

**Technical documentation**  
Last changed on: 18.08.2020

# DPS series

High Precision Built-in or System Capable High Voltage Power Supply Module

- Versions from 500 V – 10 kV
- patented resonance converter technology
- available as metal-box or 3U MMC version
- combinable in a multichannel THQ AC/DC HV power supply (not DPSmini)
- INHIBIT, adjustable hardware limits
- very low ripple and noise, low EMI
- high precision, high stability
- version with reversible polarity (not DPSmini)



## Document history

Version	Date	Major changes
3.1	18.08.2020	Improved documentation (Set / Monitor accuracy)
3.0	13.07.2020	Improved documentation (safety information, changing polarity)
2.5	11.09.2019	Improved documentation
2.4	30.07.2019	error correction
2.3	13.06.2019	Improved documentation
2.2	25.03.2019	Fixed dimensions for DPS mini Improved documentation
2.1	30.08.2017 13.06.2018	Fixed dimensions for DPS mini Improved documentation
2.0	28.02.2017	Relayouted documentation

## Disclaimer / Copyright

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**The information in this manual is subject to change without notice. We take no responsibility for any mistake in the document. We reserve the right to make changes in the product design without reservation and without notification to the users. We decline all responsibility for damages and injuries caused by an improper use of the device.**





# Safety

This section contains important security information for the installation and operation of the device. Failure to follow safety instructions and warnings can result in serious injury or death and property damage.

Safety and operating instructions must be read carefully before starting any operation.

We decline all responsibility for damages and injuries caused which may arise from improper use of our equipment.

## Depiction of the safety instructions

<b>DANGER!</b>	
 DANGER!	<p>“Danger!” indicates a severe injury hazard. The non-observance of safety instructions marked as “Danger!” will lead to possible injury or death.</p>
<b>WARNING!</b>	
 WARNING!	<p>“Warning!” indicates an injury hazard. The non-observance of safety instructions marked as “Warning!” could lead to possible injury or death.</p>
<b>CAUTION!</b>	
 CAUTION!	<p>Advices marked as “Caution!” describe actions to avoid possible damages to property.</p>
<b>INFORMATION</b>	
 INFORMATION	<p>Advices marked as “Information” give important information.</p>



Read the manual.



HIGH VOLTAGE

Attention high voltage!



Important information.

## Intended Use

The device may only be operated within the limits specified in the data sheet. The permissible ambient conditions (temperature, humidity) must be observed. The device is designed exclusively for the generation of high voltage as specified in the data sheet. Any other use not specified by the manufacturer is not intended. The manufacturer is not liable for any damage resulting from improper use.

## Qualification of personnel

A qualified person is someone who is able to assess the work assigned to him, recognize possible dangers and take suitable safety measures on the basis of his technical training, his knowledge and experience as well as his knowledge of the relevant regulations.

## General safety instructions

- Observe the valid regulations for accident prevention and environmental protection.
- Observe the safety regulations of the country in which the product is used.
- Observe the technical data and environmental conditions specified in the product documentation.
- You may only put the product into operation after it has been established that the high-voltage device complies with the country-specific regulations, safety regulations and standards of the application.
- The high-voltage power supply unit may only be installed by qualified personnel.

## Important safety instructions

### WARNING!



WARNING!

To avoid injury of users it is not allowed to open the unit. There are no parts which can be maintained by users inside of the unit. Opening the unit will void the warranty.

### WARNING!



WARNING!

The high-voltage cable must be professionally connected to the consumer/ load and the connection insulated with the appropriate dielectric strength. Do not power the consumer/ load outside of its specified range.

### WARNING!



WARNING!

Before connecting or disconnecting HV cables or any operation on the HV output or the application, the unit has to be switched off and discharge of residual voltage has to be finished. Depending on application residual voltages can be present for long time periods.

### WARNING!



WARNING!

Do not operate the unit in wet or damp conditions.

### WARNING!



WARNING!

Do not operate the unit in an explosive atmosphere.

