

Technical documentation
Last changed on: 13.06.2018

DPS series

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

- Versions from 500 V – 6 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
2.0	28.02.2017	Relayouted documentation
2.1	30.08.2017 13.06.2018	Fixed dimensions for DPS mini Improved documentation

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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.

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) ⁽¹⁾	typ. < 3 mV _{p-p} , max. 7 mV _{p-p}		typ. < 3 mV _{p-p} , max. 30 mV _{p-p}
Stability [ΔV_{out} vs. ΔV_{in}] ⁽¹⁾	< $1 \cdot 10^{-5} \cdot V_{nom}$		
Stability - [ΔV_{out} vs. ΔR_{load}] ⁽¹⁾	< $5 \cdot 10^{-5} \cdot V_{nom}$		
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	< 50 mA < 0.8 A		< 50 mA < 0.6 A
Set / Monitor voltage V_{set}	0 - 5 V opt. 0 - 10 V		0 - 5 V
Adjustment accuracy	$\pm 1 \%$		
Voltage ramp up/down	$0.25 \cdot V_{nom} / s$		
Protection	Overload and short circuit protected (ATTENTION: there is only one short circuit or arc per second allowed!)		
	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	186/75/40 mm ³	8HP / 40.64 mm	< 6kV => 109/62.5/25 mm ³ 8 kV (connector S08) => 90/74/22 mm ³ ≥ 8 kV (connector S10) => 103/74/25 mm ³ ≥ 8 kV cable => 98/74/22 mm ³
Operating temperature	0 - 40 °C		
Storage temperature	-20 – 85°C		
Humidity	Max. 70 %		

¹⁾ Specifications for stability, ripple and noise are guaranteed in the range $2\% \cdot V_{nom} < V_{out} \leq V_{nom}$

Table 1: Technical data: Specifications

OPTIONS / ORDER INFO	INFO	EXAMPLE
POLARITY (DPSmini only)	Positive: x = p , negative x = n	DP p 05 156 24 5 M_CAB
Set / monitor voltage (DPS only)	0-5V (standard): y=5 , 0-10V (optional): y=10 ,	DPR 05 106 24 10 _CAB
3U – MMC capable version	3UC	DPR 05 106 24 5_SHV- 3UC -EPU
SHV connector	SHV (DPS) , SHV / S08 / S10 (DPSmini)	DPp 05 156 24 5_ M _SHV
Cable version	CAB (DPSmini)	DPp 05 156 24 5_ M _CAB

Table 2: Technical data: Options and order information

CONFIGURATION DPS							
	V _{nom}	I _{nom}	Standard Ripple (mV _{p-p})	Internal Capacitance nominal (nF)	Damping Resistor (kOhm)	Discharge Resistor (MOhm)	Item Code
DPR 05 206 24 y	500 V	20 mA	7	450	0.22 / 0.1 ¹⁾	12	DP005206r24500000000
DPR 10 106 24 y	1 kV	10 mA	7	240	0.22 / 0.1 ¹⁾	12	DP010106r24500000000
DPR 15 805 24 y	1.5 kV	8 mA	7	130	0.22 / 0.1 ¹⁾	12	DP015805r24500000000
DPR 20 605 24 y	2 kV	6 mA	7	20 / 40 ¹⁾	0.22 / 0.1 ¹⁾	25	DP020605r24500000000
DPR 30 405 24 y	3 kV	4 mA	7	22 / 40 ¹⁾	0.22 / 0.1 ¹⁾	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

