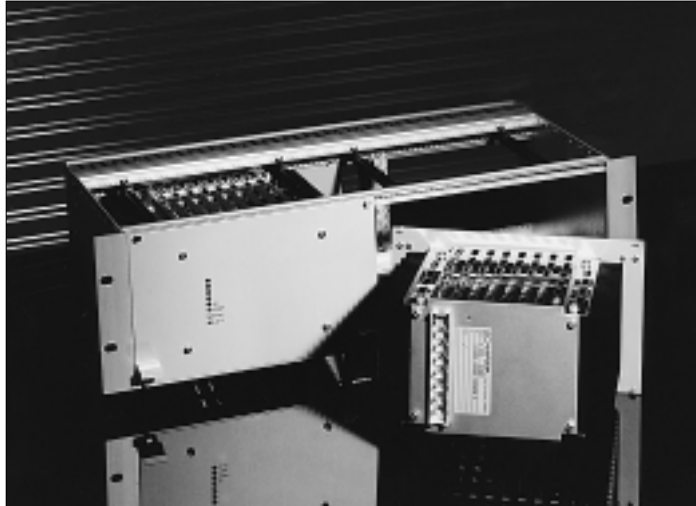


# Rack & Cabinet Mount Switchers

**C** SERIES

**50-12 kWatts**



*CE Marked - LVD & EMC*

*•  
One to Four Outputs*

*•  
5-400 Volts Output*

*•  
Eurocassette or Wall Mount*

*•  
Parallel Redundant Operation*

*•  
Fully Wired Customised Racks*

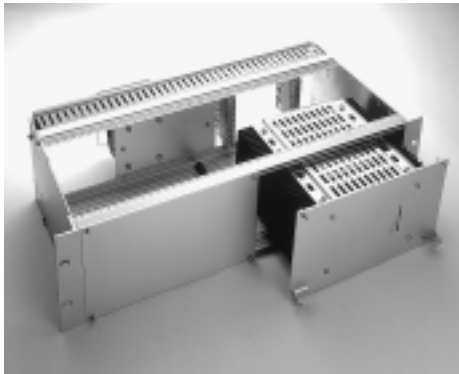
*•  
Power Factor Correction Modules*

## **Specification**

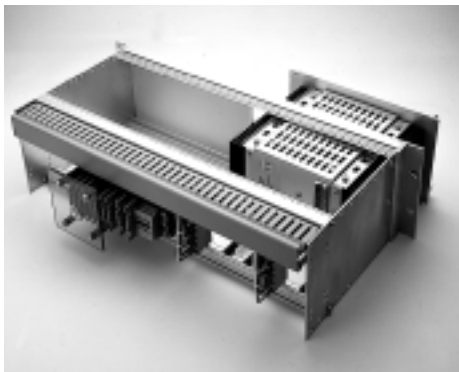
Input Voltage	• 93-138 or 185-264 V AC (see Tables for 3 phase input)
Input Frequency	• 47-440 Hz
No-Load Input Current	• 3% of full load current typical
Inrush Current	• Limited by thermistor
Switch-On Time	• 100 ms typical C/M200-C4700, 500ms typical C5600-C5800
Hold-Up Time	• Increases with input voltage 15 ms typical at 230 V AC
High-Energy Pulses/Surges	• ENV 50142 (level 3)
Spike/Bursts	• acc. to IEC 1000-4-4 (level 3)
Line Regulation ( $\pm 10\%$ )	• 0.1%
Load Regulation (10-90%)	• 0.2%
Ripple & Noise	• $\leq 1\% + 30 \text{ mV p-p}$ (0.5% typical lin.reg.aux.)
Load Transient (20-100-20%)	• 6% typical
Response Time to $\pm 1\%$	• 2 ms typical C/M200-C4700, 10 ms typical C5600-C5800
Overload Protection	• Current limited at 105-110% of full load
Overvoltage Protection	• Standard on single output models and main output on multi output units OVP switches off module with automatic restart
Remote Sensing	• Standard for main output
Temperature Coefficient	• 0.02%/°C typical
Operating Temperature	• -20 °C to +75 °C derate from +55 °C at 2.5%/°C (Optional -40 °C to +75 °C)
Storage Temperature	• -40 °C to +85 °C
Relative Humidity	• 5 to 95% Non condensing
Efficiency at Full Load	• 60-95%, depending on model
Switching Frequency	• approx. 33 kHz
Isolation	• Acc. to EN60950 class 1
RFI-Interference	• Acc. to VDE 0878, EN 55022, level A
M.T.B.F.	• Approx. 250,000 hrs @ +25 °C
Construction (Safety)	• Acc. to EN 60950 class 1
Creepage Distance	• Acc. to VDE 0110, 4 mm
Air Distance	• Acc. to VDE 0110, 3 mm
Earth leakage	• <3.5 mA at 230 V AC, to EN60950
Connector	• H 15 DIN 41612 or studs for higher current outputs C/M200-C4700, studs only for C5600-C5800

