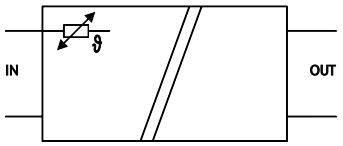
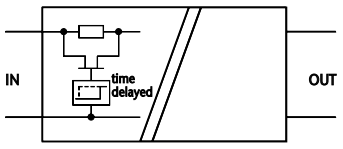
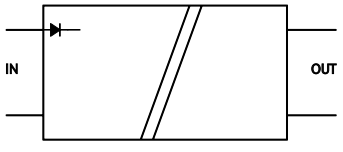
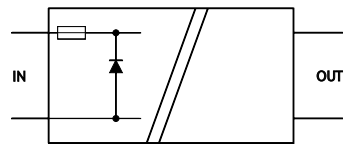
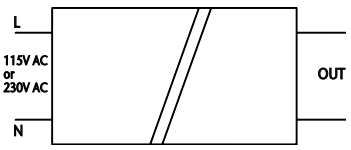
Schaefer offers the industry's most complete range of input and output voltages, combined with a selection of package style, mounting solutions, options for input and output as well as various possibilities of programming & monitoring.

Configuration of model designation:
Add the designation of options to the type number of the power supply module:
e.g. C 3674-**w-dr-eu1**.

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 high inrush current caused by built-in capacitors. Switch-on time may increase to 5s. This is realized by a series pass transistor or depending on the input voltage by thyristor softstart.	
sd	**reverse polarity protection for DC input by series diode**	
	A series diode protects the module against DC input voltage of wrong polarity. However, this also causes extra losses and reduces the overall efficiency. calculation formula: $I_{Diode} = 2 \times P_{out\ max} / U_{in\ min}$	

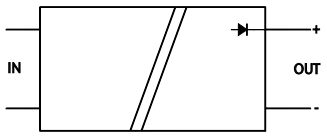
ad	**reverse polarity protection for DC input by anti parallel diode**	
	To avoid the power losses a diode is provided with opposite polarity in parallel to the input blowing an internal or external fuse if the module is connected to a supply of wrong polarity. calculation formula: $I_{Diode} = 2 \times P_{out\ max} / U_{in\ min}$	
au	**auto-ranging**	
	For standard dual AC input models the range of 115/230VAC 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 the correct connection automatically.	

Output

Parallel / redundant operation for DC output *(for details see page 125/126)*

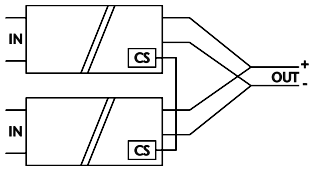
dd **decoupling diode**

A series diode built into the units output allows paralleling of 2 or more units for redundancy or higher power or battery charging. For control purposes the anode of the diode is also available at the output connector. It cannot be loaded ≥ 0.5A. The sense signal is taken partially from the anode and partially from the load/cathode of the decoupling diode. This guarantees starting and operating under all conditions, but it also effects the regulation accuracy of 2%. In this way it gives a load sharing of 15-30% between the paralleled units.



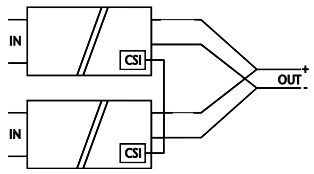
cs **active current sharing**

An additional control circuit provides active current sharing via an interconnecting wire between converters that operate in parallel. The output lines of the converters have to be in “star point” connection.



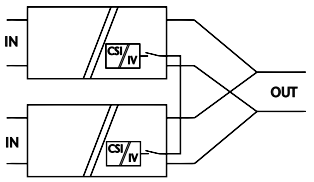
csi **current sharing interrupt (“cs” included)**

“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.



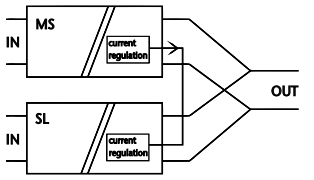
icsi **current sharing interrupt (“csi” included), galvanically isolated**

The inclusion of “csi” (current sharing interrupt) and the galvanic isolation is the optimum set up for systems with high power or high currents, were the voltage drop on the power wiring could influence the cs signal.



ma **master / slave operation (avalaible for series 6xxx)**

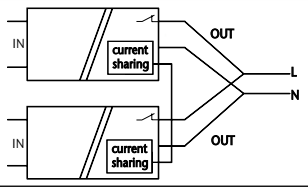
Master / Slave interface permits the parallel function of identical modules to increase the output power capapcity, shared by current control without any dynamic reduction in performance.



