HEINZINGER
HIGH VOLTAGE – SMART SOLUTIONS

Betriebsanleitung

User Manual

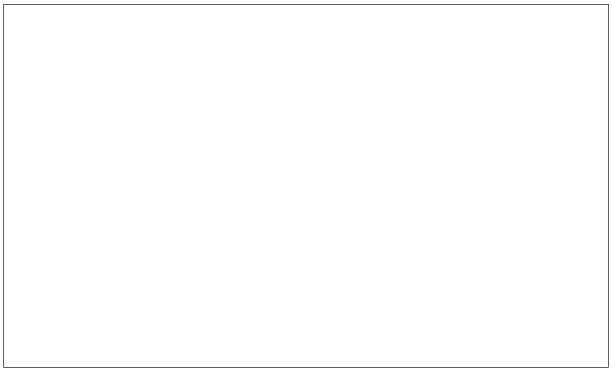
Precision Magnet Power Supplies

Heinzinger PCU-Series

HIGH VOLTAGE BUT SMART

www.heinzinger.com

TYPE PLATE



Erklärung Typenschild / *Type Plate Explanation*

Type	PCU <Nominalspannung in V> - <Nominalstrom in A> *PCU <nominal voltage in V> - <nominal current in A>*
Input	<Versorgungsspannung> <Frequenzbereich> <Wert der Primärabsicherung> *<supply voltage> <frequency range> <primary fuse>*
Output	<Max. Ausgangsspannung / Max. Ausgangsstrom> *<max. output voltage / max. output current>*
Options	M = Modifikation -> Beschreibung lt. Anlage wenn vorhanden *M = Modification as per attachment if applicable*
Partnumber	<Heinzinger Artikelnummer> *<Heinzinger article number>*
Serialnumber	<Geräteseriennummer> *<S/N of device>*

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CE

CONTENTS

1. IMPORTANT BASIC INFORMATION

1.1. Standard scope of delivery

- PCU magnet power supply
- Accessories
- Plug-set for front and backside jacks
- Covers for both output connectors
- This user manual

1.2. Disclaimer

1.2.1. Liability, Guarantee

Heinzinger electronic GmbH is not liable for damage that results from improper use of the products or due to non-observance of the operating instructions in whole or in part.

Heinzinger electronic GmbH shall provide a 2-year warranty against manufacturing and material defects effective as of the date of delivery of the product to the customer. The warranty requires the use of only original Heinzinger accessories such as connectors and cables. For detailed information on the manufacturer's warranty, please refer to the contract agreements.

1.3. Operator´s responsibilities

The operator is responsible for ensuring the power supply

- is only used in accordance with its intended use,
- is set-up and installed as prescribed
  (refer to chapter 5 Set-up and start-up on page 16),
- is only operated by trained technicians.

1.4. What you need to know about this user manual

1.4.1. User manual as part of unit

- This user manual must be observed and only applies to magnet power supply units of the PCU series.
- Please keep the user manual with the unit.
- Please pass on the user manual to the next user(s).

1.4.2. Pictograms

NOTE

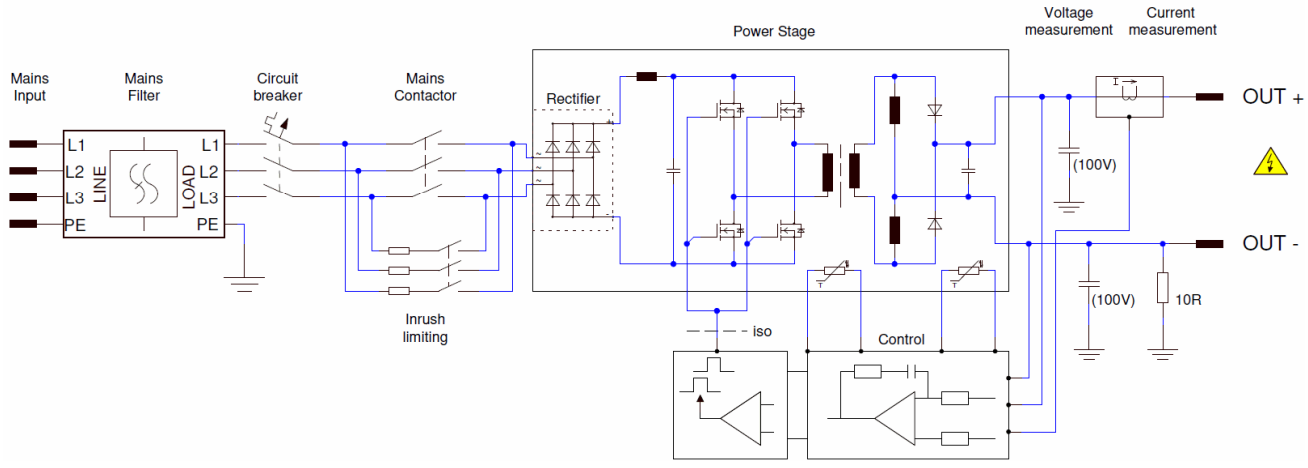
Highlights key information that the user needs to know.

1.5. Significance of this user manual

Please note at that point that

- the user manual is part of the product.
- the user manual should be retained for the entire service life of the product and updated where applicable.
- the user manual must be passed on to the next owner or user of the product.

1.6. Simplified diagram



2. SAFETY

2.1. Safety labels at the unit

DANGER, RISK OF ELECTRIC SHOCK

There is a risk of shock from contacting electrically conductive parts in this labelled area.

CAUTION

Please refer to the operating manual for information on this label.

2.2. Safety labels in this user manual

DANGER, RISK OF ELECTRIC SHOCK

Warns of possible electric shocks as a result of direct or indirect contact with electrically conductive components; potential for severe, permanent injuries to person or even death and major damage to property.

CAUTION

Indicates possible risk of injury or that the unit may not be functioning properly or could be damaged.

2.3. Basic safety instructions

2.3.1. Unit

For safety reason the unit may not be opened under any circumstances. The warranty shall also be voided if any modifications to the units are made or the unit is opened.

2.3.2. Range of use and user manual

The unit is designed for use in laboratories and production applications. The user manual must be observed by all personnel. For this reason, it should be kept near the unit at all times.

2.3.3. Requirements on staff

This unit may only be used and put into operation by qualified technicians.

2.4. Intended use

Safety, reliability and performance can only be guaranteed if

- the unit is used for its intended purpose,
- upgrades, modifications and repairs are performed only by persons authorised by the manufacturer,
- the electrical installations are in compliance with the applicable safety regulations,
- and connecting and operating conditions prescribed in this user manual are observed.