## 19" Subracks & Redundant Systems

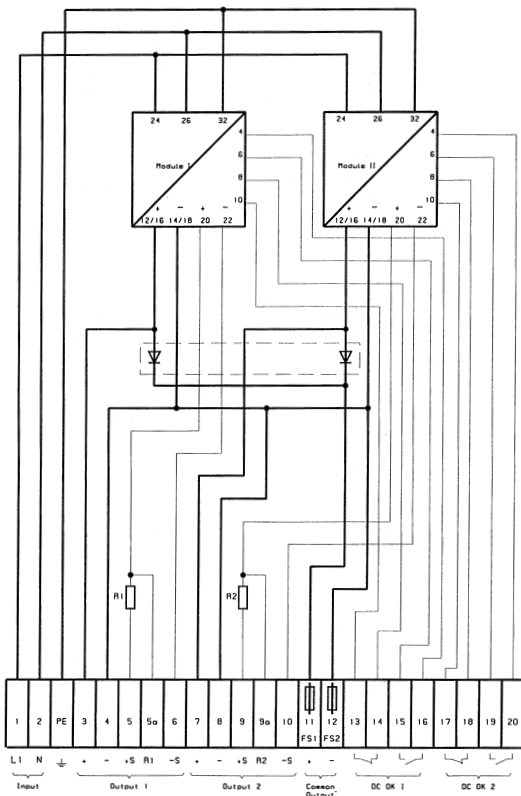
Front View



Rear View



Sample Schematic



The above demonstrates a typical schematic as supplied with each system. It shows 2 x 2 C694-DD.DR connected in parallel incorporating option DD (Decoupling Diodes) and DR (DC-OK Relay).

### Description

In addition to a complete range of individual power supplies we are able to offer a 'total solution' to your power requirements.

Subracks can be configured as 3U, 6U or 9U and multiples thereof, allowing any mix of units including 'hot swap' redundant systems.

The wide range of options available include input fuses, circuit breakers, decoupling diodes, RFI filters, front panels and full system wiring.

Outputs are via DIN rail screw terminals and are configured to customer requirements to incorporate DC OK relay contacts, input and output connections and any other options.

Please contact the sales office for a quotation.

### Example

The photographs show a typical system containing a C694-DD.DR which could be configured with similar units in an N + 1 redundant system.

Specification typically could be:

AC Input: 185-264 V

DC Output: 24 V @ 40 A N + 1 redundancy

Each unit is rated at 20 Amps and is connected in parallel via decoupling diodes and set up to current share. In the event of a psu failure the DC OK alarm relay trips, the failed psu can be identified by its front panel LED and the psu replaced without power shut down ie. 'Hot Swap'.

A full system schematic is provided with each system as shown below, the size and orientation of connectors can be specified by the customer.

