



ИБП Jovyatlas Jovucube (160 кВА) - руководство по эксплуатации. Юниджет

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Operating manual

WÄRTSILÄ

JOVYCUBE 160



BAX 5157_en



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1 Introduction

Congratulations on purchasing a UPS unit from our **WÄRTSILÄ JOVYCUBE** series. The static UPS you have chosen incorporates the latest state of technology in power electronics and digital signal processing. It provides an ideal solution to the problems of supplying power to electronic data processing systems.

Our **JOVYCUBE** UPS systems are true online systems (UPS classification VFI SS 111 in accordance with IEC 62040-3) that protect your consumers. The production of this equipment is subject to stringent quality assurance. As a result, the UPS offers the perfect solution to your power supply needs.

The reliability of this product is our top priority and the result of more than 65 years of experience in secure power supply technology.

1.1 General instructions

Please read these instructions carefully

This operating manual includes safety requirements, instructions for installation as well as working instructions to help you guarantee the maximum performance and operating readiness the UPS offers. The manufacturer accepts no liability for damage to persons or equipment caused by non-adherence to instructions given in this manual.

Please keep these instructions in a safe place

They contain important rules for the safe use of this UPS and information for contacting the manufacturer's service department (see back page) in the event of any questions or problems concerning the UPS and its correct operation.

Validity

This operating manual reflects the technical status of the UPS at the time of printing. Its contents are not part of any contract but are for information purposes only.

Wärtsilä JOVYATLAS EUROATLAS GmbH reserves the right to make substantive and technical changes relative to the content of this operating manual without prior notification. **Wärtsilä JOVYATLAS EUROATLAS GmbH** cannot be held liable for any errors or inaccuracies in this operating manual, in view of the fact that no obligation to provide regular updates to it exists.

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Our goods and services are subject to the general terms of delivery for products of the electronics industry as well as our general sales conditions. We reserve the right to make changes to this operating manual – in particular the technical data, operating instructions and weights and measures stipulated in it – at any time. We ask that any claims in respect of delivered goods be submitted within eight days of receipt of goods, enclosing the relevant packing note. Claims made at a later time cannot be considered.

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1.2 Overview of warning information

Correct operation and servicing and adherence to the safety regulations are essential in order to protect personnel and ensure that the system is constantly operational. All personnel involved in installing/dismantling, start-up, operation and service of this equipment must be familiar with and observe these safety regulations. Only trained and qualified personnel may carry out the described work and they must use the proper, intact tools, equipment, test equipment and materials.

Important instructions are indicated by the terms "**CAUTION**", "**ATTENTION**" and "**NOTE**", and by indented text passages.



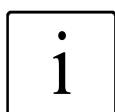
CAUTION:

This symbol identifies all working and operational procedures requiring absolute compliance to avoid any danger to personnel.



ATTENTION:

This symbol identifies all working and operational procedures requiring absolute compliance to prevent any damage or disruption to the uninterruptible power supply (UPS) or any of its components.



NOTE:

This symbol identifies technical requirements and additional information requiring the operator's attention.

2 Description of the system

Ensuring a reliable power supply is one of many major issues when using electronic data processing and process control systems. The main causes of many interruptions to power supply are:

- Spikes produced by switching devices on the mains distribution
- High frequency superposition caused by welding machines, fluorescent lights, photocopiers and more
- Voltage variations due to fast load variations in big inductive consumers (lifts, transformers, machinery, etc.)
- Voltage failures due to disturbances in the mains supply
- Frequency variations caused by the use of separate power supply units

The range of disturbances extends from data corruption to memory leaks and from hardware failure to production stoppages. Therefore, the quality of the power supply is key to the reliability of electronic data processing equipment. The perfect solution for a secure, uninterrupted power supply for critical consumers is thus the UPS (**U**ninterruptible **P**ower **S**upply). The UPS:

- Generates a constant supply voltage and frequency
- Reduces mains disturbances and feedback
- Guarantees an uninterruptible power supply to connected consumers for a specified period during a mains failure

In comparison with conventional power sources such as the mains power supply or generators*, the cutting edge technology featured in UPS systems in the **JOVYCUBE** series brings the following outstanding advantages:

- Minimum mains feedback caused by active IGBT rectifiers
- Extended communication interfaces
 - Serial port (USB) to read out the alarm history and for software updates
 - SNMP adapter for remote monitoring, data exchange via a LAN connection
 - MODBUS adapter for remote monitoring, data transfer using MODBUS protocol via RS485 interface
 - Enhanced capacity and redundancy based on installation of additional modules
 - Relay card with alarm messages for industrial remote monitoring via floating contacts

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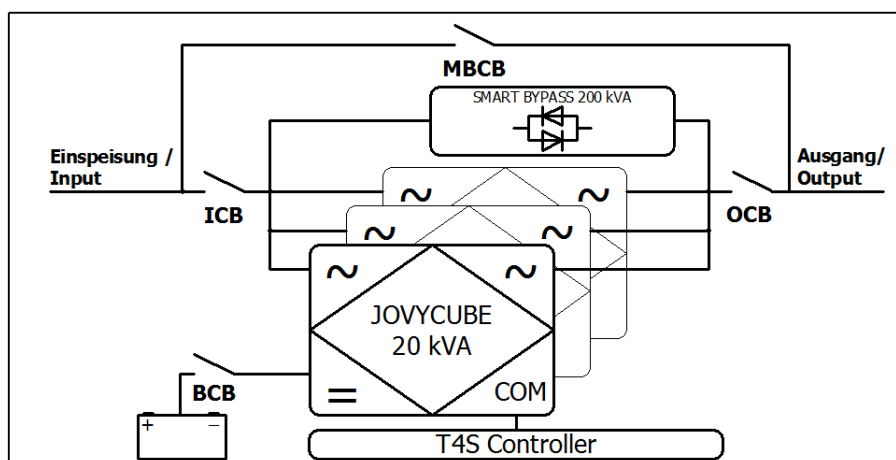
NOTE:

Operation of a UPS or other electronic consumers using a generator assumes that before installing the complete system the planner has established whether the generator can be used in conjunction with power electronics.