Parallel / redundant operation for AC output

red **inverter parallel operation: for series IT5xxx**

For redundant operation or for increased output power, two inverters of the IT5xxx series can be switched together. If one inverter fails, the internal contactor will be switched off and the output power of one inverter is still available.



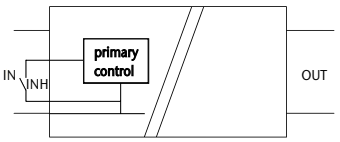
General information

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. Potentiometers or interface cards may be supplied separately for installation outside of the module.

Inhibit

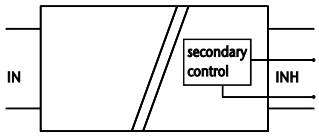
h1 inhibit by external closing contact, signal referred to input

The operation of the unit is inhibited when a voltage signal is applied in reference to the negative line of the input. This can also be used in combination with a thermal trip, which shuts the unit down.



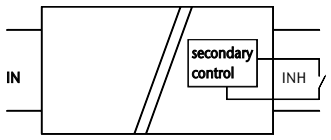
h2 inhibit by voltage signal, signal referred to output

Operation of the unit is inhibited if a voltage signal (5V / 10mA) is applied in reference to the negative line of the output.



h3 inhibit by closing contact, signal referred to output

The operation of the unit is inhibited when a voltage signal is applied in reference to the negative line of the output. This can also be used in combination with a thermal trip, which shuts the unit down.
Please note: For inverters, h3 is the only option.

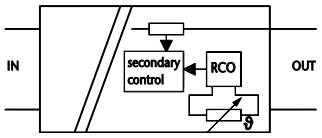


Automatic reduction of current limiting

rco reducing current limiting at increased temperatures

A circuit reduces the current limiting level at higher temperatures (to be specified).

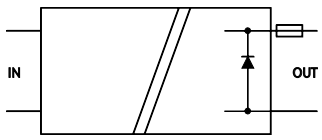
Please note:
Option is avalaible for series 48xx with ZVS topology and for high power converter modules *(see page 49)*.



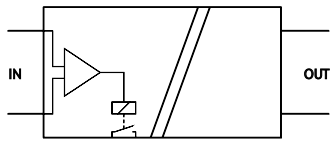
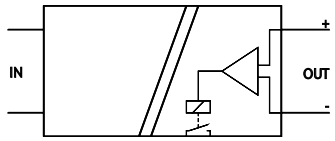
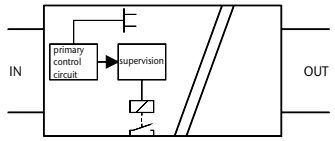
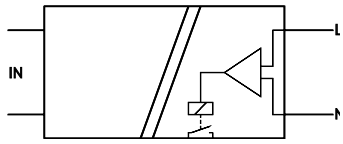
DC output protection

rd reverse polarity protection for DC output

by reverse diode with external fuse



Signals

pr	**input voltage supervision (power ok) incl. relay contacts**	
	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. A relay contact is provided for failure indication.	
dr	**output voltage supervision (DC ok) incl. relay contacts**	
	A logic signal is given if the output voltage is below the specified limit. A relay contact is provided for failure indication. DC ok level: 5V output: 4,75V all other voltages: 90% of adjusted voltage	
cf	**charger / converter fail supervision incl. relay contacts**	
	A logic signal is given if the input voltage, the auxiliary voltage of the primary side and the current of the primary side exceed or go below a specified range. A relay contact is provided for failure indication.	
ac	**AC ok for inverter including relay contacts**	
	A logic signal is given if the output voltage of an inverter is below the specified limit. A relay contact is provided for failure indication.	

General information

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. Potentiometers or interface cards may be supplied separately for installation outside of the module.

