

Chloride Apodys AC UPS 33

Product catalogue – 6 Pulses-3 phase output



CHLORIDE


EMERSON
Network Power





Chloride Apodyc AC UPS 33

Uninterruptible Power Supply System

3-phase input – 6 Pulses - 3-phase output

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1 Scope

This document describes a continuous duty three phase Alternating Current (AC) input, stand-alone, three phase AC output Uninterruptible Power System (UPS).

The Apodys AC UPS range meets customers' technical specifications for industrial applications such as Power generation, Oil and gas offshore developments (platforms, FPSO, etc...), Oil and gas transportation (pipelines...), Oil and Gas treatment plants (refineries, petrochemical units...), Railways and undergrounds control and signalling systems, etc...

The Apodys AC UPS range is part of Chloride's know-how and long-time relationship with industrial businesses.

Chloride Industrial Power services include:

- Consultancy services
- Pre-engineering design and support
- Project Management (contract management, detailed engineering, documents for approval, manufacturing, product testing, witness-testing if requested, shipment, tailored user manual)
- Services (recommended commissioning spare parts, commissioning services, product lifetime spare parts, hotline, trainings, maintenance contracts, LIFE.net remote maintenance, etc...)

2 General requirements

2.1. ISO certification

Chloride France S.A. is certified by the British Standard Institution (BSI), as a company with a total quality and environmental control system in accordance with the ISO 9001 and ISO 14001.

2.2. Applied standards

The Apodys AC UPS range shall have the CE mark in accordance with the Safety and EMC Directives 2006/95/EC and 2004/108/EC.

The Apodys AC UPS range is designed and manufactured in accordance with the following international standards:

- IEC60146 Semi conductor converters:
 - IEC60146-1-1 specifications of basic requirements
 - IEC60146-1-3 transformers and reactors
 - IEC60146-2 self-commutated semiconductor converters including direct dc converters.
- IEC60950 Safety of information technology equipment including electrical business equipment
- IEC60439 Low voltage switchgear and control gear assemblies
 - IEC60439-1 Type-tested and partially type-tested assemblies
 - IEC60439-2 Particular requirements for busbar trunking systems (busways)
 - IEC 60439-3 Particular requirements for LV switchgear and control gear assemblies intended to be installed in places where unskilled persons have access

for their use – distribution boards

- IEC60529 Degrees of protection provided by enclosures (IP Code)
- IEC60726 Dry-type power transformers
- EN61000-6-2 Electromagnetic compatibility (EMC) Generic standards – Immunity for industrial environments
- IEC61000-6-4 Electromagnetic compatibility (EMC) Generic standards – Emission standard for industrial environments.

3 Range overview

The system described is a static UPS system as shown in Figure 1. The system operates on a microprocessor-based thyristors charger and microprocessor-based IGBTs inverter. By means of digital vector control technology the performance of the UPS are enhanced. By adding system components, such as paralleling kits, safety and disconnecting devices, distribution cubicles, as well as software and communications solutions, it is possible to set up elaborated systems ensuring complete AC load protection.

3.1. The system

The UPS provides high quality AC power for electronic equipment loads. It offers the following features:

- Increased AC power quality
- Full compatibility with all types of loads
- Power blackout protection (for systems associated with battery)
- Lifetime of, at least, 20 years, combined with an appropriate preventive maintenance
- Operation temperature of 0 to 40°C permanent.

The UPS uses today's most reliable topology: the double conversion. It converts AC power from an AC source in to DC power to charge a battery and reconverts it into AC power to provide a clean and reliable AC output to power the AC load.

3.2. Models available

The Apodys AC UPS 3-ph range includes several kVA ratings output models as specified in paragraph 8. It is of the three-phase output type.

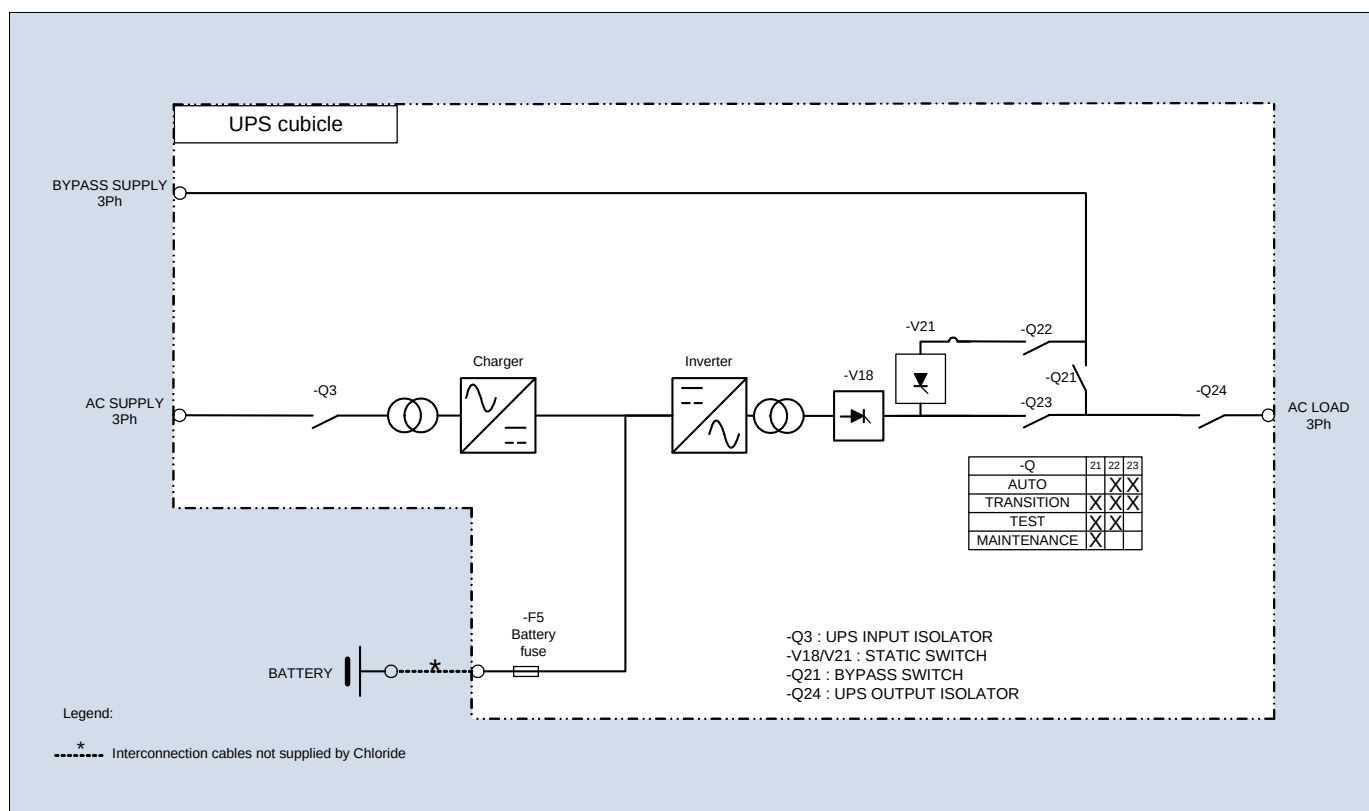


Figure 1: APODYS AC UPS single line diagram

4 System description

In this section, the main power electronic features and the operating modes of the Apodys AC UPS range are described.

4.1. General description

The three-phase current taken from the AC source is converted to a regulated DC voltage by a 6-pulse rectifier.

In order to protect the power components within the system, the rectifier bridge is fused with a fast acting fuse. A transformer is provided at the input of the rectifying bridge.

The DC current taken from the rectifier is converted to a sinusoidal and regulated AC voltage by an IGBTs inverter (Insulated Gate Bipolar Transistor), using PWM (Pulse Width Modulation). This means that the digital signal processor controls the IGBTs so that the DC input voltage is divided into pulsed voltage to generate a low distortion sinewave AC output voltage with good transient response voltage regulation. A transformer is provided at the output of the inverter bridge.

4.2. Components

The UPS consists of the following major components:

- One input isolator
- One main transformer
- 6-Thyristors bridge rectifier / battery charger
- IGBTs bridge inverter
- One output transformer
- Electronic static switches
- Manual bypass switch
- Two control units, each based on one microprocessor and one Digital Signal Processor-DSP
- One control and visualisation unit

4.3. Operating modes

The Apodys AC UPS operates as follows:

4.3.1. Normal operation

The critical AC load is continuously supplied by the UPS inverter. The rectifier-charger derives power from the AC source and converts it into DC power for the inverter whilst simultaneously maintaining the battery in a fully charged and optimum operational condition (floating mode).

The inverter converts the DC power into clean and regulated AC power to supply the critical load through the static transfer switch. The power loading can reach up to 105% of the inverter nominal rating without considering the inverter in overload conditions.

While supplying the load, the inverter and static switch control unit monitors the reserve supply signal and ensures that the inverter bridge tracks the reserve supply frequency. Thus, any automatic transfer to the reserve supply (e.g. when an overload is detected) is frequency synchronised and does not cause an interruption to the load.

4.3.2. Overload operation

The UPS inverter is considered in overload conditions when the load is beyond 105% of the inverter nominal rating.

Two cases are considered:

Case 1: Reserve supply is available:

- Upon overload detection by the UPS inverter (above 105% of the inverter nominal rating), the static switch automatically transfers the load to reserve supply. The static switch automatically switches back the load to inverter 10 seconds after the UPS inverter is back to normal conditions.

The reserve supply withstands overload as shown on Figure 2.

