SCHAEFER

Series CH / CP / BP 200

Power Supplies | Converters | Inverters | Rectifiers | Chargers | Systems

Schaefer – the Power to make it happen.

SCHAEFER

workforce

Schäfer Elektronik, founded in 1969, has grown to a dedicated workforce of 140 people in Germany, Ireland, and the USA.

experience

Thanks to decades of experience in design and manufacturing of power supplies, Schaefer offers a large variety of products, options, and enhancement features. In the field of high power requirements, Schaefer has achieved and continues to command a leading position.

customer orientation

Requirements are analyzed by a group of experts in dialog with the customer resulting in an individual concept.

flexibility

With the production located next to the development department an optimal interaction can be accomplished during all stages of a project. Hence the customer gets tailor-made solutions for large or small quantity requirements.

reliability

Schaefer power supplies are often used for applications which demand a high level of reliability under severe environmental conditions, e. g.

- Railroad industry
- Automotive industry
- Telecommunication
- Power generation plants
- Chemical plants and oil refinery
- Factory automation
- Military industry

3 YEARS SCHAEFER WARRANTY

quality

Development guidelines, arduous selection of industrial components regarding their load criteria and temperature performance as well as many test procedures during all steps of production ensure the highest product quality. In addition, Schaefer pursues a full supplier management according to ISO 9001 which guarantees permanent improvement of the products especially within the turbulent market of electronic components.

contact

Through headquarters in Germany, the USA office, and an international network of representatives prompt technical support is provided worldwide.

TÜV MANAGEMENT SERVICE ISO 9001

NEW Series CH / CP / BP 200

Features

- DC input: 18 - 320 V
- AC input: 100 - 240 V, wide range with PFC, 47 - 65 Hz
- DC output: 5 / ... / 250 V
- Continuous short circuit protection
- Overvoltage protection
- Thermal shutdown with auto restart
- EMI acc. to EN 55022, class B
- Industrial grade components
- High power density
- Efficiency up to 91%

DC / DC Converters

► 150 W

Input VDC						Output VDC	
18–36 VDC	36–75 VDC	45–90 VDC	80–160 VDC	160–320 VDC	Output Amps	Adj.	Range
CH 220	CH 230	CH 240	CH 250	CH 270	20	5	4.5– 5.5
CH 221	CH 231	CH 241	CH 251	CH 271	15	9	8– 10
CH 222	CH 232	CH 242	CH 252	CH 272	12	12	11– 13
CH 223	CH 233	CH 243	CH 253	CH 273	10	15	14– 16
CH 224	CH 234	CH 244	CH 254	CH 274	6	24	23– 26
CH 225	CH 235	CH 245	CH 255	CH 275	5	28	26– 30
CH 229	CH 239	CH 249	CH 259	CH 279	3	48	45– 55
CH 226	CH 236	CH 246	CH 256	CH 276	2.3	60	58– 68
CH 227	CH 237	CH 247	CH 257	CH 277	1.2	110	100– 130
CH 228	CH 238	CH 248	CH 258	CH 278	0.6	220	200– 250

AC / DC Power Supplies with PFC

► 150 W

Input VAC, 1-Phase		Output VDC	
100–240 V ±10 %	Output Amps	Adj.	Range
CP 290	20	5	4.5– 5.5
CP 291	15	9	8– 10
CP 292	12	12	11– 13
CP 293	10	15	14– 16
CP 294	6	24	23– 26
CP 295	5	28	26– 30
CP 299	3	48	45– 55
CP 296	2.3	60	58– 68
CP 297	1.2	110	100– 130
CP 298	0.6	220	200– 250

Battery Chargers with PFC

► 150 W

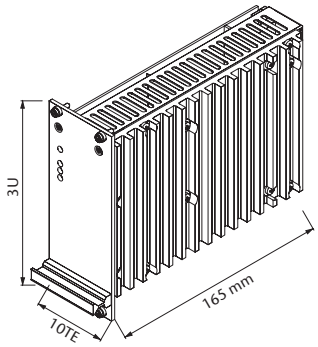
Input VAC, 1-Phase		Output VDC	
100–240 V ±10 %	Output Amps	Nom. Battery Voltage	Range
BP 291	10	12	12– 16
BP 292	5	24	24– 32
BP 294	2.6	48	48– 64
BP 296	2	60	60– 80
BP 297	1.1	110	110– 145
BP 298	0.55	220	220– 290

