

## P Series

## 120...195 Watt DC-DC Converters



Input voltage up to 150 V DC  
 1 to 4 isolated outputs 3.3...96 V DC  
 4242V DC I/O electric strength test voltage



- Extremely slim case (4 TE), fully enclosed
- Extremely low inrush current, hot swappable
- Operating ambient temperature range  
 –40...71°C with convection cooling

### Selection chart

Output 1			Output 2			Output 3			Output 4			Type	Type
$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	Input voltage	Input voltage
[V DC]	[W]	[W]	[V DC]	[W]	[W]	[V DC]	[W]	[W]	[V DC]	[W]	[W]	16...36 V DC	33.6...75 V DC
3.3	100	132	-	-	-	-	-	-	-	-	-	BP 1101-7R	CP 1101-7R
5.1	122	183	-	-	-	-	-	-	-	-	-	BP 1001-7R	CP 1001-7R
3.3	50	66	5.1	61	91	-	-	-	-	-	-	BP 2101-7R	CP 2101-7R
5.1	61	91	5.1	61	91	-	-	-	-	-	-	BP 2001-7R	CP 2001-7R
12	60	96	12	60	96	-	-	-	-	-	-	BP 2320-7R	CP 2320-7R
15	60	97.5	15	60	97.5	-	-	-	-	-	-	BP 2540-7R	CP 2540-7R
24	60	96	24	60	96	-	-	-	-	-	-	BP 2660-7R	CP 2660-7R
5.1	61	91	12	30	48	12	30	48	-	-	-	BP 3020-7R	CP 3020-7R
5.1	61	91	15	30	48	15	30	48	-	-	-	BP 3040-7R	CP 3040-7R
24	30	48	24	30	48	24	30	48	24	30	48	BP 4660-7R	CP 4660-7R

Output 1			Output 2			Output 3			Output 4			Type	Type
$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	$U_{o\ nom}$	$P_{o\ nom}$	$P_{o\ max}$	Input voltage	Input voltage
[V DC]	[W]	[W]	[V DC]	[W]	[W]	[V DC]	[W]	[W]	[V DC]	[W]	[W]	40...100.8VDC	66...150 V DC
3.3	100	132	-	-	-	-	-	-	-	-	-	DP 1101-7R	EP 1101-7R
5.1	122	183	-	-	-	-	-	-	-	-	-	DP 1001-7R	EP 1001-7R
3.3	50	66	5.1	61	91	-	-	-	-	-	-	DP 2101-7R	EP 2101-7R
5.1	61	91	5.1	61	91	-	-	-	-	-	-	DP 2001-7R	EP 2001-7R
12	60	96	12	60	96	-	-	-	-	-	-	DP 2320-7R	EP 2320-7R
15	60	97.5	15	60	97.5	-	-	-	-	-	-	DP 2540-7R	EP 2540-7R
24	60	96	24	60	96	-	-	-	-	-	-	DP 2660-7R	EP 2660-7R
5.1	61	91	12	30	48	12	30	48	-	-	-	DP 3020-7R	EP 3020-7R
5.1	61	91	15	30	48	15	30	48	-	-	-	DP 3040-7R	EP 3040-7R
24	30	48	24	30	48	24	30	48	24	30	48	DP 4660-7R	EP 4660-7R

Output 1			Output 2			Output 3			Output 4			Type
$U_{o\ nom}$ [V DC]	$P_{o\ nom}$ [W]	$P_{o\ max}$ [W]	$U_{o\ nom}$ [V DC]	$P_{o\ nom}$ [W]	$P_{o\ max}$ [W]	$U_{o\ nom}$ [V DC]	$P_{o\ nom}$ [W]	$P_{o\ max}$ [W]	$U_{o\ nom}$ [V DC]	$P_{o\ nom}$ [W]	$P_{o\ max}$ [W]	Input voltage 21.6...50.4 V DC
3.3	100	132	-	-	-	-	-	-	-	-	-	GP 1101-7R
5.1	122	183	-	-	-	-	-	-	-	-	-	GP 1001-7R
3.3	50	66	5.1	61	91	-	-	-	-	-	-	GP 2101-7R
5.1	61	91	5.1	61	91	-	-	-	-	-	-	GP 2001-7R
12	60	96	12	60	96	-	-	-	-	-	-	GP 2320-7R
15	60	97.5	15	60	97.5	-	-	-	-	-	-	GP 2540-7R
24	60	96	24	60	96	-	-	-	-	-	-	GP 2660-7R
5.1	61	91	12	30	48	12	30	48	-	-	-	GP 3020-7R
5.1	61	91	15	30	48	15	30	48	-	-	-	GP 3040-7R
24	30	48	24	30	48	24	30	48	24	30	48	GP 4660-7R