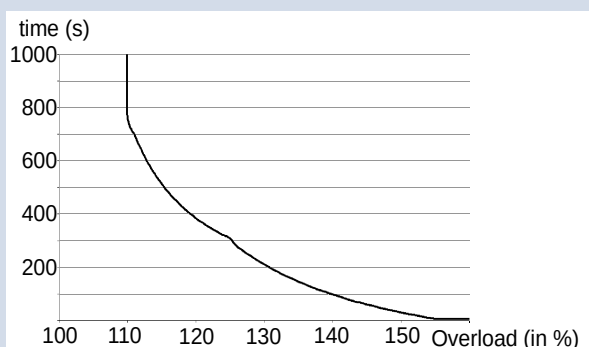


Figure 2: Reserve supply overload withstanding curve

Case 2: Reserve supply is not available:

- Upon overload detection by the UPS inverter (above 110% and up to 125% of the inverter nominal rating):
 - The system initiates a timer for a 10 minutes period.
 - The AC load remains powered by the UPS inverter for this 10 minutes period.
- Upon expiration of the 10 minutes delay, the UPS inverter shuts down.
- Upon overload detection by the UPS inverter (above 125% and up to 150% of the inverter nominal rating):
 - The system initiates a timer for a 1 minute period.
 - The AC load remains powered by the UPS inverter for this 1 minute period.
- Upon expiration of this minute delay, the inverter shuts down.
- Upon overload detection by the UPS inverter above 150% of the inverter nominal rating:
 - The UPS inverter keeps powering the AC load for 5 seconds after which it automatically shuts down.

This overload operation mode is shown in Figure 3.

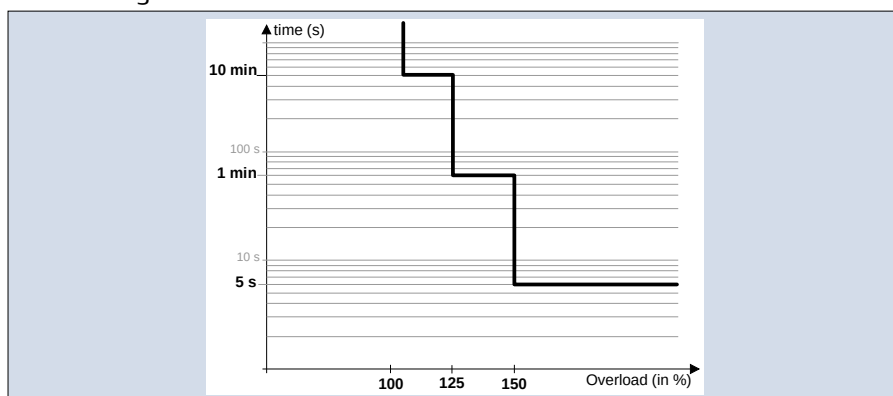


Figure 3: Apodys AC overload curve

4.3.3. Input supply failure

Upon fault of the input AC source, the rectifier-charger stops while the load remains supplied by the UPS inverter. Upon Mains input fault detection, the inverter immediately draws its power from the associated battery without switching. While the inverter is powered by the battery, indication is provided of the actual autonomy percentage remaining.

When reaching the end of battery autonomy, an alarm occurs and the static switch immediately switches the load onto reserve supply, without interruption. If for any reason, the reserve supply is not present or faulty and the battery is no longer available, the UPS automatically shuts down.

4.3.4. Battery recharge operation

After an AC input failure and upon its restoration, the rectifier-charger can be pre-set (according to customer's specification) to automatically restart in 2 ways:

1) Timer Recharge Mode:

If the Mains input failure was longer than 5 minutes, the rectifier charger automatically restarts in recharge mode for the pre-set recharge time. If the Mains input failure was less than 5 minutes, the rectifier-charger automatically restarts in floating mode.

2) Current Recharge Mode:

For any Mains input failure duration, the rectifier-charger restarts in recharge mode until the battery current is below a pre-set value. Then, the rectifier-charger automatically turns to floating mode.

3) Boost mode

This operating mode is a specific mode dedicated to vented type batteries. It is used when boost charge or commissioning charge is requested. During Boost mode, the voltage limitation is increased (up to 2.65V per cell for a Lead Acid battery and up to 1.7V per cell for a Nickel Cadmium battery). Restoration of the Floating mode is automatic after a preset typical time of 5 hours, unless the Floating mode is manually initiated by the operator through the control unit.

4.3.5. Maintenance bypass operation

- If for any reason the UPS has to be taken out of service for

maintenance or repair, the Apodys UPS is provided with a manual bypass switch. The bypass switch enables a load transfer to reserve supply without power interruption for the load. Bypass isolation is then complete, all serviceable components such as fuses, power modules etc. are isolated.

- The transfer/retransfer is based on the make-before-break principle in order to secure the critical load: the transfer/retransfer operation is automatically accomplished by paralleling and synchronising the inverter output to the reserve supply, before closing or opening the bypass switch as appropriate.

4.4. Electrical features

4.4.1. Total harmonic distortion of input voltage

The maximum voltage THD allowed on the rectifier input is 8% to guarantee the correct operation of the system (either from utility or from generator).

4.4.2. Rectifier current limitation

The rectifier-charger current of the UPS is limited to the nominal value either in floating, charge and boost mode.

4.4.3. Battery current limitation

The battery current is limited to 0,1C (Pb) or 0,2C (NiCd) of the associated battery, in floating or charge modes. In Boost mode, the battery current is limited to 0,05C (Pb) or 0,1C (NiCd).

4.4.4. Over voltage protection

The rectifier-charger of the UPS is automatically turned off if the DC voltage exceeds the maximum value associated to its operational status.

4.4.5. Output voltage harmonic distortion

The inverter provides harmonic neutralisation and filtering to limit the total harmonic distortion on the voltage to less than 3% with a linear load. For reference non-linear load (as defined by EN62040-3) the total harmonic distortion is limited to less than 5%.

4.4.6. Inverter short-circuit capacity

The inverter short-circuit capacity of Apodys UPS is detailed in Figure 4.

4.4.7. Static Switch short-circuit capacity

The electronic static switch is capable of supporting the short-circuit currents as shown on Figure 5.

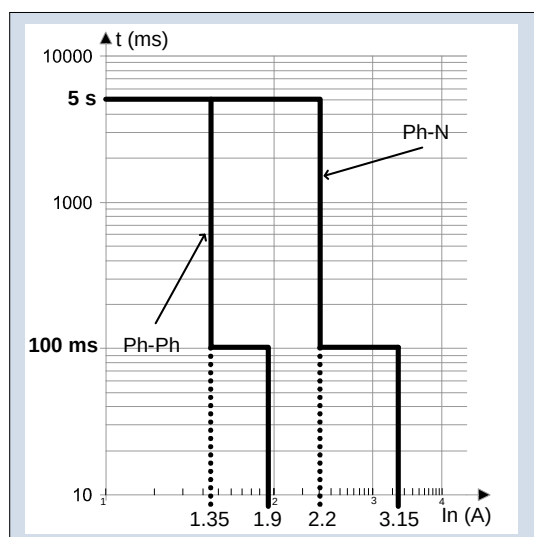


Figure 4: Apodys AC UPS 3-ph inverter short circuit capacity

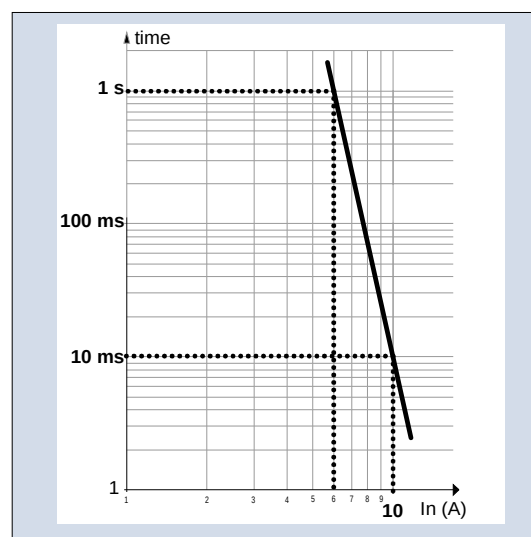


Figure 5: Apodys AC UPS reserve supply short circuit capacity

5 Monitoring and control interfaces

The UPS incorporates the necessary controls, instruments and indicators to allow the operator to monitor the system status and performance and take any appropriate action. Furthermore, interfaces are available upon request, which allow extended monitoring and control, as well as service functions.

5.1. Light emitting diodes (LEDs)

The UPS includes 3 external Light Emitting Diodes (LEDs) to indicate the overall system operation status as well as the condition of the functional blocks. LEDs operation is described in Figure 6. These LEDs shall interact with the active mimic diagram displayed on the graphical display.

5.2. Start and Stop push buttons

The Start and Stop push buttons are integrated into the mimic panel board, and operate as described on Figure 7. The control incorporates a safety feature to prevent inadvertent operation yet still allow rapid shutdown in the event of an emergency. This is achieved by pressing the “STOP” button for 2 seconds before the module stops. « Charger OFF » or « Inverter OFF » is displayed on the LCD.

