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Technical Specification
NeuHaus PowerSystem
200-700 kVA

NEUHAUS POWER SYSTEM
200-250-300-400-500-600-700kVA Three phase
Double conversion on line technology (VFI) with isolated inverter

Technical Specification Nb STE DPC 0901 GB

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0. INTRODUCTION

This Specification describes the operation and the technical characteristics of Uninterruptible Power Supply Three Phase series

NEUHAUS POWER SYSTEM

The NEUHAUS POWER SYSTEM series has been designed with consideration to the severe environment field conditions, that usually may be found in the electrical installations, well known by the engineering and research engineers of long experience. NEUHAUS POWER SYSTEM series makes use of the most advanced and reliable components today on the market, each unit is widely tested according to precise cycles of testing in the laboratories and testing room of the company.

NEUHAUS POWER SYSTEM design is based on the following main requisitions:

- IGBT transistor technology
- Continuos duty design
- True “on line operation”
- PWM inverter technology
- Microprocessor based

The general block diagram shows the complete features to be supplied with the system, which are an integral part of the NEUHAUS POWER SYSTEM cabinet and the various components which are assembled into the same cabinet.

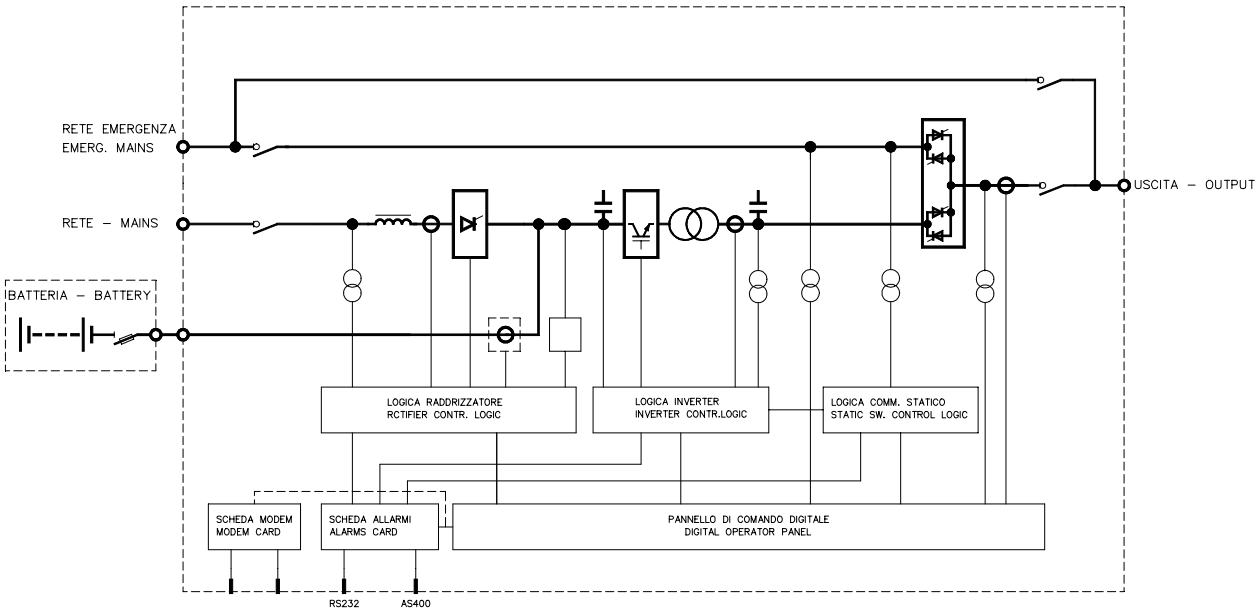

Figure 1. Block diagram of the NEUHAUS POWER SYSTEM

NeuHaus PowerSystem 200-700 kVA

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The UPS System NEUHAUS POWER SYSTEM series provides to supply the critical loads with highly reliable power and protection against network failure as brownouts and blackout, and electrical noise as spikes, sags. The NEUHAUS POWER SYSTEM feeds loads with continuity of operation in all the situations within limits as later widely specified, guaranteeing the clean energy requested by the loads.
The UPS System NEUHAUS POWER SYSTEM series provides to maintain the supply to the load with continuity of operation and provides to take care of the battery for the prompt and reliable action in case of sudden blackout.

Complete range of NEUHAUS POWER SYSTEM series

Model	kVA
DPC2200	200
DPC2250	250
DPC2300	300
DPC2400	400
DPC2500	500
DPC2600	600
DPC2700	700

1. APPLICABLE STANDARD

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All the Uninterruptible Power Supplies NEUHAUS GROUP are designed in accordance to the rule of the Standard UNI EN 29001 – 1998 (ISO 9001 – 1987) and the following standards:

IEC 146 (CEI 22-2)(BS4417) Semiconductor Rectifier Equipment

IEC 439-2 (CEI 17-13) (BS5486 1-2) Low Voltage Switchgear and Controlgear Assemblies

IEC 529 (CEI 70-1)(BS490) Protection Enclosure Degree

IEC 76 (CEI 14-4)(BS171-BS4727) Power Transformers

IEC 204-1 (CEI 44-5)(BS22771-1) Electrical Equipment of Industrial Machines

IEC 364 (CEI 64-8, CEI 20-22) Building Electrical Installation

IEC 38 (CEI 8-6) Standard Voltage

IEC 68-2-32 Free Fall Testing

CEI 20-22 Testing of cables against fire

CEI 21-6 Sealed acid battery

EN 50091-1 Uninterruptible Power Systems - general and safety requirements

EN 50091-2 Uninterruptible Power Systems - EMI requirements

EN 60950 (CEI 74-2, IEC 950, BS5850, BS6204, BS7002) Equipments for information technology including machines for office, safety.