2.5. Residual risks and safety measures

The magnet power supply of the PCU series is delivered in sound operating condition. It creates radio interference (threshold values acc. to EN 61000-6-4, class B). The operator is personally responsible for compliance with the specific safety regulations relating to a connected application.

There is a risk of electrical shock when starting, operating or shutting down the magnet power supply unit if

- the output voltage is switched on, although no load is connected to the output as directed,
- the unit is operated in spite of a known defect,
- the connected application represents a violation of the applicable electro-technical safety regulations,
- the unit was switched off and there is dangerous voltage at the output due to external and/or residual charges,
- the instructions in this user manual were not fully observed.

The specific safety measures for the unit are described in the following chapters.

3. TECHNICAL SPECIFICATIONS

3.1. Technical specifications, PCU series

Equipment series	PCU
Model series	Standard versions
Manufacturer	Heinzinger Electronic GmbH Anton-Jakob-Str. 4 83026 Rosenheim, Germany

A) MAINS CONNECTION / GENERAL INFORMATION

Supply voltage Power input	400 VAC / 3p ± 10% 50 Hz type-dependent
Ambient temperature Humidity	0 °C to +40 °C 35 to 70 % (non-condensing)
Potential separation output	acc. to DIN EN 50178
Efficiency (full load)	≥ 85 %
Power factor	90 %

B) OUTPUT

Model (PCU-)	50-100	50-200	50-300	30-340
Nominal output voltage (V) [U_N]	50	50	50	30
Nominal output current (A) [I_N]	100	200	300	340
Nominal output voltage (V) [U_N]	50	50	50	30
Nominal output power	5 kW	10 kW	15 kW	10 kW
Setting range (%)	1-100	1-100	1-100	1-100
DAC resolution (bit)	16	16	16	16
ADC resolution (bit)	16	16	16	16
Rise time (10-90%) full load (ms)	Depending on load (R,L), typically 30ms			
Residual voltage ripple p/p up to 10kHz (at 10-90% output power)	0,1 %	0,1 %	0,1 %	0,1 %
Current deviation for +/- 10% of mains variation (full load)	≤5ppm	≤5ppm	≤5ppm	≤5ppm
Current deviation for +/- 10% of load variation	≤5ppm	≤5ppm	≤5ppm	≤5ppm
Current stability over 8 hours (after 1 hour of warm-up)	≤6ppm	≤6ppm	≤6ppm	≤6ppm
Current deviation in temperature range (ppm/°C)	≤5ppm	≤5ppm	≤5ppm	≤5ppm
Absolute current accuracy deviation	2mA	4mA	6mA	7mA
Current reproducibility deviation	5mA	10mA	15mA	17mA
MTBF (hrs)	100,000	100,000	100,000	100,000
Input/output insulation (DC 1min)	2,3 kV	2,3 kV	2,3 kV	2,3 kV
Output/case insulation (DC 1min) [electrical strength 63 VDC !]	1 kV	1 kV	1 kV	1 kV

C) DIMENSIONS / WEIGHT

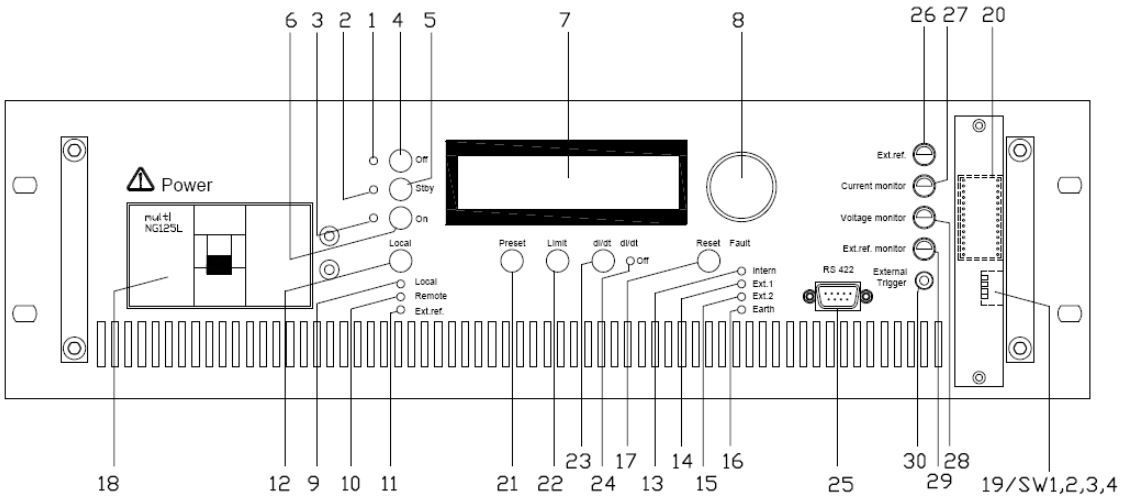
Model (PCU-)	50-100	50-200	50-300	30-340
Height max	3 U	6 U	9 U	9 U
Weight max	37 kg	55 kg	75 kg	70 kg

NOTE

Technical specifications for customised and modified units and units with integrated options may deviate from these values.

4. FRONT AND REAR PANEL CONTROLS AND CONNECTORS

4.1. Front Panel controls and indicatores



Number	Control / Indicator	Description
1	LED „Off“	Green LED shines if power supply status is “OFF”. DC output and mains conductor are off.
2	LED „StdBy“	Yellow LED shines if the power supply status is “StdBy”. DC output is disabled, mains conductor is enabled.
3	LED „On“	Red LED shines if the DC output is enabled.
4	Button „Off“	If pressed DC output will be disabled and mains conductor is “OFF”
5	Button „StdBy“	If pressed mains conductor will be switched “ON”, DC output is disabled or switched off.
6	Button „On“	If pressed DC output will be enabled.
7	Display	LCD display showes during Normal mode: Output current/output voltage; PRESET mode: Setting values; LIMIT mode: Limit values; di/dt mode: di/dt-value.
8	Encoder	High resolution encoder for adjusting the setting, limits and di/dt value.
9	LED „Local“	During local operating mode of power supply Red LED shines.