Symbol	LED colour	Description	Comments
	Green	UPS normal operation	Load supplied by inverter
	Green flashing	Load on reserve or on battery	Load powered by reserve or by battery
	Orange	UPS warning	One or more subassembly are affected but not stopped
	Red	UPS fault	Subassembly are faulty and stopped or manually stopped

Figure 6: Apodys UPS– Light Emitting Diodes (LED) operation description

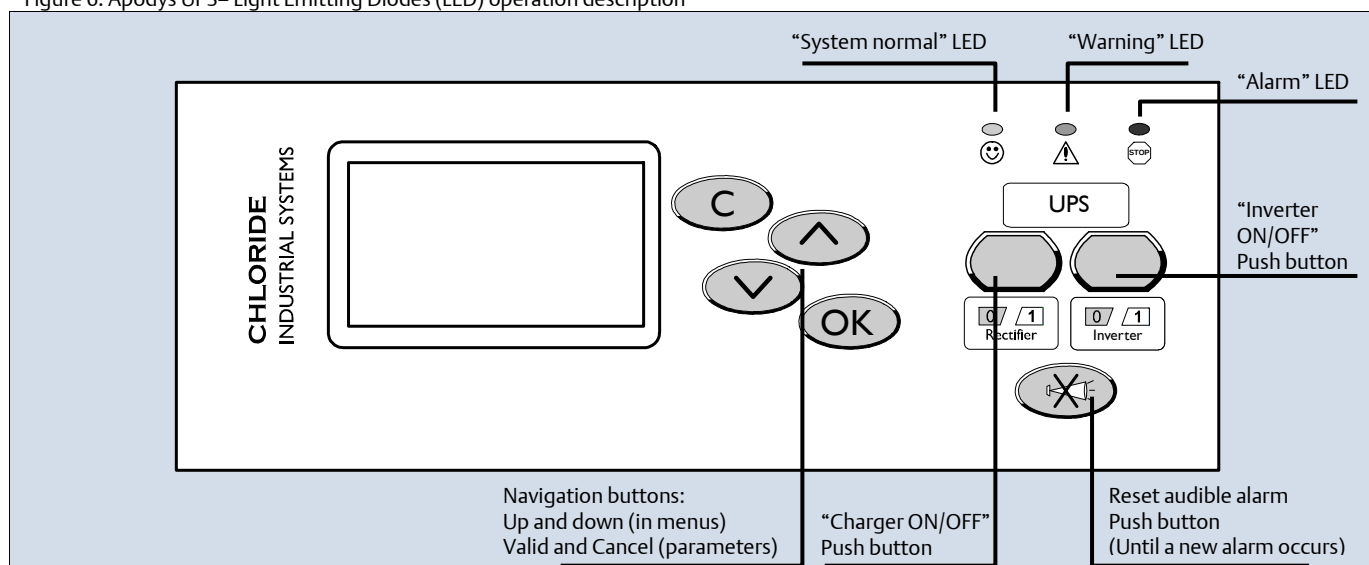


Figure 7: Apodys AC UPS – Local human-machine interface.

5.3. Display

A graphical (64 x 128 pixels) illuminated Liquid Crystal Display (LCD) is provided to enable the operating parameters, all the measurements and the active mimic diagram of the UPS to be monitored. The LCD messages are accessed by navigation buttons (see Figure 7). The text is available in English, unless otherwise mentioned.

By using the appropriate push-buttons it is possible to display the information described hereafter.

5.3.1. Default page

The default page displays the active mimic diagram of the UPS (see Figure 8).

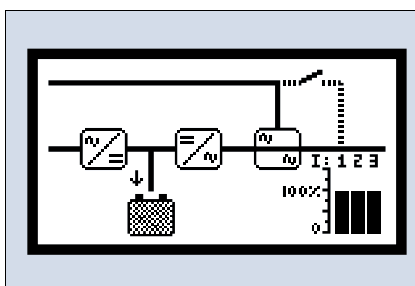


Figure 8: mimic default page.

By pressing the “OK”, “UP”, or “DOWN” buttons, the user enters the general menu. If the user is navigating in the menus, he may return to the active mimic diagram by pressing the “C” button.

If the user does not request any action (such as pressing a button) for 5 minutes while displaying the menus, the system will automatically return to the display of the default page active mimic diagram.

5.3.2. Active mimic diagram

The active mimic diagram displays the following information:

- Graphical view of the connected load
 - Graphical view of the power flow
 - Graphical view of the status of each functional block
- The Figure 9 provides an example of an active mimic situation:
- AC Mains input failure
 - Rectifier-charger stopped
 - Battery discharging
 - AC load still supplied by reserve

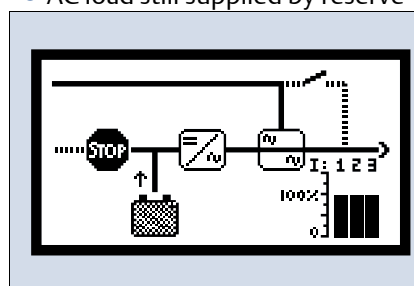


Figure 9: Active mimic panel, example of situation

5.3.3. General menu

Pressing any key from the default page (active mimic diagram) allows the user to access to the following general menu:

- Charger
- Battery
- Inverter
- Reserve supply
- AC load
- Reset
- Black Start (option)
- Event log
- Display setting
- Contact

5.3.4. Menus of functional blocks

Each functional block (charger, battery, inverter, reserve static switch, load) includes its own

menu to provide the user with detailed information, such as:

- Block status
- Block measures
- Block faults
- Block warnings

By using these menus, the user can access to detailed information about each following component:

- Rectifier-charger
- Battery
- Inverter
- Reserve supply
- AC Load

5.3.5. Rectifier-charger information

Status indications:

Charger off
Initialisation
Charger Stop
Equalisation mode*
Equalisation imposed*
Floating mode
Battery test mode*
Battery test imposed*
Boost mode*

Measurements indications:

UDC (charger output voltage)
IDC (charger output current)
U12 (Input voltage ph 1 and 2)
U23 (Input voltage ph 2 and 3)
U31 (Input voltage ph 3 and 1)
I1 (input line current)
I2 (input line current)
I3 (input line current)
Freq (input frequency)
Number of Mains failures

* Optional messages (according to specification and system configuration)

Warning indications:

Test mode
Fan failure*
DC voltage low
Overload inhibit
Charger in current limit
Customised message 1 *
Customised message 2 *
Customised message 3 *

Fault indications:

No fault
High DC voltage
High DC voltage memorised
Too high I battery memorised
Charger fuse blown
Input protection opened
Charger off
Remote switch off*
AC supply fault
Customised message 1 *
Customised message 2 *
Customised message 3 *

5.3.6. Battery information

Status indications:

Normal
Discharging
Charging
Fault or warning

Measurements indications:

Battery voltage
Battery current
Battery temperature
Battery autonomy (%)

Warnings indications:

DC earth fault*
Battery begin discharge
Imminent shutdown
Temp sensor fault memorised*
Warning BMS*
Customised message 1 *
Customised message 2 *
Customised message 3 *

* Optional messages (according to specification and system configuration)

Faults indications:

No fault
Battery test fault memorised
End of discharge
Battery protection opened*
Customised message 1 *
Customised message 2 *
Customised message 3 *

5.3.7. Inverter information

Status indications:

Inverter synchronised
Inverter on crystal
Inverter not running
Waiting for stop (only in parallel)*
Inverter switched off

Measurements indications:

UDC (inverter input voltage)
U1 (inverter output voltage ph1-N)
U2 (inverter output voltage ph2-N)
U3 (inverter output voltage ph3-N)
Inverter frequency (output frequency)

Warning indications:

No warning
Commissioning
Software time out
Fan failure*
Inverter overload warning
Customised message 1 *
Customised message 2 *
Customised message 3 *

Fault indications:

No fault
Inverter switched off
VCE bridge fault memorised
Inverter overload fault memorised
Over temperature fault memorised
Low DC voltage
Repeated low DC voltage memorised
High DC voltage memorised
Microcontroller fault memorised
High AC voltage memorised
Frequency fault memorised
Parallel communication fault memorised*
Low AC voltage memorised*
Customised message 2 *
Customised message 3 *

* Optional messages (according to specification and system configuration)

5.3.8. Reserve information

Status indications:

No warning; no fault
Warning; no fault
No warning; fault
Warning + fault

Measurements indications:

Reserve voltage U1-N
Reserve voltage U2-N
Reserve voltage U3-N
Reserve frequency

Warnings indications available:

Reserve voltage fault
Reserve frequency fault
Reserve inhibited
Parallel reserve fault memorised*
Customised warning message 1 *
Customised warning message 2 *
Customised warning message 3 *

5.3.9. Load and static switch information

Status indications:

Load on inverter
Load on reserve
Manual bypass on
Load not supplied

Measurements indications:

Load voltage U1-N
Load voltage U2-N
Load voltage U3-N
Load current I1
Load current I2
Load current I3
Load frequency
Load power Ph1 (in kVA)
Load power Ph2 (in kVA)
Load power Ph3 (in kVA)
Load power Ph1 (in kW)
Load power Ph2 (in kW)
Load power Ph3 (in kW)
Total time on inverter
Load current ratio (%)

Warning indications:

No warning
AC earth fault*
Manual bypass closed
Static switch overload
Customised message 1 *
Customised message 2 *
Customised message 3 *

Fault indications:

No fault
Emergency power off*
Static switch overload fault memorised
Inverter static switch fault memorised
Reserve static switch fault memorised
Static switch hardware fault memorised
AC output voltage fault*
Customised load fault message 2 *
Customised load fault message 3 *

* Optional messages (according to specification and system configuration)

5.3.10. Event log

The Event Log function is available through the display and allows memorising each event into the historical record, in a chronological way.

The Event Log function can operate in 2 different ways:

- Saturable mode: It records a maximum of 100 events after the first event appearance.
- FIFO mode: After recording 100 events, the 101st event deletes the 2nd one and so on.

5.3.11. Black Start

The Black Start function, as available in the display, is only for paralleled UPS systems. It allows starting parallel inverters even if the reserve supply is not present. The Black Start function operates as follow: When 2 UPS systems are paralleled and the reserve supply is not present, it is possible to start both inverters simultaneously via the control

panel of only one of the two inverters.

NOTE: This function differs from the one described in the Options section.

5.4. Remote signalling and control signal

5.4.1. Logic outputs for remote indications

Apodys UPS is able to deliver several output information. Upon request, these output information can be made available on double-pole change-over (dpco) contacts (8A/250V AC1; 8A/30V DC1; 1A/60V DC1).