Table 3: Technical data: Configurations

¹⁾ 3U Version

3 Dimensional drawings

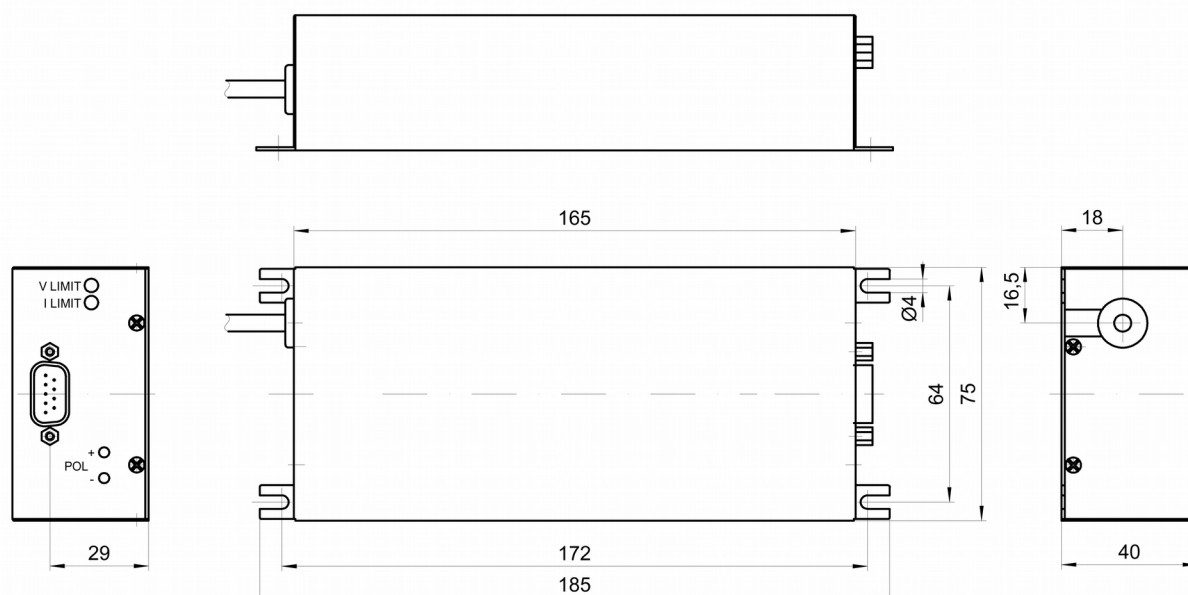


Figure 1: dimensional drawing DPS with cable

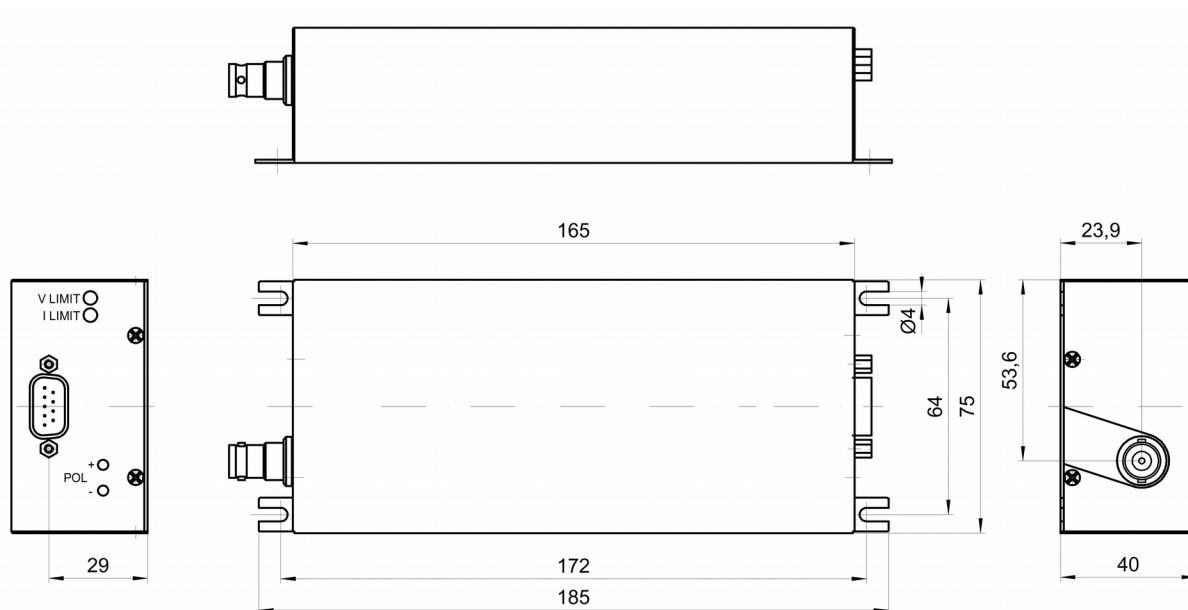


Figure 2: dimensional drawing DPS with SHV

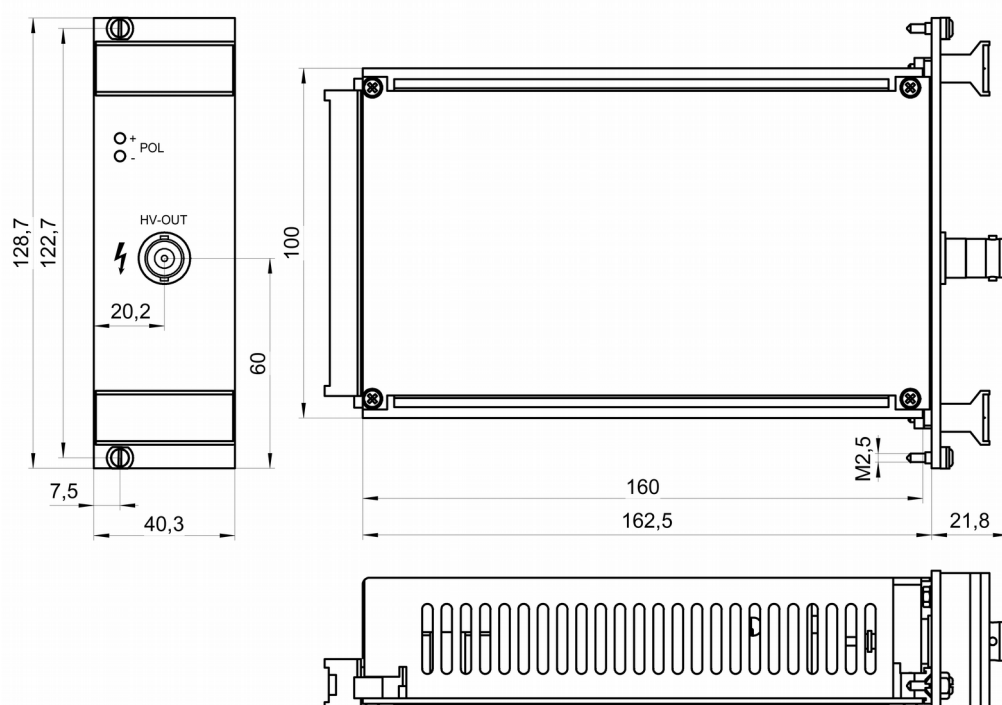


Figure 3: dimensional drawing DPS 3UC

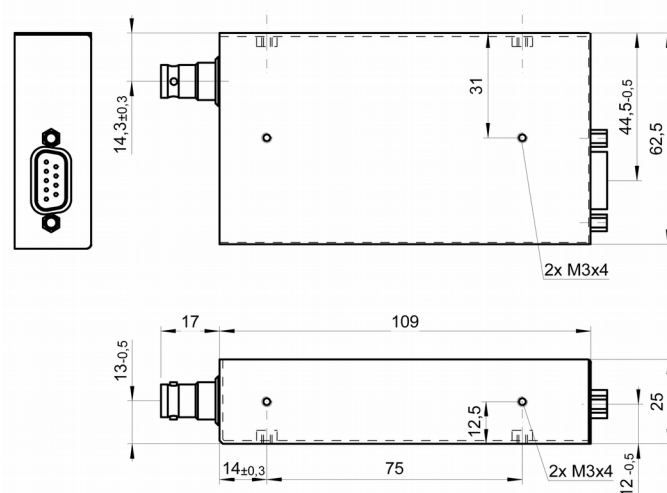


Figure 4: dimensional drawing DPSmini ≤ 6kV / SHV

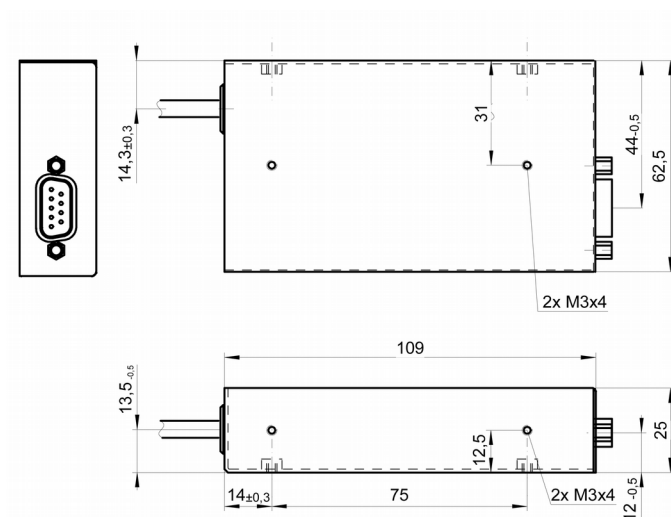


Figure 5: dimensional drawing DPSmini ≤ 6kV / cable

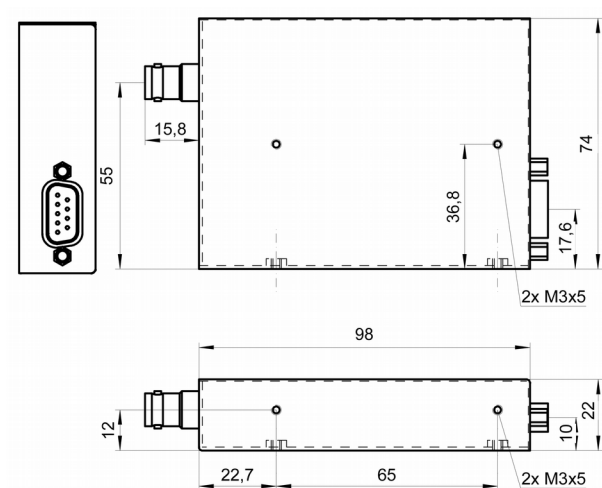


Figure 6: dimensional drawing DPSmini = 8kV / SHV

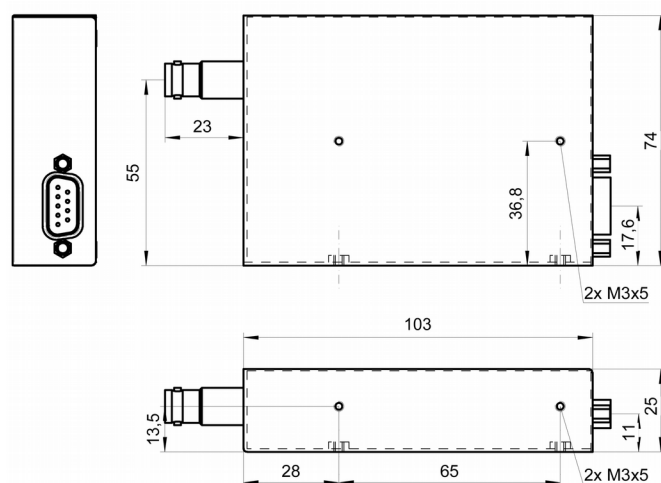


Figure 7: dimensional drawing DPSmini ≥ 8kV / SHV (S10)

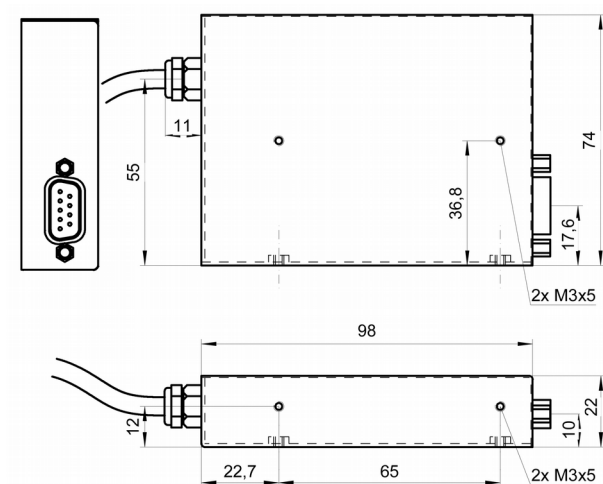


Figure 8: dimensional drawing DPSmini > 8kV / cable

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	
SHV (ROSENBERGER)			
Socket	57S501-200N3	Connector	57K101-006N3 / Z590162
S08 (RADIAL) – 8 kV			
Socket	R317.580.00	Connector	R317.0500 / Z592474