Front Panel controls and indicatores

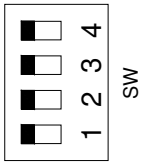
Number	Control / Indicator	Description
10	LED „Remote“	During remote operating mode of power supply (via RS422) Green LED shines.
11	LED „External“	During external operating mode of power supply (via analog interface) Yellow LED shines.
12	Button „Local“	If pressed REMOTE operation mode will be changed over to the LOCAL operation mode.
13	LED „Internal“	Red LED shines in case of an internal failure like - temperature fault - transducer fault - P.R.S fault DC output will be disabled; Power supply will remain in “OFF” state.
14	LED „Ext.1“	Red LED shines if an external fault 1 occurs. DC output will be disabled; Power supply will changed over into “OFF” state.
15	LED „Ext.2“	Red LED shines if an external fault 2 occurs. DC output will be disabled; Power supply will changed over into “OFF” state.
16	LED „Earth“	Red LED shines if an earth fault occurs. DC output will be disabled; Power supply will changed over into “OFF” state.
17	Button „Reset“	In order to reset a failure.
18	Circuit breaker AC Power	Mains On/Off control.
19	Setup Switch “SW”	DIP switch for selecting programming source, trigger source and operating mode (see chapter 4.2).
20	Programming socket	Socket for adjustment of the current loop.
21	Button „Preset“	Output value setting. Output current setting for constant current mode or output voltage setting for constant voltage mode - New value can be adjusted during pressing PRESET and turning the encoder knob, - New value is kept after releasing PRESET button.

Number	Control / Indicator	Description
22	Button „Limit"	Limit value setting. Limit voltage setting for constant current mode or Limit current setting for constant voltage mode - New value can be adjusted during pressing LIMIT and turning the encoder knob; - New value is kept after releasing LIMIT.
23	Button „di/dt"	di/dt value setting. - Press di/dt button and set the new value by turning the encoder knob - Release PRESET to validate the new value
24	LED „di/dt-Off"	Red LED glows if the di/dt-function is disabled

4.2. Setup switch SW

CAUTION

Before making any changes to the SW switch setting, disable the power supply by switching off the unit via the circuit breaker.



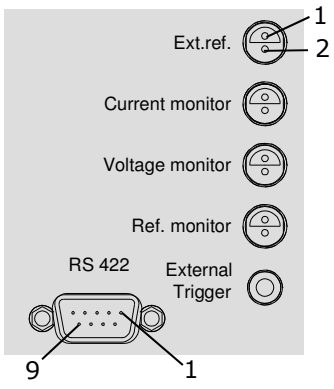
The setup switch allows the user to choose

- the Digital (Local/RS422) or analog interface for remote programming,
- constant current or constant voltage mode, or
- to enable / disable external triggering.

Position	Function	Off	On
SW1	Enable / disable external triggering	External triggering disabled	External triggering enabled
SW2	Operation mode constant current or constant voltage mode	Constant current mode	Constant voltage mode
SW3	Digital or analog remote programming	Output programming digital (Local/RS422)	Output programming external Ref. (analog)
SW4	Not used		

4.3. Front Panel Connectors

Number	Connector	Description
25	RS 422	Connector for RS422 programming interface: Pin Description 1 NC 2 Rx 3 /Rx 4 NC 5 GND 6 NC 7 /Tx 8 Tx 9 NC
26	Set value	2 pin connector; input for analog voltage (0..10V) programming of the output current in constant current mode or for programming the output voltage, in constant voltage mode (Pin1:+, Pin2: GND)
27	Current monitor	2 pin connector; output for monitoring the output current; output level range 0 ... 10V (Pin1:+, Pin2: GND)
28	Voltage monitor	2 pin connector; output for monitoring the output voltage; output level range 0 ... 10V (Pin1:+, Pin2: GND)
29	Ref. monitor	2 pin connector; output for monitoring the set value; output level range 0 … -10V (Pin1:-, Pin2: GND)
30	External trigger- input	Coax-connector for trigger-input: if enabled (SW1=ON) actual monitor values are transferred via a 24 V pulse at the center pin.



Front panel connectors

4.4. Rear Panel

Number	Connector	Description
1	AC input connection	Wire clamp connector for L1, L2, L3
2	Earth connection	Earth bolt with M6 screw for chassis ground connection
3	Interlock and fault	12 pin connector with Pin description 1 or K External Fault 1 (Interlock 1) *) 2 or L External Fault 1 common *) 3 or M External Fault 2 (Interlock 2) *) 4 or H External Fault 2 common *) 5 or J NC 6 or A NC 7 or B Power converter ON signal **) 8 or C Power converter ON signal **) 9 - 10 or D - G NC
4	Polarity reserve switch	15 pin D-Sub connector for connection of optional polarity reserve switch Pin description 1 Polarity-Switch Status (E) 2 Polarity-Switch Status (C) 3 Polarity-Switch connected (E) 4 Polarity-Switch connected (C) 5 Polarity-Switch neg. (E) 6 Polarity-Switch neg. (C) 7 Polarity-Switch fault (E) 8 Polarity-Switch fault (C) 9 – 15 NC
5	DC output	Bus-bars with bolt connections

*) no interconnection means fault **) Closed = ON, Open = OFF

Set-up

5. SET-UP AND START-UP

5.1. Set-up

5.1.1. Special safety instructions for set-up

When selecting the location to set up the unit, please observe the ambient conditions for the units as specified in this guide (-> see chapter 3 Technical specifications, PCU series on page 9). Measures should be taken to aviod excessively high ambient temperatures (T_a max. = 40°C), too high humidity (max. rel. humidity: 70%) and excessive dust and dirt around the unit. The unit may otherwise be damaged or there is an impact for the application.

VENTILATION AND EXHAUST

The unit features exhaust and cooling vents and – if required – integrated fans to prevent overheating. These vents and the air flow to the fans must not be blocked. No objects should be placed within at least 5 cm around the unit.

INFRASTRUCTURE

The necessary infrastructure must be in place to ensure stable installation and proper mains wiring for the power supply unit as well as for the specific application.

ACCESSIBILITY

Depending on the model, the power supply unit feature control and connection elements at the front or back side. During installation appropriate accessibility should be given.

5.1.2. Unpacking an rack mounting

Please proceed as follows:

- Check for visible damage to the packaging or the unit caused during shipping;

DANGER, RISK OF ELECTRIC SHOCK

If there is any visible damage, do not power up the unit under any circumstance!

- Check whether all items were included with the delivery (see chapter 1.1 Important basic information on page 5).
- Carefully set up the unit at the intended location.
- Before installing in a 19" cabinet install appropriate rack mount slides to balance the high weight of the unit. Afterwards move the power supply carefully into position and fix it with front panel screws at the rack.

5.2. Start-up

5.2.1. Special safety instructions for initial start-up

CAUTION

If you have any difficulties starting the unit or suspect technical problems, please contact the manufacturer's service department.

5.2.2. Connecting the unit

Please follow these steps:

- Set the mains circuit breaker to OFF.
- Connect it to mains power at the rear panel at the 3-terminal wire clamp.
- Earth connection has to be executed via a screw bolt.
- Connect the load wires securely using wire terminal lugs together with spring and flat washer. Screw size: M10 for PCU 50-100 and M12 for all other versions.
- Both Interlock Pins at the rear panel have to be interconnected.