CE

CE Marking according to the European standard
89/336 CEE, 92/31 CEE, 93/68 CEE
Electromagnetic Compatibility

2. SYSTEM OVERVIEW

2.1 Main functions

With reference to Figure 1 the UPS system NEUHAUS POWER SYSTEM is composed of the following main blocks:

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- Rectifier-Battery Charger
- Inverter IGBT technology and PWM modulation
- Static Switch SCR solid state
- Maintenance By-pass
- Cubicle for standard battery
- Operator panel mounted on front cabinet
- LBS for Input line, Output, Emergency line
- LBS with fuse for battery

2.2 General description, modes of operation

a) Normal operation

The critical loads are supplied through the NEUHAUS POWER SYSTEM system, which against the mains fluctuations maintains the parameters of Voltage, Frequency and Power within the limits defined at par. 5.1 “Electrical Characteristics”.
The Rectifier-Battery Charger, always connected to the mains, provides to convert the input ac voltage into a stabilised dc output voltage, which supplies the inverter and simultaneously maintains the floating voltage to the battery, providing to its full charge.
The inverter provides to invert the dc voltage from the output of Rectifier-Battery Charger into an ac voltage, filtered and cleaned of any disturbances. The inverter provides to regulate the output voltage and frequency within the close parameters specified in the “Electrical Characteristics”.
The inverter operation is always synchronised with the emergency line, which guarantees the immediate transferring of the supply from Inverter to Emergency line in case of overloads etc., within time = 0.

b) Lack of mains

In case of mains lack, the energy requested from the loads will be furnished by the battery always connected on the Inverter, which provides to run without any interruption or parameters variations and still supplies the loads.
The operator panel monitors in a both visual and acoustic mode the lack of mains.

c) Restoration of mains

After the return of mains, the Rectifier Battery Charger automatically provides to recharge the battery by the Voltage Vs Current diagram in function of the degree of discharging and to restore the full charge.
The inverter during all the period of battery restoring continues to supply the loads at constant voltage and frequency.

d) UPS behaviour in case of overloads

In case an overload occurs on the output of UPS causing a request of energy greater than the rated one of the inverter, then all the loads are transferred to the emergency line in zero time.
The static switch is designed to withstand an instantaneous current up to 10 times the inverter rated current and is able to sustain most of the accidental overloads.

e) Operation without battery

Battery can be disconnected from the UPS system for maintenance, without any interruption or output parameter variation.

The Rectifier Battery Charger operation without battery is the following:
The Rectifier Battery Charger supplies the inverter at constant voltage and the latter provides to supply loads through the Static Switch.

f) Maintenance by-pass

The important function of manual by-pass for maintenance purpose is included into the NEUHAUS POWER SYSTEM system.
The manual by-pass is operated in complete safety for the operator and without any interruptions.
The transfer operation are performed without any interruption or parameter variations.

g) Statistic function

The system NEUHAUS POWER SYSTEM is set for the use of the software POWERSHIELD MAX able to monitor most of the electrical parameters and to acquire data to perform the statistic calculation, predictor of the UPS operation.
By the use of a PC it is possible to print and save the information generated by the software.

h) NEUHAUS POWER SYSTEM as Frequency Converter

The NEUHAUS POWER SYSTEM has been designed to work as frequency converter 50-60-400Hz, with or without the battery connected to the inverter, and to supply the loads with the voltage and frequency parameters within the limits.
In this case, there are not the facilities of emergency line and maintenance by-pass.
The choice of frequencies operation as per referred Par.7.10

3. SPECIFICATIONS

3.1 Rectifier Battery Charger

General

The Rectifier Battery Charger is designed for all the series NEUHAUS POWER SYSTEM with fully controlled Tyristors Bridge. The NEUHAUS POWER SYSTEM series is available both with six pulses and twelve pulses bridge rectifier.
The Input line is protected by circuit breakers and voltage dc regulation will be performed according to the constant voltage / current diagram.
Input choke will reduce the effect of harmonics rejected on mains.
The rectifier battery charger is able to charge and operate with the following types of battery:

Stationary Pb:

- Sealed lead acid
- Lead acid Vented Type

Nickel cadmium NiCd (on request)

The electronic regulation circuit provides to adjust the charging parameters according to the type of battery, and furthermore the charging voltages are compensated in accordance to the room temperature to increase the life of the battery itself.

The efficiency of the battery is periodically checked and the results are monitored on the operator panel.

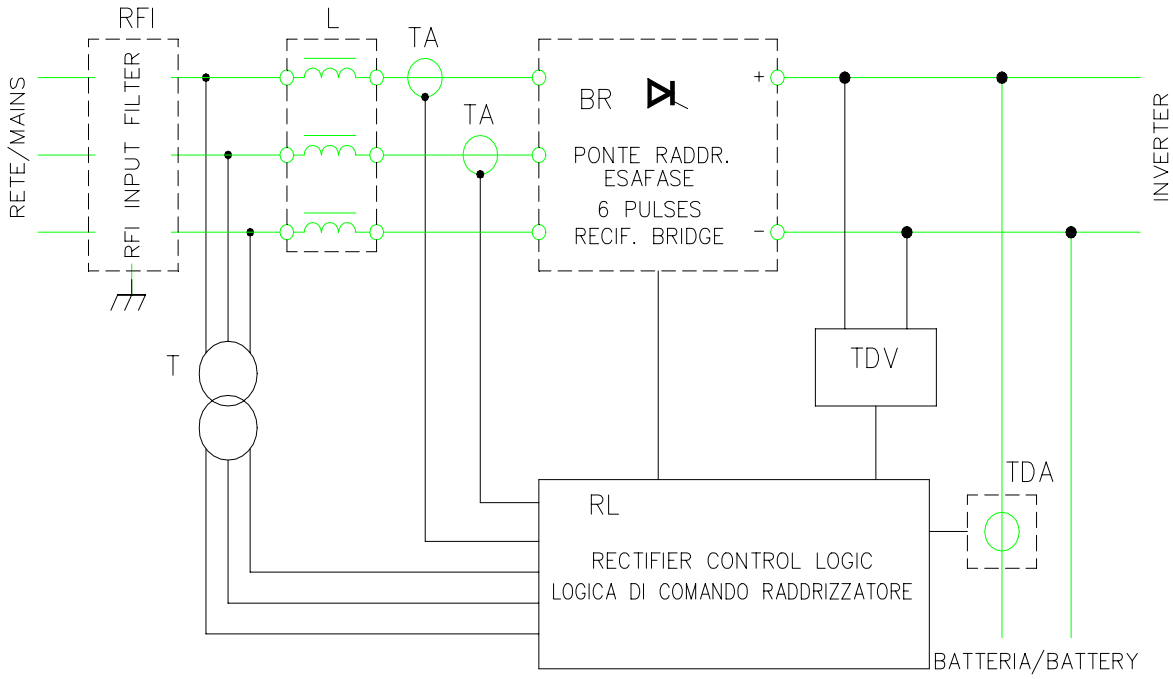

Figure 2. Rectifier-Battery Charger block diagram

Description of the main components:

RFI Input filter RFI
L Input choke filter
BR Six pulses bridge
RL Rectifier control logic
TA Current transducer
TDV Voltage transducer
TDA Current transducer
T Isolation transformer for RL logic

Voltage regulation

The output voltage will be regulated at the battery values required by the charging cycles and suggested by the Manufacturer, with the static accuracy of + - 1% at the following conditions:

Load variation 0 – 100%
Input line variation ± 15%
Frequency line variation ± 5%

Rectifier Battery Charger supplies the inverter providing the rated power in all the above

conditions, and in the case of further temporary decreasing of input voltage till -25% it is able to maintain the power required by the inverter with the support of the battery.