S10 (KINGS) – 10 kV			
Socket	1064-1QD	Connector	1065-1QD

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

PIN	NAME	DESCRIPTION	VALUE
1	0V [*]	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 [*]	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	VREF	V _{ref} Internal reference voltage	5 V (opt. 10V)
Note: Case is connected to GND *) internally connected			

Table 5: PIN Assignment D-SUB 9

4.3 System connector H15 (DPS 3UC)

PIN	NAME	DESCRIPTION	VALUE
8	VREF	V _{ref} Internal reference voltage	5 V (opt. 10 V)
10	0V *)	Supply ground	
12	GND *)	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	I _{set} Set voltage of output current	0 .. 5 V (opt. 0 .. 10 V)
30	KILL_ENA	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
Note: Case is connected to GND *) internally connected			

Table 6: PIN Assignment 3U H15

*) 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.

4.4 Interface connector D-SUB 9 (DPSmini)

PIN	NAME	DESCRIPTION	VALUE
1	0V *)	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 *)	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	VREF	V _{ref} Internal reference voltage	5 V (opt. 10V)
Note: Case is connected to GND *) internally connected			

Table 5: 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 _{nom}	I _{nom} (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 5kV 03 = SHV 8kV 04 = SHV 10kV	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 (*)
SHV	04	HV cable shielded 30kV (HTV-30S-22-2)	open	SHV_1C04-LLL
S08	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S08_1C04-LLL
S10	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S10_1C04-LLL
*) 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 factory warranty is up to 12 months, starting from date of issue (invoice). Within this period a 5 years warranty extension can be ordered at additional charge. Please contact iseg sales department.

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

7 Manufacturer's contact

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