

# HSE03201LIRC

# DIN Rail

Made in Germany

**320 Watts Power Supply -20...+70°C**  
**115/230Vac Input Voltage – low inrush**

## Short Specification:

- Metal housing
- Up to 91% efficiency
- -20°C...+60°C full output power
- C/V curve down to 0V, no fold back
- Free air convection
- Galvanic insulated
- Continuous short circuit protected
- Overload & low voltage protected
- Open Circuit Proof
- Soft start & auto-recovery
- Hold up time >30ms
- Switching frequency typ. 100KHz
- EMI/EMS EN61000-6-2,3, EN55022 class B
- PFC: EN61000-3-2 class A
- IEC(EN)60950-1
- Series & parallel operation
- DIN Rail 35mm
- Screw terminals AWG21...AWG10
- 24 hours burn in test
- High reliability, shock & vibration resistant

Models	Voltage	Current
HSE03201.05T	5V-9V	18A
HSE03201.12T	12V	18A
HSE03201.15T	15V	17A
HSE03201.24T	24V	13.5A
HSE03201.36T	36V	8.9A
HSE03201.48T	48V	6.7A
HSE03201.60T	60V	5.4A



## Technical Data Table

AC Input Range	85...132Vac / 184...265Vac, 47...63Hz, 250...375Vdc (set input selector to 230VAC)			
AC Nominal Input	115Vac <4.8A / 230Vac <2.2A			
Model Name	HSE03201.05T	HSE03201.12T	HSE03201.15T	HSE03201.24T
Nominal Voltage	5V	12V	15V	24V
Nominal Current	18.0A	18.0A	17.0A	13.5A
Boost Current 60s	21.6A	21.6A	20.4A	16.2A
Voltage Set Range	5,0...9,0V	11,4...14,4V	14,2...18,0V	22,5...28,8V
Ripple 230Vac/20MHz	25mVpp	30mVpp	30mVpp	20mVpp
Stability Load Switch 0-100%	± 0,3%	± 0,3%	± 0,3%	± 0,3%
Model Name	HSE03201.36T	HSE03201.48T	HSE03201.60T	
Nominal Voltage	36V	48V	48V	
Nominal Current	8.9A	6.7A	5.4A	
Boost Current 60s	10.7A	8.1A	6.6A	
Voltage Set Range	34,2...43,2V	34,2...39,6V	45,6...52,8V	
Ripple 230Vac/20MHz	30mVpp	50mVpp	50mVpp	
Stability Load Switch 0-100%	± 0,5%	± 0,5%	± 0,5%	
Power	320W continuous			
Operation Failure Relay	Yes, break contact isolated up to 60Vdc			
Factory Adjust. Tolerance V <sub>out</sub>	± 1%			
Load regulation	< ± 0.5% 10-100%, 100-10%			
Response to Load Change	<1ms 10-100%, 100-10%			
Short Circuit Protection	Continuous			
Open Circuit Proof	Continuous			
Efficiency	91% typical at 90% load			
Load Protection	1,2x I <sub>rated</sub> with auto recovery			
Voltage Protection	140% of U <sub>out</sub> with auto recovery			
Hold Up Time	> 30ms 230Vac			
Inrush Current	< 10.6A <sub>eff</sub> / 15A <sub>peak</sub> active inrush current limiter inside			
MCB (Circuit Breaker)	4A type-B 230Vac and 6A type-B 115Vac with 6kA each recommended			
Softstart	20ms typical			
Cooling	Natural convection			
Derating	+60°C...+70°C 2.5%/°C			
Ambient Temperature	- 20°C...+70°C			
Storage Temperature	- 40°C...+85°C			
EMI	EN55022 class B / EN61000-3-2			
EMS	EN61000-6-2,3			
Safety	EN60950-1, EN60204-1			
Safety class 1(A)	VDE0805, VDE0100			
Isolation Paths	> 8mm creepage distance & clearance paths			
Input to Output Isolation	3000Vac			
Input to Case Isolation	2000Vac			
Output to Case	500Vdc, models ≥60Vdc 2400Vdc			
MTBF EN61209	500.000h			
MTTF EN61209.SN29500	154.300h @ 40°C 24/7 85% load			
Environment	Humidity 90% non-condensing @ 25°C, climate class. 3k3, pollution rate II			
Altitude Operations	3000m NN / 9842 ft. above sea level			
Dimensions (HxWxD)	124x120x99.5mm			
ROHS	2011/65/EG confirmed			
REACH	EG No. 1907/2006 confirmed			
Weight	1200g			
Connectors Option (AC & DC)	Spring-type terminal with cable protection 0,5...6mm <sup>2</sup> 21...10AWG according with IEC/EN60664-1, IEC/EN61984. Use copper conductors only. Tightening torque per terminal block is 0.5 - 0.6 Nm / 4.5 - 5.3 lbf-in, strip 4.5mm			