### Standard Options

See Over for Integral PSU Options

3U subrack, 215 or 275 mm deep

6U subrack, 215 or 275 mm deep

6U subrack, configured as 2 x 3U

9U subrack, configured as 3 x 3U

9U subrack, configured as 1 x 3U, 1 x 6U

H15 mating connectors and wiring

DIN rail terminal strip at rear

Input Fuse up to 25 A  
up to 63 A

MCB, single pole up to 25 A  
up to 40 A  
up to 63 A

MCB, dual pole up to 25 A  
up to 40 A  
up to 63 A

Decoupling Diodes on Heatsink 2 x 50 A  
2 x 80 A

RFI filter, 20-40 dB reduction up to 10 A  
up to 20 A

Front panels, plain or drilled all sizes



<b>Output Voltage &amp; Current Ratings - Multi Output Models</b>									
Output Power		50 Watts		150 Watts		200 Watts		250 Watts	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
DC Output Voltage									
5 V	(4.5 – 5.5 Adj)	C290	8 A	C390	20 A	C1290	30 A	C590†	35 A
9 V	(8 – 10 Adj)	C291	5 A	C391	15 A	C1291	18 A	C591	25 A
12 V	(11 – 13 Adj)	C292	4 A	C392	12 A	C1292	15 A	C592	20 A
15 V	(14 – 16 Adj)	C293	3.2 A	C393	10 A	C1293	12 A	C593	16 A
24 V	(23 – 26 Adj)	C294	2.0 A	C394	6 A	C1294	7.5 A	C594	10 A
28 V	(26 – 30 Adj)	C295	1.7 A	C395	5 A	C1295	6.5 A	C595	8.5 A
48 V	(45 – 55 Adj)	C299	1.0 A	C399	3 A	C1299	3.6 A	C599	4.5 A
60 V	(58 – 68 Adj)	C296	0.8 A	C396	2.3 A	C1296	3 A	C596	3.7 A
110 V	(100 – 130 Adj)	C297	0.4 A	C397	1.2 A	C1297	1.5 A	C597	2 A
220 V	(200 – 250 Adj)	C298	0.2 A	C398	0.6 A	C1298	0.8 A	C598	1 A
Size		3U x 10TE x 160 mm		3U x 14TE x 160 mm		6U x 10TE x 160 mm		3U x 21(24)TE x 160 mm	

<b>Output Voltage &amp; Current Ratings - Multi Output Models</b>									
Output		40 Watts		80 Watts		160 Watts		180 Watts	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
1	5 V (See Note)	M290	5 A	M390	5 A	M1290	20 A	M590	15 A
2	5, 12 OR 15 V (+ve)		2 A		2 A		2 A		3 A
3	5, 12 OR 15 V (-ve)		0.5 A		0.5 A		1.2 A		1.2 A
4	5, 12 OR 15 V OR 24 V				1.2 A		2 A		3 A
					0.5 A		1 A		1.2 A
Size		3U x 10TE x 160 mm		3U x 14TE x 160 mm		6U x 10TE x 160 mm		3U x 21(24)TE x 160 mm	

## NOTES:

- Main Output 1, voltage may be any of the listed single outputs, observing maximum power output.
- All outputs are isolated from the others, outputs 2 & 3 have a common return.
- † Signifies use of a 40 mm heatsink extending the TE width, all others use 25 mm heatsink.
- \* User specified at time of order. Contact sales office for part number.

<b>Output Voltage &amp; Current Ratings - Single Output Models</b>									
Output Power		350 Watts		400 Watts		400 Watts		500 Watts	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
DC Output Voltage									
5 V	(4.5 – 5.5 Adj)	S690	50 A	C2590†	55 A	C1390	50 A	C690	80 A
9 V	(8 – 10 Adj)	S691	32 A	C2591	32 A	C1391	35 A	C691	50 A
12 V	(11 – 13 Adj)	S692	26 A	C2592	27 A	C1392	30 A	C692	40 A
15 V	(14 – 16 Adj)	S693	22 A	C2593	23 A	C1393	25 A	C693	32 A
24 V	(23 – 26 Adj)	S694	14 A	C2594	15 A	C1394	15 A	C694	20 A
28 V	(26 – 30 Adj)	S695	12 A	C2595	13 A	C1395	13 A	C695	17 A
48 V	(45 – 55 Adj)	S699	6.5 A	C2599	7.2 A	C1399	7.3 A	C699	9 A
60 V	(58 – 68 Adj)	S696	5.2 A	C2596	6 A	C1396	6 A	C696	7.5 A
110 V	(100 – 130 Adj)	S697	3 A	C2597	3 A	C1397	3 A	C697	4 A
220 V	(200 – 250 Adj)	S698	1.5 A	C2598	1.6 A	C1398	1.5 A	C698	2 A
Size		3U x 42TE x 160 mm		3U x 21(24)TE† x 220 mm		6U x 14TE x 160 mm		3U x 42TE x 160 mm	

<b>Output Voltage &amp; Current Ratings - Multi Output Models</b>							
Output		300 Watts		320 Watts		450 Watts	
		Model	Max Rating	Model	Max Rating	Model	Max Rating
1	5 V	SM690	30 A	M1390	30 A	M690	40 A
2	5, 12 OR 15 V (+ve)		3 A		3 A		3 A
3	5, 12 OR 15 V (-ve)		1.2 A		1.2 A		3 A
4	5, 12 OR 15 V OR 24 V		3 A		3 A*		3 A*
			1.2 A		1.2 A*		1.2 A*
Size		3U x 42TE x 160 mm		6U x 14TE x 160 mm		3U x 42TE x 160 mm	

## NOTES:

- Main Output 1, voltage may be any of the listed single outputs, observing maximum power output.
- All outputs are isolated from the others, outputs 2 & 3 have a common return.
- † Signifies use of a 40 mm heatsink extending the TE width, all others use 25 mm heatsink.
- \* User specified at time of order. Contact sales office for part number.