### WARNING!



WARNING!

Do not operate the unit if you suspect the unit or the connected equipment to be damaged.

**CAUTION!**



CAUTION!

Before changing the polarity of modules with switchable polarity, the high voltage generation must be switched off. The HV-Output including connected loads must not have any residual voltage.

**Nonobservance of this condition may damage the module.**

**CAUTION!**



CAUTION!

The devices (3UC) must only be used in combination with iseg approved crates.

**INFORMATION**



INFORMATION

Please check the compatibility with the devices used.

## 1 General description

DPS modules are highly precise and highly stable analog controlled high voltage power supplies. The modules are available as compact metal box or system capable in 3U Eurocassette (standard DPS) or in very compact metal box (DPSmini). DPS and DPSmini modules can be used as standalone DC/DC converters, DPS can be combined to a multichannel AC/DC supply in a THQ AC/DC HV unit or integrated in a modular MMC system as 3U module. The output voltage is controllable via analog interface with either a potentiometer (internal reference voltage) or an analog control voltage. The polarity of standard DPS modules is electronically switchable. To protect the connected load the modules are equipped with INHIBIT, standard DPS modules are also equipped with adjustable current and voltage limits.

**Customized versions can be produced on [request](#).**

## 2 Technical Data

SPECIFICATIONS	DPS	DPS 3U	DPSmini
Output voltage $V_{nom}$	500 V – 6 kV		500 V – 10 kV
Polarity	Switchable		Factory fixed, positive or negative
Ripple and noise ( $f > 10$ Hz) <sup>1)</sup>	typ. < 3 mV <sub>p-p</sub> , max. 7 mV <sub>p-p</sub>		typ. < 3 mV <sub>p-p</sub> , max. 30 mV <sub>p-p</sub>
Stability – $[\Delta V_{out} \text{ vs. } \Delta V_{in}]$ <sup>1)</sup>	< $1 \cdot 10^{-5} \cdot V_{nom}$		
Stability – $[\Delta V_{out} \text{ vs. } \Delta R_{load}]$ <sup>1)</sup>	< $5 \cdot 10^{-5} \cdot V_{nom}$		
Temperatur coefficient	50 ppm/K		
Supply voltage $V_{in}$	22.8 – 25.2V		
Supply current $I_{in}$ at $V_{out} = 0$ at $V_{out} = V_{nom}$ / with load	< 120 mA < 800 mA		< 50 mA < 600 mA
Set / Monitor voltage $V_{set}$	0 – 5 V   opt. 0 – 10 V		0 – 5 V
Set / Monitor accuracy	$\pm 1 \% \cdot V_{nom}$		
Voltage ramp up/down	$0.25 \cdot V_{nom} / s$		
Protection	Overload and short circuit protected <b>(ATTENTION: there is only one short circuit or arc per second allowed!)</b>		
	INHIBIT, V/I-limit (setting with potentiometer LIMIT I resp. V)	INHIBIT	V/I-limits = $V_{nom}, I_{nom}$
Remote connector	D-Sub 9	H15	D-Sub 9
HV connector	HV-cable   SHV	SHV	HV-cable   SHV
Case	metal box (also THQ version)	3U cassette (MMC capable)	metal box
Dimensions – L/W/H	185/75/40 mm <sup>3</sup>	160mm/8HP/3U	$\leq 6kV \rightarrow 109/62.5/25$ mm <sup>3</sup> $\geq 8$ kV to $\leq 10$ kV (cable) $\rightarrow 98/74/22$ mm <sup>3</sup> 8 kV (connector S08) $\rightarrow 98/74/22$ mm <sup>3</sup> 10 kV (connector S10) $\rightarrow 103/74/25$ mm <sup>3</sup>
Operating temperature	0 – 40 °C		
Storage temperature	-20 – 85°C		
Humidity	max. 70 %		
Notes: <sup>1)</sup> Specifications for stability, ripple and noise are guaranteed in the range $2\% \cdot V_{nom} < V_{out} \leq V_{nom}$ ; $I_{set} \geq 4\% I_{nom}$ for DPS 3U / DPS mini			