Assistance in table use:

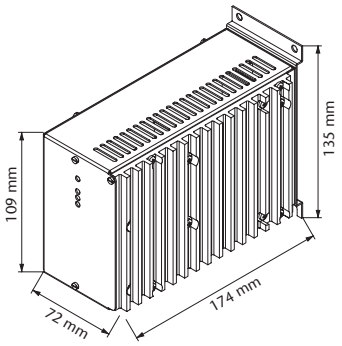
1 Select the column for input voltage range.
2 Select the row for the appropriate output voltage.
3 The intersection of both results in the module required.

For example:

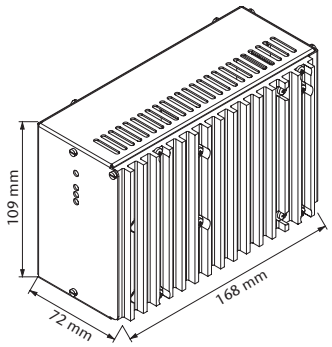
1 input voltage = 230 VAC
2 output voltage = 15 VDC @ 10 A
3 results in a CP 293 module.



Eurocassette / approx. 0.7 kg
(pluggable module for 19" sub-rack)



Chassis mount / approx. 1.05 kg



DIN rail mount / approx. 1.0 kg

Specifications

Input

Voltage range	see table, unit switches off at under- and overvoltage
Protection	by internal fuse
No-load input power	6 W typical
Switch-on time	250 ms typical
Inrush current	limited by thermistor
Hold-up time	AC input: 10 ms typical
Power factor correction	for CP and BP series acc. to EN 61000-3-2, class D
Immunity	
- ESD	acc. to DIN / EN 61000-4-2 level 3
- Fast transients	acc. to DIN / EN 61000-4-4 level 3
- Surges	acc. to DIN / EN 61000-4-5 level 3

Output

Line regulation (±10 %)	0.1 %
Load regulation (10 - 90 %)	0.2 %
Load transient (10-90-10 %)	6 % typical
Response time to ±1 %	1 ms typical
Turn-on rise time	Soft-start, 100 ms typical
Ripple	≤ 1 % +30 mV_{p-p}
Overload protection	current limited to 105 % of I_{nom}
Overvoltage protection	OVP switches off module with automatic return to operation
Remote sense	standard for CH and CP series, up to 10 % of U_{nom} for output < 40 VDC, up to 4 V for output > 40 VDC
Parallel operation	with active current sharing
Charger control	acc. to IU characteristic

General

Efficiency	80 - 91 %
Operating temperature	-20 to +75 °C
Load derating	2.5% / °C from +55 °C
Storage temperature	-40 to +85 °C
Humidity	up to 95 % RH, non-condensing
Cooling	natural convection
Temperature coefficient	0.02 % / °C typical
Safety / Construction	acc. to DIN / EN 60950-1: 2003
Protection category	IP 20, others or NEMA upon request
EMI	acc. to EN 55022, class B
MTBF	approx. 140,000 h @ 40 °C acc. to MIL-HDBK-217 E (notice 1)
Connector for eurocassette - std. design	H15 (details see page 103)
Marking	CE

Options (details see page 90 – 92)

Input
- Reverse polarity protection for DC input

Output
- Redundant operation

Signals
- DC ok (output) via open collector or relay contacts

Charger Programming
- Temperature compensated charging voltage

Mechanics / environment:
- 19" sub-rack for eurocassette, refer to page 93
- Chassis mount
- DIN rail mount
- Increased mechanical strength
- Tropical protection
- Extended temperature range to –40 °C