NOTE

Unit output can not be enabled, if Interlock 1 ("External fault1") and Interlock 2 ("External fault2") pins are not interconnected.

5.2.3. Self-test

At the beginning if the circuit breaker is turned on, the device starts a self-test, if is this ok the display shows "Self-test OK", if is not ok it shows "Failure Self-test XXX".

The significance of the failure can be seen from the table:

Failure code	Description	Corrective action
001	Button fault	Contact manufacturer support
002	EEPROM fault	Contact manufacturer support
003	SPI-Communication fault	Contact manufacturer support

Special operational safety instructions

6. OPERATION

6.1. Special operational safety instructions

> ***CAUTION***
>
> **Start-up and operation of unit shall only be performed by qualified personnel!**

6.2. Introduction

This chapter describes the local operation mode. Ensure that the "Local Status LED" is ON. Otherwise if the "Remote Status LED" is ON, press the front panel "Local button" to change the operating mode to local.

In case if the "External Status LED" is ON, it is not possible to operate the power supply in "Local mode".

For this you have to change the setup first, to bring the unit into digital (Local/Remote) mode.

- For more information regarding remote programming see chapter 7
- For more information regarding External Ref. (analog) programming see chapter 8
- For more information regarding changing setup see chapter 9

6.3. Basic Operation

The power supply normally operates in constant current mode. It is also possible to change the operating mode to constant voltage mode by changing the setup. An automatic switch-over between the two kinds of operation modes is not integrated.

For more information regarding changing setup see chapter 9.

6.3.1. Constant Current Mode

In constant current mode the power supply regulates the output current at the setting values while the voltage varies with the load. The display shows in the first line the value of the current and in the second line, the value of the voltage. This mode is indicated by an "*" character, on the first line of the display on right hand side.

```
CURR      +123.40A*
VOLT      +  50.00V
```

6.3.1.1. Adjustment of output current

Adjustment of the output current can be done at any output states (“Off”, “StdBy”, “On”) of the power supply.

To display the programmed current value, press the <Preset> button. The second line of the display will show the last programmed current value. To set the new value, turn the encoder knob. After releasing the <Preset> button, the new value will be valid and the display goes back in normal state. The minimum setting resolution is 0.01 Ampere for the display and I_N / 65,535 for the output.

```
CURR      +123.40A *
VOLT      +200.00V <-
```

6.3.1.2. Adjustment of voltage limitation

To display the programmed voltage limitation value, press the <Limit> button. The first line of the display will show the last programmed value. To set the new value turn the encoder knob. After releasing the <Limit> button the new value will be valid and the display goes back in normal state. The minimum setting resolution is 0.01 Volt for the display and U_N / 65,535 for the output.

```
Limit     +  20.00V <-
VOLT      +  50.00V
```

6.3.1.3. Adjustment of di/dt

To display the programmed di/dt value, press the <di/dt> button. The first line of the display will show the last programmed value. To set the new value turn the encoder knob. After releasing the <di/dt> button the new value will be valid and the display goes back in normal state. Setting range is 50 to 400 A/s, with a resolution of 10A/s.

```
di/dt          400A/S <-
```

To disable the di/dt – function turn the encoder knob clockwise until the display shows the following sequence:

```
di/dt              OFF <-
```

After releasing the <di/dt> button, the di/dt-LED glows.

To enable the di/dt – function again press the <di/dt> button and turn the encoder knob anti clockwise.

6.3.2. Constant Voltage Mode

In constant voltage mode the power supply regulates the output voltage at the setting values while the load current varies by load. The display shows in the first line the value of the current and in the second line the value of the voltage. This mode is indicated by a
"*" character on the second line of the display on right hand side.

```
CURR      +123.40A
VOLT      +  50.00V *
```

6.3.2.1. Adjustment of output voltage

Adjustment of the output voltage can be done at any output states ("Off", "StdBy", "On") of the power supply.

To display the programmed voltage value press the <Preset> button. The first line of the display will show the last programmed voltage value. To set the new value turn the encoder knob. After releasing the <Preset> button the new value will be valid and the display goes back in normal state. The minimum setting resolution is 0.01 Volt for the display and U_N / 65,535 for the output.

```
Preset    +  50.00V <-
VOLT      +  50.00V *
```

6.3.2.2. Adjustment of current limitation

To display the programmed current limitation value press the <Limit> button. The first line of the display will show the last programmed value. To set the new value turn the encoder knob. After releasing the <Limit> button the new value will be valid and the display goes back in normal state. The minimum setting resolution is 0.01 Ampere.

```
CURR      +123.40A
Limit     +200.00A <-
```

6.3.2.3. Function di/dt

In constant voltage mode this function is disabled at any time. The "di/dt LED" is illuminating and if pressing the <di/dt> button the display shows the following:

```
di/dt                 OFF
```

6.3.3. Setting Memory

The power supply unit is equipped with Setting Memory which stores the actual power supply parameters by pressing the <Limit> and <di/dt> button at the same time.

When turning on the power supply by AC ON/OFF or with a "RST" command via remote control the unit starts to its last settings of preset (with polarity sign), limit and di/dt-values.

6.3.4. Limitation of output values

A limitation of the setting values can be adjusted by pressing the preset and limit button at the same time and setting the new value by turning the encoder.

6.4. Output Control

The DC output can be controlled locally by the three buttons <Off>, <StdBy> and <On>. The actual DC output state will be shown by three LEDs close to the buttons.

6.4.1. Output in "Off-State"

In "Off-State" the Off-LED glows and the DC output is "Off"; the mains conductor is "Off" as well.

6.4.2. Output in "Standby-State"

By pressing the <StdBy> button the power supply goes in "StandBy" state, this means that the DC output is still "Off", but the mains conductor is already switched on.

The StdBy-LED illuminates.

6.4.3. Output in "On-State"

By pressing the <On> button the power supply goes in "On" state, this means that the DC output is "On". The On-LED illuminates. Switching the output off can be done by pressing the button <Stdby> or <Off> again.

Introduction

7. RS 422 REMOTE CONTROL

7.1. Introduction

This chapter describes the operation of PCU power supplies via the RS422 – Interface with details about the setting parameters, the communication interface protocol and the command set description.

7.2. Parameter settings

All communication parameter of the RS422 interface are fixed and can not be changed.

Baud-rate :	9600 baud
Parity :	none
Data bit :	8
Start bit :	1
Stop bit :	2

7.3. Communication Interface Protocol

7.3.1. Data Format

A data string contains 8 data bits, 1 start bit, 2 stop bits and no parity bit.

