



## Application Note

# 1606-XL720E-3

- World-wide approvals (  $\text{CE}$   $\text{UL}$   $\text{UL}$  ) for industry
- Input: 3 AC 400...500V
- Output: 24...28V / 720W

- 92.5% efficiency
- Ideal for parallel operation
- Simple fusing

### Input

Input voltage	3 AC 400...500V, $\pm 15\%$ 47...63 Hz; Suitable for IT power systems
Rated Tolerances	
• Continuous operation	340...576V AC resp. 450...820V DC
• Short term (1 min) at 24V/30 A	300...620V AC resp. 420...890V DC
Input current	3 x 2.0 A
Inrush current	< 17 A bei 576V AC
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 <sup>2</sup> s
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 acc. EN 61000-3-2 (PFC)	
Transient handling	Active transient filter incorporated, so transient resistance acc.to VDE 0160 / W2 (1560 V / 1.3 ms), for <i>all</i> load conditions.
Hold up time	> 10 ms at 400V AC, 24V / 30 A

### Efficiency, Reliability etc.

Efficiency	typ. 92.5 % (400V AC, 24V/30 A)
Losses	typ. 60 W (400V AC, 24V/30 A)
MTBF	425,000 h @ 400VAC, 360,000 h @ 480VAC (Siemensnorm SN 29500 (Release 07.97), 24V/30 A, $T_{\text{amb}} = +40^\circ\text{C}$ )
Life cycle (electrolytics)	The unit exclusively uses longlife electrolytics, specified for +105°C. High reliability and lifetime, as <ul style="list-style-type: none"> <li>• only four aluminium electrolytics and</li> <li>• no small aluminium electrolytics are used.</li> </ul>

### Output

Output voltage	24...28V DC, adjustable by (covered) front panel potentiometer. Adj. range guaranteed
Output noise suppression	Radiated EMI values below EN50081-1, even when using long, unscreened output cables.
Ambient temperature range $T_{\text{amb}}$	Operation: $0^\circ\text{C}...+70^\circ\text{C}$ ( $>60^\circ\text{C}$ : Derating) Storage: $-25^\circ\text{C}...+85^\circ\text{C}$
Rated continuous loading with convection cooling at $T_{\text{amb}}=0^\circ\text{C}...60^\circ\text{C}$	24V/30 A (720 W) resp. 28V/26 A (728 W)
Derating	typ. 18 W/K (at $T_{\text{amb}}=+60^\circ\text{C}...+70^\circ\text{C}$ )
Voltage regulation	better than 2% over all
Ripple	(incl. spikes (20 MHz bandwidth), 50 $\Omega$ measurement)
• Output charact. S	< 20 mV <sub>pp</sub> (< 0.1 %)
• Output charact. P (S/P Single/Parallel Mode)	< 40 mV <sub>pp</sub> (In: 230VAC, Out: 24V/30A) < 100 mV <sub>pp</sub> (In: 184VAC, Out: 24V/30A)
Over-voltage protection	At $32V \pm 10\%$ : switch to hiccup mode
Front panel indicators:	<ul style="list-style-type: none"> <li>• Green LED on, when <math>V_{\text{out}} &gt; U_T</math>, where <math>U_T</math> is ca. 2 V below <math>V_{\text{out}}</math> adjusted (24V...28V)</li> <li>• Red LED on, when <math>10V &lt; V_{\text{out}} &lt; U_T</math></li> <li>• Red LED flashes, when <math>0V &lt; V_{\text{out}} &lt; 10V</math></li> </ul>
Parallel operation	Yes, up to ten units
To achieve current sharing the output V/I characteristic can be altered to be 'softer' (25V at 0.4A, 24V at 30A). This is done by repositioning a bridge connection (without opening the unit).	
Power Back Immunity	> 30V

### Construction / Mechanics

Housing dimensions and Weight	
• W x H x D	240 mm x 124 mm x 112 mm (+ DIN rail)
• Free space for ventilation above/below	70 mm recommended
• Weight	left/right 25 mm recommended 2.0 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<sup>2</sup>), Solid 20...10 AWG (0.5...6 mm<sup>2</sup>)
- 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	$V_{out} < \text{ca. } 10\text{V}$
Duration between switch-on attempts	ca. 1 s

Electronic current limiting, protects against overload and short circuit:

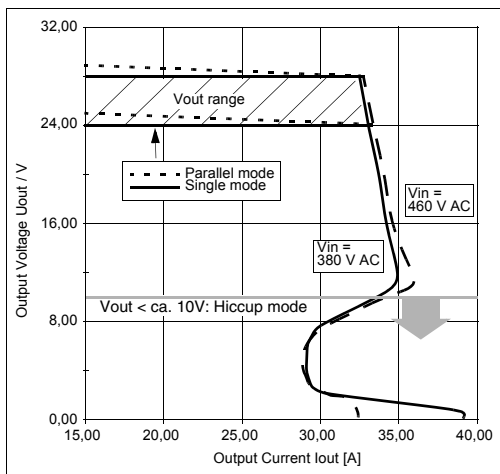
- $V_{out} < \text{ca. } 10\text{V}$ : Periodical switch-on attempts (hiccup-mode).
- $V_{out} > \text{ca. } 10\text{V}$ : The output current is continuous.

The V/I characteristic of the supply is straight.

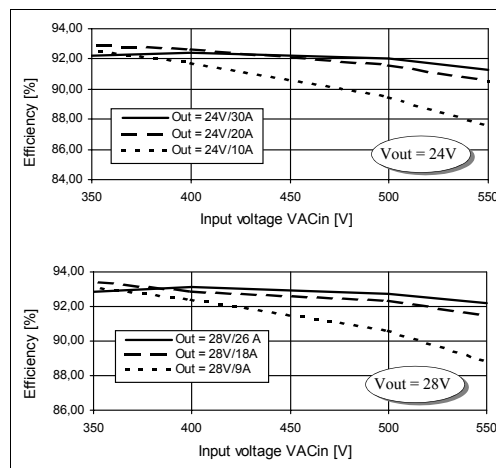
Advantages of the switch-on/overload behavior:

- 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.

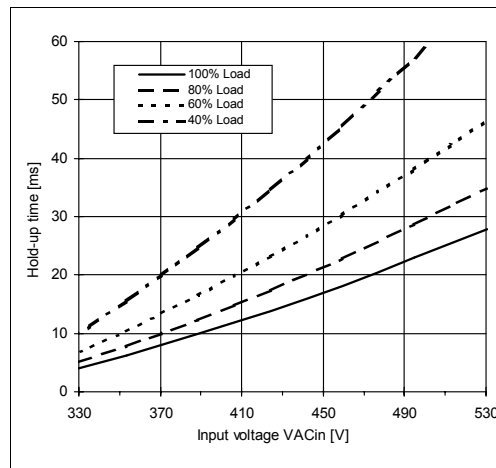
### Output V/I characteristic (typ.)



### Efficiency (typ.)



### Hold-up time (min., at $V_{out}=24\text{V}$ )



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.

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