Input

i	**inrush current limiting**
	A thermistor is connected in series with the input lines which changes its resistance from high to low when it gets hot. It does not reduce the surge current if the input power is interrupted for a short period of time not allowing the thermistor to cool down. Thermistors are fitted as standard to all mains input models except for 1-phase input of models > 2.5 kW. Thermistors are available up to 45A. For higher input current an electronic inrush current limitation can be offered.
ie	**electronic inrush current limiting**
	An electronic circuit limits the inrush current.
sd	**series diode**
	A series diode protects the module against DC input voltage of wrong polarity. Additional power losses are to be taken into account.
ad	**anti parallel diode**
	To avoid the power losses a diode is provided with opposite polarity in parallel to the input blowing an internal or external fuse if the module is connected to a supply of wrong polarity.
au	**auto-ranging**
	For standard dual AC input models the range of 115 / 230 V AC is to be selected by connecting the input line to different pins on the connector. With auto-ranging the unit senses the input voltage and provides automatically the correct connection.
p	**power fail**
	A logic signal is given if the input voltage (AC or DC) drops below the specified limit. In AC input models the rectified input voltage is sensed so that a power fail alarm can be avoided if at light load mains power returns before the input capacitors are substantially discharged.
r	**relay**
	A relay instead of a logic signal is provided for failure indication.

Output

dd	**decoupling diode**
	For redundant operation the outputs of two or more units are paralleled behind decoupling diodes so that an internal fault of one module does not affect the operation of the others. These diodes cause power losses.
cs	**active current sharing**
	An additional control circuit provides active current sharing via an interconnecting wire between converters that operate in parallel.
csi	**current sharing interrupt**
	csi will effect the removal of the cs signal. Should there be an instance where a unit is not supplying the load, then the effect of its cs signal is removed, and the load voltage is unaffected by this condition (details see page 101).
h1	**inhibit, signal referred to input**
	A terminal connected to the negative input line shuts off the converter. It can also be used in conjunction with a thermal trip which shuts off the unit.
h2	**inhibit, signal referred to output**
	Operation of the unit is inhibited if a voltage signal (5V / 10mA) is applied in reference to the negative line of the (main) output.
rco	**reducing current limiting at over temperature**
	A circuit reduces the current limiting level at higher temperature (to be specified).
d	**DC ok, one output**
	A logic signal is given if the output voltage is below the specified limit.
m	**DC ok, all outputs**
	In multi-output systems a logic signal is provided if the voltage of any output is below the specified limit.
ac	**AC ok**
	A logic signal connected to relay contacts is given if the output voltage of an inverter is below the specified limit.
y	**sys-reset**
	This logic signal is a combination of power fail and DC ok as specified for VME systems.
r	**relay**
	A relay instead of a logic signal is provided for failure indication.

► **Configuration of model designation:**
Add the designation of options to the model number, e.g. **C 3674-d-r-h1-eu1.**

► **Please note:** The number of options per module may be restricted due to limitation of space inside the module or due to a limited number of connector pins. Potentiometer or interface card may be supplied separately for installation outside of module.

Programming & Monitoring

Programming series 200 – 5800, 6600		
of output voltage from 0 to 100 %	by external signal, 0 – 10 V	eu1
	by external signal, 4 – 20 mA	eu2
	by 270° potentiometer	eu3
	by 10 turn potentiometer	eu4
of output current from 0 to 100 %	by external signal, 0 – 10 V	ei1
	by external signal, 4 – 20 mA	ei2
	by 270° potentiometer	ei3
	by 10 turn potentiometer	ei4
isolating amplifier for programming		iso
programming via interface RS 232 or IEEE 488		

Monitoring series 200 – 5800, 6600		
of output voltage from 0 to 100 %	by external signal, 0 – 10 V	mu1
	by external signal, 4 – 20 mA	mu2
of output current from 0 to 100 %	by external signal, 0 – 10 V	mi1
	by external signal, 4 – 20 mA	mi2
isolating amplifier for monitoring		iso
monitoring via interface RS 232 or IEEE 488		

Charger programming (all series)		
temperature compensated charging voltage (sensor not included)		tc
temperature sensor	not interchangeable due to fixed resistor values	ts1
	interchangeable, IC controlled	ts2
automatic selection of charging characteristic (float / equalize charge) with timer		ch1
additionally: Manual selection of charging characteristic		ch2
additionally: Boost charge operation (manually activated with time delayed return to normal operation)		ch3