Upon request, the following information is made available on voltage-free contacts:

UPS general alarm
Charger fault
Inverter fault
Reserve supply fault
Load on reserve
Imminent shutdown
Customised message 1
Customised message 2
Customised message 3

When information is requested on voltage-free contact, connection of the customer cables is achieved on the identified, screw-clamp terminal blocks of each relay-holder.

5.4.2. Logic inputs

The Apodys UPS range allows the signalisation of specific alarms from the customer's environment and eventually takes the appropriate action on the UPS thanks to dedicated logic inputs available.

Among all possible function, the following logic inputs can be wired upon request:

Remote control on/off
Emergency power off

5.5. Communication interfaces (options)

5.5.1. Isolated RS 232 link

Upon request, Apodys UPS can be equipped with one sub-D 9 points connector for direct (1 master, 1 slave, max 15 meters) serial RS232 communication.

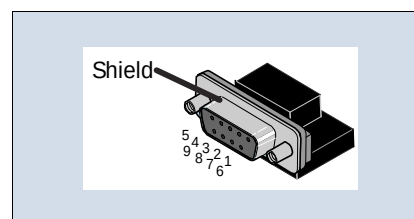


Figure 10: RS 232 SubD 9 points connector

Pin assignment is described in the Table 1 hereafter.

Pin	Signal	Explanation
1	Not used	
2	Tx	Transmission RS232
3	Rx	Reception RS232
4	Not used	
5	RS232 GND	Signal ground
6	Not used	
7	RTS	Clear to send RS232
8	Not used	
9	Not used	

Table 1: RS232 pin assignment

NOTE:

If simultaneous use of RS232 port and RS 485 is necessary, this will require 2 separate PCB, one for RS232 and the other for RS485.

5.5.2. Isolated RS 485 link

Upon request, Apodys UPS can be equipped with 6 points socket for multipoint (1 master, up to 31 slaves, max 1300 meters) serial RS485 communication.

Customer connection is easily achieved thanks to the screw-clamp connector provided (see figure below). Earth connection is achieved on the PCB through a 6.35 Faston lug.

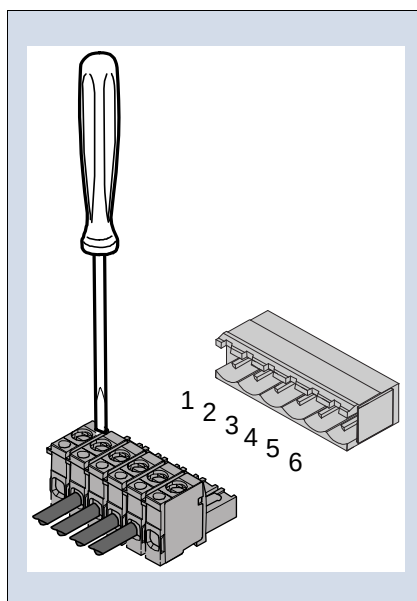


Figure 11: RS 485 6 points connector

The RS485 communication path may be used either in 4 wires mode or in 2 wires mode, as described in the Table 2 hereafter.

Pin	Signal	4-wires mode	2-wires mode
1	GND	Not used	Not used
2	Tx-	Transmission RS485/ neg.	Negative signal
3	Tx+	Transmission RS485/ pos.	Positive signal
4	Rx-	Reception RS485/ neg.	Not used
5	Rx+	Reception RS485/ pos.	Not used
6	+5V	Not used	Not used

Table 2: RS 485 pin assignment

6 Mechanical data

6.1. Enclosure

The Apodys UPS is housed in a space-saving modular enclosure including front doors and removable panels (standard external protection IP 20). The enclosure is made of sheet steel. The doors can be locked. The enclosure is of the floor mounted type.

For harsh environmental conditions (dust, water), a higher degree of protection, of up to IP42 is available in option. Specific system design can be achieved up to IP54. In such extreme cases, technical characteristics mentioned in this document are not maintained.

6.2. Ventilation

Fan-assisted air cooling is standard on the Apodys AC UPS range. The cooling air entry is in the base and the air exit at the top of the device. It is recommended that the enclosure is installed with at least 400 mm of free space between device and ceiling at the top in order to allow an unhindered cooling air exit.

6.3. Cable entry

Cable entry is achieved via the bottom of the cabinet. Top cable entry is also available in option.

6.4. Enclosure design

All the surfaces of the enclosure are finished with an electrostatically applied powder-epoxy-polyester coat, cured at high temperature. Colour of the enclosure is RAL 7032 (pebble grey) textured semi-gloss.

For uniformity of the UPS with other equipments in electrical rooms, the surface finishing and the colour of the enclosure may be available according to the customer's specification and upon request.

6.5. Components identification

Main components are identified by self-adhesive vinyl labels. In option, Apodys UPS offers the possibility to include specific component identification by engraved traffolyte labels.

6.6. Internal cables connection

Connection of cables is achieved by inserting cables directly in screw-clamps.

6.7. Access to integrated subassemblies

All internal subassemblies are accessible for typical and most frequent maintenance from the front of the unit. Top access is available for replacement of cooling fans. Rear access is not required for installation or servicing. In any case and if side or rear access is required, the side and rear panels are removable.

6.8. Installation

The UPS is forkliftable from the front. Upon request, it can be equipped with lifting lugs to facilitate its installation on site.

7 Environmental conditions

The Apodys UPS is capable of withstanding any combination of the following environmental conditions. It operates without mechanical or electrical damage or degradation of operating characteristics.

7.1. Ambient temperature

The UPS is capable of operating permanently from 0° to 40°C.

7.2. Relative humidity

The UPS is capable of withstanding up to 90% humidity level (non-condensing) for an ambient temperature of 20°C.

7.3. Altitude

The maximum altitude without derating is 1000 metres above sea level.

Please consult us for operating the system above 1000 metres.

8 Technical data

Data common to the complete Apodys AC UPS 31 range

Rectifier input

Nominal input voltage	(V)	400 [380 / 415]
Input phases		3 ph + N
Input voltage tolerance	(%)	+10 / -10
Nominal frequency	(Hz)	50 / 60 (factory setting selectable)
Tolerance on frequency	(%)	+5 / -5
Rectifier type		6-pulses SCR (thyristors)
soft start	(s)	5
Isolation transformer		Standard
Maximum recommended voltage distortion (THD) from Mains (or generator) on the input of the rectifier	(%)	8

Rectifier output

DC voltage stability	(%)	< +/- 1
DC voltage ripple in float (disconnected battery)	(% rms)	1
Rectifier-charger current limitation (in floating, charge or boost)		I nominal

Inverter output

Nominal output voltage		See tables on the following pages
Nominal output frequency	(Hz)	50 / 60 [factory setting selectable]
Overload at cos phi = 0.8	(%)	125 (10 min) / 150 (1 min)
Short circuit capacity	(%)	315 (100 ms) / 220 (5 s)
Isolating transformer		Standard on the complete range
Voltage stability (for 100% load variation):		
♦ Static	(%)	+/- 1
♦ Dynamic	(%)	Complies with IEC/EN 62040-3, class 1
Frequency response	(Hz/s)	0.1
Frequency stability:		
♦ with own oscillator	(%)	+/- 0.05
♦ with reserve supply synchronisation	(%)	+/- 4 [adjustable from 1.2 to 6]
Harmonic voltage distortion:		
♦ with 100% linear load	(%)	< 3
♦ with 100% non linear load	(%)	Complies with IEC 62040-1-2
Output crest factor admissible		3/1
Load power factor		0.5 lag to 0.5 lead

Reserve supply input

Reserve input voltage	(V)	See tables on the following pages
Reserve input voltage tolerance	(%)	+/- 10 [adjustable from +/-5% to +/-20%]
Reserve input frequency	(Hz)	50 / 60 [factory setting selectable]
Reserve input frequency tolerance	(%)	+/- 3 [adjustable from +/-0.2% to +/-5%]

System data

External protection degree		IP 20
Internal protection degree		IP 20
Cable entry		Bottom
Access		Front
System design life	(years)	20

Environmental data

Operating temperature	(°C)	0 to 40 (permanent operation)
Storage temperature	(°C)	-20 to +70
Maximum relative humidity (non condensing)	(%)	<90
Operating altitude		1000 m (without system derating)

Data for 3 x 400 VAC output / 120 VDC (110 VDC) intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 120 VDC [110 VDC]

Output voltage: 400 VAC [380, 415] three phase

Ratings	(kVA)	5	7.5	10	15	20	25	30	40	50
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UPS input

Nominal input voltage, frequency, tolerances	See page 15									
Maximum current consumption at full load (°)	(A)	14	23	29	45	70	70	90	112	140
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)									

Rectifier-charger output

Nominal voltage	(V)	120								
Output voltage in floating	(V)	136.2								
Max DC current	(A)	50	80	100	160	250	250	320	400	500

Battery

Battery output power	(W)	4762	7143	9524	14118	18823	23529	28235	37647	46512
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UPS output

Nominal output voltage AC	(V)	400 [380, 415] – 3-phase + neutral								
Nominal output current(*)	(A)	7	11	14	22	29	36	43	58	72

Reserve static switch

Nominal voltage AC	(V)	400 [380, 415] – 3-phase + neutral
Recommended type for reserve input protection		D curve (circuit breakers) or gL (fuses)

UPS System data

Heat dissipation system(**)	F	F	F	F	F	F	F	F	F	F
UPS system losses(*)	(W)	1291	1937	2582	3514	4460	5575	6691	8921	10556
UPS system efficiency(***)	(%)	74	75	76	76	78	78	78	78	79
UPS system noise	(dBA)	62	62	62	70	70	71	71	71	73
Height	(mm)	1852	1852	1852	1852	1852	1852	1852	1852	1852
Width	(mm)	800	800	800	1200	1200	1200	1200	1200	1600
Depth	(mm)	808	808	808	808	808	808	808	808	808
Footprint	(m²)	0.64	0.64	0.64	0.96	0.96	0.96	0.96	0.96	1.28
Mass(****)	(kg)	360	400	440	540	650	720	780	870	990

Drawing (See paragraph 11)

Code for general arrangement	B0	B0	B0	C0	C0	C0	C0	C0	C0	E0
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (60 cells) operated at $U_{float}=2,27V$ per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x400 VAC nominal output voltage.