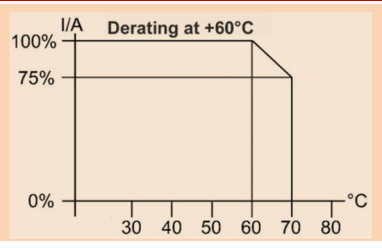
## Technical Concept

The Camtec HSR03201 series is a high precision switch mode power supply for an upscale demand. The unit is voltage adjustable. It is engineered and manufactured by CAMTEC in Germany. The designed meets challenging applications like railway, complex drives, battery charging for DC-UPS, test-stands, machine-building and infrastructure projects. The power supply provides a low ripple-noise, a precise load-regulation and high efficiency up to 91%. High-end long-life capacitors guarantee an extended hold-up-time and an extraordinary lifetime of the power supply. The circuit design starts complex loads easily. The internal control circuit manages illegal operating conditions to prevent your system from damages. The HSR series features active high input transients with suppressor diodes, X2-capacitors and varistors. All inputs, outputs and feature connections are galvanic isolated. The design rules set value on extended interference immunity and safety. The unit is designed in accordance to the EN60950-1 and the EMC-compatibility to EN55022. Our engineering design is made in accordance to the CSA/UL60950-1 and the IEEE CB scheme rules.

## Overtemperature, Over Voltage Protection & Derating

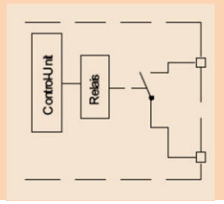
**OT Over Temperature** The maximum ambient temperature is +70°C. There is temperature protection inside the power supply. When the temperature exceeds a certain level the HSR03201 will be shut down. The unit provides an automatic restart when the temperature returns to applicable conditions.

**OVP Over Voltage Protection** Exceeding the OVP results into ticker mode. Resuming the failure causes automatic restart into normal operation.



## DC-OK (Power Good Relay)

The DC ok relay indicates if the output voltage is low. The contact is galvanic insulated to the AC input and the DC output connections. The isolation covers the overall adjustment range of the HSR03201 series up to 60Vdc. If the DC voltage is ok the relay is closed. If the power supply unit is in false operation the relay is open.



## C/V Current Voltage Behaviour

The HSR03201 series provides a good current voltage chart. It has no fold back or other abnormalities. The output voltage can drop down to zero volts when the power supply is overloaded. The unit delivers a stable and constant current to the outputs. When the output voltage is set to the maximum demanded value and the current limit reaches its margin, the output voltage drops down and the unit delivers constant current.

## Connections

AC Main Input	DC Mains	Outputs
L - wire	DC + voltage	DC-ok power good relay
N - wire	DC + voltage	DC-ok power good relay
PE - wire	DC - voltage	
	DC - voltage	

## Parallel Operation & Decoupling

To increase the overall power of the power supply, two or more devices of the same model with the same output voltage may be operated in parallel. To avoid any issues, make sure the cable lengths and cable cross-sections of all power supplies to the star point are identical.