Some generators are designed such that operation with power electronics consumers is not possible due to the additional loading with harmonics, power factor and commutation notches. In some cases faults may occur such as voltage unbalance, a tendency to oscillate and the shutting down of the generator. It may help to ask the generator manufacturer about this and, if necessary change the regulator on the generator or incorporate damper windings in the generator from the outset.

2.1 Functional description

The block diagram shows the functional design of a JOVYCUBE UPS. It normally comprises several parallel switched single modules. The "ICB", "MBCB", "BCB" and "OCB" switches are used to start and shut down the UPS as well as to switch over to the bypass. Additionally, for maintenance purposes the battery can be disconnected from the UPS. The drawing includes the optional static bypass (smart bypass).



2-1 Block diagram of a JOVYCUBE UPS

Key to the block diagram

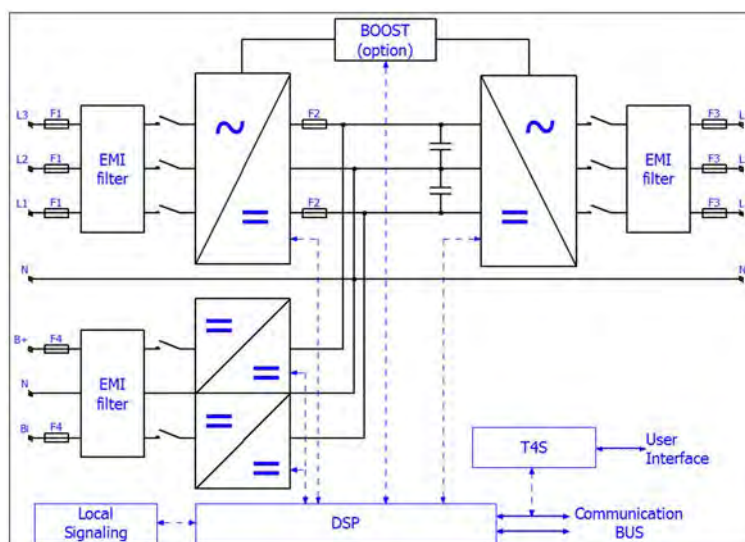
- Mains/bypass → UPS supply
- ICB → Input **C**ircuit **B**reaker
- MBCB → **M**anual **B**ypass **C**ircuit **B**reaker
- BCB → **B**attery **C**ircuit **B**reaker
- OCB → **O**utput **C**ircuit **B**reaker
- Output → Output for the connection of consumers

2.1.1 UPS module

One UPS module on its own in fact provides all the functionality of a conventional UPS system, including a rectifier, inverter and battery charger.

The main benefit of these UPS modules lies in their hot-pluggable and hot-swap capability.

This means that in live operation you can plug additional modules into the UPS cabinet, provided there are free slots available, and remove modules from it, provided the power supply of the remained modules is sufficient.



2-2 The block diagram gives an description of the topology and operation of a 20kVA module

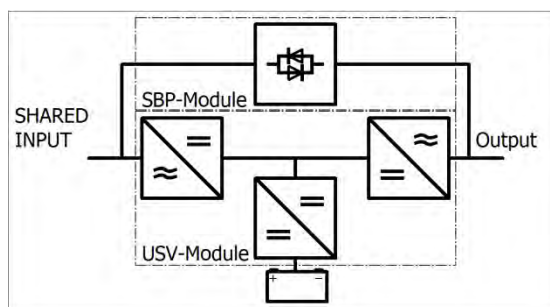
2.1.2 Static bypass module

Depending on the operating mode, the static bypass module (SBP module for short) improves the consumers' supply reliability and/or saves energy. Thanks to the 200 kVA/kW output and a short-circuit current of max. 2,900 A/20 ms per module and phase, fuse triggering due to short circuits or load surges presents no problem.

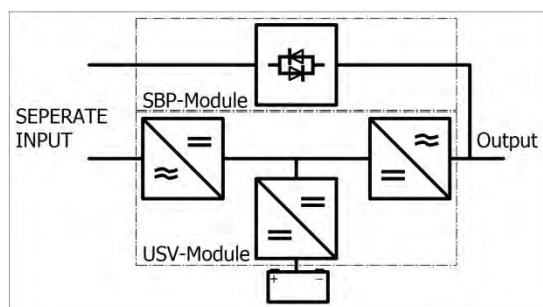
There are two operating modes available. These are set either using the switch on the module or in the software.

In **VFI mode** (voltage and frequency independent), load is supplied through the UPS. The static switch only becomes active in the event of a malfunction, of overload or if there is a short circuit. Load is applied to the SBP module within 5 ms.

In **ECO mode**, load is supplied permanently via the SBP module. As mentioned above, this offers the benefit of reduced energy consumption. In the event of failures and/or mains grid irregularities, battery mode is engaged immediately, thus ensuring critical load.



2-1 Topology with shared input



2-2 Topology with separate input

As the diagrams show, the module is connected in parallel to the 20 kVA UPS modules.

The module's dimensions correspond to those of a UPS module. The SBP can therefore be retrofitted into an existing system without difficulties provided there is sufficient space and shared input is ensured.

2.1.3 UPS system

A UPS system normally comprises several UPS modules interconnected inside a UPS cabinet by way of a rail system which together supply the power needed by the connected consumers.