<b>Output Voltage &amp; Current Ratings - Single Output Models</b>									
Output Power		600 Watts		800 Watts		850 Watts		1200 Watts	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
5 V	(4.5 – 5.5 Adj)	C1590†	80 A	C2690	100 A	C3590†	110 A	C1690	160 A
9 V	(8 – 10 Adj)	C1591	50 A	C2691	75 A	C3591	65 A	C1691	95 A
12 V	(11 – 13 Adj)	C1592	42 A	C2692	60 A	C3592	56 A	C1692	82 A
15 V	(14 – 16 Adj)	C1593	34 A	C2693	50 A	C3593	45 A	C1693	67 A
24 V	(23 – 26 Adj)	C1594	23 A	C2694	30 A	C3594	30 A	C1694	46 A
28 V	(26 – 30 Adj)	C1595	20 A	C2695	27 A	C3595	27 A	C1695	40 A
48 V	(45 – 55 Adj)	C1599	11 A	C2699	15 A	C3599	14 A	C1699	20 A
60 V	(58 – 68 Adj)	C1596	9 A	C2696	12 A	C3596	12 A	C1696	17 A
110 V	(100 – 130 Adj)	C1597	4.5 A	C2697	6.5 A	C3597	6.5 A	C1697	9 A
220 V	(200 – 250 Adj)	C1598	2.4 A	C2698	3.2 A	C3598	3.5 A	C1698	5 A
	90–200 V*	C1597J	3.1 A	-	-	C3597J	4 A	C1697J	6 A
	380–400 V*	C1598J	1.5 A	-	-	C3598J	2 A	C1698J	3 A
Size		6U x 21(24)†TE x 160 mm		3U x 42TE x 220 mm		6U x 21(24)†TE x 220 mm		6U x 42TE x 160 mm	

<b>Output Voltage &amp; Current Ratings - Single Output Models</b>											
Output Power		1250 Watts		1700 Watts		2500 Watts		2500 Watts		Up to 6 K Watts <sup>(1,4)</sup>	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
5 V	(4.5 – 5.5 Adj)	C3790	150 A	C3690	200 A	-	-	C4790 <sup>(2)</sup>	180 A	C5680	400 A
9 V	(8 – 10 Adj)	C3791	100 A	C3691	130 A	-	-	C4792 <sup>(2)</sup>	150 A	C5681	400 A
12 V	(11 – 13 Adj)	C3792	85 A	C3692	115 A	C3892	160 A	C4793 <sup>(2)</sup>	130 A	C5682	400 A
15 V	(14 – 16 Adj)	C3793	70 A	C3693	90 A	C3893	130 A	C4794 <sup>(2)</sup>	110 A	C5683	375 A
24 V	(23 – 26 Adj)	C3794	50 A	C3694	65 A	C3894	100 A	C4795	80 A	C5684	230 A
28 V	(26 – 30 Adj)	C3795	42 A	C3695	55 A	C3895	85 A	C4795	70 A	C5685	200 A
48 V	(45 – 55 Adj)	C3799	23 A	C3699	30 A	C3899	45 A	C4799	40 A	C5689	110 A
60 V	(58 – 68 Adj)	C3796	18 A	C3696	25 A	C3896	36 A	C4796	30 A	C5686	88 A
110 V	(100 – 130 Adj)	C3797	10 A	C3697	14 A	C3897	20 A	C4797	20 A	C5687	46 A
220 V	(200 – 250 Adj)	C3798	5 A	C3698	7 A	C3898	10 A	C4798	10 A	C5688	24 A
	190–200 V*	C3797J	6 A	C3697J	8.5 A	C3897J	12 A	C4797J	10 A	C5687J	30 A
	380–400 V*	C3798J	3 A	C3698J	4.3 A	C3898J	6 A	C4798J	5 A	C5688J	15 A
Size		6U x 28TE x 220 mm		6U x 42TE x 220 mm		6U x 56TE x 220 mm		6U x 28TE x 360 mm		6/9U x 19" x 360/460 mm <sup>(3)</sup>	

**NOTES:**

- 185-264 V AC input only, for 98-138 V AC models part no. becomes CXX6X - consult sales office for details.
  - External fan recommended.
  - Dependant on output voltage - Consult Sales Office.
  - Temperature controlled fans fitted.
- \* Note these J versions provide the required input voltage for I series inverters.