Programming

Converter Programming	
	programming of output voltage from 0 to 100 %
eu1	by external signal, 0 – 10V
eu2	by external signal, 4 – 20mA
eu3	by 270° potentiometer
eu4	by 10 turn potentiometer
	programming of output current from 0 to 100 %
ei1	by external signal, 0 – 10V
ei2	by external signal, 4 – 20mA
ei3	by 270° potentiometer
ei4	by 10 turn potentiometer
iso	**isolating amplifier for programming**
	Programming signal is galvanically isolated from any potentials of the power supply.
	programming via
rs	RS232 (external)
can	CAN Bus (external)

Charger Programming	
	temperature features
tc	temperature compensated charging voltage (sensor not included)
ts1	temperature sensor not interchangeable due to fixed resistor values
ts2	temperature sensor interchangeable, IC controlled
	charging characteristics
ch1	External card: automatic and manual selection of charging characteristic (float/ equalized boost charge) with timer (delayed return to normal operation), including aux. supply and options “tc” and “ts1”
ch2	External card: consisting of option “ch1” plus: Battery current limitation & battery shunt
ch3	External card: consisting of option “ch2” plus: CAN-Bus-interface & programmable parameters

Monitoring

Converter / Charger Monitoring	
	monitoring of output voltage from 0 to 100%
mu1	by external signal, 0 – 10V
mu2	by external signal, 4 – 20mA
	monitoring of output current from 0 to 100%
mi1	by external signal, 0 – 10V
mi2	by external signal, 4 – 20mA
iso	**isolating amplifier for monitoring**
	Monitoring signal is galvanically isolated from any potentials of the power supply.
	monitoring via
rs	RS232 (external)
can	CAN Bus (external)

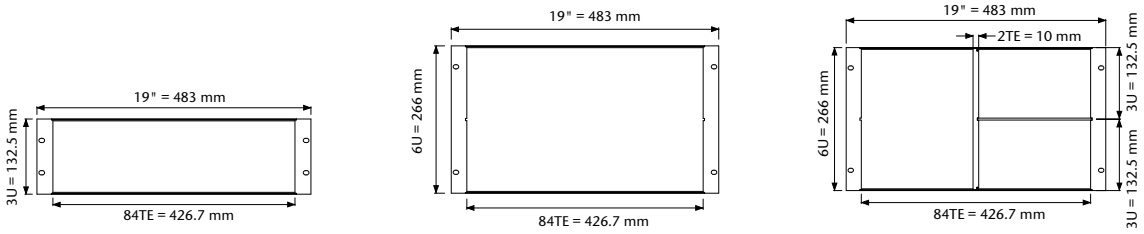
Mechanics

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.

Optionally, 19" sub-racks are available and 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

19" Sub-Racks



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 through a terminal block. Should the application not require a pluggable module / rack solution, wall mounting presents an alternative option 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. Option is avalaible for currents up to 60Amps.

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. Option is avalaible for currents up to 60Amps.

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 to achieve 99% RH, non condensing.
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 with Loctite and heavy components are fastened by ties and / or glue. Modules with the "ms" are build acc. to EN 61373 regarding shock and vibration.

Control & Monitoring

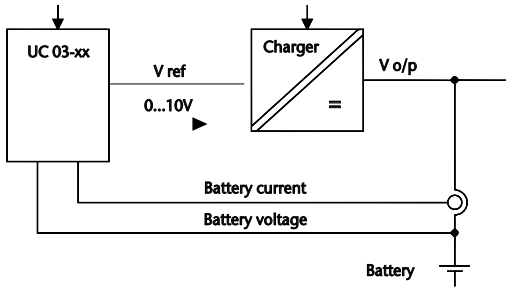
TC 01 **Control function**

analog or micro processor controlled supervision:

- input voltage
- output voltage
- battery circuit
- ground insulation failure
- over temperature

UC 03 **Enhanced controller function**

The "UC 03" unit controls and supervises the optimum charging of a battery, up to an entire UPS system. A battery charging in a basic way, with a switch mode AC/DC or DC/DC Charger, is shown in the following figure.



The charger output voltage is regulated inside the charger according to the input "Vref" signal. The gain factor between Vref and Vo/p is defined in the Specification of the Charger. The charger current limitation is also a function of the charger. The reference values, limitations and monitoring levels for charging a battery (ies) are configurable in the UC 03. The charging of the battery occurs according to the current / voltage characteristics, i.e. the battery is loaded in current limitation, until the appropriate voltage is reached. The following working conditions are processed by the UC 03:

a.

Float Charge conforms to the recommended permanent voltage to hold the battery within a completely charged state.

b.

Equalize or Automatic Boost Charge: To charge the battery after a partial or deep discharge as quickly as possible, an increased voltage is provided. This mode is activated automatically via different functions, or manually via the front panel button.

c.

Manual Boost Charge: independently adjustable voltage, to regenerate an aged battery. In all three working conditions the maximum battery charge current is limited.


OK
Esc