-(**) F: Fan cooling.

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85.

Chloride Apodys AC UPS 33^{6P-3ph}



Data for 3 x 400 VAC output / 240 VDC (220 VDC) intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 240 VDC [220 VDC]

Output voltage: 400 VAC [380, 415] three phase

Ratings	(kVA)	15	20	25	30	40	50	60	80	100
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UPS input

Nominal input voltage, frequency, tolerances	See page 15									
Maximum current consumption at full load (°)	(A)	42	53	65	83	104	130	165	206	257
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)									

Rectifier-charger output

Nominal voltage	(V)	225								
Output voltage in floating	(V)	258.8								
Max DC current	(A)	80	100	125	160	200	250	320	400	500

Battery

Battery output power	(kW)	13953	18605	22988	27586	36782	45977	54545	71111	87912
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UPS output

Nominal output voltage AC	(V)	400 [380, 415] – 3-phase + neutral								
Nominal output current(*)	(A)	22	29	36	43	58	72	87	116	144

Reserve static switch

Nominal voltage AC	(V)	400 [380, 415] – 3-phase + neutral
Recommended type for reserve input protection		D curve (circuit breakers) or gL (fuses)

UPS System data

Heat dissipation system(**)	F	F	F	F	F	F	F	F	F	F
UPS system losses(*)	(W)	3004	4005	4456	5347	7129	8912	9416	10854	12539
UPS system efficiency(***)	(%)	80	80	81	82	82	82	84	86	86
UPS system noise	(dBA)	63	64	65	68	70	71	71	73	73
Height	(mm)	1852	1852	1852	1852	1852	1852	1852	1852	1852
Width	(mm)	800	800	800	800	1200	1200	1600	1600	1600
Depth	(mm)	808	808	808	808	808	808	808	808	808
Footprint	(m²)	0.64	0.64	0.64	0.64	0.96	0.96	1.28	1.28	1.28
Mass(****)	(kg)	500	565	625	695	835	930	1000	1230	1380

Drawing (See paragraph 11)

Code for general arrangement	B0	B0	B0	B0	C0	C0	E0	E0	E0
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (114 cells) operated at Ufloat=2,27V per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x400 VAC nominal output voltage

-(**) F: Fan cooling

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85.

Data for 3 x 400 VAC output / 400 VDC intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 400 VDC

Output voltage: 400 VAC [380, 415] three phase

Ratings	(kVA)	40	50	60	80	100	120
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UPS input

Nominal input voltage, frequency, tolerances	See page 15						
Maximum current consumption at full load (°)	(A)	109	140	175	216	277	343
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)						

Rectifier-charger output

Nominal voltage	(V)	384					
Output voltage in floating	(V)	435.8					
Max DC current	(A)	125	160	200	250	320	400

Battery

Battery output power	(kW)	35165	43478	52174	69565	86956	104348
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UPS output

Nominal output voltage AC	(V)	400 [380, 415] – 3-phase + neutral					
Nominal output current(*)	(A)	58	72	87	116	144	173

Reserve static switch

Nominal voltage AC	(V)	400 [380, 415] – 3-phase + neutral
Recommended type for reserve input protection		D curve (circuit breakers) or gL (fuses)

UPS System data

Heat dissipation system(**)		F	F	F	F	F	F
UPS system losses(*)	(W)	5409	6253	7504	9227	11533	12696
UPS system efficiency(***)	(%)	86	86	86	87	87	88
UPS system noise	(dBA)	70	71	73	73	73	74
Height	(mm)	1852	1852	1852	1852	1852	1852
Width	(mm)	1200	1200	1600	1600	1600	1600
Depth	(mm)	808	808	808	808	808	1008
Footprint	(m²)	0.96	0.96	1.28	1.28	1.28	1.60
Mass(****)	(kg)	810	925	1100	1250	1390	1560

Drawing (See paragraph 11)

Code for general arrangement	C0	C0	E0	E0	E0	F0
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (192 cells) operated at $U_{float}=2,27V$ per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x400 VAC nominal output voltage.

-(**) F: Fan cooling.

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85.

Chloride Apodys AC UPS 33^{6P-3ph}



Data for 3 x 220 VAC output / 120 VDC (110 VDC) intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 120 VDC [110 VDC]

Output voltage: 220 VAC [190, 208] three phase

Ratings	(kVA)	5	7.5	10	15	20	25	30	40	50
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UPS input

Nominal input voltage, frequency, tolerances	See page 15									
Maximum current consumption at full load (°)	(A)	14	23	29	45	70	70	89	112	140
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)									

Rectifier-charger output

Nominal voltage	(V)	120								
Output voltage in floating	(V)	136.2								
Max DC current	(A)	50	80	100	160	250	250	320	400	500

Battery

Battery output power	(kW)	4762	7143	9524	14118	18823	23529	28235	37647	46512
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UPS output

Nominal output voltage AC	(V)	220 [190, 208] – 3-phase + neutral								
Nominal output current(*)	(A)	13	20	26	39	52	66	79	105	131

Reserve static switch

Nominal voltage AC	(V)	220 [190, 208] – 3-phase + neutral
Recommended type for reserve input protection		D curve (circuit breakers) or gL (fuses)

UPS System data

Heat dissipation system(**)	F	F	F	F	F	F	F	F	F	F
UPS system losses(*)	(W)	1291	1937	2582	3514	4460	5575	6691	8921	10556
UPS system efficiency(***)	(%)	74	75	76	76	78	78	78	78	79
UPS system noise	(dBA)	61	62	62	68	70	70	71	71	73
Height	(mm)	1852	1852	1852	1852	1852	1852	1852	1852	1852
Width	(mm)	800	800	800	1200	1200	1200	1200	1200	1600
Depth	(mm)	808	808	808	808	808	808	808	808	808
Footprint	(m²)	0.64	0.64	0.64	0.96	0.96	0.96	0.96	0.96	1.28
Mass(****)	(kg)	365	410	445	540	655	730	790	875	995

Drawing (See paragraph 11)

Code for general arrangement	B0	B0	B0	C0	C0	C0	C0	C0	C0	E0
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (114 cells) operated at $U_{float}=2,27V$ per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x220 VAC nominal output voltage.

-(**) F: Fan cooling.

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85.

Data for 3 x 220 VAC output / 240 VDC (220 VDC) intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 240 VDC [220 VDC]

Output voltage: 220 VAC [190, 208] three phase

Ratings	(kVA)	15	20	25	30	40	50	60	80	100
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UPS input

Nominal input voltage, frequency, tolerances	See page 15									
Maximum current consumption at full load (°)	(A)	43	53	66	83	104	130	165	206	257
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)									

Rectifier-charger output

Nominal voltage	(V)	225								
Output voltage in floating	(V)	258.8								
Max DC current	(A)	80	100	125	160	200	250	320	400	500

Battery

Battery output power	(kW)	13953	18605	22988	27586	36782	45977	54545	71111	87912
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UPS output

Nominal output voltage AC	(V)	220 [190, 208] – 3-phase + neutral								
Nominal output current(*)	(A)	39	52	66	79	105	131	157	210	262

Reserve static switch

Nominal voltage AC	(V)	220 [190, 208] – 3-phase + neutral
Recommended type for reserve input protection		D curve (circuit breakers) or gL (fuses)

UPS System data

Heat dissipation system(**)		F	F	F	F	F	F	F	F	F
UPS system losses(*)	(W)	3167	4005	4719	5347	7129	8912	9416	10854	12539
UPS system efficiency(***)	(%)	80	80	80	82	82	82	84	86	86
UPS system noise	(dBA)	63	64	65	68	70	71	71	73	73
Height	(mm)	1852	1852	1852	1852	1852	1852	1852	1852	1852
Width	(mm)	800	800	800	800	1200	1200	1600	1600	1600
Depth	(mm)	808	808	808	808	808	808	808	808	808
Footprint	(m²)	0.64	0.64	0.64	0.64	0.96	0.96	1.28	1.28	1.28
Mass(****)	(kg)	505	570	630	700	840	940	1010	1240	1405

Drawing (See paragraph 11)

Code for general arrangement	B0	B0	B0	B0	C0	C0	E0	E0	E0
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (114 cells) operated at $U_{float}=2,27V$ per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x220 VAC nominal output voltage

-(**) F: Fan cooling

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85.