Table 1: Technical data: Specifications

OPTIONS / ORDER INFO	INFO	EXAMPLE
<b>POLARITY</b> (DPSmini only)	Positive: <b>x = p</b> , Negative: <b>x = n</b>	DP <b>p</b> 05 156 24 5
<b>Set / monitor voltage</b> (DPS only)	0 – 5V (standard): <b>y = 5</b> , 0 – 10V (optional): <b>y = 10</b> ,	DPR 05 106 24 <b>10</b>
<b>3UC</b>	<b>3U</b> , Height unit based on the 19-inch standard housing, MMC capable version	
<b>SHV connector</b>	<b>SHV</b> (DPS) , <b>SHV / S08 / S10</b> (DPSmini)	
<b>Cable version</b>	CAB (DPSmini)	

Table 2: Technical data: Options and order information

CONFIGURATION DPS							
	V <sub>nom</sub>	I <sub>nom</sub>	Standard Ripple (mV <sub>p-p</sub> )	Internal Capacitance nominal (nF)	Damping Resistor (kOhm)	Discharge Resistor (MOhm)	Item Code
DPR 05 106 24 y	500 V	10 mA	7	450	0.22 / 0.1 <sup>1)</sup>	12	DP005106r24500000000
DPR 10 106 24 y	1 kV	10 mA	7	240	0.22 / 0.1 <sup>1)</sup>	12	DP010106r24500000000
DPR 15 805 24 y	1.5 kV	8 mA	7	130	0.22 / 0.1 <sup>1)</sup>	12	DP015805r24500000000
DPR 20 605 24 y	2 kV	6 mA	7	20 / 40 <sup>1)</sup>	0.22 / 0.1 <sup>1)</sup>	25	DP020605r24500000000
DPR 30 405 24 y	3 kV	4 mA	7	22 / 40 <sup>1)</sup>	0.22 / 0.1 <sup>1)</sup>	25	DP030405r24500000000
DPR 40 305 24 y	4 kV	3 mA	7	27	0.22	30	DP040305r24500000000
DPR 50 205 24 y	5 kV	2 mA	7	10	0.68	30	DP050205r24500000000
DPR 60 155 24 y	6 kV	1.5 mA	7	10	0.68	30	DP060155r24500000000
CONFIGURATION DPS mini							
DPx 05 156 24 y M	500 V	15 mA	10	450	0.1	3,3	DM005156x24500000000
DPx 10 805 24 y M	1 kV	8 mA	10	425	0.22	50	DM010805x24500000000
DPx 20 405 24 y M	2 kV	4 mA	10	44	1.0	50	DM020405x24500000000
DPx 30 305 24 y M	3 kV	3 mA	10	33	1.5	50	DM030305x24500000000
DPx 40 205 24 y M	4 kV	2 mA	10	22	1.5	50	DM040205x24500000000
DPx 60 105 24 y M	6 kV	1 mA	30	12	18	200	DM060105x24500000000
DPx 80 105 24 y M	8 kV	1 mA	30	5	36	500	DM080105x24500000000
DPx 100 504 24 y M	10 kV	0,5 mA	30	4	54	500	DM100504x24500000000
Notes: <sup>1)</sup> 3U Version							