Programming / Monitoring – series 6400		
programming of output voltage and current from 0 to 100% including isolation	by external signal, 0 – 10 V	e1
	by external signal, 4 – 20 mA	e2
programming of output voltage from 0 to 100 %	by 270° potentiometer	eu3
	by 10 turn potentiometer	eu4
programming of output current from 0 to 100 %	by 270° potentiometer	ei3
	by 10 turn potentiometer	ei4
monitoring of output voltage and current from 0 to 100 % including isolation	by external signal, 0 – 10 V	m1
	by external signal, 4 – 20 mA	m2
remote on/off, programming and monitoring of output voltage and current from 0 to 100 % including isolation	by external signal, 0 – 10 V	em1
	by external signal, 4 – 20 mA	em2
	via interface RS 232 and IEEE 488	em3
improved tolerance	between reference (external signal) and measured value / between measured value and displayed signal: voltage 0.2 % and current 0.5 %	tol

Environment

t	**tropical protection**
	The unit is given additional protection by a heavy coat of varnish on the printed circuit board(s) and on components.
c	**extended temperature range**
	The circuit is designed and tested for operation at an ambient temperature as low as –40°C.
ms	**increased mechanical strength**
	Screws are secured by Loctite and heavy components are fastened by ties and / or glue. Modules with the „ms“ option meet the standard EN 61373 regarding shock and vibration.

Mechanics

w	**wall mount**
	Modules, which have the wall mount option, are typically fixed to a structure or within a cabinet. Depending on the size of the module, this may be done with a flat or angled plate (see photo). The load connections are typically a terminal block. Should the application not require a pluggable module / rack solution, wall mounting presents an alternative for the customer to choose from.

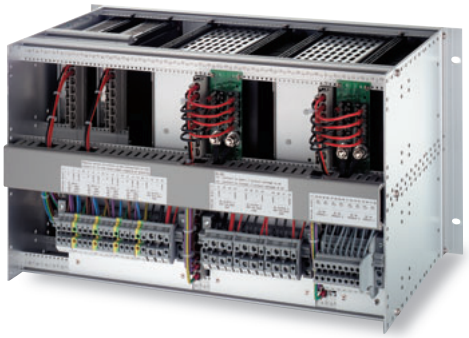
cha	**chassis mount**
	Module is designed for installation to a structure or within a cabinet. Screw type mating connectors are supplied with the module. Due to the limited number of connector pins this option is not available for modules with dual AC input or for multi-output converters with output 4 supplying more than 10 A.

din	**DIN rail mount**
	Module is designed for DIN rail mounting to a structure or within a cabinet. Screw type mating connectors are supplied with the module. Due to the limited number of connector pins this option is not available for modules with dual AC input or for multi-output converters with output 4 supplying more than 10 A.

► **Configuration of model designation:**
Add the designation of options to the model number, e.g. **C 4758-p-r-t-w.**

► **Please note:** The number of options per module may be restricted due to limitation of space inside the module or due to a limited number of connector pins.

19" Sub-Racks



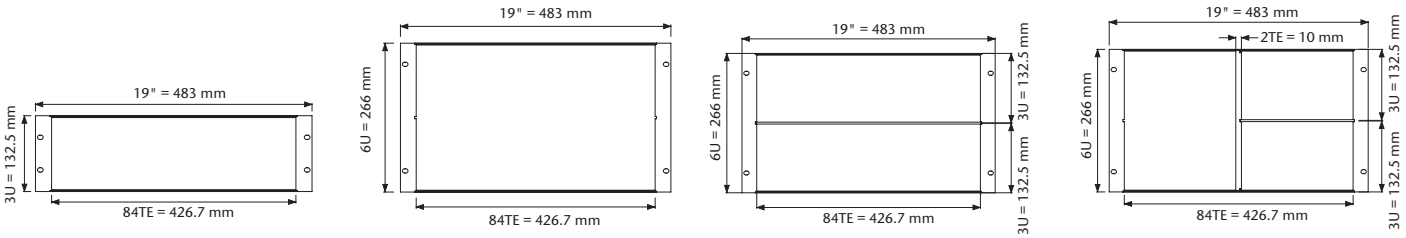
As standard, all of the modules are designed and manufactured for insertion into 19" sub-racks. Higher power modules are already constructed in 19" format.