If you install an additional UPS module in such a UPS system you will be sure of maintaining the best possible safe supply to connected consumers, as the redundant UPS module maintains the power supply in the event of a technical fault in one of the primary modules.

In such a case you can easily and conveniently replace the faulty UPS module with a new one while the other modules continue supplying the connected consumers.

2.1.4 Battery

The battery works in standby parallel operation, which means that the inverter, charger and battery are permanently connected in parallel. To obtain the maximum lifetime of the battery it is protected by floating operation according to DIN 41773.

2.1.5 Internal, manual bypass

Manual bypass is used to bypass parts of the UPS. In the event of maintenance or repair, the load is supplied directly from the mains.

2.2 Operating states

NOTE:

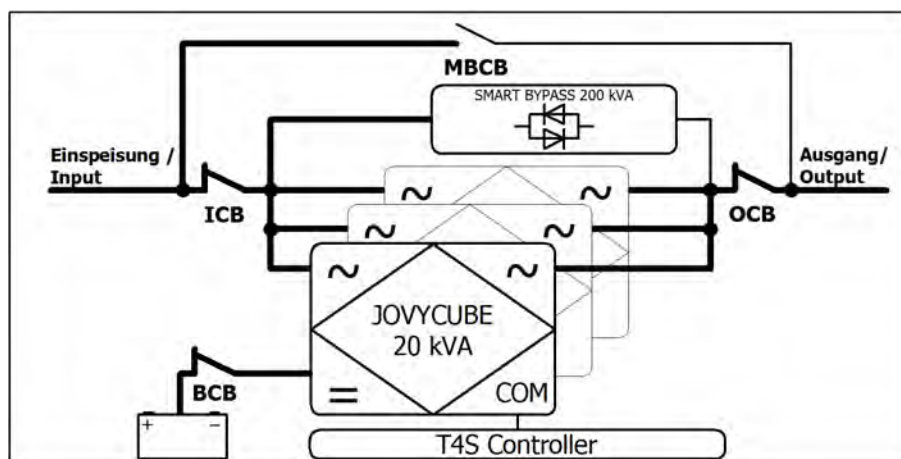
The block diagrams include the optional SBP static bypass. It is integrated into the system depending on the UPS design.

2.2.1 Normal operation

In normal operation, all the installed UPS modules supply the connected consumers, with the power demand being spread equally across all the UPS modules.

Online operation

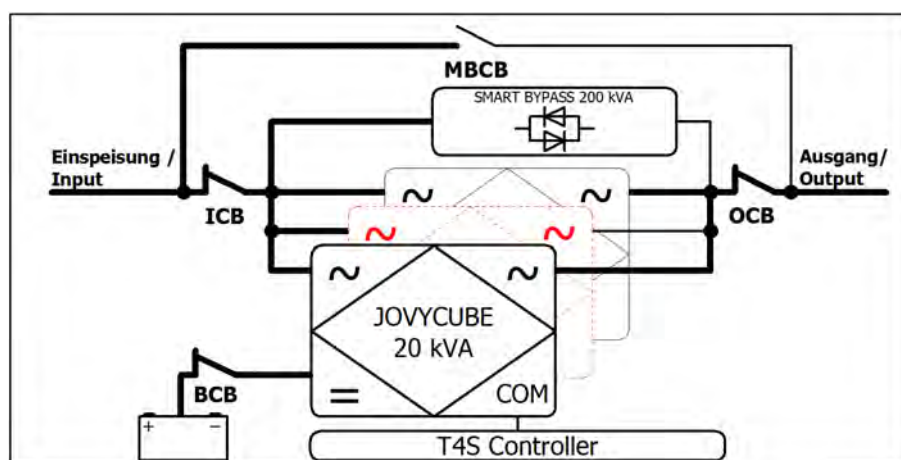
- The mains feeds the rectifiers.
- The rectifiers provide the DC voltage for the inverter and charge the battery.
- The inverters supply the load at the output with the necessary energy.



2-3 Online operation: load supplied via the inverter

2.2.2 Module error

- The mains feeds the rectifiers.
- The rectifiers provide the DC voltage for the inverter and charge the batteries.
- In the event of a module error, the module concerned is shut down and the load is distributed across the remaining modules, provided enough reserve is available. If not enough reserve was available, the UPS would switch to overload mode and so supply to the consumers would no longer be assured. For that reason, we recommend running a redundant 20kVA module in parallel.



2-4 Module error: Load supplied via the remaining UPS modules

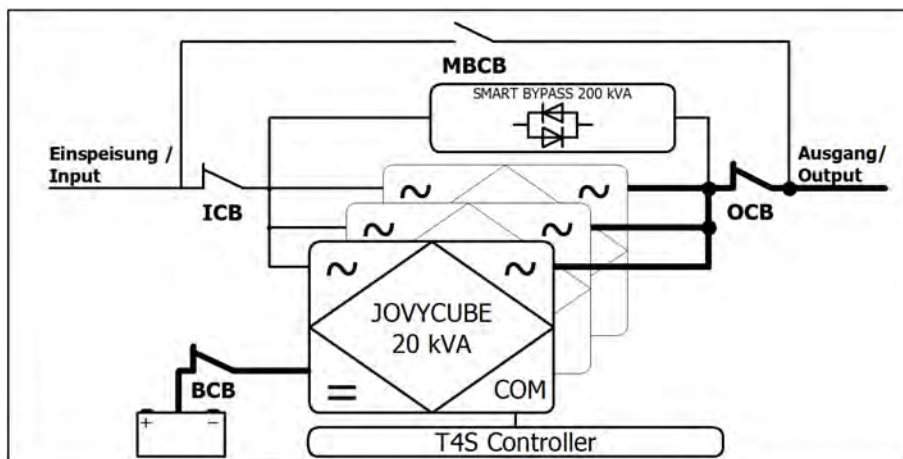
2.2.3 Mains failure

- The battery provides the DC voltage for the inverters (for the duration of the stored energy time).
- The inverter supplies the load at the output with the necessary energy.
- If there is any threat of a deep battery discharge, the system automatically shuts down completely and the load is no longer supplied with power.