<b>Output Voltage &amp; Current Ratings - Single Output Models</b>											
Output Power		Up to 8 k Watts <sup>(4)</sup>		Up to 12 k Watts <sup>(4)</sup>		850 Watts <sup>(1)(2)</sup>		1250 Watts <sup>(1)(2)</sup>		1700 Watts <sup>(1)(2)</sup>	
		Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
5 V	4.5 – 5.5 Adj)	-	-	-	-	C3580V <sup>(3)</sup>	100 A	C3780V <sup>(3)</sup>	150 A	C3680V <sup>(3)</sup>	200 A
9 V	(8 – 10 Adj)	-	-	-	-	C3581V	65 A	C3781V	100 A	C3681V	130 A
12 V	(11 – 13 Adj)	-	-	-	-	C3582V	56 A	C3782V	85 A	C3682V	115 A
15 V	(14 – 16 Adj)	C5783	400 A	-	-	C3583V	45 A	C3783V	70 A	C3683V	90 A
24 V	(23 – 26 Adj)	C5784	310 A	C5884	400 A	C3584V	30 A	C3784V	50 A	C3684V	65 A
28 V	(26 – 30 Adj)	C5785	270 A	C5885	400 A	C3585V	27 A	C3785V	42 A	C3685V	55 A
48 V	(45 – 55 Adj)	C5789	145 A	C5889	220 A	C3589V	14 A	C3789V	23 A	C3689V	30 A
60 V	(58 – 68 Adj)	C5786	120 A	C5886	180 A	C3586V	12 A	C3786V	18 A	C3686V	25 A
110 V	(100 – 130 Adj)	C5787	62 A	C5887	92 A	C3587V	6.5 A	C3787V	10 A	C3687V	14 A
220 V	(200 – 250 Adj)	C5788	32 A	C5888	48 A	C3588V	3.5 A	C3788V	5 A	C3688V	7 A
	190–200 V*	C5787J	42 A	C5887J	60 A	C3587VJ	4 A	C3787VJ	6 A	C3687VJ	8.5 A
	380–400 V*	C5788J	21 A	C5888J	30 A	C3588VJ	2 A	C3788VJ	3 A	C3688VJ	4.3 A
Size		6/9U x 19" x 360/460 mm <sup>(3)</sup> with temp. controlled fan		6/9U x 19" x 360/460 mm <sup>(3)</sup> with temp. controlled fan		6U x 21TE x 220 mm		6U x 28TE x 220 mm		6U x 19" x 360 mm	

**NOTES:**

- For 200 V 3 phase input (160-230 V AC) models, part no. becomes CXX6XV - consult sales office for details.
  - For 480 V 3 phase input (400-530 V AC) models, part no. becomes CXX9XV - consult sales office for details.
  - External fan recommended
  - 185-264 V AC input only, for 93-138 V AC models part no. becomes CXX6X - consult sales office for details.
  - Dependant on output voltage - Consult Sales Office
- \* These J versions provide the required input voltage for I Series inverters.