7.3.2. End of Message

The end of all sent messages is marked by the carriage return character (ASCII 13). The end of all received messages is marked with the line feed character (ASCII 10) and carriage return character (ASCII 13).

7.4. Command Set Description

7.4.1. General notes

- Any command or argument may be in capital letters or lower case letters.
- During local mode no “Writing” commands are possible.
- During remote mode all “Local”-setting functions are disabled.

7.4.2. Control commands

Control command	Function / Action	Valid value string	Note
AD 0	Read output current	015000	15A in mA
AD 2	Read output voltage	045000	45V in mV
DA 0,XXXXXX	Write output current	025000	25A in mA
DA 2,XXXXXX	Write output voltage	050000	50A in mV
N	Set the PSU in On-Status		
F	Set the PSU in Off-Status		
STB	Set the PSU in Standby-Status		
RS	Reset the PCU fault message		
PO	Read the output polarity	+ or -	
S1H	Read the PSU Status	600000	Hex-Word

7.4.3. Content of Status Register

Position	Content	Status
1	Off	Status high
2	Local	Status high
3	Not used (over I r.m.s.)	Always low
4	Internal fault	Status high
5	P.R.S fault	Status high
6	Power/transducer fault	Status high
7	Not used	Always low
8	External 1	Interlock high
9	Standby	Status high
10	Sum-interlock	Interlock high
11	Not used (DC over current)	Always low
12	Not used (over voltage protection)	Always low
13	On	Status high
14	External 2	Interlock high
15	Not used (mains failure)	Always low
16	Not used (current limit)	Always low
17	Earth leakage failure	Interlock high
18	Not used (converter over voltage)	Interlock high
19	MPS overtemperature	Interlock high
20	Spare	Always low
21	Spare	Always low
22	Spare interlock	Always low
23	Not used (MPS not ready)	Always low
24	Not used (MPS fan fault)	Always low

7.4.4. SCPI-Instructions (Standard Commands for Programmable Instruments)

The following instruction set is available for unit control independent from the unit type.

The communication between PC and Digital Interface can happen with a service program. At MS-Windows PC´s the Program HyperTerminal is available by default. For use the program has to be set to "VT52 emulation".

The instruction sequenz comprises ASCII-characters in the following format:

[Instruction] [Space] <Parameter optional> [LF]

Instructions are written in capital letters; lower case letters are optional. Every instruction sequenz is terminated with a LF (dec. 10); once the instruction is sent to the interface it is executed immediately.

Functionality	Instruction	Sample(s)
Programing of Nominal Output Voltage (V)	**VOLTage <voltage>**	VOLT 40
Query of voltage value (V)	**VOLTage?**	VOLT?
Programing of Nominal Output Current (A)*	**CURRent <current>**	CURR 10
Query of current value (A)*	**CURRent?**	CURR?
Control of DC-Output	**OUTPut <ON or OFF>** ON : Output activated, OFF: Output off	OUTP ON OUTP OFF
Query of effective output voltage	**MEASure:VOLTage?**	MEAS:VOLT?
Query of effective output current	**MEASure:CURRent?**	MEAS:CURR?
Determins the number of recordings for average value calculation	**AVERage <number of recordings>** Number of recordings: 1, 2, 4, 8, 16 approx. 320 ms per recording	AVER 4
Query of number of recordings for average value calculation	**AVERage?**	AVER?
Shows the Versionsnummer of the Digital Interfaces	**VERSion?** Sample: 2.02 -290806	VERS?

Command Set Description

Functionality	Instruction	Sample(s)
Shows the model type of the power supply	***IDN?**	*IDN?
Reset of the Digital Interface;	***RST**	*RST
Switching from local to remote (since V.2.03)	**REM**	REM

* V.2.03: current values in mA

8. EXTERNAL / ANALOG INTERFACE

8.1. Introduction

This chapter describes the operation of PCU power supplies via the external / analog – interface. The analog interface allows the user to program the current or voltage output levels via an analog control voltage with a range of 0-10V.

8.2. Change Operation Mode from Local / Remote to Analog Control

In standard case the power supply can be programmed via local mode (front panel) or via remote mode (RS422-Interface). To enable the analog interface you have to change the setting of the power supply as follows:

1. Disable the power supply by switching off the unit via the circuit breaker.
2. Remove the cover plate from the front panel at the right hand side.
3. Change the setup switch setting on Pos. 3 to the ON-position.
4. Assemble the cover plate again on the front panel.

CAUTION

The power supply has to be switched off via the circuit breaker before changing the SW switch setting.

8.3. Programming of Output values

For setting the power supply to Analog control the following procedure has to be performed:

1. Switch the power supply off via the circuit breaker.
2. Check if the setup switch on Pos.3 is set to the ON-positionl.
3. Connect the programming source (0..10V) to the connector "Ext.Ref." at the front panel. Check correct polarity of the connection (PIN 1: +, PIN 2: GND).
4. Set the programming source to the desired level of the current output in constant current mode or to the level of the voltage output in case of constant voltage operation mode.
5. Turn the power supply ON.
6. Set the LIMIT level for output voltage in case of constant current mode or the current output LIMIT level in case of constant voltage mode, by pressing the <LIMIT> button and turning the encoder knob.
7. To enable the output press the <STDBY> button and afterwards the <ON> button.
8. Adjust the programming source to change the power supply output.

8.4. Monitoring of Output

The connector "Current Monitor" located on the front panel provides an analog signal of 0..10V for monitoring the output current and the connector "Voltage monitor" provides the same for monitoring the output voltage. A third connector "Ref.monitor" is available for monitoring the set values. The monitoring signals represent 0 to 100% of the output current, output voltage and setting level.

Notes for operation with ext. ref.:

- **Front panel <Preset> button disabled**
  In external (analog) operation mode the output current (in constant current mode) or the output voltage (in constant voltage mode) can not be set by the <Preset> button.
- **Front panel <Off>, <StdBy>, <On> button enabled**
  The power supply output can be controlled by these buttons in external operation mode.
- **Front panel <Limit> button enabled**
  The limit level can be set via the <Limit> button and the encoder knob.
- **Front panel <di/dt> button disabled**
- **Front panel <Local> button enabled**
- **Front panel <Reset> button enabled**
- **RS422 interface is enabled**
  but no setting of current/voltage possible

9. UNIT SETUP

9.1. Current loop setup

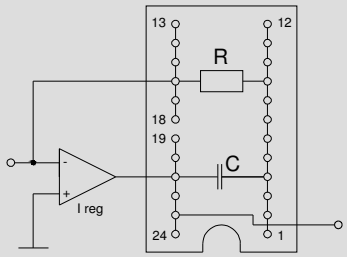
The current loop of the units output characteristic can be modified to adapt it to the load. For this purpose selected test components (R - C combination) are assembled at a 24 pin IC socket. For replacement or reconfiguration of the socket proceed as follows:

CAUTION

Turn off the AC input power before executing changes as described.