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Note:

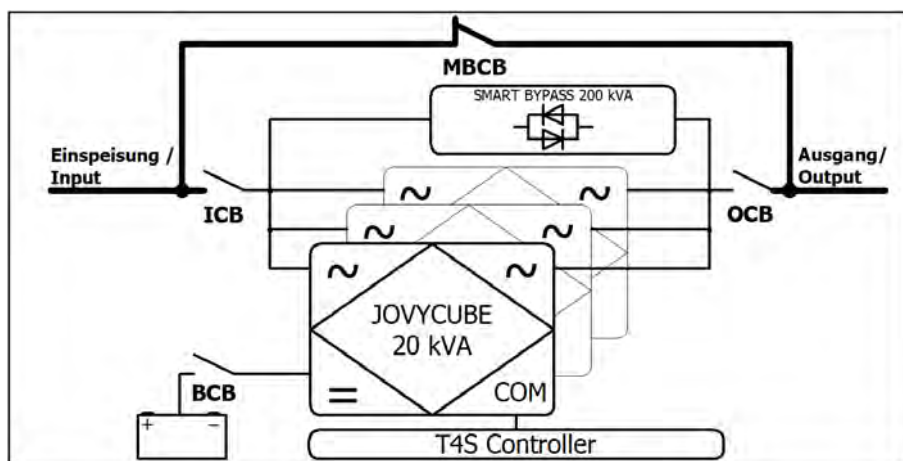
In case of failure of one phase at the input, the load is proportionately supplied of the two remaining phases and from the battery until it is discharged.



2-5 Mains failure: load supplied via the inverter according to the stored energy time of the batteries

2.2.4 Manual bypass

- The load is supplied by the mains via the manual bypass.
- Any necessary maintenance or repairs to the UPS can be carried out safely.

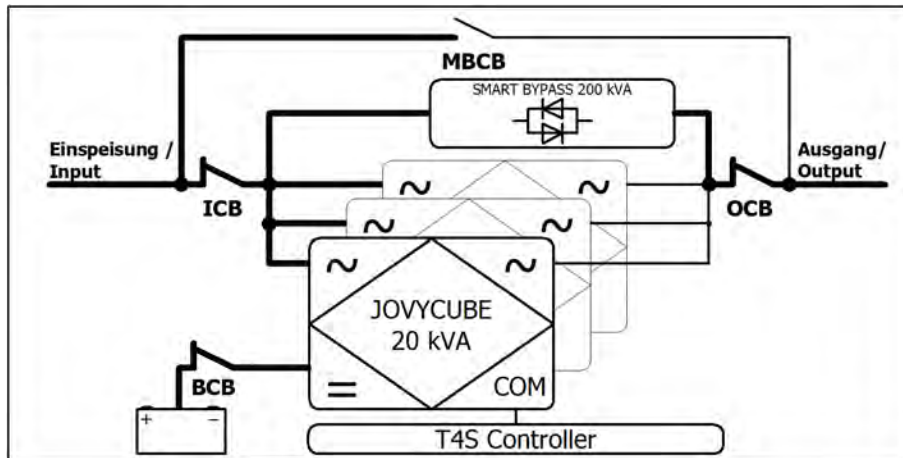


2-6 Manual bypass Load supplied via the manual bypass

2.2.5 Smart bypass

ECO mode:

- The load at output is supplied by the mains via the static bypass.
- The mains feeds the rectifiers.
- The rectifiers supply the DC voltage and charge the batteries.
- In the event of grid failure and/or irregularities in the supply, the UPS switches to battery mode within 5 ms and supplies load via the UPS modules' inverters.



2.7 Bypass Mode: Load supplied via the smart bypass

Online mode (VFI):

- The mains feeds the rectifiers.
- The rectifiers provide the DC voltage for the inverter and charge the battery.
- The inverters supply the load at the output with the necessary energy (see Figure 2-3).
- In the event of a fault, e.g. overload, short circuits or module malfunctions, the UPS switches to bypass mode within 5 ms (see Figure 2-7) and supplies the load via the static bypass. Once the faults have been rectified, online mode is immediately re-engaged.

3 Installation

Remove the packaging immediately after receiving the UPS and check the system for transport damages. The transport company must be informed immediately after receipt of the UPS in the event of any damage caused during transportation. If the UPS is not installed immediately it must be stored in an upright position as indicated on the packaging and kept in a dry, well ventilated room. If the UPS is not stored in the original packaging, it must be protected from dust and moisture.

3.1 Installation

The UPS must be set up in a clean, dry, dust-free room. The operator must ensure that the room is adequately ventilated, so that the system is sufficiently cooled and overheating is prevented. Please observe the set-up diagram in the appendix. If the UPS is supplied with built-in batteries, the exchange of air with the external environment must be in accordance with EN 62040, appendix N.

3.2 Electrical connections, cross sections, fuses

The electrical connection of the UPS unit is the task of the electrician providing the electrical installation services. This task is not carried out by the UPS manufacturer. For this reason, the following recommendations are only an indication, as the UPS manufacturer is not responsible for the electrical installation.

In all cases, we recommend installing and connecting the input and output in conformity with local regulations and standards. **In particular, take care to ensure a clockwise rotation phase sequence during electrical installation.** If no error message is generated, the Jovycube will also operate with an anti-clockwise rotating field, and this may result in destruction of the UPS/modules if the manual bypass is used. In the event that strong electromagnetic fields are emitted, we recommend the use of shielded cables between the UPS and the load.



