

# 1 u. 3 $\Phi$ AC/DC Converter

1000 W

## 1000 LWB 400 M24 W00

$V_{I\text{ nom}} = 400\text{V}\sim, 440\text{V}\sim, 50\text{Hz}$  3 Phase Input  
230V $\sim, 379\text{V}\sim, 50\text{Hz}$  Single Phase

$V_{O\text{ nom}} = 24\text{V}$   $I_{O} = 40.0\text{A}$

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>INPUT</b>						
$V_I$	Input voltage range 1 phase	Continuous	207		417	$V_{AC}$
		Short time $0.2s \leq t \leq 2.0s$	417		588	$V_{AC}$
$V_I$	Input voltage range 3 phase	Continuous	360	400	484	$V_{AC}$
		plug X11				
f	Line frequency 1, 3 phase		47		63	Hz
$V_{I\text{ DC}}$	Input voltage range	DC operation	300		600	$V_{DC}$
$V_{I\text{ DC}}$	Converter shutdown DC		300		850	$V_{DC}$
$\lambda$	Power factor 3 $\Phi$	$340\text{V}\sim \leq V_I \leq 500\text{V}\sim, I_O \leq 40.0\text{A}$	0.9			
$I_I$	Input current	No load $V_I = 440\text{V}\sim, I_O = 0\text{A}$ Nominal load $V_I = 400\text{V}\sim, I_O = 40\text{A}$ Nominal load $V_I = 230\text{V}\sim, I_O = 40\text{A}$			35 1.6 2.75	$\text{mA}_{\text{rms}}$ $\text{A}_{\text{rms}}$ $\text{A}_{\text{rms}}$
	Input current integral	$V_I = 440\text{V}\sim$			15	$\text{A}^2\text{s}$
$I_{I\text{ max}}$	Max. input switch on current	$I_O = 40.0\text{A}$ $\Delta t \leq 100\text{ms}$		on request		
$C_I$	Converter input capacity			220		$\mu\text{F}$
	Reverse input protection at DC input	6 B Rectifier				
	Input fuse	Yes		10 AT		

### OUTPUT: Power unit

230 V $\sim, 379\text{V}\sim, 400\text{V}\sim, 440\text{V}\sim \pm 10\%$

$P_{O\text{ nom}}$	Output power			1000		W
$V_{O\text{ nom}}$	Output voltage factory adjust	Default Customer select 26V X21:pin X3 = 24V	23.75 25.5	24.0 26.0	24.25 26.5	$V_{DC}$ $V_{DC}$
$V_O$	Voltage accuracy	$0\text{A} \leq I_O \leq 40.0\text{A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$		$\pm 1$	$\pm 3$	%
	pins X1 – X6; X22					
$V_{O\text{ rms}}$	Output voltage ripple	$0\text{A} \leq I_O \leq 40.0\text{A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$		150	250	$\text{mV}_{\text{rms}}$
$V_{O\text{ pp}}$	Output voltage noise	$0\text{A} \leq I_O \leq 40.0\text{A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$			500	$\text{mV}_{\text{pp}}$
$V_O$	Voltage stability ( $\Delta V_O/V_{O,\text{nom}} \cdot 100\%$ )	$0\text{A} \leq I_O \leq 40.0\text{A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$		0.5	1.0	%
$V_{O\text{ pp}}$	Ripple (50Hz, 100Hz) & Noise	$0\text{A} \leq I_O \leq 40.0\text{A}$ Nom. load BW 20 MHz			3.0	$\text{V}_{\text{rms}}$
$t_h$		$0\text{A} \leq I_O \leq 40.0\text{A}$	20			ms
	Overvoltage shutdown $V_O$	$0\text{A} \leq I_O \leq 40.0\text{A}$		Converter OFF $V_O \leq 30.0\text{V}$		V
$I_O$	Output current	X22		40.0		A
$I_O$	Output current	X1 – X6	8			A
	Output current limitation threshold of $I_O$	X22	42		45	A
	Output short circuit current X22	Short circuit between + $V_O$ and – $V_O$		48	51	A
	X1 – X6			10	12	A
$C_O$	Output capacity			22		mF

### SIGNALS, Control

	Input voltage Output voltage Overload	Input o.k. Output o.k. Output current overload	LED green ON LED green ON LED red ON			
EN_D	ENABLE for continuous operation	Select at X21 Pin x1	16,8	24	30	V
EN_T	ENABLE for 5 min ON, 20 min OFF	Select at X21 Pin x2	16,8	24	30	V
EN_26	Select $V_{O\text{ out}}$ to 26V	Select at X21 Pin x3	16,8	24	30	V

### GENERAL SPECIFICATIONS

f1	Switching frequency	Step Down Converter		75		kHz
f2	H-Bridge	DC/DC converter		150		kHz
$\eta$	Efficiency	$P_O \geq 0.7 \times P_{O\text{ nom}}$	86	90		%
	MTBF (SN 29500)	$V_I = 440\text{V}\sim, I_O = 40\text{A}, T_A = +40^\circ\text{C}$		400 000		h
	No load, short circuit proof			Continuously		