Soft Start function

The Soft start function provides to gradually increase the output voltage till the rating of the Rectifier-Battery charger in such a way to apply a slow power to the mains, with a time of about 20".

The Soft start function is particularly useful in conjunction with a stand-by GenSet, to help the generator to take over the power.

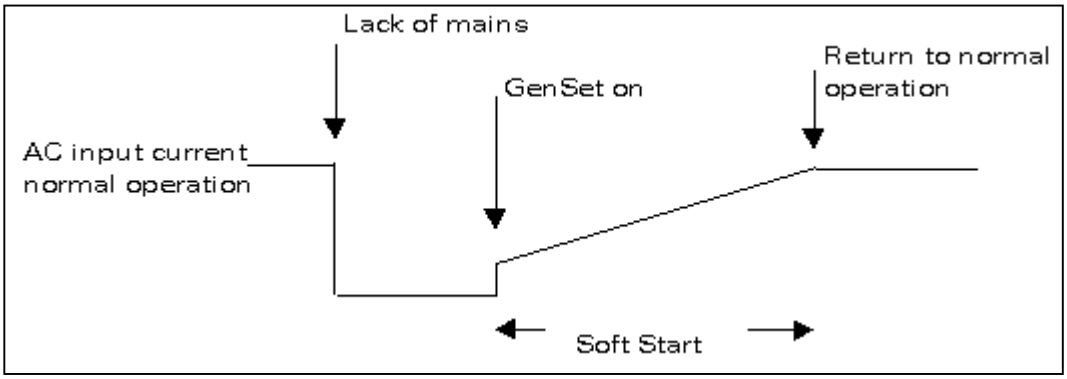

Figure 3. Soft Start flow diagram

Total Harmonics Distortion (THD)

The THD reflected to the mains does not exceed 30%.

Whether it is requested a lower percentage of harmonics, besides the twelve pulses bridge solution (THD = 10%), optional filters are supplied on request as per the optional list on the Par. 7.1

Capacity

The rectifier-battery charger is power sized to permit the full charging of the battery, for instance after the complete discharge, and simultaneously to furnish the full power to the inverter for the normal conditions of operation.

Overvoltage Protection

The rectifier-battery charger is equipped with electronic circuits to protect input circuits of inverter from overvoltages.

Parallel operation

NEUHAUS POWER SYSTEM rectifier-battery charger can work in parallel with other units of the same capacity, in order to provide system configurations with single battery. (Option)

Periodic battery testing

The Battery status is monthly monitored automatically, by the suited electronic circuit, which controls its efficiency, and that of the associated circuits.

Battery supervising

The Charging of the battery is in accordance to DIN 41773. The Charging parameters of float voltage, end of discharge, boost charge are protected during all the charging cycle and

working range.

Furthermore it is provided the temperature compensating circuit to adjust the voltage float charge in accordance to the temperature of the battery, to increase the operating life of the battery itself.

- Main voltage parameters, referred to the Stationary Sealed Lead Acid Battery:

	DPC2 200÷700kVA 192 Cells
Nominal Voltage	384 Vdc
Floating Voltage	428 Vdc
Boost Voltage	430 Vdc
End charge Voltage	320 Vdc
Range working Voltage	320-430 Vdc

- Main voltage parameters, referred to the Stationary Lead Acid Battery Vented Type:

	DPC2 200÷700kVA 180 ÷190 Cells
Nominal Voltage	360÷380 Vdc
Floating Voltage	396÷418 Vdc
Boost Voltage	432÷440 Vdc
End charge Voltage	300÷320 Vdc
Range working Voltage	320÷430 Vdc

Battery Nickel Cadmium: contact NEUHAUS GROUP.

3.2 Inverter

General

The Inverter is suitable to convert the dc voltage from the rectifier or the battery charger into a sinusoidal AC voltage at the frequency rate of 50, 60 or 400Hz.

It is used the PWM technology and the conversion power bridges use the transistors IGBT and operate within the output specifications on the normal dynamic voltage range of the Battery Charger.

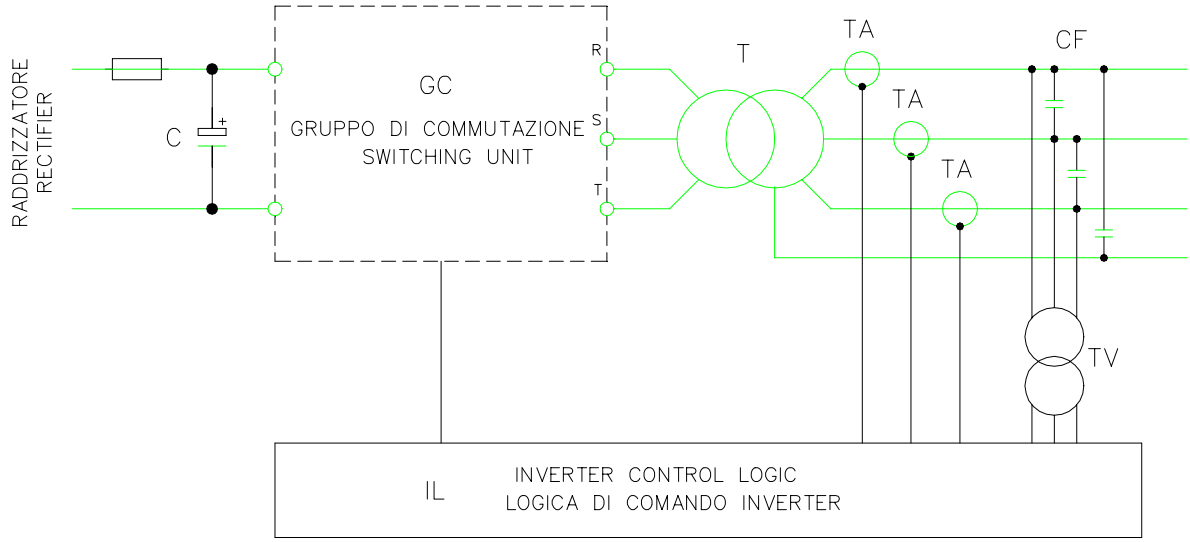

Figure 4. Block diagram of the Inverter unit

Description of components:

C	Input filter of the inverter, it performs the function of filtering the dc voltage of the rectifier battery charger.
GC	Power three phase bridge IGBT based, which commutes the dc voltage into three phase output voltages
T	Isolation transformer which performs the function to adapt the output inverter voltage to the suitable voltage of the loads. (380-400-415V)
CF	Rectifier Output filter, it performs the function to reduce the harmonic content of the output voltage to the specified values.
TA	Current transducer
TV	Voltage transducer
IL	Electronic regulation circuits and inverter logic

Voltage regulation

The three phase output voltages are individually controlled to maintain the output voltages within the following limits:

- Steady State: Output voltages does not deviate more than ± 1% for the combined effects of load and input voltage variations within the specified limits.