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Data for 3 x 220 VAC output / 400 VDC intermediate circuit

Input voltage: 400 VAC [380, 415] three phase

Intermediate voltage: 400 VDC

Output voltage: 220 VAC [190, 208] three phase

Ratings	(kVA)	40	50	60	80	100	120
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UPS input

Nominal input voltage, frequency, tolerances	See page 15					
Maximum current consumption at full load (*) (A)	109	140	175	216	277	343
Recommended type for UPS input protection	D curve (circuit breakers) or gL (fuses)					

Rectifier-charger output

Nominal voltage (V)	384					
Output voltage in floating (V)	435.8					
Max DC current (A)	125	160	200	250	320	400

Battery

Battery output power (kW)	35165	43478	52174	69565	86956	104348
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UPS output

Nominal output voltage AC (V)	220 [190, 208] – 3-phase + neutral					
Nominal output current(*) (A)	105	131	157	210	262	315

Reserve static switch

Nominal voltage AC (V)	220 [190, 208] – 3-phase + neutral					
Recommended type for reserve input protection	D curve (circuit breakers) or gL (fuses)					

UPS System data

Heat dissipation system(**)	F	F	F	F	F	F
UPS system losses(*) (W)	5409	6253	7504	9227	11533	12696
UPS system efficiency(***) (%)	86	86	86	87	87	88
UPS system noise (dBA)	70	71	73	73	73	74
Height (mm)	1852	1852	1852	1852	1852	1852(°°)
Width (mm)	1200	1200	1600	1600	1600	1600(°°)
Depth (mm)	808	808	808	808	808	1008(°°)
Footprint (m²)	0.96	0.96	1.28	1.28	1.28	1.60(°°)
Mass(****) (kg)	815	930	1110	1260	1415	1590(°°)

Drawing (See paragraph 11)

Code for general arrangement	C0	C0	E0	E0	E0	F0(°°)
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NOTA:

-These data are typical and are valid in the following conditions: Sealed lead acid battery (192 cells) operated at $U_{float}=2,27V$ per cell and at 20°C, with a 3x400VAC Mains input. The system can also be designed and pre-set for use with any other type of stationary battery.

-Full customized technical specification is provided at the bidding stage of project.

-(*) at full load (cos phi 0.8), battery in floating, and at 3x220 VAC nominal output voltage

-(**) F: Fan cooling

-(***) For tolerance, see IEC 60146-1-1

-(****) For information only. Mass may vary according to configurations and options

-(°) at inverter full load (cos phi 0.8), battery in recharge, low input voltage level (400Vac -10%) and with charger input power factor 0.85

-(°°) external bypass cabinet mandatory and not included in this description.

9 Parallel operation

The Apodys UPS systems have the capability to be connected in parallel for Dual configurations between units of the same rating. The parallel connection of Apodys UPS increases reliability for the AC load.

9.1. Distributed parallel configuration

9.1.1. System description

The Apodys UPS range is capable of operating in Dual distributed parallel configuration as shown on Figure 12.

Each Apodys UPS is supplied with the parallel kit option, which consists in one printed circuit board POB (Parallel Operation Board) and one 25 poles, screened data line to the neighbouring UPS system. A dual parallel system is controlled and monitored automatically by controlling each individual UPS. All reserve lines and UPS included share the load.

9.1.2. Operating principle

In this configuration, the 2 UPSs are connected in parallel so that they continuously share the load.

If one of the UPS fails, the remaining UPS keeps supplying the load.

In such configuration, the paralleled UPSs must share the same reserve supply.

9.1.3. Benefits

- Very simple system
- Thanks to the vector control, there is no master and no slave.
- No single point of failure as each UPS includes its own parallel operation board
- The available overload current is doubled

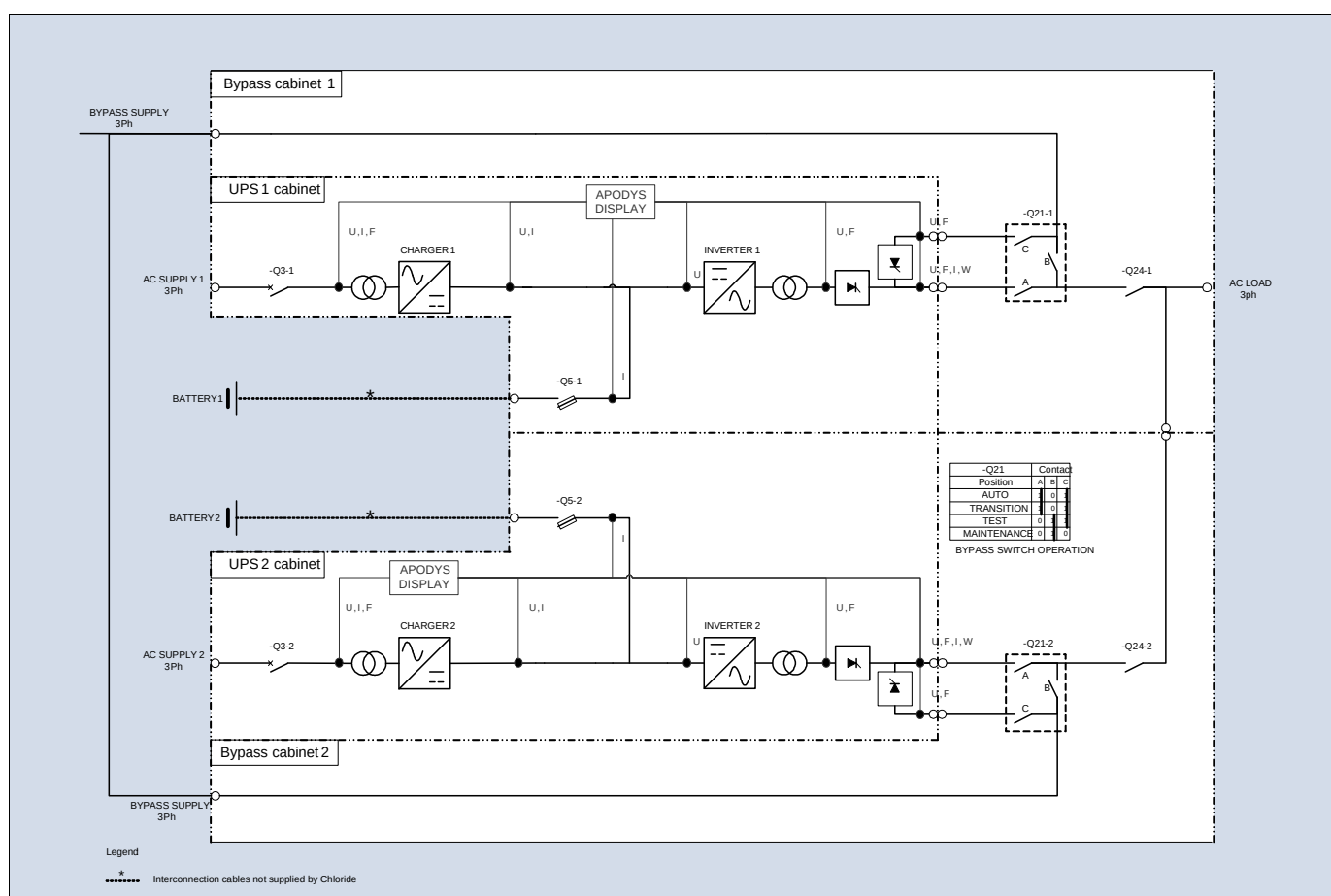


Figure 12: Distributed parallel configuration

9.2. Centralised parallel configuration

9.2.1. System description

The centralised paralleling philosophy enables UPSs without reserve static switches to be connected in parallel. Hereby the reserve supply to the loads works with one central reserve cubicle (see Figure 13).

Again, UPSs of the same rating are connected in parallel.

Each Apodys UPS is supplied with the parallel kit option, which includes one printed circuit board POB (Parallel Operation Board) and one 25 poles, screened data line to the neighbouring UPS system.

Each UPS is monitored and controlled individually. Each UPS includes only one inverter static switch, which is paralleled with the single reserve static switch.

9.2.2. Operating principle

In this configuration, each UPS does not include its own reserve supply anymore. The reserve supply is externally centralised in a COC (Common Output Cubicle).

All the UPS continuously share the load. If one of the UPS fails, the remaining UPS keeps supplying the load.

9.2.3. Benefits

- Thanks to the vector control, there is no master and no slave.
- No single point of failure as each UPS includes its own parallel operation board
- The available overload current is doubled
- Perfect load sharing
- 3 simple static switches instead of 2 double static switches, which increases overall reliability through higher MTBF
- Only one single reserve supply input is present.