ATTENTION:

Even when the mains voltage is switched off there is a dangerously high battery voltage inside the device. All installation and connection work may therefore only be carried out by a qualified electrician. Before commencing work, electricians must read this manual carefully to familiarize themselves with the special features of this UPS unit. The UPS output still carries voltage even in the event of a mains failure. For this reason, the installer must clearly label the outlets and sockets on the UPS unit in accordance with EN 62040!



ATTENTION:

The input line between the mains and the UPS unit must be protected against short circuits!
The use of FI safety switches before the UPS unit is not recommended.

3.2.1 Fuses and cross sections for cable connections to the UPS

The following table shows only dimensions (cable current carrying capacity in accordance with DIN VDE 0298-4) under defined, specified (operating) conditions. However, because the suitable cable cross-sections have to be determined for each individual application with consideration for cable type, routing, ambient temperature, cable bundling and cable lengths in accordance with VDE and local regulations, these values are only applicable under these specific conditions.

The dimensions given below assume the following conditions:

- H07V-K PVC-insulated single-core non-sheathed cable with a max. operating temperature of 70 °C
- Cable routed through electric wiring conduit
- Ambient temperature 30 °C
- Cable bundling (group 2)
- Max. 50 m cable length between load and UPS unit
- Protective conductor dimensioning to VDE 0100 Part 540
- 400V alternating voltage

160 kVA	WÄRTSILÄ JOVYCUBE	
	Cross section [mm ²] (phases + N / PE)	Recommended fusing [A]
Rectifier input	4 x 95 / 1 x 50	3 x 250
UPS output	4 x 95 / 1 x 50	-
Battery B+, B-, N	2 x 3 x 95 / 1 x 95	3 x 500

3.2.2 Connections to the UPS

The UPS should be connected up as shown in the technical drawings in the appendix at the end of this operating manual.

Attention:

The max. Voltage and current of the potential free message contacts is
30VDC/2A.

Notice:

In normal mode, the feed's neutral line is required under all circumstances. If this cannot be ensured, a transformer forming a neutral point needs to be connected upstream.

3.2.3 Mounting and connecting the battery

Please refer to the technical drawings in the appendix of this operating manual for information on mounting and connecting the battery to the UPS.

Attention:

Unless otherwise noted, the battery cables of the battery cabinets or strings must be connected directly to the UPS.

The reason is the reduced cross section of the cable.

Note:

Observe DIN EN 50272 when setting up the battery.

4 Operation

The operation is exclusively over the modules (ON/OFF-Switch).

The information gathering such as voltages, currents, power etc is done via the control unit (T4S*) or the optional 7 inch touchscreen. In both versions, a connection can be established via IP, from the display or the RJ-45 port in the connector panel, to a PC. For this purpose, only a web browser such as Mozilla Firefox and a patch cord (not supplied) is required.

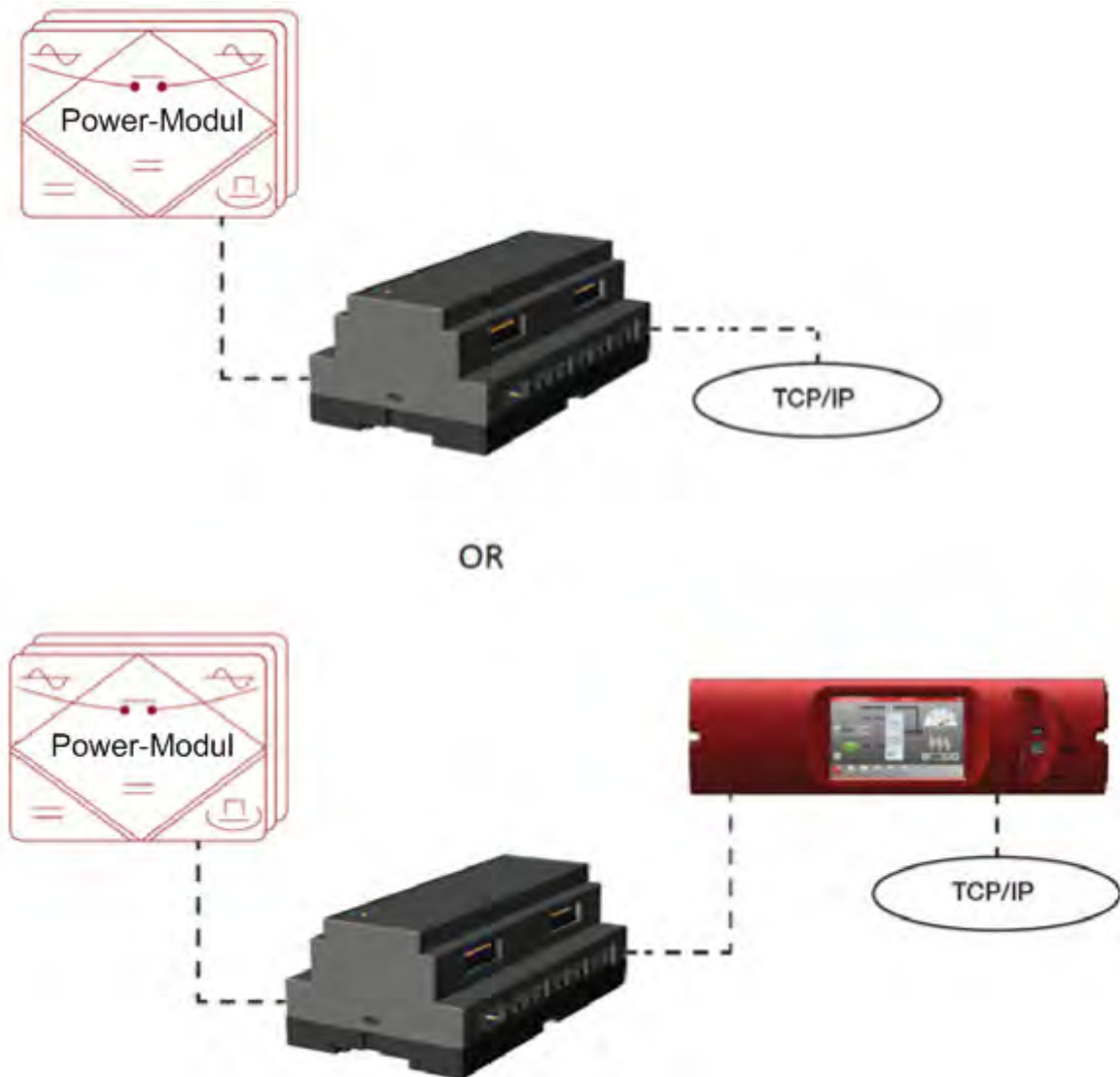
The IP address is set in the factory to **192.168.0.2** and can be changed in its sole discretion.