Power - Derating: – 2,0%  $T_A = +50^\circ\text{C} \dots +70^\circ\text{C}$

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SYMBOL PARAMETER TEST CONDITIONS MIN TYP MAX UNITS

## SAFETY / DIMENSIONS

	Creepage / clearance distances PD2, OV2 PCB FR4, V0, TG = + 150°C	Input   output Input   case Output   case	6.0 4.0 2.0			mm mm mm
	Converter dielectric strength test every unit with ramp function: 2 s - 3 s - 2 s type test: 1 Minute	Input – output Input – case Output – case			3'500 2'500 500	V <sub>DC</sub> V <sub>DC</sub> V <sub>DC</sub>
	Connectors WAGO Cage Clamp	Input X11 Output: X1 – X6, X22 Control Signals SE M4: additional bolt	739-303, 745-302, 232-102/026-047/032-000 739 - 308			
	Protection class, protection system		I, IP 20			
	Dimensions with mounting plate <i>see drawing</i>	w x h x d Chassis mounting	225 x 300 x 150			mm
	Assembling	Chassis mounting with screws	See Mech. Drawing			
	Weight			3.9		kg

## ENVIRONMENTAL CONDITIONS

T <sub>A</sub>	Operating temperature range T <sub>A</sub> <i>Forced cooling with 2 * 12V DC fans</i>	Continuously T <sub>A</sub> > + 50°C power derating -2% EN 50155 Class T2	- 40		+ 70	°C
T <sub>Storage</sub>	Storage Temperature		- 40		+ 70	°C
	Cooling		free air convection			
	Humidity	EN 50155, IEC 60571	75% averaged year, 95% 30 days			
	Vibration / Shock valid only for chassis mounting	IEC 61373, IEC 68-2-27 Cat. I 3 Shocks per axis	50 m / s <sup>2</sup> , 30 ms			

## EMC

	Emission*)	Line conducted and radiated	EN 50121 - 3 - 2: 2007			
	Immunity*)	ESD EN 61000 - 4 - 2	6 kV / 8 kV Performance criteria - B -			
		High frequency field EN 61000 - 4 - 3	20 V / m 80 MHz ... 2.5 GHz Performance criteria - A -			**)
		Burst EN 61000 - 4 - 4	Level 3 asym., sym. Performance criteria - A -			
		Surge EN 61000 - 4 - 5	2 kV asym. / 1 kV sym. R <sub>i</sub> = 42 Ω, Perf. criteria - A -			
		HF – Current injection EN 61000 - 4 - 6	10 V <sub>eff</sub> , R <sub>i</sub> = 150 Ω Performance criteria - A -			

## STANDARDS

Applied Standards:	EN 50155: 2007	EN 60 950	EN 50124 - 1: 2006	EN 50121 - 3 - 2: 2007	IEC 60571-1
	SN 29500	EN 50121 - 1	EN 50125 - 1	EN 60068 - 2 - 6, 2...27	EN 61000 - 4 - 2...6
	EN 61131-2 :2007	EN 60721 - 3 - 5	EN 61373	EN 60529 : 1991	DIN 41773 T.1
	EN 61000 - 3 - 2	EN 61000-3-3			

Technical specifications valid for: - 40° C ≤ T<sub>A</sub> ≤ + 70° C, 230 V~ ≤ V<sub>in</sub> ≤ 440 V~, unless otherwise noted.

\*) In closed housing, emission: radiated @ EN 50121-3-2, conducted @ EN 50121- 3 - 2

\*\*) 1400 MHz – 2100MHz 10V/m 2100MHz – 2500MHz 5V/m

## Pin Assignment Power

Input X11		
PIN		Recom. wire gauge
1	L1	1.5 ... 2.5 mm <sup>2</sup>
2	L2	1.5 ... 2.5 mm <sup>2</sup>
3	L3	1.5 ... 2.5 mm <sup>2</sup>
Output Power X22		
1	+ V <sub>Out</sub>	8 mm <sup>2</sup>
2	- V <sub>Out</sub>	8 mm <sup>2</sup>

Earth  $\oplus$ : housing connecting with 4mm<sup>2</sup> wire gauge recommended

Output X1 – X6		Recom. wire gauge
1	+ V <sub>out</sub>	1.5mm <sup>2</sup>
2	- V <sub>out</sub>	1.5mm <sup>2</sup>

Control X21			
1	EN1	Connect to ext. 24V source	1.0mm <sup>2</sup>
2	EN2	Connect to ext. 24V source	1.0mm <sup>2</sup>
3	26V	Connect to ext. 24V source	1.0mm <sup>2</sup>
4	n.c.	free	1.0mm <sup>2</sup>
5	- V <sub>out</sub>	Ground V <sub>out</sub>	1.0mm <sup>2</sup>
6	PF	X6-X7 connect. V <sub>out</sub> O.k.	1.0mm <sup>2</sup>
7	PF	X6-X7 open V <sub>out</sub> Fail	1.0mm <sup>2</sup>
8	-	-	

Converter Status	EN1	EN2
DC/DC converter OFF	Low	Low
DC/DC converter ON	High	Low
DC/DC converter ON	High	High
5min ON   20min OFF   5min ON	Low	High
If pin 26V connected to ext. 24V	V <sub>out</sub> = 26V	
Default (pin 26V n.c.)	V <sub>out</sub> = 24V	

Dimensions (in millimetres)