19" sub-racks can be configured as 3U or 6U allowing any mix of units and can be upgraded in accordance to the customers' requirements, e.g.

- mating connectors wired to a terminal block
- fuses or circuit breakers
- hot swappable configuration upon request
- analog or digital meters
- switches
- fans
- filters
- decoupling diodes
- provisions for keying the modules to ensure module / slot designation

Alternatively, the racks can be provided in 23" format.

Constructions of 19" Sub-Racks



Enclosures

wall-mounted enclosure designation	weight (empty) [kg]	height	width	depth
		dimensions [mm]		
R2	9	300	380	210
R3	12	380		
R4	17		600	
R4+	26	600		
R4T	22	380		350
R5	31	600		
R5+	38	760		

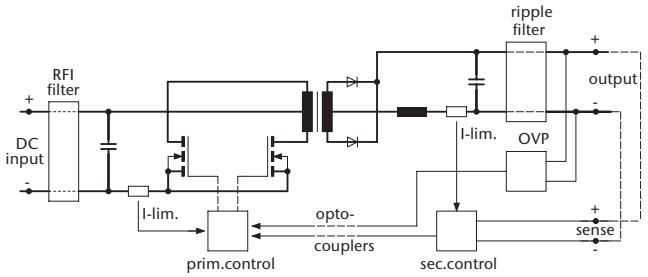
floor-mounted enclosure designation	weight (empty) [kg]	height*	width	depth
		dimensions [mm]		
R6	66	1200	600	400
R6+	80		800	
R7	127	1800	600	
R7+	150		800	
R8	147	2000	600	500
R8+	175		800	
R9	250		1200	600

*) The height of the base frame, elevated roof and suspension eyes is to be added, if needed.

There are various circuit topologies and the selection depends on the requirements, such as low or high input voltage, low or high output voltage, single or multi output, power rating. The following circuits present our common concepts of power conversion.

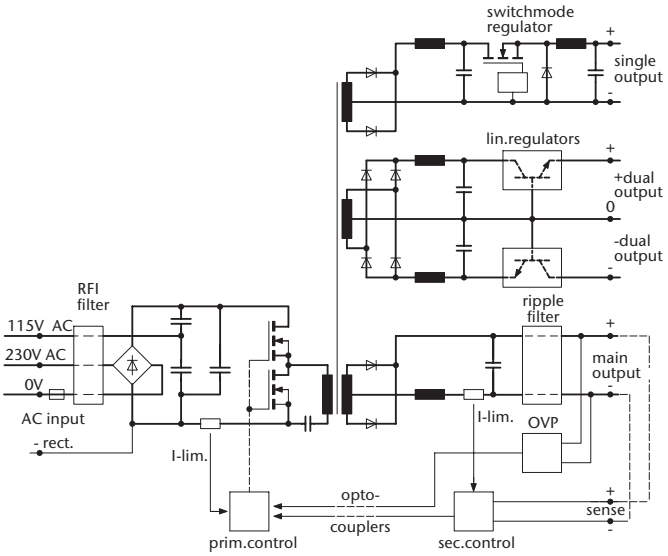
Push Pull Converter

The push pull converter is often used for applications with low input voltage. The switching transistors are alternately conducting with variable pulse-width. At the secondary side, after rectification and filtering, the output voltage is sensed and compared with a reference. The error signal controls via an opto-coupler the primary circuit.



Half Bridge Converter

The following circuit shows, as an example, a converter with dual AC input in a half bridge connection. With the input voltage supplied to the 230 V terminal, the rectifier circuit is a standard bridge connection; supplied to the 115 V terminal the rectifier circuit functions as a voltage doubler circuit. At the secondary side a multi-output system is shown with a switch mode regulator for the single output and linear regulators for the dual outputs. As the voltages induced in the secondary transformer windings track with the voltage of the main output quite inaccurately, additional regulators are normally used for the other outputs. A switch mode regulator is used for higher current as it has lower power losses than a linear regulator.