## Input

Input voltage refer to selection chart

## Output

Nominal output current $I_{o1,2,3,4\ nom}$	$P_{o\ nom}/\text{Number of outputs}/U_{o1,2,3,4\ nom}$	
Maximal output current $I_{o1,2,3,4\ max}$	$P_{o\ max}/\text{Number of outputs}/U_{o1,2,3,4\ nom}$	
Efficiency	$U_{i\ nom}, I_{o\ nom}$	up to 92%
Voltage setting accuracy 1, 2	$U_{i\ nom}, I_{o\ nom}$	$\pm 0.6\% U_{o1,2\ nom}$
Voltage setting accuracy 3, 4	$U_{i\ nom}, I_{o\ nom}$	$\pm 1.5\% U_{o3,4\ nom}$
Worst case output voltage 1, 2	$U_{i\ min...}U_{i\ max}, 0...I_{o1,2\ max}, T_C\ min...T_C\ max$	$\pm 1.6\% U_{o\ nom}$
Minimum output current 1, 4	in parallel configuration not required	0 A
	in individual or series configuration	5% $I_{o1,4\ nom}$
Minimum output current 2, 3	in parallel configuration not required	0 A
	in individual or series configuration	5% $I_{o2,3\ nom}$
Load regulation output 4	$I_{o1,4\ min...}I_{o1,4\ max}$	typ. 100 mΩ • ( $I_{o1...}I_{o4}$ )
Load regulation output 3	$I_{o2,3\ min...}I_{o2,3\ max}$	typ. 100 mΩ • ( $I_{o2...}I_{o3}$ )
Output voltage switching noise	IEC/EN 61204, total, peak-peak	typ. 0.4% $U_{o\ nom}$
Common power limitation	$(P_{o1} + P_{o4})$ rectangular U/I characteristic	typ. 130% $P_{o\ max}/2$
	$(P_{o2} + P_{o3})$ rectangular U/I characteristic	typ. 130% $P_{o\ max}/2$

## Protection

Input reverse polarity	built-in fuse	
Input undervoltage lockout	typ. 90% $U_{i\ min}$	
Input overvoltage lockout	typ. 110% $U_{i\ max}$	
Input transient protection	varistor	
Output	no-load, overload and short-circuit proof	
Output overvoltage	varistor	
	typ. 125% $U_{o\ nom}$	
Overtemperature	switch-off with auto restart	
	$T_C$ typ. 100°C	

**Control**

Output voltage adjustment	output 1, 4	60/80...110% $U_{o\ nom}$
Inhibit on input side	TTL input, output(s) disabled if open circuit	
Status indication	LEDs: In OK, Out OK	
Output good signal (Out OK)	isolated open collector signal	

**Safety**

Approvals	EN 60950, UL 1950, CSA C22.2 No. 950	
Class of equipment		class I
Protection degree		IP 40
Electric strength test voltage	I/case, O/case, Out OK/case	1.5 kV AC
	I/O, Out OK/I, Out OK/O	4242 V DC / 3 kV AC
	O/O	500 V DC

**EMC**

Electrostatic discharge	IEC/EN 61000-4-2, level 4 (8/15 kV)	criterion B
Electromagnetic field	IEC/EN 61000-4-3, level 3 (10 V/m)	criterion A
Electr. fast transients/bursts	IEC/EN 61000-4-4, output/input, level 3/4 (2/4 kV)	criterion B
Surge	IEC/EN 61000-4-5, input, level 2/3 (1/2 kV)	criterion B
Conducted disturbances	IEC/EN 61000-4-6, level 2/3 (3/10 V)	criterion A
Electromagnetic emissions	CISPR 22/EN 55022, conducted	class B

**Environmental**

Operating ambient temperature	$U_{i\ nom}, P_{o\ nom}$ , convection cooled	-25...71 °C
Operating case temperature $T_C$	$U_{i\ nom}, P_{o\ nom}/P_{o\ max}$	-25...95 °C
Storage temperature	non operational	-40...100 °C
Damp heat	IEC/EN 60068-2-3, 93%, 40 °C	56 days
Vibration, sinusoidal	IEC/EN 60068-2-6, 10...60/60...2000 Hz	0.35 mm/5 $g_n$
Shock	IEC/EN 60068-2-27, 11 ms	50 $g_n$
Bump	IEC/EN 60068-2-29, 11 ms	25 $g_n$
Random vibration	IEC/EN 60068-2-64, 20...500 Hz	4.9 $g_{n\ rms}$