- Voltage Transient Response: Output voltage transient does not deviate more than ± 5% for load change steps of 0-100-0%

- Transient Recovery: Output voltages returns to the nominal voltage ± 1% within 10 ms after a load step of 100%

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Frequency Regulation

a) On mains synchronism

The inverter frequency regulation is controlled to achieve the output frequency to the loads within the accuracy of ± 0,5 %. It is possible to select optionally the following range of tolerance: ± 2-3-4-5%

b) On quartz oscillator synchronism

The inverter frequency regulation with operation on quartz oscillator operating as a free running unit is maintained with the accuracy of 0,01%.

Total Harmonic Distortion (THD)

The inverter power unit and the filtering components are designed to generate the minimum harmonic content in the output voltage, not greater than 1,5% in condition of linear load; in condition of distorting load with peak values of 3:1 the THD is not greater than 5%.

Overload

The inverter power unit is designed to withstand overloads due to sudden and/or continuous changes in the loads, performing the capability to continue to supply loads up to 125% for 10min. 150% for 1 min.

Protections

The inverter is designed to withstand to short-circuit applied directly to the output terminal board of UPS itself, for indefinite time.

Furthermore it is protected against dc under/over voltages exceeding the rated values.

3.3 Electronic static by - pass

General

The Static Switch is an integral part of the UPS, and is located into the same cabinet.
The transfer time of loads between inverter and emergency line is zero.
It is designed by pairs of SCR for each phase, rated for continuous duty operation capable to withstand for indefinite time the full load and the short time or instantaneous overloads.
The static transfer from inverter to emergency line is performed automatically on the basis of the following events:

- Overloads exceeding the specifications
- Inverter failure

When overload has occurred the Static Switch provides to transfer automatically the loads back to the inverter with a delay of 30 sec. after restore of loads to nominal value.

The static transfer from emergency line to inverter will be performed on the following conditions:

- Return of loads to nominal value
- Inverter in synchronism with emergency line

Operator can optionally perform the transfer and retransfer.
The transfer anyhow will be inhibited on the following events:

- Emergency line voltage out of limits
- Inverter not in synchronism with emergency line

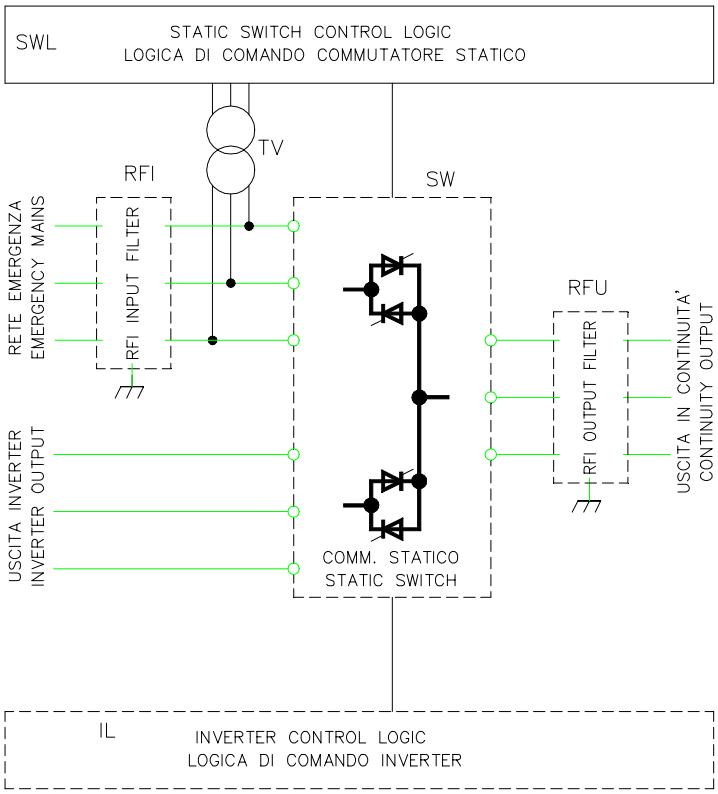


Figure 5. Electronic Static By-pass block diagram

Description of components:

SW By-pass unit arranged with pairs of SCR rated for continuous duty without any electromechanical devices.
TV Voltage transducer
RFI Input filter RFI
RFU Output filter
IL Portion of inverter logic related to the transfer operation
SWL Static switch logic, which performs, measures and control for load transfer

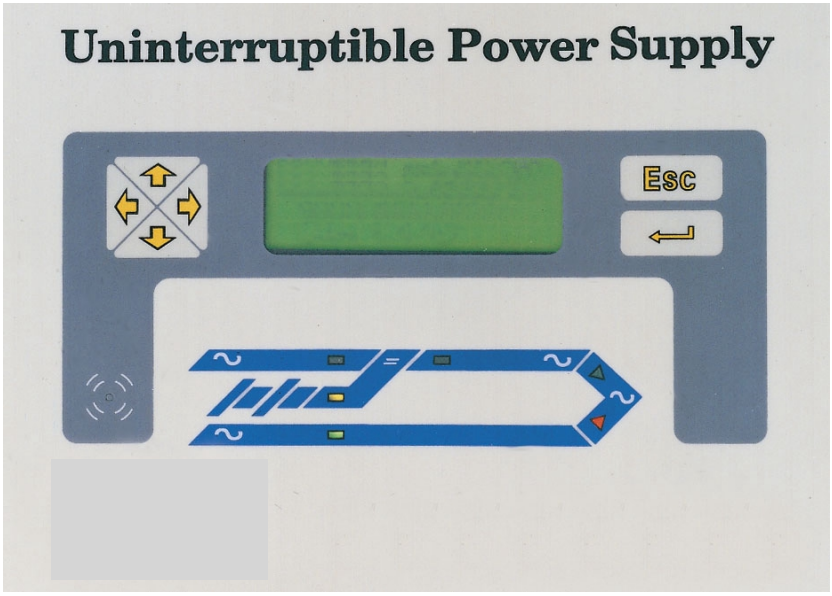
3.4 Maintenance By - pass

General

The Maintenance by-pass is an integral part of the UPS and it is located into the same cabinet.
The MBP provides to feed loads from the reserve line by-passing the inverter and static switch, for maintenance purpose.
The transfer operation is performed without any interruption of loads and in safety conditions for the operator and loads.

