



Wide input voltage ranges up to 60 V DC  
 1, 2 or 3 outputs up to 48 V DC  
 4 kA DC I/O electric strength test voltage



- Rugged electrical and mechanical design
- Output 1 regulated, outputs 2 and 3 tracking
- Operating ambient temperature range -25...71 °C with convection cooling

## Selection chart

Output 1		Output 2		Output 3		Input voltage $U_i$ [V DC]	Type	Options
$U_{o \text{ nom}}$ [V DC]	$I_{o \text{ nom}}$ [A]	$U_{o \text{ nom}}$ [V DC]	$I_{o \text{ nom}}$ [A]	$U_{o \text{ nom}}$ [V DC]	$I_{o \text{ nom}}$ [A]			
5.1	8	-	-	-	-	8...15	12H1001-2R	-7, D, V
5.1	8	-	-	-	-	14...30	24H1001-2R	-7, D, V
5.1	8	-	-	-	-	28...60	48H1001-2R	-7, D, V
12	4	-	-	-	-	8...15	12H1301-2R	-7, D
12	4	-	-	-	-	14...30	24H1301-2R	-7, D
12	4	-	-	-	-	28...60	48H1301-2R	-7, D
15	3.4	-	-	-	-	8...15	12H1501-2R	-7, D
15	3.4	-	-	-	-	14...30	24H1501-2R	-7, D
15	3.4	-	-	-	-	28...60	48H1501-2R	-7, D
24	2	-	-	-	-	8...15	12H1601-2R	-7, D
24	2	-	-	-	-	14...30	24H1601-2R	-7, D
24	2	-	-	-	-	28...60	48H1601-2R	-7, D
48	1	-	-	-	-	9...15	12H1901-2R	-7, D
48	1	-	-	-	-	18...30	24H1901-2R	-7, D
48	1	-	-	-	-	36...60	48H1901-2R	-7, D
12	2	12	2	-	-	8...15	12H2320-2	-7, D
12	2	12	2	-	-	14...30	24H2320-2	-7, D
12	2	12	2	-	-	28...60	48H2320-2	-7, D
15	1.7	15	1.7	-	-	8...15	12H2540-2	-7, D
15	1.7	15	1.7	-	-	14...30	24H2540-2	-7, D
15	1.7	15	1.7	-	-	28...60	48H2540-2	-7, D
5.1	5	12	0.7	12	0.7	8...15	12H3020-2	-7, D, V
5.1	5	12	0.7	12	0.7	14...30	24H3020-2	-7, D, V
5.1	5	12	0.7	12	0.7	28...60	48H3020-2	-7, D, V
5.1	5	15	0.6	15	0.6	8...15	12H3040-2	-7, D, V
5.1	5	15	0.6	15	0.6	14...30	24H3040-2	-7, D, V
5.1	5	15	0.6	15	0.6	28...60	48H3040-2	-7, D, V

**Input**

Input voltage	refer to selection chart
---------------	--------------------------

**Output**

Efficiency	$U_{i\text{ nom}}, I_{o\text{ nom}}$	up to 86%
Output voltage 1 setting acc.	$U_{i\text{ nom}}, I_{o\text{ nom}}$	$\pm 2\% U_{o1\text{ nom}}$
Output voltage 2, 3 setting acc.	$U_{i\text{ nom}}, I_{o\text{ nom}}$	$\pm 7.5\% U_{o2,3\text{ nom}}$
Output voltage switching noise	IEC/EN 61204, total	typ. 200 mV <sub>pp</sub>
Line regulation	$U_{i\text{ min}} \dots U_{i\text{ max}}, I_{o\text{ nom}}$	typ. $\pm 1\% U_{o\text{ nom}}$
Load regulation output 1	$U_{i\text{ nom}}, 0 \dots I_{o1\text{ nom}}$	typ. $0.2\% U_{o1\text{ nom}}$
Load regulation output 2, 3	$10 \dots 100\% I_{o2,3\text{ nom}}$	typ. 0.7 V
Output voltage 2, 3	$U_{i\text{ nom}}, I_{o1\text{ nom}}, I_{o2,3} = 0$	max. 115% $U_{o2,3\text{ nom}}$
Cross load regulation outp. 2, 3	$0 \dots 100\% I_{o1\text{ nom}}$	typ. 0.7 V
Minimum output current	not required	0 A
Current limitation main output	rectangular U/I characteristic	typ. 110% $I_{o\text{ nom}}$
Current limitation aux. output(s)	rectangular U/I characteristic	typ. 120% $I_{o\text{ nom}}$
Operation in parallel	by current limitation	
Hold-up time	$U_{i\text{ nom}}, I_{o\text{ nom}}$ , with ext. diode in input line	up to 1 ms