- Switch off the Mains
- Remove the small cover plate from the front panel at the right hand side.
- Unplug the 24 pin IC socket; use a special tool like a "IC-pliers" to remove the socket itself.
- Assemble the selected R – C components at the IC socket.
  Note: Shipped standard configuration: Resistor 390Ω, capacitor 200nF.
- Reinstall the IC socket and the cover plate carefully.

24 pin IC socket, circuit diagram and component assembly



10. POARITY REVERSE SWITCH

10.1. Installation

> ***CAUTION***
>
> **Turn off the AC input power before making or changing any rear panel connection of the PCU or PRS unit. Ensure that all connections are securely tightened before applying power again.**

10.1.1. Load and PCU connection

To connect the load and the PCU with the PSR unit use wire terminal lugs together with spring and flat washer. Screw size : M10 for PCU 50-100 and M12 for all other versions.

10.1.2. Control connection

To connect the PCU "PRS Control port " (X7) with the PSR unit (X1) use a cable with two 15 pin D-Sub connectors with the following wiring:

D-Sub I Pin	D-Sub II Pin
1	8
2	7
3	6
4	5
5	4
6	3
7	2
8	1

Pin 9 –15 are not connected

10.2. Operation

After correct connection of the control port and switching on the PCU and PRS unit the display of the PCU display shows a "+" or "-" sign for all settings and measurement values. Starting position ≙ positive polarity:

Output 1 = positive polarity Output 2 = negative polarity

The LED on the front of the PRS indicates the selected polarity. To change the polarity during local mode use the encoder knob (see chapter 6). After releasing the <Preset> button the new polarity will be valid. In remote control mode polarity can be set via sending a setting value with a "+" or "-" character at the beginning.

11. CARE, MAINTENANCE, CALIBRATION

11.1. General information

PCU power supplies are to a large extent maintenance-free. The following instructions however need to be observed.

DANGER, RISK OF ELECTRIC SHOCK

The unit may only be opened by instructed technicians. Please observe the warranty terms.

11.2. Care and cleaning

Depending on the ambient conditions, the unit may become dirty from circulating air and/or static charges. This may influence the unit performance due to overheating or leakage current. In this case, it should be inspected at appropriate intervals and cleaned where required. This work should be carried out by the manufacturer's service department.

11.3. Service and maintenance

Necessary maintenance depends to a great extent on the condition under which the unit is operating. Its our recommendation to inspected and maintain the unit at least every five years. This should be performed by the manufacturer's service department.

11.4. Calibration

Upon request, the manufacturer will calibrate the unit in accordance with DIN EN ISO 9000.

11.5. Service address

Maintenance and repairs are carried out directly by the manufacturer. Please contact

Heinzinger electronic GmbH
Anton-Jakob-Str. 4
83026 Rosenheim / Germany

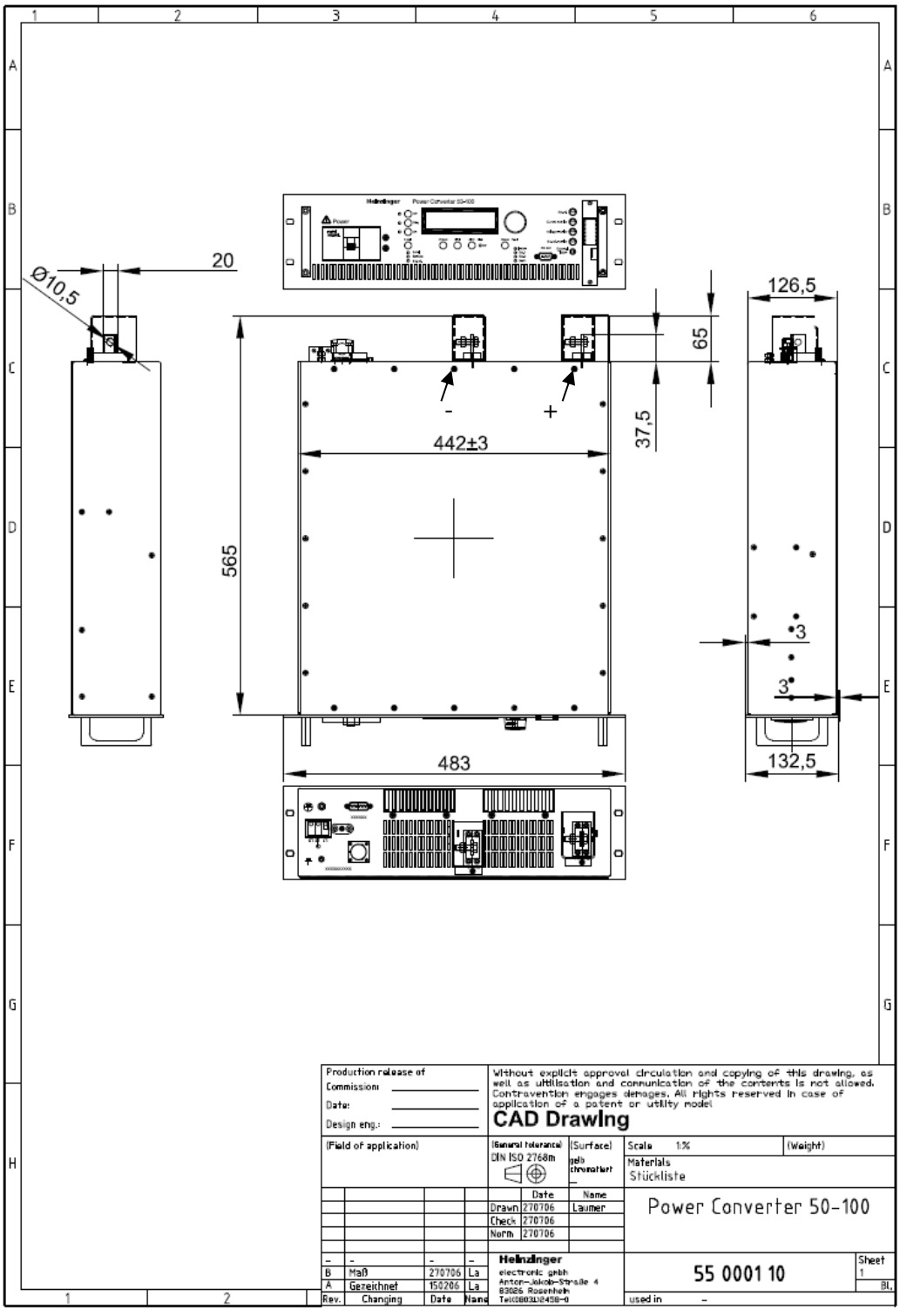
Phone +49 8031 2458 0
Fax +49 8031 2458 58
info@heinzinger.de