Table 3: Technical data: Configurations



### 3 Dimensional drawings

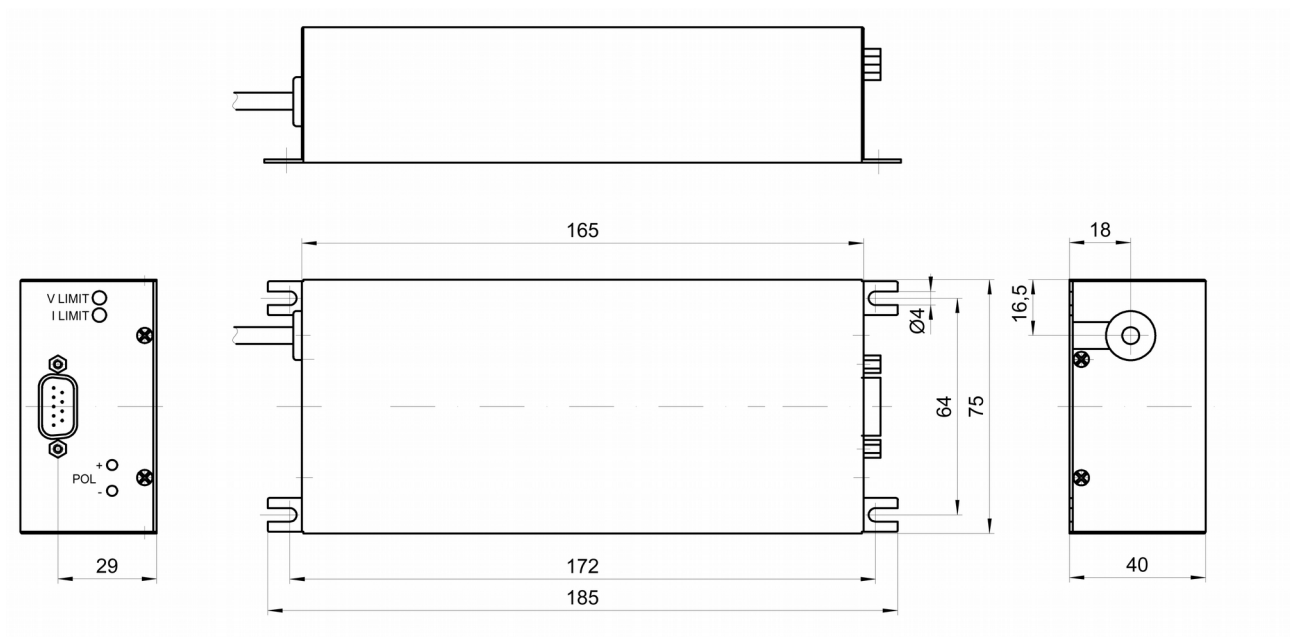


Figure 1: dimensional drawing DPS with cable

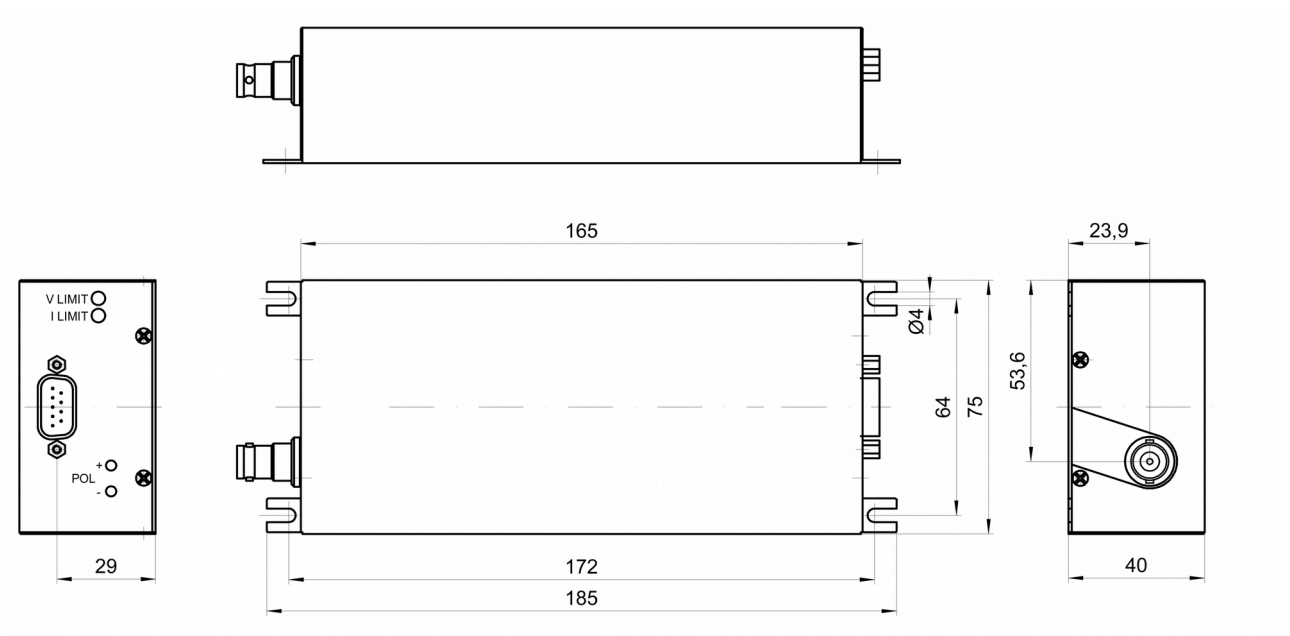


Figure 2: dimensional drawing DPS with SHV