The password for the basic access is set from the factory to **pass123** and can be changed at your discretion. The expert mode is reserved exclusively for the company WÄRTSILÄ JOVYATLAS.

4.1 Software overview

The software embedded in T4S and the Display allows complete system supervision through "touchscreen display" or via web browser, and provides functionalities such as:

- System setting and configuration (password protected)
- System status and information display
- System alarms and events log file.
- System-self-maintenance (battery test, battery boost charge, ...)

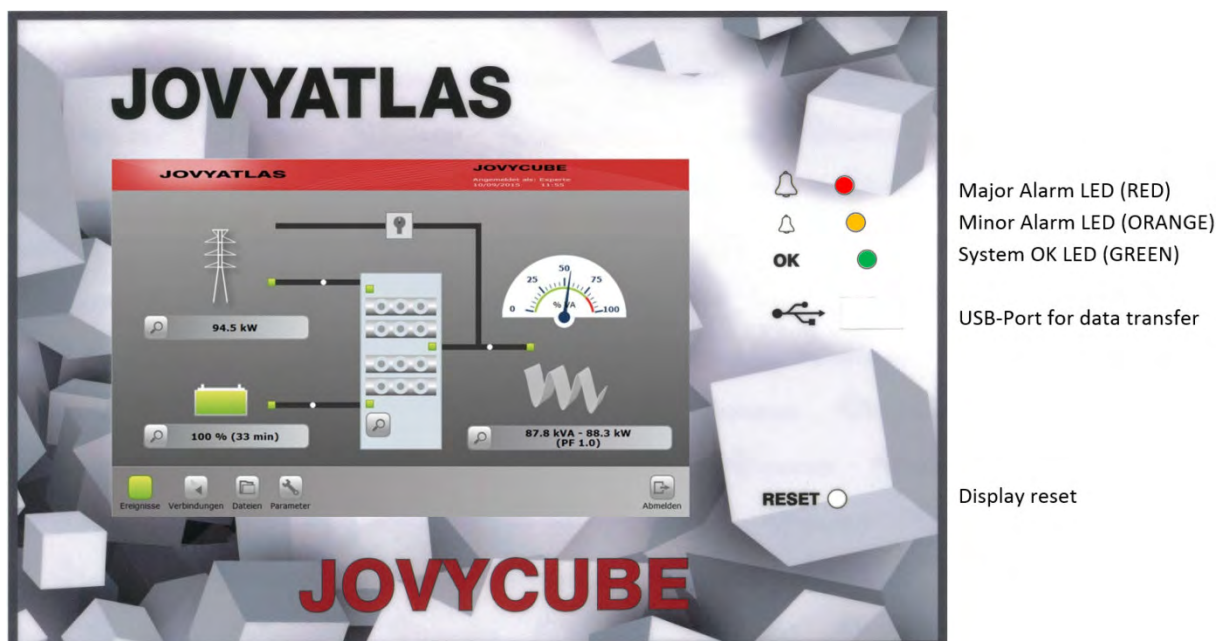


4.2 Touchscreen Display

The 7" touchscreen display provides easy access to system monitoring via a powerful web-based graphic display. Along with the display there is also PC-based access to the same GUI via the Ethernet port provided as standard on the front panel.

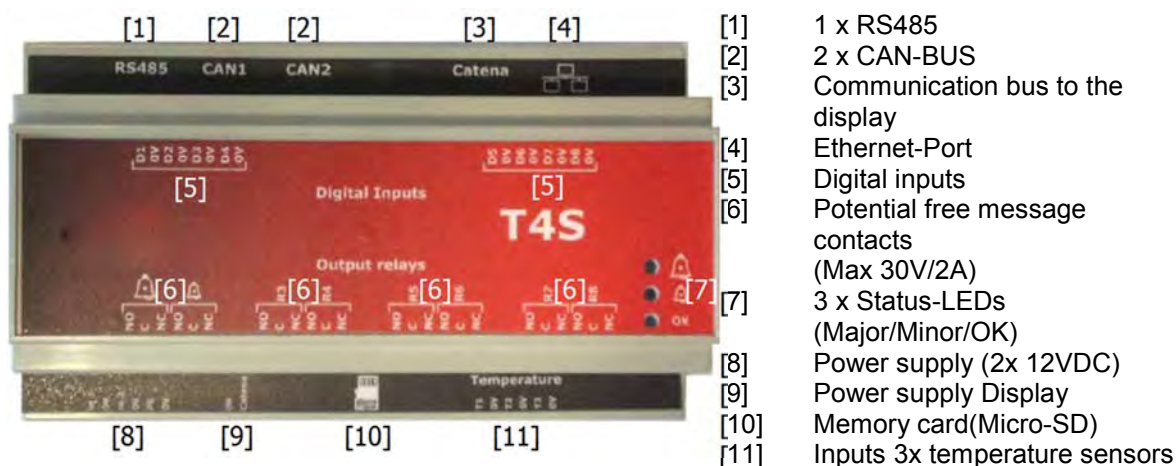
There are two versions of the display:

- Rack installation: The display is flush-mounted in the cabinet instead of a 20 kVA module.
- Door installation: The display is installed in the door. Note that in this case the protection class is lower – IP20.