4. MONITORING, COMMANDS, CONTROLS

4.1 Operator Panel



General

The operator panel is located on the front top of cabinet, and is complete of the main functions of commands, alarms, messages display for a clear and immediate outlook of NEUHAUS POWER SYSTEM operation.
Particularly it is available the following:

- Alphanumeric display complete of four rows of 20 characters each, to show messages, alarms, signalling, measures, and power history.
- Four directional push buttons to select the programming menu' and perform the individual reading of the electrical parameters.
- Two push buttons of ESC and ENTER to select the readings and perform the programming.
- The flow energy diagram with indications by coloured LED's to indicate the global operation of UPS.
- A Buzzer for acoustic alarm

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Energy flow diagram

The operation status of UPS is shown continuously by the energy flow diagram, which presents the real time operation and the operator can acquire all the main information on:

- Battery charger operation
- Inverter operation
- Battery near to end of discharge
- Inverter operation from Inverter
- Inverter operation from Emergency line
- Operation status of Static Switch

Event changes during the normal operation of UPS will produce the activation of Buzzer, which transmits the acoustic alarm.
Signalization has been opportunely modulated in two tonalities to warn operator immediately about the alarm being present: operation alarm, end of discharge battery.

Display

The display by its wide visual capacity performs the full reading of all the selected information.
By the directional push buttons one runs the main menu', shown on display, and the item of interest can be easily selected by ENTER.

It's therefore possible in such a way to acquire the full information capacity of the UPS, very simply. Following is the summary of main functions (see product technical manual for details):

- Display in real time of the measures of electric parameters, voltages and currents in dc,ac, frequency, etc.
- Alarms status and description
- Command of On/Off inverter, rectifier/battery charger and static switch
- Display and set function of the internal clock for the synchronization of all the functions
- Display of power history, with event memory up to 30 levels. By the use of proprietary software NEUHAUS GROUP POWERSHIELD MAX, see Par 7.7, memory is increased up to 3000 events.
- Messages of alarms, status, signals

Measures

The measures selectable by menu will be the following:

- 3xInverter output voltages

- 3xUPS output voltages
- 3xEmergency line voltages
- 3xUPS output current
- 3xEmergency line currents
- Voltage and Current of charge/discharge battery
- Output frequency
- Battery autonomy

4.2 Communications

a) Software RS232C/422/Modem

The operator panel is designed to communicate, by serial interface EIA-RS 232C with PC having such interface and transmit all the parameters processed by the panel microprocessor.
The managing resident software into PC will perform the display of all signals, alarms, messages generated by the UPS during operation.
NEUHAUS GROUP has designed for the purpose the Software POWERSHIELD MAX, for Windows '95, which performs furthermore the statistic calculations of the events and can save up to 3000 events. For protocols of communication 422/485 an optional board is required.

b) Interfaces – distance signalling

The UPS is set for communication at distance through two different channels.
The first one is a serial communication channel (RS232 or RS422 or MODEM) and the other one is by means of free potential contacts (AS400 or NOVELL or ALARMS).

- In case the UPS utilises a RS232 port (Standard set) the serial communication is available on a DB9 pin female connector.
  In case the UPS utilises a RS422 port (OPTIONAL) there are two connectors type DB9 pin, male and female.
  In case the UPS utilises a Modem card (MDM-OPTIONAL) the communication is provided by two telephone connectors.

- As far as the interfacing with computers type AS400 or Novell or with a generic distance monitoring system is concerned, there is a connector type DB9 pin female which provides some free potential alarms contacts.

The connector pin configuration, with reference to the given signalling, is the following:

AS400	Pin7	Battery undervoltage
	Pin9	Mains failure
	Pin6	By-pass on
	Pin8	UPS ok
	Pin 5	Common (GND)
NOVELL (OPZIONE)	Pin3	Mains failure
	Pin5	Battery undervoltage
	Pin4	Common (GND)
ALARMS (OPTION)	Pin1	Common (GND)
	Pin2	Inverter feeding load
	Pin3	Mains failure
	Pin4	Mains feeding load

Pin5 Battery undervoltage
Pin6 Synchronism ok
Pin7 Overload
Pin8 Inverter ok
Pin9 Rectifier ok

4.3 Alarms and signalling

Following are the alarms and signals shown on the operator panel display, which can be stored into the memory of the power history.

Signalling	Indications
Automatic return to inverter	Re-transfer to inverter is active
Mains ok	Mains between limits
Synchronism ok	Inverter synchronised with mains
Load not on mains	Loads not on reserve line
Load on inverter	Inverter supplies load
Inverter ok	Inverter normal operation
Inverter normal load	Inverter load within limits
Inverter supplies load	Inverter supplies load
Rectifier normal load	Rectifier load within limits
Supply ok	Rectifier is working
Boost charge	Battery in boost charge
Float charge	Battery in floating charge
Battery ok	Battery is efficient

Alarms	Indications
Retransfer on inverter blocked	Re-transfer to inverter is blocked
Mains not ok	Mains out of limits
Synchronism not ok	Inverter not synchronised with mains
Mains feeding load	Load on emergency line
Inverter not ok	Inverter failure
Battery end of discharge	Battery end autonomy
Inverter overload	Inverter overload
Mains synchronism not ok	Inverter in free running operation
Inverter not feed load	Inverter disconnected
Rectifier overload	Rectifier overload
Lack of supply	Rectifier disconnected
Battery failure	Battery not efficient

5. TECHNICAL SPECIFICATION

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5.1 Electrical characteristics

Rectifier input

Rating kVA	200	250	300	400	500	600	700
Nominal input voltage	380/400/415 V3 ~ N						
Tolerance on input voltage (battery in float charge)	± 15%						
Min input voltage without battery discharge @ 400V	-20%						
Nominal frequency	50/60 Hz						
Tolerance on frequency	± 5%						
Max input power with battery in float charge (kVA)	320	400	480	640	800	950	1130
Max input current with battery in boost charge @ 380V	364 A	455 A	540 A	719 A	899 A	1079A	1258A
Power factor @ 380V and nominal load	=> 0,82						
Input current distortion @ full load	=< 30 %(six pulses bridge) =<10%(12 pulses bridge)						
Soft start time	20 sec						
Efficiency in float	=> 98,3 %						

Rectifier output

Rating kVA	200	250	300	400	500	600	700
Battery nominal voltage	384V						
Floating charge voltage	428V Adjustable						
Boost charge voltage	436V Adjustable						
Working range	320÷440V						
Voltage stability for combined effect of input voltage and output current variation	± 1%						
Voltage ripple in float	< 2%						
Max output current	610 A	760 A	900 A	1200A	1500A	1800A	2100A