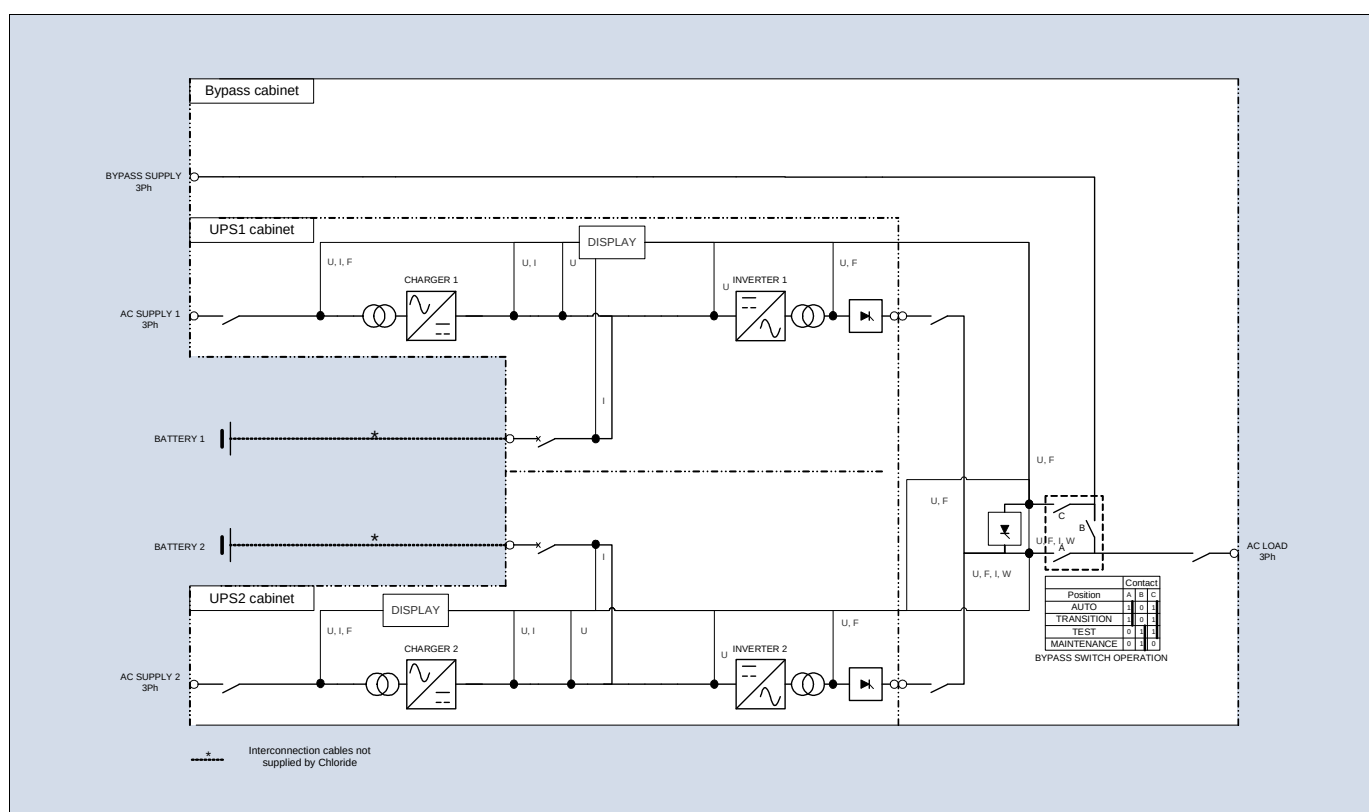


Figure 13: Centralised parallel configuration

10 Options

10.1. Main electrical options

The list of options described in this section is non-exhaustive. Please consult us for any other requirement.

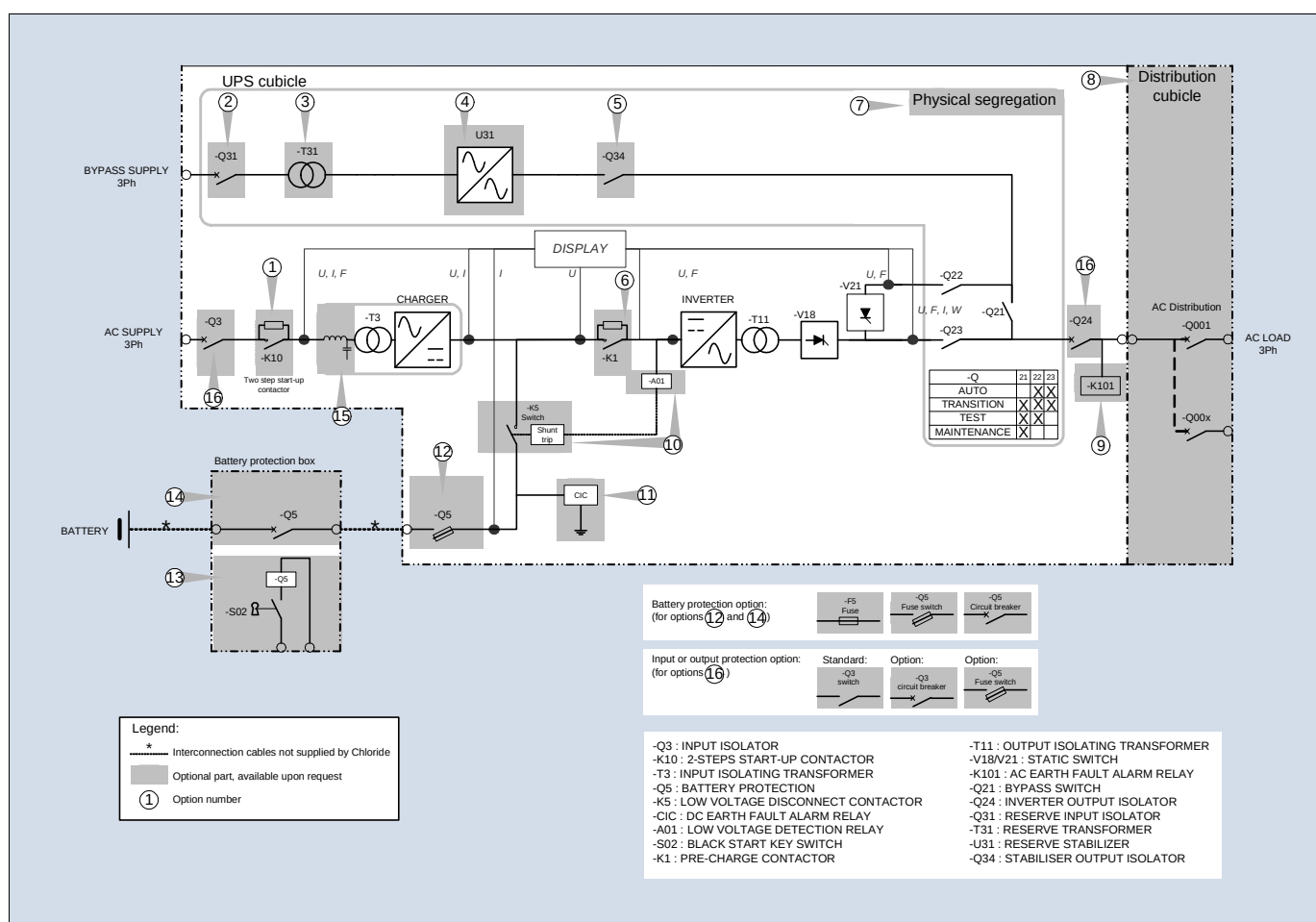


Figure 14: Apodys UPS – overview of electrical options

Option No.	Option name	Function / description
①	Two-steps start-up contactor	Limit the inrush current on starting up the system to 8 times the nominal input current (15 times as standard). Addition of a two-steps start-up device to limit the inrush current due to the magnetisation of the transformer. The device uses a timing relay to firstly magnetise the input transformer through resistors. The contactor is then switched to close position to allow starting up the charger part of the UPS. <i>Please note that the rectifier dimensions mentioned in this document may not be maintained with this option.</i>
②	Reserve supply circuit breaker	Protect the reserve supply input by a double-pole circuit breaker.
③	Reserve supply transformer	Provide full galvanic isolation between the input and the output of the UPS. This transformer is of the type 3-phase input / 3-phase output. <i>This option may affect the overall dimensions of the system.</i>
④	Reserve supply stabiliser	Adjust the reserve supply voltage. The reserve supply voltage adjustment ensures the output voltage is within the tolerance accepted by the connected AC load. The stabiliser can be of the electronic type or electro-mechanical type. <i>This option may affect the overall dimensions of the system.</i>
⑤	Stabiliser output isolator	Isolate the output of the stabiliser to be able to safely maintain it. This isolator is usually a fully rated switch. By opening the reserve input circuit breaker and this isolator, it is possible to completely isolate the reserve stabilizer.
⑥	Inverter capacitors automatic pre-charge	Pre-charge the inverter capacitors to avoid high circulating current when starting up the inverter. The capacitors pre-charge device uses a parallel resistor to firstly supply the DC capacitors during a pre-set time. The contactor is then switched to close position to start-up the inverter. This device is also recommended when using the Black Start option (N° 13).
⑦	Physical segregation	Isolate physically the reserve supply from the UPS System. The reserve bypass supply can be physically apart from the main parts of the UPS system to increase people's safety when maintaining the UPS system. This option is achieved by cabling the reserve supply components (e.g. circuit breaker, transformer, stabilizer) in a separate By-Pass cabinet. <i>This option affects the overall dimensions of the system.</i>
⑧	AC distribution	Ensure the distribution, protection and segregation of the AC load. Distribution boards may be included in the UPS system or installed in a separate cabinet. These distribution boards may be customised (form 1 to form 4) according to the customer's requirements. MCB, MCCB, or fuses are available. <i>This option may affect the overall dimensions of the system.</i>
⑨	AC earth fault alarm	Monitor the insulation resistance on the AC output circuit. Used in conjunction with the isolation transformer, this option is made of an electronic circuit CIC (or equivalent). It is fitted into the UPS cubicle and delivers remote indication by a changeover voltage-free contact. Local indication (inside the cabinet) by two LED's is available on the PCB (or moulded device) to indicate the polarity on fault. A local test push-button is also available on the device to simulate fault conditions.

Option No.	Option name	Function / description
⑩	Low voltage disconnect contactor (LDV)	Protect the battery from deep discharges and thus enhance battery lifetime. The LDV option includes an output contactor controlled by voltage relay in order to disconnect the load at the end of battery autonomy period. Reconnection of the load is automatic at the charger restoration and upon the resumption of normal conditions.
⑪	Earth leakage monitor (DC earth fault alarm)	Monitor the insulation resistance on the DC bus. Used in conjunction with the isolation transformer, this option is made of an electronic circuit "Chloride CIC" (or equivalent). It is fitted into the UPS cubicle and delivers remote indication by a changeover voltage-free contact. Local indication (inside the cabinet) by two LED's is available on the PCB (or moulded device) to indicate the polarity on fault. A local test push-button is also available on the device to simulate fault conditions (+ or -).
⑫	Battery protection	Prevent any short-circuit that could occur on the battery circuit and therefore prevent the battery cables from fire risks. This option is either fitted into the UPS cabinet or externally (battery cabinet or battery protection box). It can not be used with the option N°14. 3 types of protections are made available: – Fuse: fully rated fuse with auxiliary contact for the monitoring of its operating status. – Fuse switch: fully rated fuse switch with auxiliary contact for the monitoring of its operating status. – Circuit breaker: fully rated circuit breaker and an additional auxiliary contact for the monitoring of its position.
⑬	Black Start	Start-up of the UPS (inverter part only) to provide power to the load, even when the Main is not present on the input of the UPS. This option is made of a key switch to force the battery circuit breaker Q5 to close. In this way, the battery circuit is powered, thus allowing the inverter to start thanks to the battery current.
⑭	External battery protection	Protect the battery circuit as for option 12, but can not be used in conjunction with option N°12. The battery protection device is housed in a wall-mounted metal box for battery systems mounted on racks and it is supplied with the battery cabinet, when the battery is fitted in a matching cubicle. Furthermore, this device serves as a safety element for the cross section of the power cable between the UPS and the remotely placed battery system. Therefore, the wall-mounted box must be installed as close as possible to the battery and the length of cables between battery and UPS system must be the shortest.
⑮	Low THDi	Reduce the harmonic currents rejected on the Mains. The standard 6-pulse rectifier is replaced by the standard 12-pulse rectifier, with or without additional filter, according to the THDi requirements. <i>This option affects the overall dimensions of the system.</i>
⑯	Input / output protections	Protect and isolate the input and the output of the UPS system. 3 types of protections are made available: – Switch: the standard configuration includes a fully rated switch with auxiliary contact for the monitoring of its operating status. – Fuse switch: fully rated fuse switch with auxiliary contact for the monitoring of its operating status. – Circuit breaker: fully rated circuit breaker and an additional auxiliary contact for the monitoring of its position.