4.3 Controller T4S

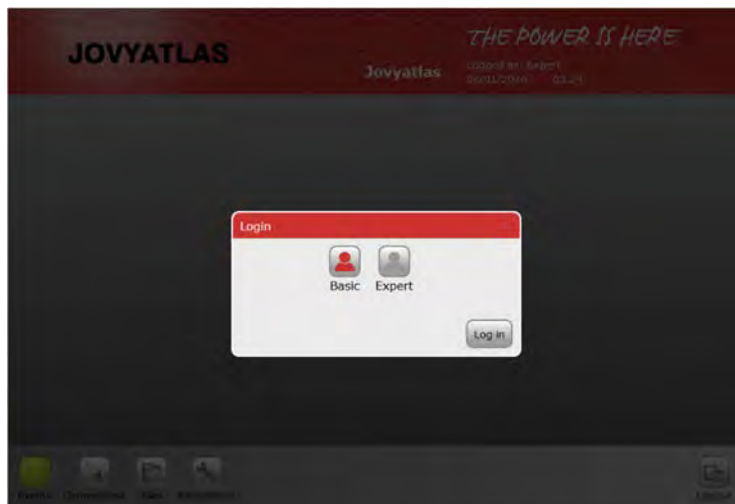
The T4S is the central control unit which stored all parameters, controlled the modules and sent information's via SNMP or RJ45 interface.



4.4 Startup/Login

As described in section 5, the system can be accessed via either the display or via web browser. To access the system via web browser, enter IP address **192.168.0.2** in the browser address bar and confirm.

Both versions have the same interface structure:



The login screen gives you two access options:

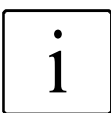
BASIC:

This is only for the purpose of obtaining information. Changes are not allowed.

EXPERT:

Allows system parameters to be modified and changed.

The default factory-set password for basic access is **pass123** and can be changed at your own discretion (If you lose the password, a change is no longer possible. This has the consequence that a service technician from WÄRTSILÄ JOVYATLAS needs to update the software). Expert mode is reserved exclusively for WÄRTSILÄ JOVYATLAS.

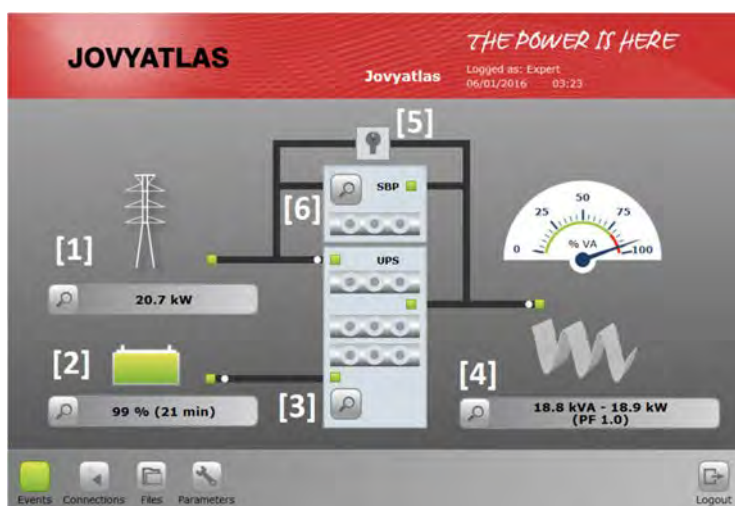


The values explained in the sections below cannot be changed in BASIC access mode. Changes can only be made by trained personnel in EXPERT access mode.

NOTE:

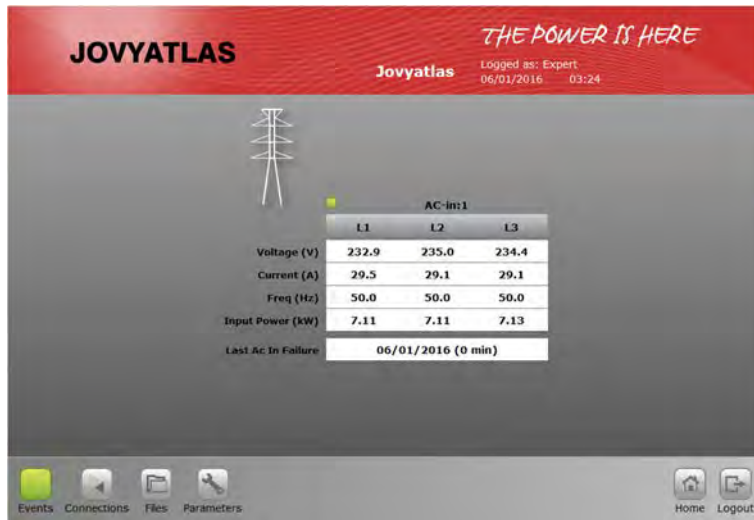
4.5 Standard functions

The main screen displays the status and current measured values of the system components. For details, simply click on the relevant magnifier icon:



- [1] AC input
 - Green: OK
 - Red: Mains fault
- [2] Battery
 - Green: OK/charge
 - Amber: OK/discharge
 - Red: Battery fault
- [3] UPS module
 - 3-status LEDs:
 - AC-IN
 - AC-OUT
 - BATTERY
- [4] AC output
 - Green: Inverter feeding load
 - Amber: Load >75%
 - Red: Inverter not feeding load
- [5] Manual bypass
- [6] Static bypass
 - The symbol is only visible when using an SBP module.

