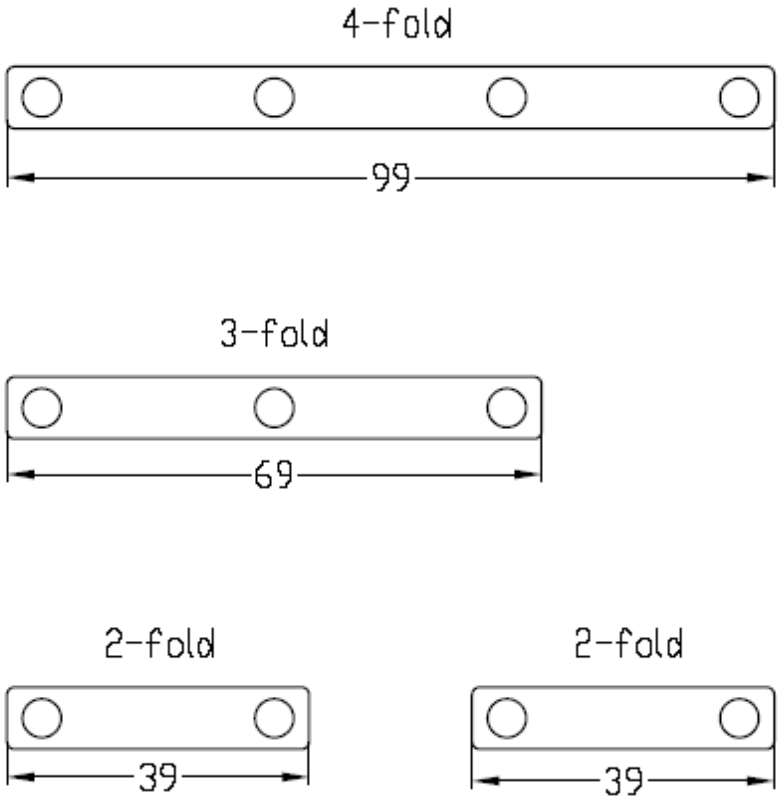


Figure 7.3: Current Bar Dimensions

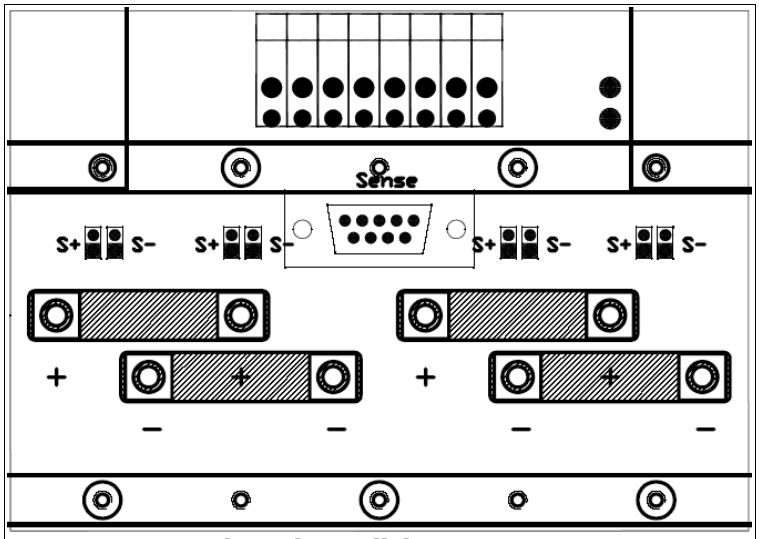


Figure 7.4: Two Channels Parallel

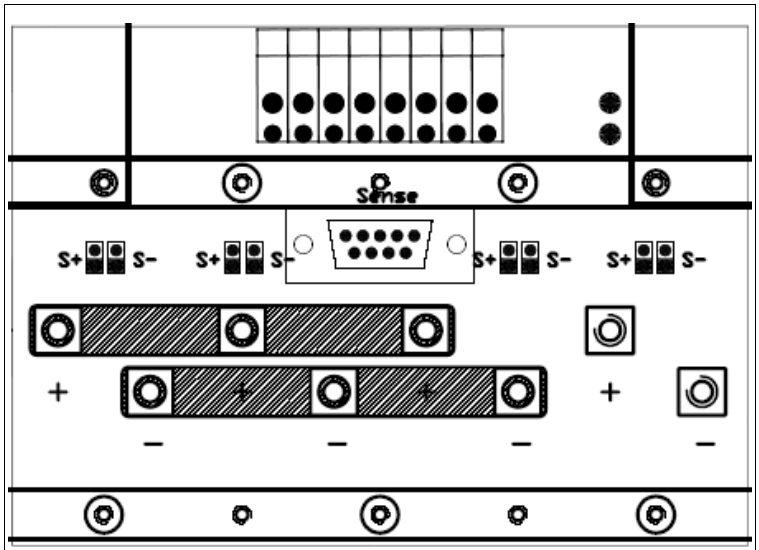


Figure 7.5: Three Channels Parallel

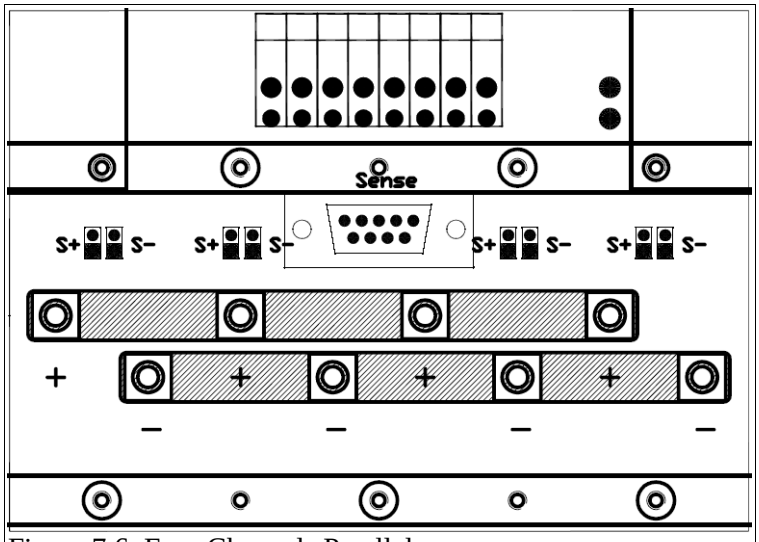


Figure 7.6: Four Channels Parallel