**Options**

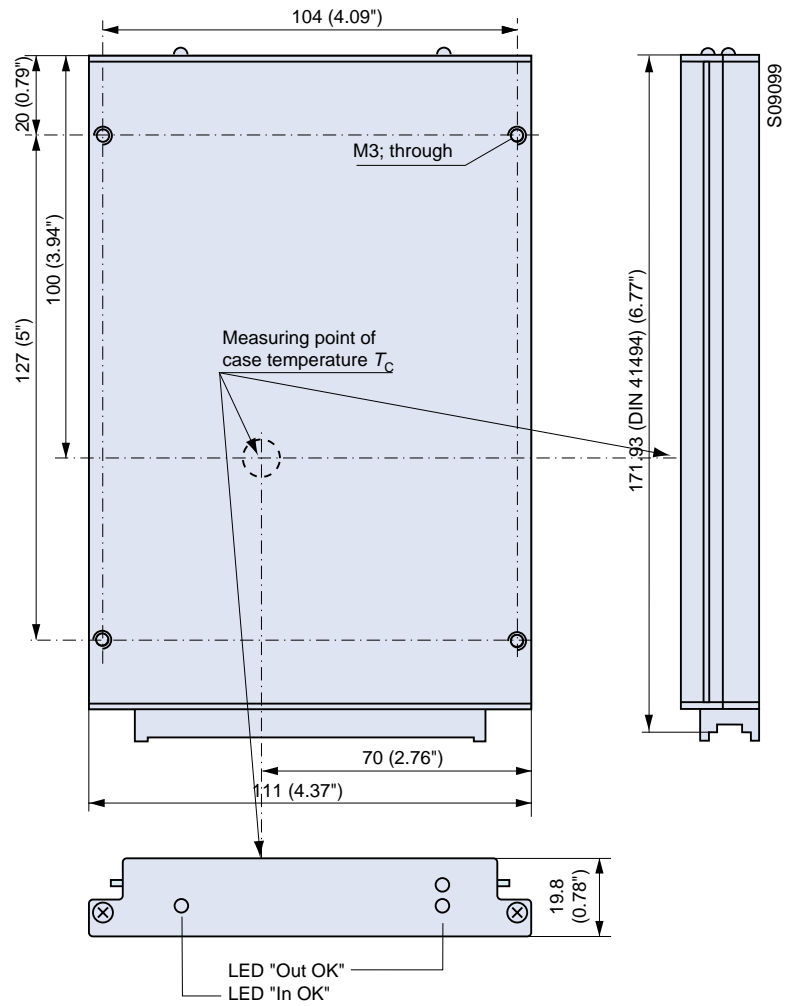
Extended temperature range	-40...71 °C, ambient, operating	-9
Out OK output	excludes option i	D
Current sharing		T
Inhibit on output side	excludes option D	i
Synchronisation		W
Heat Sink		B1

# Cassette Style

# P Series

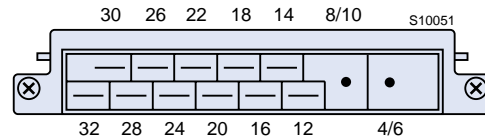
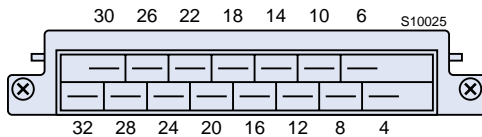
## Mechanical data

Tolerances  $\pm 0.3$  mm (0.012") unless otherwise indicated.



Pin allocation

Pin	P 1000		P 2000		P 3000		P 4000	
4	Vo1+	Output 1	Vo1+	Output 1	Vo1+	Output 1	Vo1+	Output 1
6			Vo2+	Output 2	Vo2+	Output 2	Vo2+	Output 2
8	Vo1-	Output 1	Vo1-	Output 1	Vo1-	Output 1	Vo1-	Output 1
10			Vo2-	Output 2	Vo2-	Output 2	Vo2-	Output 2
12	S+	Sense	S1+	Sense 1	S1+	Sense 1	Vo4+	Output 4
14	S-	Sense	S1-	Sense 1	S1-	Sense 1	Vo4-	Output 4
16	R	Control of $U_o$	R1	Control of $U_{o1}$	R1	Control of $U_{o1}$	R1/4	Control of $U_{o1/4}$
			T1	Current sharing	T1	Current sharing		
18	T	Current sharing	S2+	Sense 2	Vo3+	Output 3	Vo3+	Output 3
20	n.c.	Not connected	S2-	Sense 2	Vo3+	Output 3	Vo3+	Output 3
22	Out OK+	Output good	Out OK+	Output good	Out OK+	Output good	Out OK+	Output good
	i+	Inhibit second.	i+	Inhibit second.	i+	Inhibit second.	i+	Inhibit second.
24	Out OK-	Output good	Out OK-	Output good	Out OK-	Output good	Out OK-	Output good
	i-	Inhibit second.	i-	Inhibit second.	i-	Inhibit second.	i-	Inhibit second.
26	⊕	Prot. ground	⊕	Prot. ground	⊕	Prot. ground	⊕	Prot. ground
28	i	Inhibit	i	Inhibit	i	Inhibit	i	Inhibit
	W	Synchronisat.	W	Synchronisat.	W	Synchronisat.	W	Synchronisat.
30	Vi+	Input	Vi+	Input	Vi+	Input	Vi+	Input
32	Vi-	Input	Vi-	Input	Vi-	Input	Vi-	Input



Accessories

- Additional external heat sinks for operation above  $P_{o\ nom}$  or  $T_{A\ max}$
- Front panels for 19" rack mounting in 3U or 6U configuration (Schroff/Intermas)
- Mating H15 connectors with screw, solder, fast-on or press-fit terminals
- Mechanical mounting supports for chassis, DIN-rail and PCB mounting