**Protection**

Input reverse polarity	with external fuse	
Input undervoltage lockout		typ 80% $U_{i\text{ min}}$
Input overvoltage lockout		typ 110% $U_{i\text{ max}}$
Input transient protection	suppressor diode	
Output	no-load, overload g2d short circuit proof	
Output overvoltage	suppressor diode in each output	typ 150% $U_{o\text{ nom}}$
Overtemperature	switch-off with auto restart	$T_C$ typ 100°C

**Control**

Output voltage adjustment	single output models	$0 \dots 110\% U_{o1\text{ nom}}$
Inhibit	TTL input, output(s) disabled if left open-circuit	
Status indication	LEDs: OK, inhibit	

**Safety**

Approvals	EN 60950, UL 1950, CSA C22.2 No. 950	
Class of equipment		class I
Protection degree	units without options	IP 40
Electric strength test voltage	I/case	2 kV AC
	I/O	4 kV AC
	O/case	1 kV AC
	O/O	0.2 kV AC

**EMC**

Electrostatic discharge	IEC/EN 61000-4-2, contact discharge, level 2 (4 kV)	criterion A
Electromagnetic field	IEC/EN 61000-4-3, level x (20 V/m)	criterion A
Electr. fast transients/bursts	IEC/EN 61000-4-4, input, level 1 (0.5 kV)	criterion A
Surge	IEC/EN 61000-4-5, input, level 1 (0.5 kV)	criterion A
Electromagnetic emissions	CISPR 22/EN 55022, 12H, conducted	class A
	CISPR 22/EN 55022, 12H, radiated	class B
	CISPR 22/EN 55022, 24H, 48H, radiated and conducted	class B

**Environmental**

Operating ambient temperature	$U_{i\ nom}, I_{o\ nom}$ , convection cooled	-10...50 °C
Operating case temperature $T_C$	$U_{i\ nom}, I_{o\ nom}$	-10...80 °C
Storage temperature	non operational	-25...100 °C
Damp heat	IEC/EN 60068-2-3, 93%, 40°C	21 days
Vibration, sinusoidal	IEC/EN 60068-2-6, 10...60/60...150 Hz	0.15 mm/2 $g_n$
Shock	IEC/EN 60068-2-27, 11 ms	15 $g_n$
Bump	IEC/EN 60068-2-29, 16 ms	10 $g_n$
MTBF	MIL-HDBK-217E, $G_B$ , 40°C, single output types	384'000 h

**Options**

Extended temperature range	-25...71°C, ambient, operating	-7
Input and/or output undervoltage monitoring, excludes option V		D1...D8
Input and/or output undervoltage monitoring (VME), excludes option D		V2, V3

**Accessories**

- Front panels 19" (Schroff/Intermas)
- Mating H11 connectors with screw, solder, fast-on or press-fit terminals
- Connector retention facilities and code key system for connector coding
- Flexible PCB for connecting the converter via an H11 connector, if mounted on a PCB
- Chassis or wall mounting plates for frontal access
- Universal mounting brackets for chassis or DIN-rail mounting

**Pin allocation**

Pin	Electrical Determination	H1000	H2000	H3000
2	Inhibit control input	i	i	i
5	Save Data or ACFAIL	D or V	D or V	D or V
8	Output voltage (positive)	Vo1+		Vo3+
11	Output voltage (negative)	Vo1-		Vo3-
14	Control input +	R		
17	Control input -	G		
14	Output voltage (positive)		Vo2+	Vo2+
17	Output voltage (negative)		Vo2-	Vo2-
20	Output voltage (positive)	Vo1+	Vo1+	Vo1+
23	Output voltage (negative)	Vo1-	Vo1-	Vo1-
26	Protective earthing	⊕	⊕	⊕
29	DC input voltage	Vi+	Vi+	Vi+
32	DC input voltage	Vi-	Vi-	Vi-

2/12.2000

## Mechanical data

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