<b>Output Voltage &amp; Current Ratings - Single Output Models</b>										
DC Output Voltage	2500 Watts		2500 Watts		Up to 6 k Watts		Up to 8 k Watts		Up to 12 k Watts	
	3PH 400 V (320-460)		3PH 400 V (320-460)		3PH 400 V (320-460)		3PH 400 V (320-460)		3PH 400 V (320-460)	
	Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating	Model	Max Rating
5 V (4.5 – 5.5 Adj)	-	-	C4780V <sup>(3)</sup>	180 A	C5680V	400 A	-	-	-	-
9 V (8 – 10 Adj)	-	-	C4781V	150 A	C5681V	400 A	-	-	-	-
12 V (11 – 13 Adj)	C3882V	160 A	C4782V	130 A	C5682V	400 A	-	-	-	-
15 V (14 – 16 Adj)	C3883V	130 A	C4783V	110 A	C5683V	375 A	C5783V	400 A	-	-
24 V (23 – 26 Adj)	C3884V	100 A	C4784V	80 A	C5684V	230 A	C5784V	310 A	C5884V	400 A
28 V (26 – 30 Adj)	C3885V	85 A	C4785V	70 A	C5685V	200 A	C5785V	270 A	C5885V	400 A
48 V (45 – 55 Adj)	C3889V	45 A	C4789V	40 A	C5689V	110 A	C5789V	145 A	C5889V	220 A
60 V (58 – 68 Adj)	C3886V	36 A	C4786V	30 A	C5686V	88 A	C5786V	120 A	C5886V	180 A
110 V (100 – 130 Adj)	C3887V	20 A	C4787V	20 A	C5687V	46 A	C5787V	62 A	C5887V	92 A
220 V (200 – 250 Adj)	C3888V	10 A	C4788V	10 A	C5688V	24 A	C35788V	32 A	C5888V	48 A
190-200 V*	C3897J	12 A	C4787J	10 A	C5687VJ	4 A	C5787VJ	42 A	C5887VJ	62 A
380-400 V*	C3898J	6 A	C4788J	5 A	C5688VJ	2 A	C5788VJ	21 A	C5888VJ	31 A
Size	6U x 58TE x 220 mm		6U x 28TE x 300 mm		6/9U x 19" x 360/460 mm <sup>(5)</sup> with temp. controlled fan		6/9U x 19" x 360/460 mm <sup>(5)</sup> with temp. controlled fan		6/9U x 19" x 360/460 mm <sup>(5)</sup> with temp. controlled fan	

## NOTES:

- For 200 V 3 phase input (160-230 V AC) models, part no. becomes CXX6XV - consult sales office for details.
  - For 480 V 3 phase input (400-530 V AC) models, part no. becomes CXX9XV - consult sales office for details.
  - External fan recommended
  - 185-264 V AC input only, for 93-138 V AC models part no. becomes CXX6X - consult sales office for details.
  - For actual size contact sales office (dependant on output voltage).
- \* These J versions provide the required input voltage for I Series inverters.

<b>Output Voltage &amp; Current Ratings - PFC Modules</b>					
Input Voltage Range	Nominal Input Voltage	Output Voltage	Output	Output	Model Number
93-264 V AC	115 / 230 V AC	380 V DC	0.50 kW	1.4 A	P590
			0.80 kW	2.2 A	P2590
			1.00 kW	2.8 A	P1590
			1.50 kW	4.1 A	P3590
			2.00 kW	5.5 A	P3790
			2.50 kW	6.9 A	P4790
			3.00 kW	8.3 A	P4790F <sup>(1)</sup>
185-264 V AC	230 V AC	380 V DC	0.75 kW	2.1 A	P580
			1.20 kW	3.3 A	P2580
			1.50 kW	4.1 A	P1580
			2.00 kW	5.5 A	P3580
			2.50 kW	6.9 A	P3780
			3.00 kW	8.3 A	P4780
			4.00 kW	11.0 A	P4780F <sup>(1)</sup>

## NOTES:

- External temperature controlled fan fitted.

**Power Factor Correction Modules**

The input current of a rectifier connection with capacitors behind the rectifier circuit consists of very high current pulses during the short periods when the capacitor is charged with every cycle. A choke in the circuit reduces the distortion of the current substantially, but is quite large and heavy, especially for single-phase input. Therefore, an electronic circuit for "power factor correction" (PFC) is used, controlled in switchmode operation in such a way that the input current is nearly sinusoidal. However, such a circuit increases substantially the cost of the system. Alternatives are

- tolerating the distortion of the current or
- providing a choke

The second solution is an acceptable alternative for three-phase input systems as the choke is reasonable in size and the harmonics of the input current increase the rms-value by 5-10% only, whereas a switchmode three-phase PFC circuit would be very complex and expensive. For single phase circuits the choke is quite large and the selected solution is a compromise between cost, size and required performance.

For maximum flexibility PFC-circuits of series P are individual modules that are to be connected in front of the converters or inverters which are available with input voltage ranges that match the output of the PFC-module. Besides, separating the PFC from the converter or inverter gives the possibility to supply several modules or other load circuits through one PFC module as shown below.