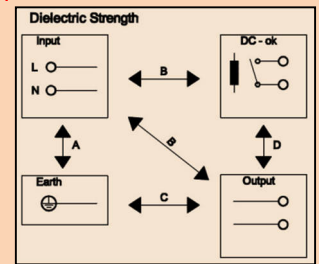
## Safety Test

	T	A	B	C <sup>1)</sup>	D
Type Test	60s	2500Vac	3000Vac	500Vdc	3000Vac
Factory Test	5s	2000Vac	2000Vac	500Vdc	2000Vac
Field Test	2s	2000Vac	2000Vac	500Vdc	2000Vac

<sup>1)</sup>  $\geq 60Vdc = 2400Vdc$

Type test and factory tests are conducted by the manufacturer. Do not repeat the test in field. Field test rules:

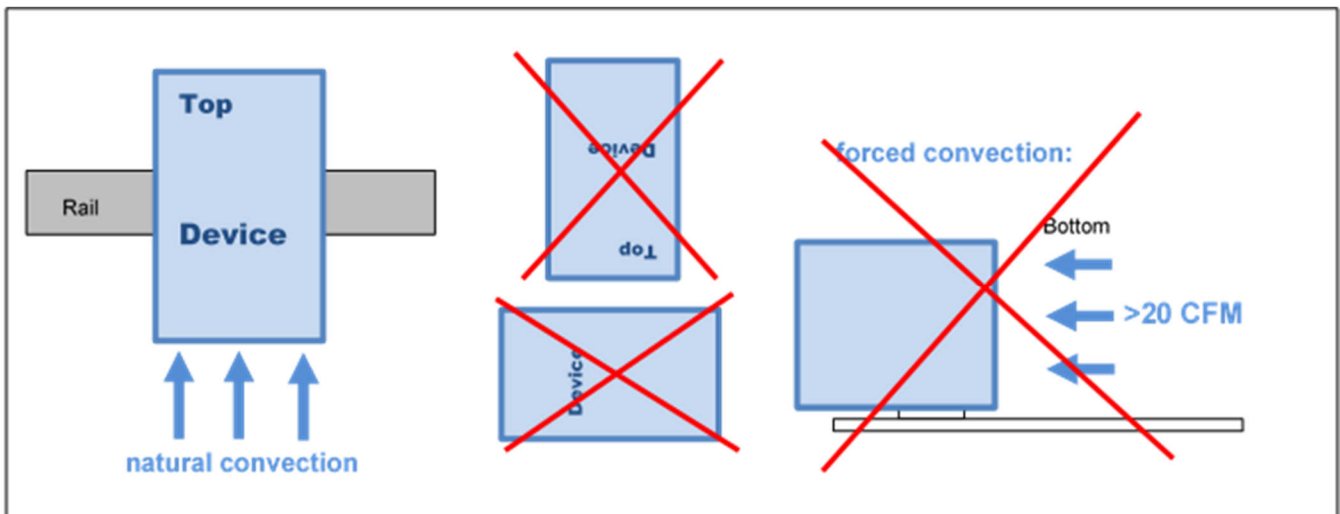
- Use appropriate test equipment which apply the voltage with a slow ramp
- Connect L1 and N together, as well as all output poles
- Use only AC test-voltages with 50/60Hz. The output voltage is floating and has no ohmic reference to ground.
- If testing output voltages are  $\geq 60Vdc$  remain to security directives. Use only isolated screw drivers to adjust output voltages.