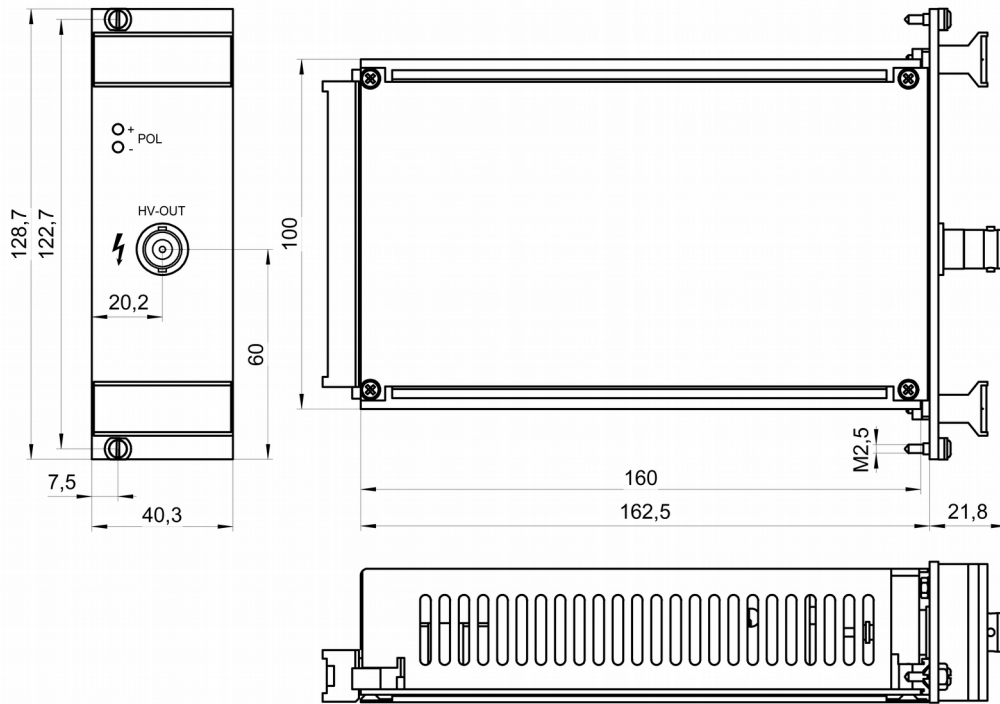


Figure 3: dimensional drawing DPS 3UC

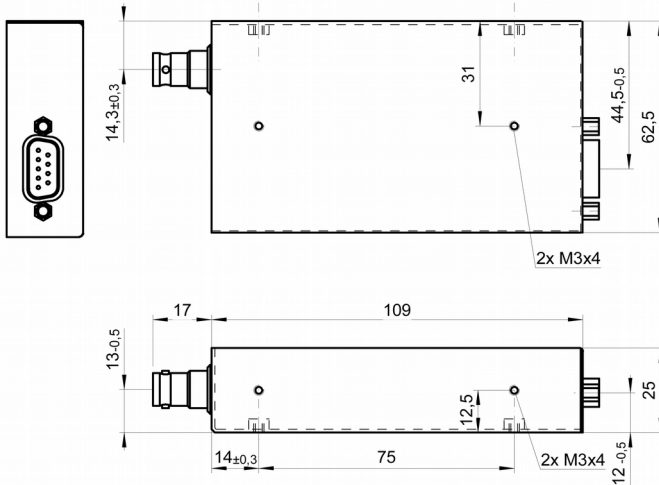


Figure 4: dimensional drawing DPSmini ≤6kV / SHV

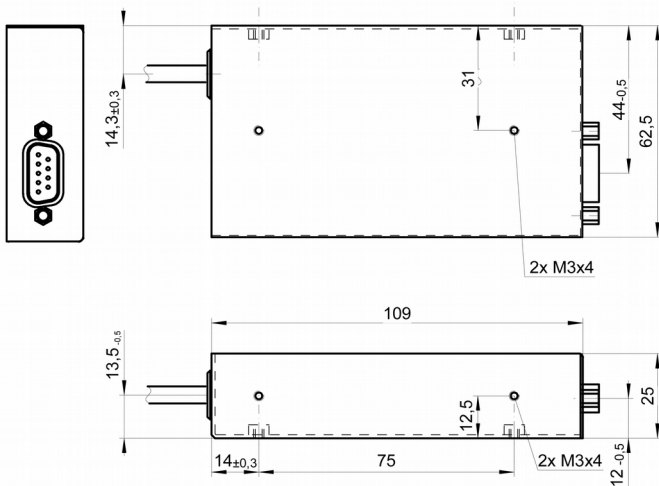