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Adjusting range of battery charging current [A]	0 ÷ 60	0 ÷ 75	0 ÷ 90	0 ÷ 120	0 ÷ 150	0 ÷ 180	0 ÷ 200

Battery							
N. of cells Pb-Ca	180	192					
Number of cells NiCd	Please contact NEUHAUS GROUP						

Inverter input

Rating kVA	200	250	300	400	500	600	700
Nominal voltage	384V						
Dc voltage range	320÷440V						
Dc nominal current @ full load and battery end of discharge	540 A	670 A	800 A	1070A	1340A	1600A	1880A

Inverter output

Rating kVA	200	250	300	400	500	600	700
Nominal power @ p.f.0,8	200 kVA	250 kVA	300 kVA	400 kVA	500 kVA	600 kVA	700 kVA
Nominal Voltage	380-400-415 V3 ~ N						
Nominal Current @ p.f. 0,8 and 400V	290 A	360 A	430 A	580 A	720 A	860 A	1000A
Nominal frequency	50/60 Hz						
Wave form	Sinusoidal						
THD:							
With linear load	=<1,5%						
With not linear load and crest factor 3:1	=<5%						
Static voltage stability with combined effect of loads and input voltage variations	± 1%						
Dynamic voltage stability for load change 0÷100% and vice versa	± 5%						
Recovery time of voltage within the limits of static stability	10 ms						

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Rating kVA	200	250	300	400	500	600	700
Output frequency stability:							
With main synchronism	±2-3-4-5% (Selectness)						
With internal quartz	±0,01%						
Load crest factor (Ipk/Irms)	3 : 1						
Overload @ nominal voltage	110% for 60 min. @25°C 125% for 10 min. 150% for 1min						
Short circuit current capacity for 1 sec.	150%						
Symmetry on voltages with balanced load	±1%						
Symmetry on voltages with unbalanced load 100%	±3%						
Phase angle tolerance with balanced load	120° ±1°						
Phase angle tolerance with unbalanced load 100%	120° ±3°						
Efficiency @ 50%	=>92,5%						
Efficiency @ 100%	=>93%						

Electronic static switch

Rating kVA	200	250	300	400	500	600	700
Nominal power	200 kVA	250 kVA	300 kVA	400 kVA	500 kVA	600 kVA	700 kVA
Nominal Voltage	380-400-415 V3 ~ N						
Nominal frequency	50/60 Hz						
Frequency range	±10%						
Tolerance on voltage	±20%						
Max operating voltage @ 400V	304 ÷ 488V						
Overload capacity	150% for 30 min. or 1000% for 100ms.						
Efficiency	=>99,5%						
Max transfer time from INVERTER to MAINS:							
For Inverter failure	=< 1ms.						
For Inverter overload	0 ms.						
Max transfer time from MAINS to INVERTER	0 ms.						

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System data

Rating kVA	200	250	300	400	500	600	700
Total efficiency @ p.f.0,8 :							
@ 100% nominal load	92%		94%				
@ 75% nominal load	92%		94%				
@ 50% nominal load	91%		93%				
@ 25% nominal load	90%		91%				
Max loss power @ nominal load [KW]	13,9	17,4	18,1	24,1	30,1	36,1	42,2
Audible noise @ 1 mt dB(A)	55		60				
Operating temperature	0°C to 40°C						
Relative humidity	<90% @20°C non condensing						
Power derating above 1000 m	5% each 1000 m						

Battery

Rating kVA	200	250	300	400	500	600	700
DC power kW	174	216	258	344	430	520	600
Operating temp.	15 ÷ 25°C						
N° of cells:							
Stationary Pb	180 cells						
NiCd	Contact NEUHAUS GROUP						
End of discharge voltage	300V						
End of discharge current	540A	670A	800A	1070A	1340A	1600A	1880A

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5.2 Mechanical data

Six pulses bridge version							
DPC2	200	250	300	400	500	600	700
	Fig 1	Fig 2		Fig 3			
L	1500	1960	2360	2920	3880	4780	
P	900						
H	1800						
Weight	2100	2500	2800	3800	4200	4800	5200
Kg/sq.m	1555	1420	1320	1450	1203	1116	1209
sq.m	1,35	1,76	2,12	2,62	3,49	4,3	

Twelve pulses bridge version							
DPC2	200	250	300	400	500	600	700
	Fig 1	Fig 2		Fig 3			
L	1500	1960	2360	2920	3880	4780	
P	900						
H	1800						
Weight	2200	2600	3000	4000	4500	5000	5500
Kg/sq.m	1176	1477	1415	1526	1289	1162	1279
sq.m	1,87	1,76	2,12	2,62	3,49	4,3	

Protection degree	IP 20
Cable entry	Bottom
Cooling	Axial forced ventilation
Colour	Frame: RAL 7035- Panel: RAL 7032

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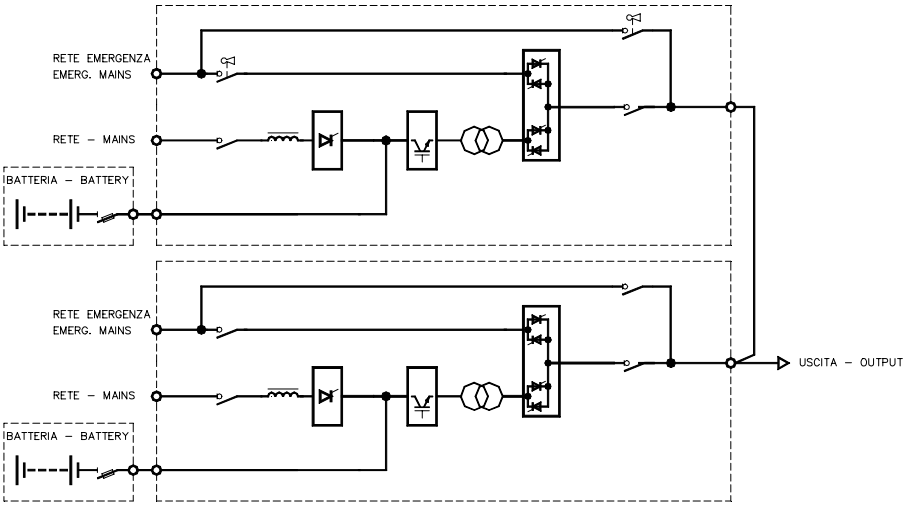
6. PARALLEL OPERATION

NEUHAUS POWER SYSTEM series has been designed to perform parallel configurations suitable for redundant systems, power systems and flexible solutions of "upgrade" for those installations which can have future increasing.