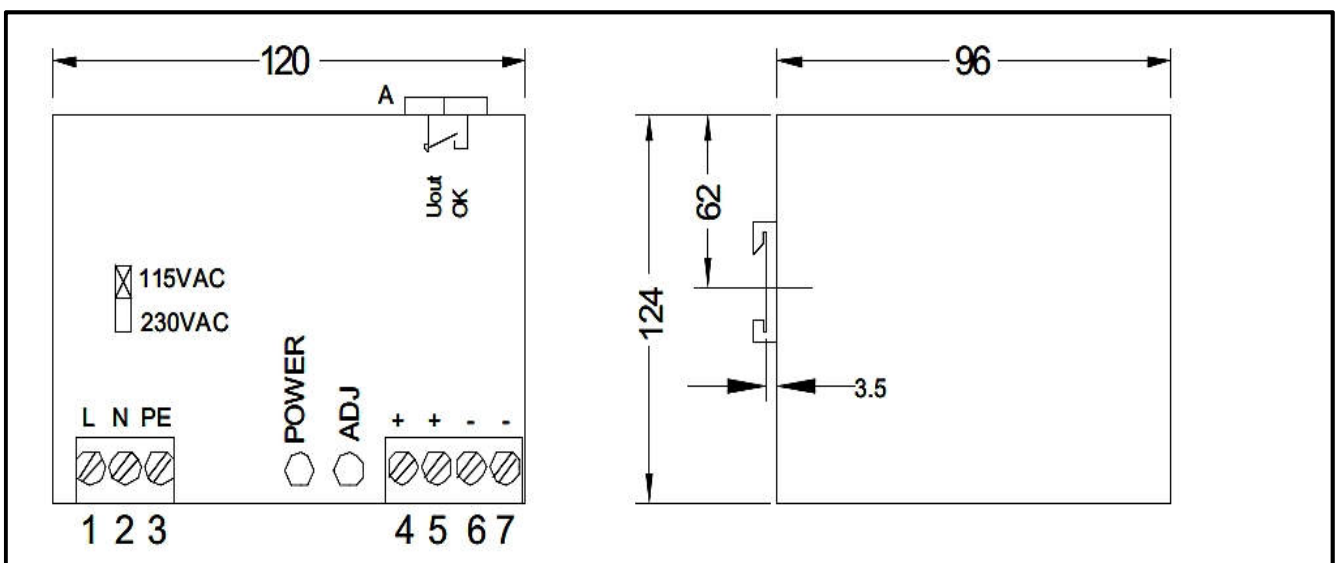
## Mechanics & Installation Instruction of the HSR03201

Stable metal/aluminium housing IP20. To allow adequate convection, a free air space of 50mm (top/bottom) and 5mm (sidewalls) is required; and to active devices 15mm space from the sidewalls. Patented 35mm DIN-Rail bracket meet EN60275. It is easy to mount/dismount while snapping it onto the 35mm DIN-Rail - no tools necessary.

Other mounting direction then shown are not evaluated from our engineering team and may need a power derating or it can cause a derating of the product life time.



Mounting Instruction: recommended airflow space below and above is 50mm (2 Inch)



## Ordering Codes

Model (DIN-Rail standard)	Information	Camtec Article Number
HSE03201.05T	5V	3041056099CA
HSE03201.12T	12V	3041056014CA
HSE03201.15T	15V	3041056015CA
HSE03201.24T	24V	3041056017CA
HSE03201.36T	36V	3041056020CA
HSE03201.48T	48V	3041056018CA
HSE03201.60T	60V	3041056019CA
Connector Power Good **	2pole, 10 pcs per pack, lead space 5,08mm	3520037

\*\* Note that the power good contact connectors are not a part of the power supply and require separate order

**Safety regulations: Please read these instructions completely before using the equipment. Keep these instructions on to hand. The device may only be operated by trained specialist staff.**

### Installation:

- 1) The device is designed for devices and systems that meet the standard requirements for hazardous voltages, power and fire prevention.
- 2.) Installation and service only by trained persons. The AC power must be switched off. The work is to be labeled; accidental reconnection of the system must be prevented.
- 3.) Opening the device, its modification, loosening bolts or operation outside the specified herein specification or in an unsuitable environment, has the immediate loss of warranty to follow. We disclaim any responsibility for any resulting damage to persons or things.
- 4.) Note: The device must not be operated without an upstream circuit breaker (CB). We recommend the use of a 4A type-B for 230Vac and 6A type-B for 115Vac. It is prohibited to use the unit without PE. It may be necessary upstream device has a power switch.

### Warning:

**Non-compliance can result in fire and serious injury or death.**

1. Operate the appliance without PE connection.
2. Before connecting the device to the AC network, make wires free of voltage and assure accidently switch on.
3. Allow neat and professional cabling.
4. Never open nor try to repair the unit. Inside are dangerous voltages that can cause electrical shock hazard.
5. Avoid metal pieces or other conductive material to fall into the item
6. Do not operate the device in damp or wet conditions
7. Do not operate the unit under EX-conditions

All parameters base on 15 minutes run-in @ full load / 25°C / 230Vac 50/60Hz, as otherwise stated.