Service address

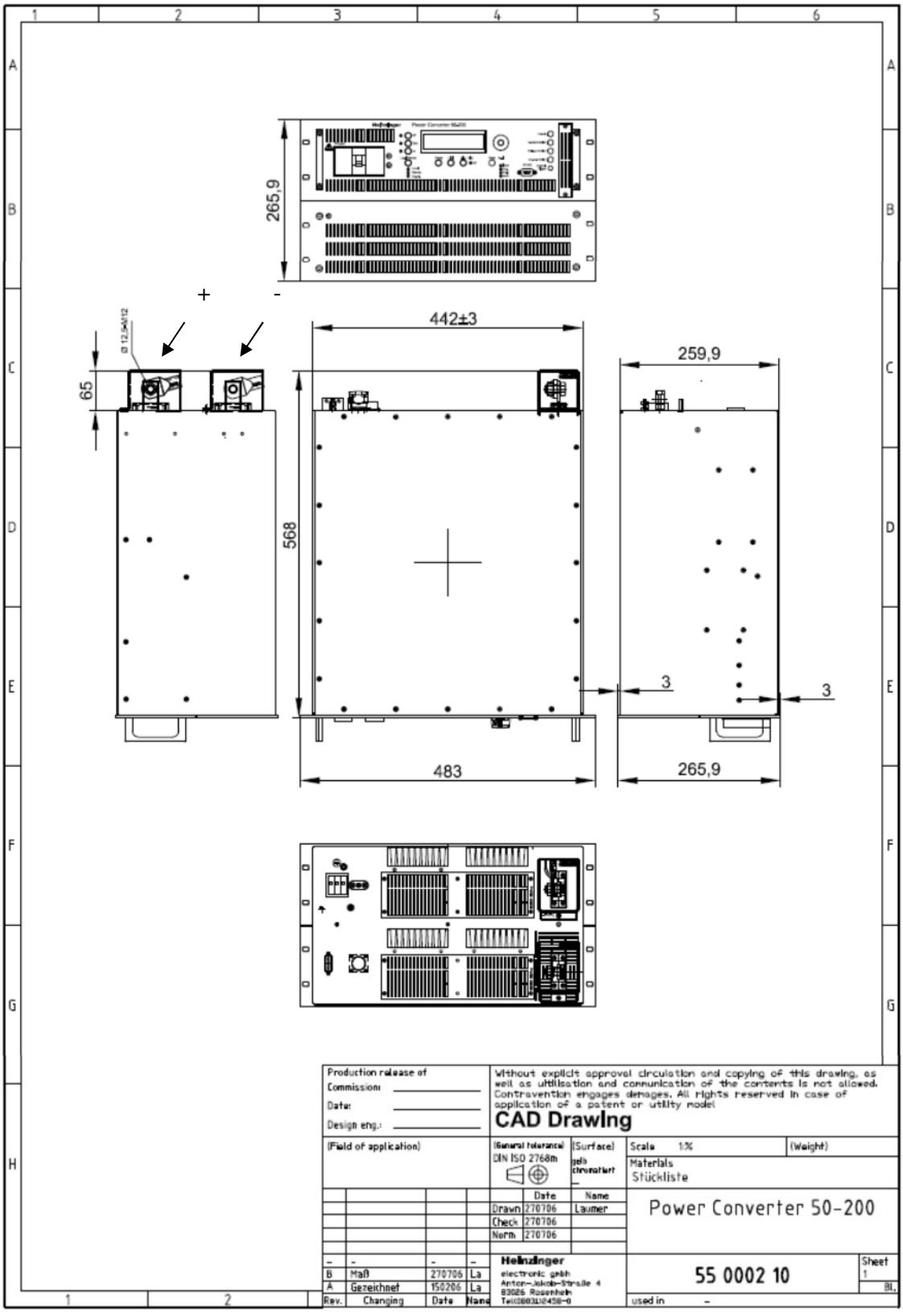
Appendix

A.A. Drawings

A.A.A. PCU 50-100



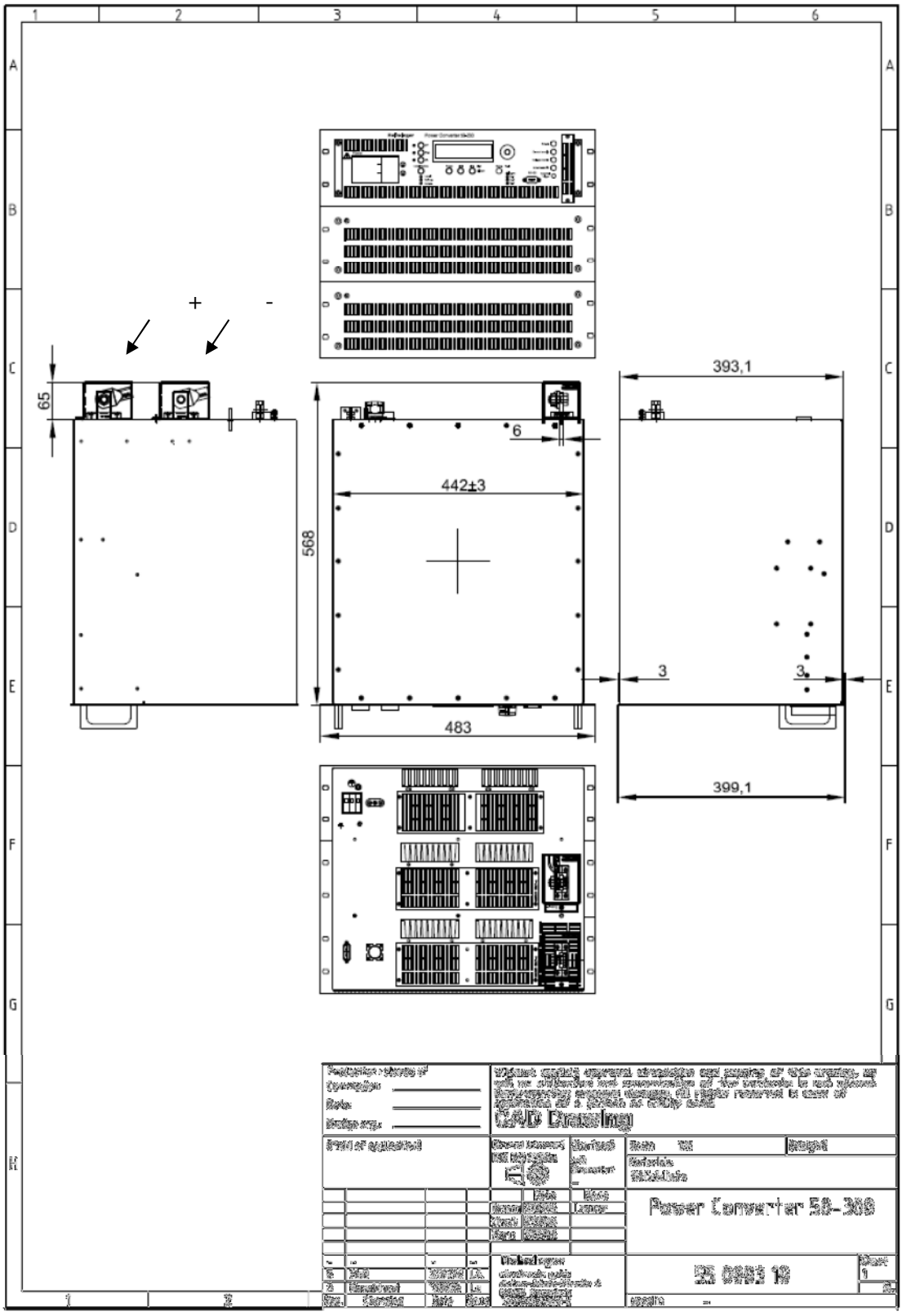
PCU 50-200



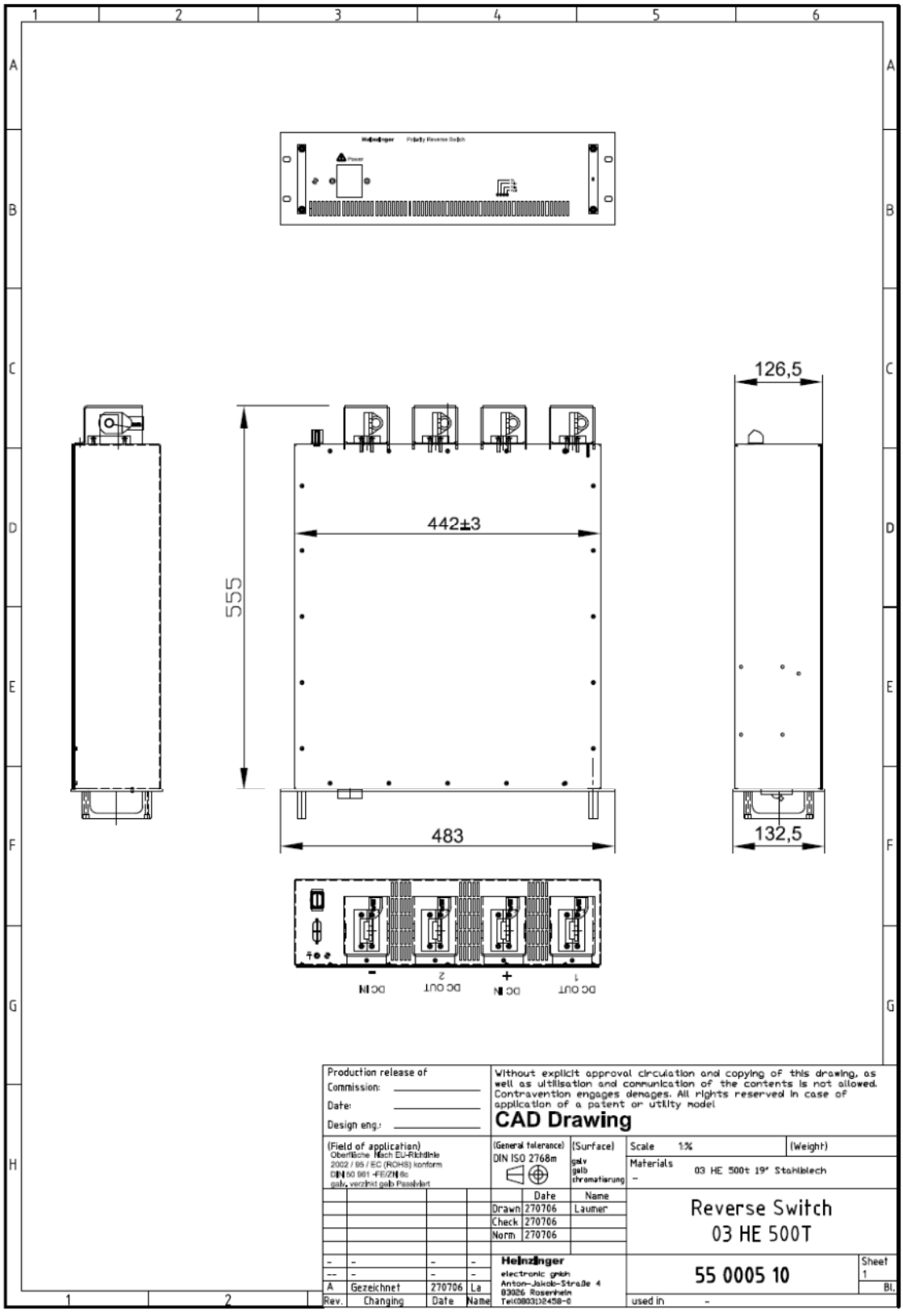
A.A.B.

Service address

PCU 50-300 and PCU 30-340



A.A.C. Reverse switch



Service address

A.B. Declaration of conformity

Heinzinger electronic GmbH
Anton-Jakob-Straße 4

D-83026 Rosenheim

Tel.: +49(0)8031/2458-0
Fax.: +49(0)8031/2458-58

Certificate of Conformity

of PCU - Series

The above listed furnishing conforms to the following requirements:

2014/30/EU Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (EMC directive).
The entire compliance with the following standards gave evidence of conformity of the above listed furnishing with the laws of this directive:

EN 61000-6-4 : 2007 + A1 : 2011 [Interference emission]
EN 61000-6-2 : 2005 [Immunity to interference]

2014/35/EU Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits (low voltage directive).
The entire compliance with the following standards gave evidence of conformity of the above listed furnishing with the laws of this directive:

EN 61010-1 : 2011 [Product safety]

For meeting the standards during operation the following requirements have to be kept:

- Installation and operation of the power supply only by appropriately skilled person.
- All connecting cables to analog control and/or digital interfaces have to be performed by appropriately shielded cabels.
- The connected load may not inject any electromagnetic interference (if necessary load including cabels has to be protected against EMI.).

Rosenheim, 24.07.2019

Alfred Werndl
General manager

HAFTUNGSAUSSCHLUSS

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