Figure 5: dimensional drawing DPSmini ≤6kV / cable

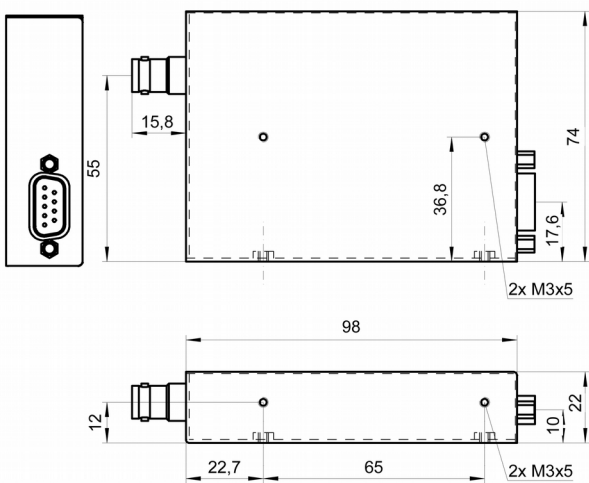


Figure 6: dimensional drawing DPSmini 8kV / SHV (S08)

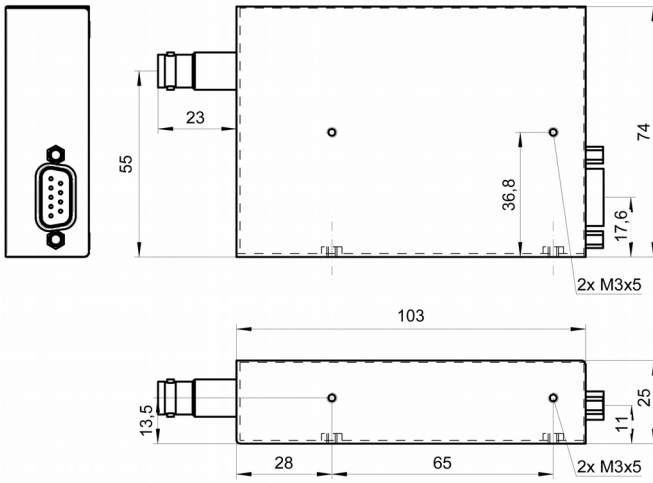


Figure 7: dimensional drawing DPSmini 10kV / SHV (S10)