Inrush current

When the module is connected to the input power, the primary capacitors will be charged by a high current pulse. The magnitude of this pulse depends mainly on the input supply system.
With a thermistor (temperature dependent resistor) in series with the input, this current pulse can be reduced, as the thermistor has a relatively high value of resistance as long as it is cold. This resistance becomes very low as the thermistor heats up. If the input power is interrupted for a short period of time not allowing the thermistor to cool down, and the primary capacitors are discharged, the current limitation function of the thermistor will not be effective. The thermistor is standard on mains input models up to 45 Amps input current. For higher input current there are two further alternatives available: Schaefer PFC or an electronic current limitation.

Power Factor Correction (PFC)

Power supplies draw line current in pulses from the input supply. Should it be required, a PFC will integrate these pulses to be both, effectively sinusoidal in shape, and in phase with the AC input supply. The result of this integration, be it active or passive, is the reduction of the harmonic distortion and allows a more effective loading of the input source.

Spike suppression

High input voltage spikes generated in the supply system that could disturb operation of the unit or cause damage will be absorbed by a varistor across the input lines.

Input under and over voltage turn off

The input voltage range of the unit is defined as the voltage limits at which it will operate. Should the input be reduced to a specific voltage, the unit will turn off by switching off the power circuit. The same applies to an increase in the input voltage. Once a preset value is reached then the power circuit will be switched off. It must be considered that the switching off of the power circuit does not mean a removal of the input circuit from the power supply.

Thermal shutdown with auto restart

The higher power Schaefer modules are fitted with a thermal shutdown. In the event of a temperature rise above a preset value, the unit will turn off. This safety feature will then remain active until the point of temperature measurement has reduced significantly. The time duration for this to be reached is dependent upon the environment and level of cooling.

Temperature derated load

It is the responsibility of the client to reduce the loading of the Schaefer product with respect to the temperature (derated load: 2.5 % / °C from +55 °C operating temperature). The maximum operating temperature of +75 °C must lead to the unit being switched off.

Efficiency

The optimum efficiency is obtained through a high input voltage measured against a high output voltage at maximum power rating.

Soft start

The application of the input power permits the unit to generate a secondary output. The switching on of the primary power circuit is controlled and gradually increased to allow a controlled charging of the secondary capacitors. The time duration for the secondary capacitors to be charged is defined as the soft start.

No load operation

Single output converters require no minimum load for operation within tolerance.
Multi output converters require the main output be loaded. Semi-regulated auxiliary outputs may also require a minimum load to be applied.

Short circuit protection

The main output of a converter will be immune against a momentary or continuous short circuit.
The secondary current limitation will not permit the sustained output current to be higher than the calibrated setting, and it will actively reduce the output voltage in accordance to the overload.
The removal of the overload / short circuit will result in the output voltage being increased to the calibrated value.
Regulated auxiliary outputs will also reduce the output voltage / current in accordance to their overloading. The characteristic may vary according to the circuit employed.

Over voltage protection (OVP)

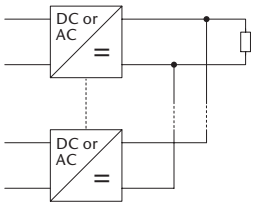
The main output voltage is measured, either internally or through sense leads. This measured value is compared against a calibrated value. When the calibrated value has been reached, this circuit turns off the primary power circuit. Once the measured value has reduced below the calibrated value, the primary power circuit is permitted, once again, to be activated.
The high power units have an additional feature, which will shut down the primary power circuit after a continued OVP operation. For removing this shut down, the unit must be reset.

Sense leads

Through the use of sense leads, an output voltage may be regulated to a point outside of the unit. The sense leads should be connected to the power connection at the point of load under regard of polarity. There should be a non-interruptible connection between sense and load points. Interruption may lead to damage or the activation of the OVP circuit. The units, which have sense leads, have the ability to regulate to a higher voltage at the output connection. This increase is largely dependent upon the unit. The details may be found in the respective unit specification.
Parallel operation with sense leads allows a common point for the units to regulate their voltages to. Units whose output voltage has been calibrated to be near identical will now be able to supply a common load.
De-coupled outputs will be sensed both, before and after the decoupling diodes, which in turn will lead to an output voltage regulation, specific to load and unit. Sense leads are typically employed with a decoupled output voltage of less than 40 VDC.
The current sharing option will effectively override the sense lead output voltage setting, but the point at which the output voltage is regulated, will be the point of sense lead connection.

