




Application Note

1606-XL480E-3



- World-wide approvals (  ) for industry
- Input: 3 AC 400V/3 AC 480V
- Output: 24...28V/480 W (600 W)

- 92% efficiency
- Ideal for parallel operation
- Simple fusing

Input

Input voltage	XL480E-3: AC 480V, - 15 %, + 20 % (XL480E: AC 230V, s. separate data sheet) 47...63 Hz, Suitable for IT power systems	
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Rated Tolerances

• Continuous operation	408...576V AC	resp. 550...820V DC
• Short term (1 min) at 24V/20 A	360...620V AC	resp. 450...890V DC

Input current	3 x 1.5 A
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Inrush current	< 15 A at 440V AC, < 17 A at 480V AC
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Inrush current limiting done with a fixed 47R resistor (not a thermistor) which is bridged after the unit is running, so losses are minimised. That means no reset time even at a warm-start.

Fuse loading	< 2 A ² s
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If you intend to protect the primary side of the power supply with fuses or circuit breakers, 10 A (x3) slow acting fuses (HBC) or a supplementary protectors 1492-SP3C100 are recommended. In order to meet local requirements, please consult local codes and regulations for proper installation.

Harmonic current emissions (PFC)	acc. EN 61000-3-2
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Transient handling	Active transient filter incorporated, so transient resistance acc.to VDE 0160 / W2 (1300 V / 1.3 ms), for <i>all</i> load conditions.
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Hold up time	> 11 ms at 24V/20 A, $V_{in, nom}$
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Efficiency, Reliability etc.

Efficiency	typ. 92 % (24V/20 A, $V_{in, nom}$)
Losses	typ. 42 W (24V/20 A, $V_{in, nom}$)
MTBF	310.000 h acc. to Siemensnorm SN 29500 (24V/20 A, $V_{in, nom}$, $T_{amb} = +40^{\circ}C$)
Life cycle (electrolytics)	The unit exclusively uses longlife electrolytics, specified for +105°C. High reliability, as <ul style="list-style-type: none"> • only four aluminium electrolytics and • no small aluminium electrolytics are used.

Output

Output voltage	24...28V DC, adjustable by (covered) front panel potentiometer; preset: 24V $\pm 0.5\%$ Adjusting range guaranteed
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Output noise suppression	Radiated EMI values below EN50081-1, even when using long, unscreened output cables.
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Ambient temperature range	Operation: 0°C...+70°C (>60°C: Derating) Storage: -25°C...+85°C
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Rated continuous loading with convection cooling	
• $T_{amb} = 0^{\circ}C \dots 60^{\circ}C$	24V / 20 A (480 W) resp. 28V / 18 A (504 W)
• $T_{amb} = 0^{\circ}C \dots 45^{\circ}C$	24V / 25 A (600 W) resp. 28V / 22 A (616 W) short-term also at 60 °C

Derating	typ. 12 W/K (at $T_{amb} = +60^{\circ}C \dots +70^{\circ}C$)
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Voltage regulation	better than 2% over all
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Ripple	< 20 mV _{pp} (i.e. < 0.1 %) incl. spikes 20 MHz bandwidth, 50 Ω measurement
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Over-voltage protection	At 32V $\pm 10\%$: switch to hiccup mode
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Front panel indicators:	<ul style="list-style-type: none"> • Green LED on, when $V_{out} > U_T$, where U_T is ca. 2 V below V_{out} adjusted (24V...28V) • Red LED on, when $14V < V_{out} < U_T$ • Red LED flashes, when $0V < V_{out} < 14V$
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Parallel operation	Yes, up to ten units
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To achieve current sharing the output V/I characteristic can be altered to be 'softer' (25V at 0.4A, 24V at 20A). This is done by repositioning a bridge connection (without opening the unit).

Power Back Immunity	> 30V
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Construction / Mechanics

Housing dimensions and Weight	
• W x H x D	220 mm x 124 mm x 102 mm (+ DIN rail)
• Free space for ventilation above/below	70 mm recommended left/right 25 mm recommended
• Weight	1.8 kg

Design advantages: All connection blocks are easy to reach as mounted at the front panel; PVC insulated cable can be used for all connections, as the connection blocks are mounted in the cooler area on the underside of the unit.