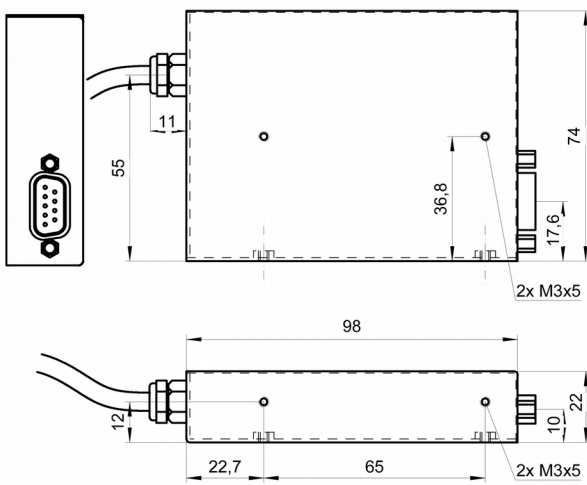




Figure 8: dimensional drawing DPSmini  $\geq 8\text{kV}$  to  $\leq 10\text{kV}$  / cable

## 4 Connectors and PIN assignments

### 4.1. HV connectors

HV CONNECTORS			
Name	SHV / S08	S10	
Figure			

CONNECTORS PART NUMBERS (manufacturer code / iseg accessory parts item code)			
POWER SUPPLY SIDE		CABLE SIDE	
<b>SHV (ROSENBERGER)</b>			
Socket	57S501-200N3	Connector	57K101-006N3 / Z590162
<b>S08 (RADIALL)</b>			
Socket	R317.580.000	Connector	R317.005.000 / Z592474
<b>S10 (KINGS)</b>			
Socket	1064-1QD	Connector	1065-1QD

### 4.2. Interface connector D-SUB 9 (DPS metal box)

PIN	NAME	DESCRIPTION	VALUE
1	0V <sup>1)</sup>	Supply ground	0 V
2	IMON	$I_{mon}$ Monitor voltage of output current	0 ... 5 V (opt. 0 ... 10 V)
3	ON	HV ON/OFF with voltage ramp	TTL-level: LOW → HV ON HIGH or n.c. → HV OFF
4	POL	Polarity	HIGH or n.c. → positive LOW → negative
5	VIN	$V_{in}$ Supply voltage	+24 V DC
6	GND <sup>1)</sup>	Signal ground	
7	VMON	$V_{mon}$ Monitor voltage	0 ... 5 V (opt. 0 ... 10 V)
8	VSET	$V_{set}$ Set value of output voltage	0 ... 5V (opt. 0 ... 10V)
9	REF	$V_{ref}$ Internal reference voltage	5 V (opt. 10V)

Notes:  
Case is connected to GND  
<sup>1)</sup> internally connected

Table 4: PIN Assignment D-SUB 9

### 4.3. System connector H15 (DPS 3UC)

PIN	NAME	DESCRIPTION	VALUE
8	REF	$V_{ref}$ Internal reference voltage	5 V (opt. 10 V)
10	0V <sup>(1)</sup>	Supply ground	
12	GND <sup>(1)</sup>	Signal ground	
14	IMON	$I_{mon}$ Monitor voltage of output current	0 ... 5 V (opt. 0 ... 10 V)
16	ON	HV ON/OFF with voltage ramp	TTL-level: LOW → HV ON HIGH or n.c. → HV OFF
20	VSET	$V_{set}$ Set value of output voltage	0 ... 5 V (opt. 0 ... 10 V)
22	POL	Polarity	HIGH or n.c. → positive LOW → negative
24	VMON	$V_{mon}$ Monitor voltage	0 ... 5 V (opt. 0 ... 10 V)
26	VIN	$V_{in}$ Supply voltage	+24 V DC
28	ISET <sup>(3)</sup>	$I_{set}$ Set voltage of output current	0 ... 5 V (opt. 0 ... 10 V)
30	KILL_ENA <sup>(2)</sup>	Killenable, high active	TTL-level
32	INH	Inhibit, LOW = active, shut down the output voltage	TTL-level: LOW → HV OFF HIGH or n.c. → HV ON