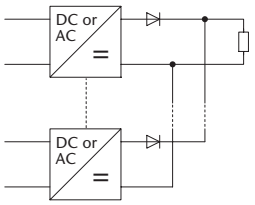
► P arallel operation

Single output modules of the same voltage / power rating can operate in parallel under specific conditions. The output voltage can be carefully adjusted to be near identical. When there is sufficient loading on the combined output, all units will be active and supply the load. The load demand must be significant enough for the multiple units to deliver output current.



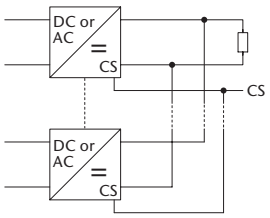
► Redundant operation

The inclusion of the option “dd” (decoupling diode) on the output of the units will permit parallel operation, where the inability to provide output from one unit will not have a negative effect on the load provision. The decoupling diode will also result in a load regulation value, which, as a percentage of the output voltage, will be unit / output dependent. In terms of calibration the same criteria follow as for parallel operation.



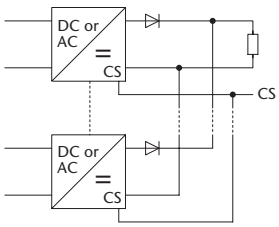
► Balanced current operation

The inclusion of the option “cs” (current sharing) allows for parallel operation with a significant degree of current balancing. The communication between the units allows for a voltage setting correction, which in turn shall equate to an automatic current sharing (balancing) on the outputs. The tolerance of such balancing is module dependent. In terms of calibration the same criteria follow as for parallel operation.



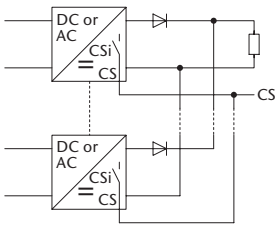
► Redundant balanced operation

The inclusion of both, the “cs” and “dd” option results in an optimized balanced current provision while being de-coupled from each other. A connected module, who is not supplying an output voltage, will influence the load voltage. The voltage may be reduced by up to 7 %. In terms of calibration the same criteria follow as for parallel operation.



► Fault tolerant operation

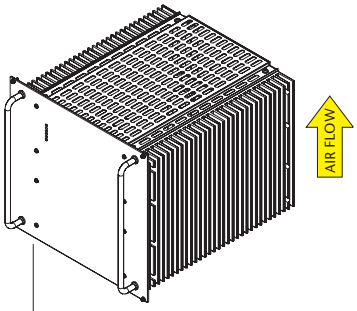
The inclusion of “csi” (current sharing interrupt), “cs” and “dd” is the optimum set up for a fault tolerant application. “csi” will effect the removal of the “cs” signal from the load voltage common connection. Should there be an instance where a unit is not supplying the load, then the effect of its current sharing signal is removed, and the load voltage is unaffected by this condition. In terms of calibration the same criteria follow as for parallel operation.



Mounting

Air flow

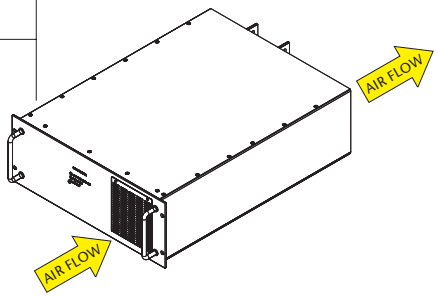
- The air to the module / system should be cool, unhindered, unsaturated, as well as free of chemicals, impurities and particles.
- The external air supply should be directed to all modules.
- Air having passed through one unit should not be used to pass through the next. Where possible, the airflow should be directed elsewhere.



Direction of air flow

Typically, Schaefer Modules and systems are cooled through air supply entering below and exiting above, with the exception of models of series C/B 5100, 5200, 5300, 5400 and 6400 whose airflow is from front to back.