Wire Size Input/Output:	
Stranded	20...10 AWG (0.5...4 mm ²), Solid 20...10 AWG (0.5...6 mm ²)
Tightening Torque:	7 lbs in (0.8 Nm) recommended

Start / Overload Behavior

Startup delay	typ. 0.2 s
Rise time	ca. 20...80 ms, depending on load
Duration of switch-on attempts at	
• Initial application on mains	ca. 1.4 s
• Subsequent attempts	ca. 0.5 s
Hiccup operation at	$V_{out} < ca. 14V$
Duration between switch-on attempts	ca. 4 s

Electronic current limiting, protects against overload and short circuit:

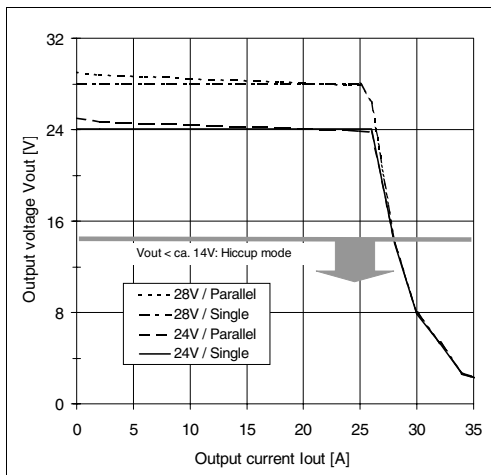
- $V_{out} < ca. 14V$: Periodical switch-on attempts (hiccup-mode).
- $V_{out} > ca. 14V$: The output current is continuous.

The V/I characteristic of the supply is straight.

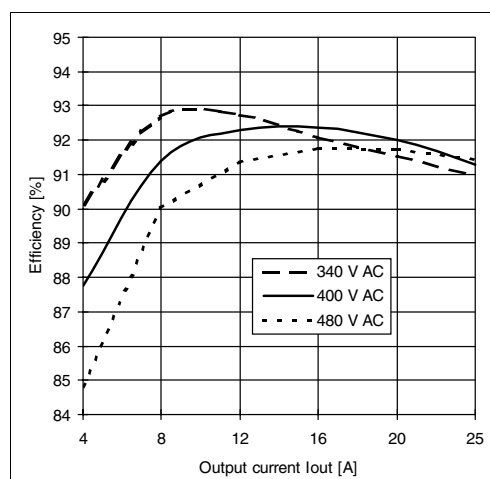
Advantages of the switch-on/overload behavior:

- Safer switch-on into highly non-linear loads with large starting currents
- Short-term overloads result in current limiting and not in an immediate shut-down.
- Parallel operation of several units possible. Proper switch-on performance is obtained.

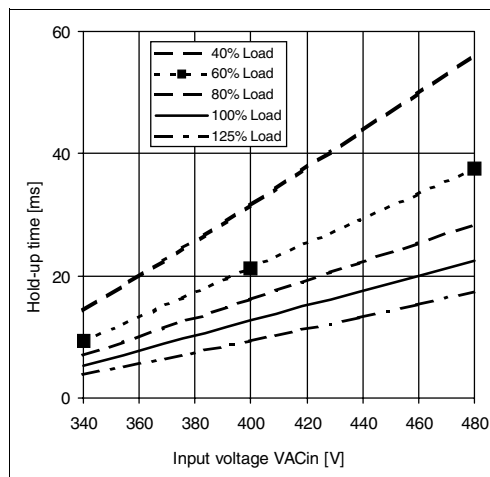
Output V/I characteristic (typ.)



Efficiency (typ., at $V_{out}=24V$)



Hold-up time (typ., at $V_{out}=24V$)



Specifications valid for 3x400V AC input voltage, +25°C ambient temperature, and 5 min run-in time, unless otherwise stated. They are subject to change without prior notice.

With 480V input some values may differ.

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