Notes:  
Case is connected to GND  
<sup>1)</sup> internally connected  
<sup>2)</sup> If KillEnable is active the occur of Inhibit will trigger a Kill-signal. This signal will switch off the HV immediately without ramp. Restoring the output voltage is only possible after operating KILL-ENA or HV\_ON.

Table 5: PIN Assignment 3U H15

### 4.4. Interface connector D-SUB 9 (DPSmini)

PIN	NAME	DESCRIPTION	VALUE
1	0V <sup>(1)</sup>	Supply ground	0 V
2	IMON	$I_{mon}$ Monitor voltage of output current	0 ... 5 V (opt. 0 ... 10 V)
3	INH	Inhibit, LOW = active, shut down the output voltage	TTL-level: LOW → HV OFF HIGH or n.c. → HV ON
4	ISET	$I_{set}$ Set voltage of output current	0 ... 5 V (opt. 0 ... 10 V)
5	VIN	$V_{in}$ Supply voltage	+24 V DC
6	GND <sup>(1)</sup>	Signal ground	
7	VMON	$V_{mon}$ Monitor voltage	0 ... 5 V (opt. 0 ... 10 V)
8	VSET	$V_{set}$ Set value of output voltage	0 ... 5V (opt. 0 ... 10V)
9	REF	$V_{ref}$ Internal reference voltage	5 V (opt. 10V)

Notes:  
Case is connected to GND  
<sup>1)</sup> internally connected

Table 6: PIN Assignment D-SUB 9

## 5 Order guides

CONFIGURATION ORDER GUIDE (item code parts)								
DP	030	405	P	24	50	000	02	00
Type DPS	V <sub>nom</sub>	I <sub>nom</sub> (nA)	Polarity	Input Voltage	Monitor Voltage	Option (hex)	HV-Connector	Customized Version
DP = Metal box DK = 3U Casette DM = DPS mini	three significant digits • 100V  For Example: 030 = 3000V	two significant digits + number of zeros  For Example: 405 = 4mA	p = positive n = negative r = reversible	two significant digits	two significant digits 1.th hex • 1V 2.th dez • 0,1V  For Example: A0 = 10V	three significant characters	00 = Cable 02 = SHV 03 = S08 04 = S10  see 4.1 HV connectors	00 = non

Table 7: Configuration item code

CABLE ORDER GUIDE				
POWER SUPPLY SIDE CONNECTOR	CABLE CODE	CABLE DESCRIPTION	LOAD SIDE CONNECTOR	ORDER CODE LLL = length in m <sup>(1)</sup>
SHV	04	HV cable shielded 30kV (HTV-30S-22-2)	open	SHV_C04-LLL
S08	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S08_C04-LLL
S10	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S10_C04-LLL

Notes:  
<sup>1)</sup> Length building examples: 10cm → 0.1, 2.5m → 2.5, 12m → 012, 999m → 999

Table 8: Item code parts for different configurations

## 6 Warranty & Service

This device is made with high care and quality assurance methods. The standard factory warranty is 12 months. Please contact the iseg sales department if you wish to extend the warranty.

### CAUTION!



CAUTION!

Repair and maintenance may only be performed by trained and authorized personnel.

For repair please follow the RMA instructions on our website: [www.iseg-hv.com/en/support/rma](http://www.iseg-hv.com/en/support/rma)

## 7 Disposal

### INFORMATION



INFORMATION

All high-voltage equipment and integrated components are largely made of recyclable materials. Do not dispose the device with regular residual waste. Please use the recycling and disposal facilities for electrical and electronic equipment available in your country.

## 8 Manufacturer contact

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