Custom design also offers lateral cooling. Such details are however, project specific.



Cabinet

To enhance a module / system, a cabinet may be employed.

- This may be required to fulfil the increased IP / NEMA rating, due to a negative effect of the environment on the solution.
- Specifically, in an unclean, saturated, corrosive or otherwise aggressive air quality it may be required to employ a cabinet in combination with features such as hermetical closure and air exchange amongst others.
- The enclosure must be capable of sustaining the weight of the modules, specifically if module support rails are used.
- Stationary cabinets should be fastened to the ground.
- The centre of gravity must be as low as possible with portable systems.

Transportation of module

The grips on the front of the modules are to assist in module insertion into a sub-rack, and not for supporting the weight of the module.

Wall mount / chassis mount

Modules with a mounting plate or angle are designed for integration into the host equipment. They are not for employment outside of an enclosure.

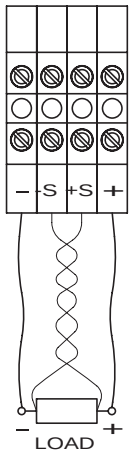
Installation

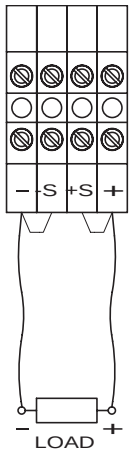
Input fuse

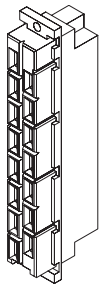
An input fuse, internal or external, should be selected with a slow burn characteristic.

Sense leads

- The length of the load connection from the module / system may result in a voltage drop between the output and the load connection. To compensate for a limited value of such a voltage drop, sense leads can be connected to the load under regard of polarity. The sense leads determine the point at which the voltage is regulated to. As the sense leads carry very low current, they are susceptible to noise pick up. Therefore, it is recommended that they are intertwined and if necessary shielded.
- When the remote sense facility is not used, sense links must be made at the output terminals. If the sense links are left open, the output voltage may rise causing the OVP circuit to be activated.

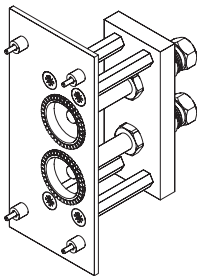






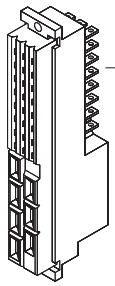
H15 Female Connector

Number of contacts:	15
Contacts:	Fastons or screw terminals
Operating current at +20 °C:	15 A
Operating temperature:	–55 to +125 °C
Test voltage (contact to contact):	3100 V_{rms}
Test voltage (contact to ground):	3100 V_{rms}
Contact resistance:	8 mΩ
Performance according to:	IEC 60603-2 / DIN 41612



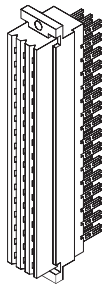
High Current Female Connector

Number of contacts:	2
Contacts:	Bolts with 8 mm diameter for terminal lugs M8
Operating current at +20°C:	170 A
Operating temperature:	–55 to +125 °C
Test voltage (contact to contact):	500 V_{rms}
Test voltage (contact to ground):	2500 V_{rms}
Contact resistance:	0.06 mΩ
Dimensions (H x W x D):	118 x 35 x 85 mm
Performance according to:	IEC 60603-2 / DIN 41612



F24H7 Female Connector

Number of contacts:	24 / 7
Contacts:	solder pins / fastons
Operating current at +20°C:	6 / 15 A
Operating temperature:	–55 to +125 °C
Test voltage (contact to contact):	1550 / 3100 Vrms
Test voltage (contact to ground):	2500 / 3100 Vrms
Contact resistance:	15 / 8 mΩ
Performance according to:	IEC 60603-2 / DIN 41612



F48 Female Connector

Number of contacts:	48
Contacts:	solder pins
Operating current at +20 °C:	6 A
Operating temperature:	–55 to +125 °C
Test voltage (contact to contact):	1550 V_{rms}
Test voltage (contact to ground):	2500 V_{rms}
Contact resistance:	15 mΩ
Performance according to:	IEC 60603-2 / DIN 41612