10.2. Environment-related options

10.2.1. External cubicle protection

According to IEC 60529 (Degrees of protection provided by enclosures-IP Code), it is possible to protect the UPS cubicle from solid or liquid intrusion. The protection levels available are:

IP 21

IP 22

IP 40

IP 41

IP 42

In all cases, even for standard IP 20 level, the third number shall be 7, representing mechanical protection.

It is also possible to require a higher IP code, up to IP54, upon customers' specification and request. In this case, the product is re-designed and might have new technical characteristics that are not mentioned in this document.

10.2.2. Special enclosure finishing

Standard finishing of the enclosure is RAL 7032 (grey) textured semi gloss. Any other type of painting specification is also achievable upon request, in compliance with AFNOR, RAL or BS standards.

10.2.3. Specific ambient operation conditions

Specific temperature conditions: Upon request, the Apodys UPS is able to operate above 40°C (and up to 55°C) or below 0°C.

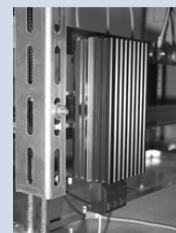
High relative humidity – tropical atmosphere: Specific

modifications of the system may be made upon request, to allow the UPS to operate in high humidity percentage: above 90% of humidity at 20°C.

Special seismic design: Specific modifications of the system may be added to allow the UPS to operate in seismic risks areas (up to 5g).

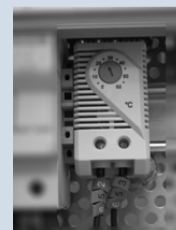
In such extreme conditions, the customer must specify the required service conditions, as specified in IEC 60146-2, §5.

10.2.4. Anti-condensation heater



This option includes a heater which is fitted inside the cubicle, to prevent internal components from condensation, mainly when the UPS is stored for a long period.

10.2.5. Temperature monitoring



This option consists in a thermostat fitted inside the cubicle to indicate abnormal heating in the UPS. This device is adjustable below 90°C and includes a remote indication available on a normally open, voltage-free contact.

10.2.6. LSF (Low Smoke Fume) cables

LSF cables may be available in option. These cables are of the fire-retardant type according to IEC 60332-3A standard.

10.3. Remote monitoring options

10.3.1. Customer interface relays



It is possible to increase the number of inputs/outputs described in paragraph 5.4 by providing an additional board with corresponding output relays. These input/outputs can be used to monitor several parameters specified by the user. Each board includes:

- 3 inputs (from voltage free contacts – Not provided)

Twenty outputs to drive voltage free contacts (provided). The requested number of output information will be made available on double-pole change-over (dpco) contacts (8A/250V AC1; 8A/30V DC1; 1A/60V DC1).

10.3.2. Modbus / Jbus

Upon request, Apodys UPS is able to remotely deliver information through Modbus/Jbus protocol (2 or 4 wires).

This additional feature includes:

- A hardware kit: an additional communication board is included into the Apodys UPS. Customer connections are described in paragraph 5.5.

A software kit: The Apodys UPS is delivered with Chloride's standard Modbus/Jbus code

(embedded into the system) and fully detailed protocol coding documentation.

NOTE:

The communication cable between the UPS and the monitoring station is not part of Chloride's supply.

10.3.3. Monitoring software PPVis

Software solution is available to remotely monitor all Chloride's UPS from the Apodys range (DC and AC systems).

The PPVis software (windows based) offers several features, such as:

- Current state of components
- Display of output voltage, UPS performances, load current
- Number of input failures
- Data storage function

The figure hereafter shows a PPVis screenshot for a UPS system.

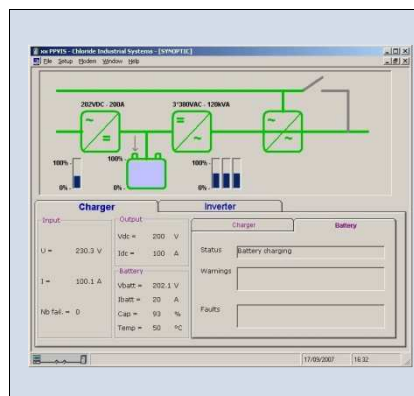


Figure 15: PPVis software screenshot.

10.4. Other options

10.4.1. Special identification of internal components

As standard, Apodys UPS includes internal sub-assemblies identification with self-adhesive vinyl labels. As an option, it is possible to change these labels to engraved traffolyte labels, black signs on white background.

10.4.2. Top cable entry

The option allows power cable entry from the top of the UPS, by adding an external cabinet to drive the cables down to the bottom of the UPS.

IMPORTANT NOTE

This option affects the overall dimensions of the system.

10.4.3. Internal lighting



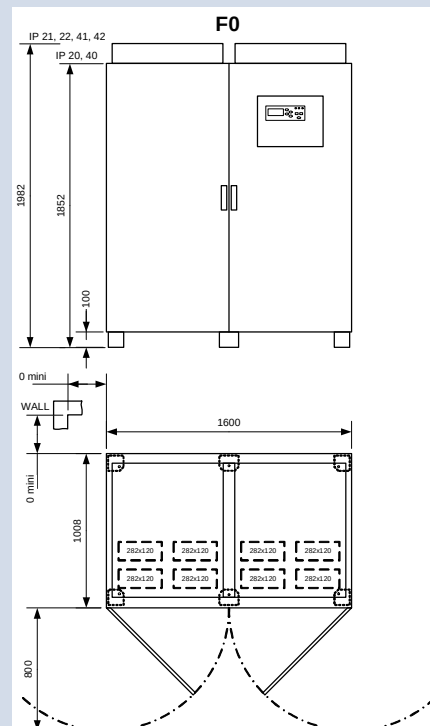
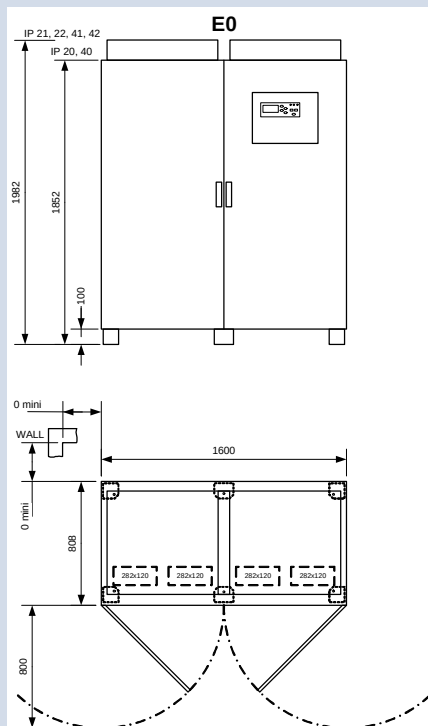
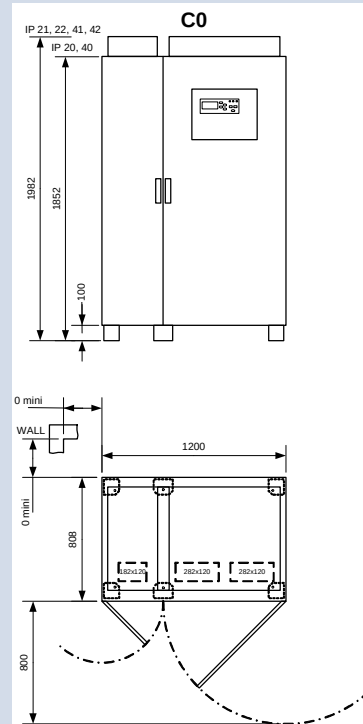
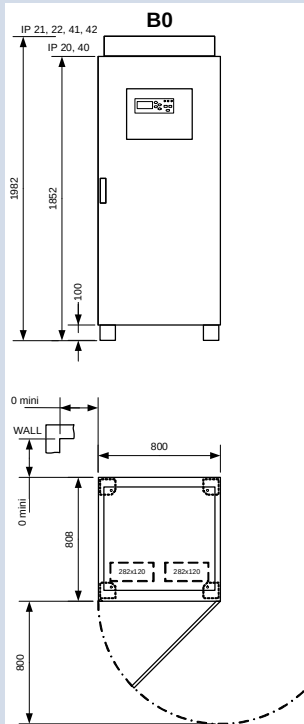
Internal lighting is available upon request to improve internal visibility of the system.

10.4.4. Lifting eyes



Upon request, the UPS cubicle can be equipped with lifting eyes to facilitate its installation on site.

11 General arrangement drawings



[illegible]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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