Parallel configuration offers the following benefit:

- Greater reliability of the system
- Increasing of the delivered power

a) Solution **SBRD**: STAND-BY REDUNDANT DISTRIBUTED



- It is the most widespread and reliable solution of redundant parallel composed of two sided UPS, and sparing of floor space.
- UPS1 supplies the load at 100%.
- UPS2 it's working with no load and in stand-by condition
- Electronic circuits of logic surveys continuously the parameters of synchronism, voltages and frequency of two UPS and provide to transfer load on stand-by UPS2 without interruption.
- Each UPS is designed to supply energy to load with complete redundancy of Rectifier battery charger, Inverter, Static switch, Maintenance by-pass.

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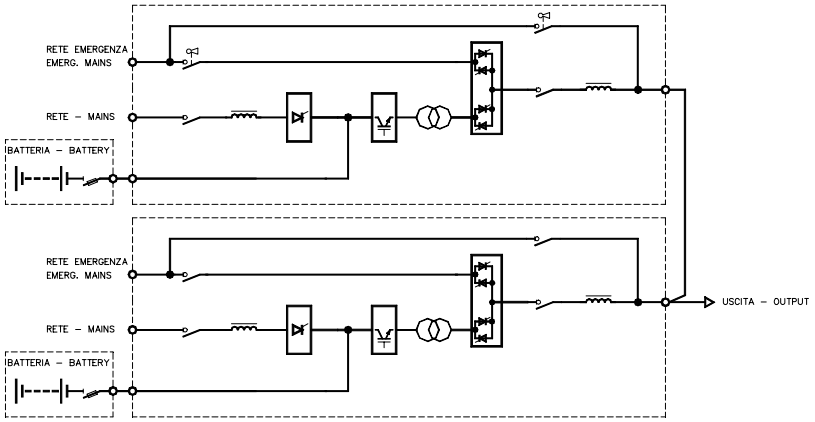
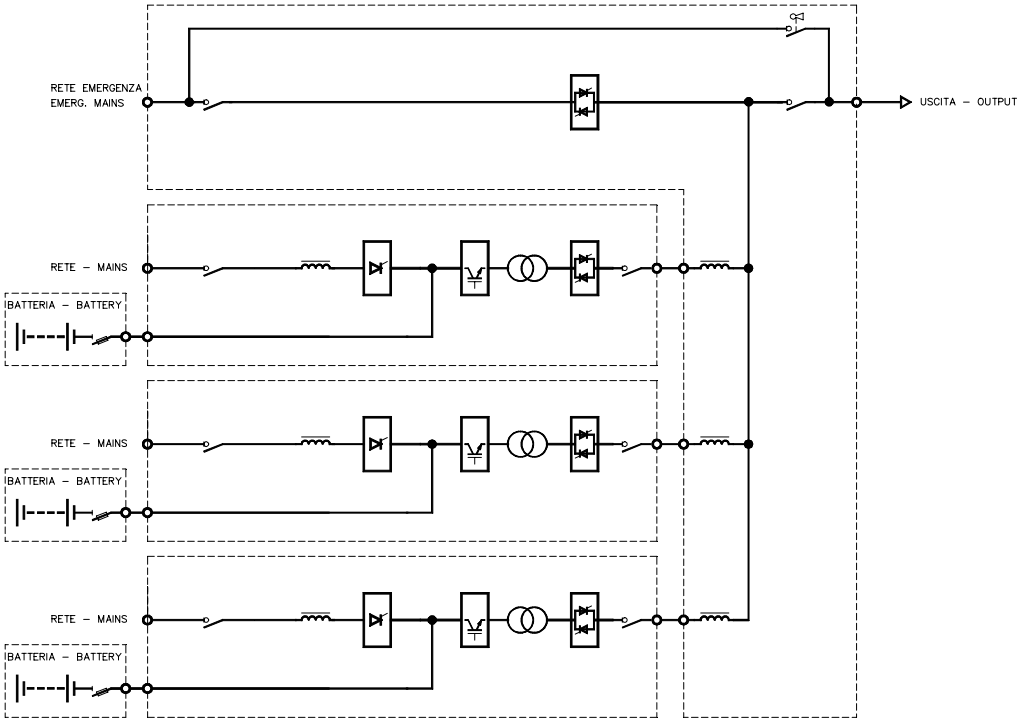
b) Solution **LSDB**: LOAD SHARING DISTRIBUTED PARALLEL



- This solution provides two sided UPS, which work in parallel with current sharing at 50%. The solution does not offer advantages in comparison to the one shown in a), but it has been achieved to meet special requirements in the industrial field.
- UPS1 and UPS2 supply load at 50% each.
- The two UPS share the current at 50%, and are sized to supply the full load of 100% each one.
- As per the solution a) the redundancy is complete.

c) Solution **LSPP**: LOAD SHARING POWER PARALLEL



This solution provides the parallel of many UPS to increase the delivered power available for single unit (700kVA)

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Solution is arranged out of “n” units in parallel up to six, which work in sharing current; the static switch is one for the whole system and provides to transfer the load on emergency line in case of overload or system failure.

7. OPTIONS

7.1 Rectifier Twelve Pulse bridge , Input Filter

The THD reflected to mains can be reduced to lower value to meet particular field requirements.
The model NEUHAUS POWER SYSTEM with twelve pulses bridge, has a low distortion value, THD=12% therefore it doesn’t need further additional filters, anyway NEUHAUS GROUP can arrange special filters to suit special field applications.
The model NEUHAUS POWER SYSTEM with six pulses bridge can be equipped with additional filters cabinet with the same shape of NEUHAUS POWER SYSTEM and the THD will be reduced to value below 10%

Reduction to 10% (*)

Harmonic	Six pulses bridge	Twelve pulses bridge
5°	29%	1,9%
7°	5%	0,8%
11°	7%	8,8%
13°	1%	3,6%
17°	3%	-
19°	1%	1%
THD	30%	10%

Reduction to 5% (*)

Harmonic	Twelve pulses bridge	Twelve pulses bridge with filter
5°	1,9%	1%
7°	0,8%	-
11°	10,8%	4,5%
13°	3,6%	2%
17°	-	-
19°	1%	-
THD	11,5%	5%

(*) Values are always referred to the operation nominal data of NEUHAUS POWER SYSTEM

7.2 Battery LBS

The on load switch and fuses, normally mounted inside the battery cabinet, on request, can be substituted with an automatic circuit breaker equipped minimum voltage coil and auxiliary contact for opening and remote signalling.

7.3 Input Isolation Transformer

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This option provides to add an isolation transformer either on input rectifier or on emergency line and it is located into an extra cabinet sided to NEUHAUS POWER SYSTEM with same shape.

7.4 Power Factor rephasing to 0,9

This option provides the UPS with an extra circuit suited to rephase the input line p.f. to 0,9, in case the electrical installation where the UPS are placed is missing this centralised circuit.

7.5 Return energy protection – BRE

Protection applies to emergency line and prevents, in case of static switch failure, the energy return towards mains.

Electronic board and breaking device are located into their UPS cabinet.

7.6 Teleservice via Modem

This option provides the facility to control the in field UPS operation, from a remote location.

All the operation parameters are detected in real time and the events stored in the memory of power history can be read to perform the diagnosis and periodic check of UPS operation.

7.7 Diagnostic Software POWERSHIELD MAX

It is the proprietary software NEUHAUS GROUP, which provides to the management and display of the UPS operation.

It works in Windows ’95, performs the measures of the electric values, analyses the events statistic, stores on disk 3 ½ the events detected in the power history, prints the analysis reports, shows in real time the status of operation both by numeric and visual way.

7.8 Software for automatic “shut-down”

This software performs the programmed shutdown of an EDP in case of failure of the UPS.

It can be used on one of the following operative system: Windows ’95, Windows NT, NetWare, IBM OS/2, and UNIX.

7.9 Remote synoptic panel

Remote synoptic panel shows the main operation status, alarms of UPS and the energy flow diagram.

In particular the Buzzer doubles the acoustic modulated alarms of the operator panel to warn the EDP personnel about events.

7.10 NEUHAUS POWER SYSTEM as Frequency Converter

NEUHAUS POWER SYSTEM can operate as frequency converter with the following ranges:

	In		Out
a)	50Hz	-	60Hz
b)	60Hz	-	50Hz
c)	50Hz	-	400Hz

d) 60Hz - 400Hz

Pos. c) and d) please contact NEUHAUS GROUP for the suitable definition of the supply.

7.11 Battery cabinets

Empty battery cabinets are available, complete of accessories for mounting of batteries by the customer itself. Cabinets are available in standard dimensions, same shape of UPS, and are furnished with shelves, protection devices, power connections, and terminal boards.

7.12 Distribution board

Distribution boards are designed according to the customer specifications and to meet the field requirements, to complete the supply of the UPS installation.

8. DIMENSIONS

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200-700 kVA

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FIG. 1

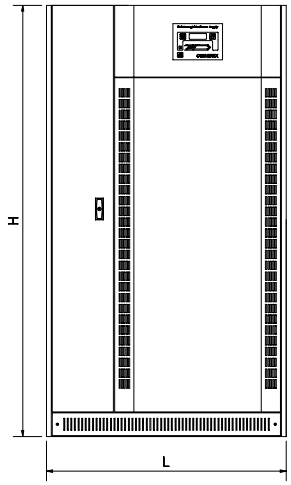
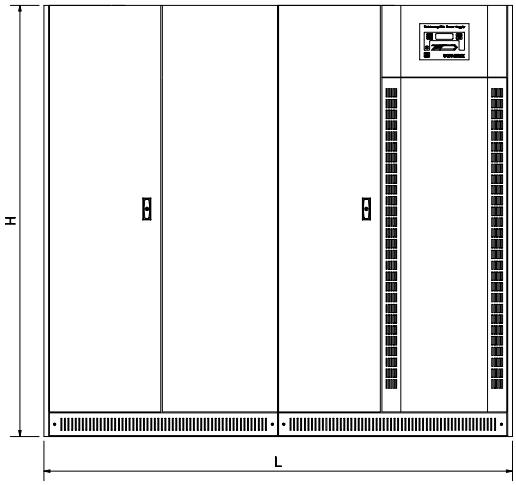


FIG. 2



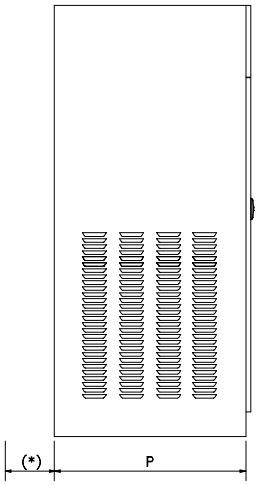
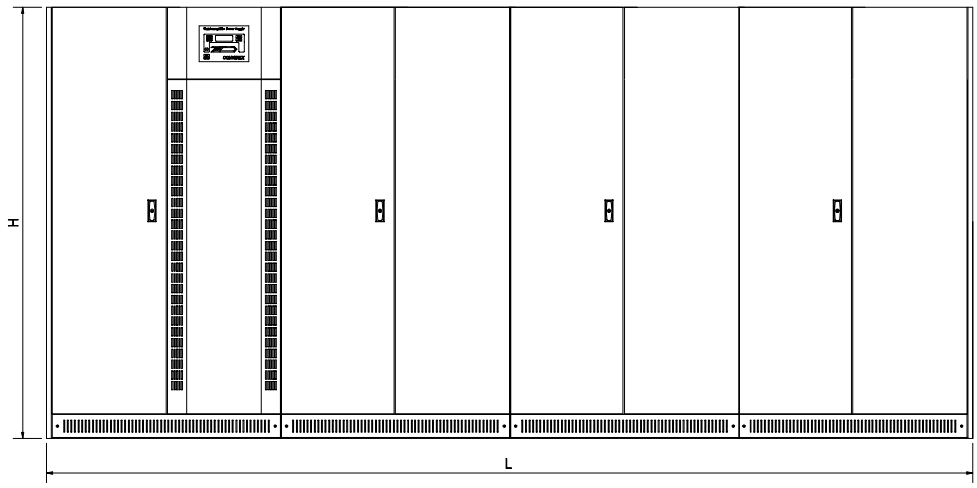
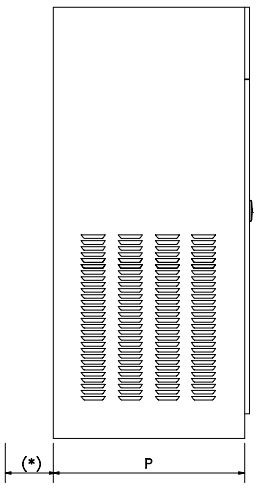


FIG. 3





*) Min. distance from wall 300 mm.

NEUHAUS POWER SYSTEM Six Pulses version							
DPC2	200	250	300	400	500	600	700
	Fig 1	Fig 2		Fig 3			
L	1500	1960	2360	2920	3880	4780	
P	900						
H	1800						
Weight	2100	2500	2800	3800	4200	4800	5200

Units: L,P,H (mm); Weight (Kg)

NEUHAUS POWER SYSTEM Twelve Pulses version

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Units: L,P,H (mm); Weight (Kg)

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Product specifications and design
can change according to evolution of materials
and technical improvement.
Please ask NEUHAUS GROUP confirmation
for binding contract.