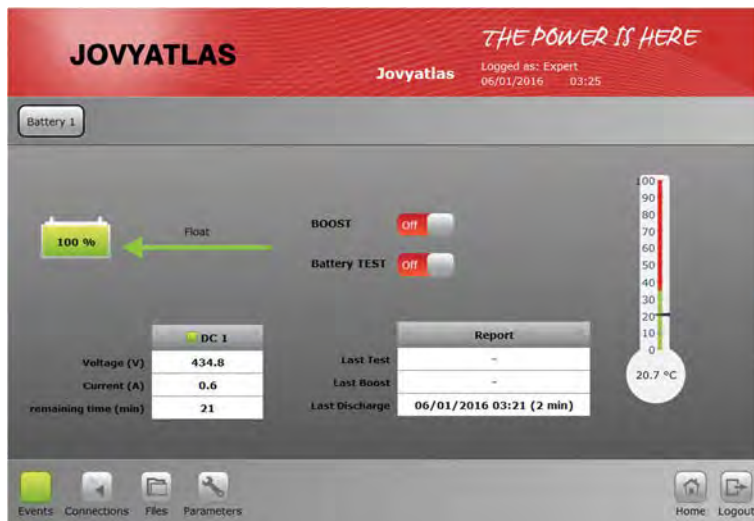
4.5.1 [1] AC Input



Returns AC input data:

- Voltage [V]
- Current [A]
- Frequency [Hz]
- Output [kW]

4.5.2 [2] Battery



Returns battery data:

- Temperature [°C]
- Voltage [V]
- Current [A]
- Report:
 - Last Test
 - Last Boost
 - Last Discharge

The manually battery test and/or boost can be start here.

The following points must be true to start the test/boost:

- Logged in as expert
- Test/Boost is enabled and configured in the parameter settings
- The last test is longer than a week ago

4.5.3 [3] UPS Module



Returns information about the 20 kVA module:

- Number of installed modules
- Redundancy level
- Installed power
- Available power
- Average temperature

4.5.3.1 Module selection table

Clicking the "Select module" icon opens a module selection table in a separate window.

Client ID	Serial no	Soft version	AC In		DC In	AC out	
			Group	Phase		Group	Phase
1	000762	16	1	1-2-3	1	1	1-2-3
3	001047	16	1	1-2-3	1	1	1-2-3

-Clicking a module calls up detailed information for that module.
In addition, the respective module's LEDs flash.

- A green LED indicates that the module is running without faults.
- An orange LED indicates a fault, usually one that can be rectified.
- A red LED indicates a major fault.
Clicking "Events" will then show you the current fault.
- A module highlighted grey has been removed or is not detected by the bus system.

4.5.3.1.1 Module information

AC Input			
	L1	L2	L3
Voltage (V)	231.9	233.7	233.4
Current (A)	14.1	14.1	14.1
Power (kVA)	3.5	3.5	3.5
Power (kW)	3.3	3.3	3.3

AC Output			
	L1	L2	L3
Voltage (V)	231.4	231.3	231.1
Current (A)	13.2	13.1	13.3
Power (kVA)	3.1	3.1	3.1
Power (kW)	3.2	3.2	3.2
Out ratio (%)	47.0	47.3	48.5

DC	
	DC-In:1
Voltage (V)	434.8
Current (A)	0.0
Power (kW)	0.0

- Clicking "Identify" shows the assigned module in the network (all LEDs flash)

- The LEDs show the status of the plug-in module:
AC Input
DC Input
AC Output

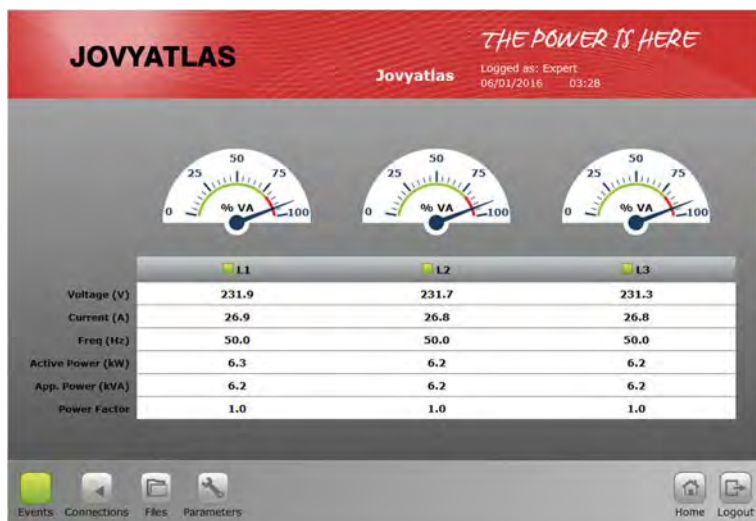
- Green: OK
- Amber: Repairable fault
- Red: Non-repairable fault

- Clicking "Select module" returns you to the selection table

- Clicking "X" erase the unplugged module

-Clicking the fan symbol resets the interval timer for fan replacement.

4.5.4 [4] AC Output



The AC Output control board returns the following output values by phase (L1–L3):

- Voltage [V]
- Current [A]
- Frequency [Hz]
- Active power [kW]
- Apparent power [kVA]

– Plus utilisation per phase (see diagram)

4.6 Toolbar

The following sections outline and explain the toolbar subgroups. The toolbar gives you access to any information and parameters you need.



4.6.1 Events



The table shows current events/alerts

- Red: Major alert
- Amber: Minor alert
- White: No alert

Clicking "Log" displays the stored events/alerts history.

4.6.1.1 Filter



The "Filter" button makes it easier to search for specific alerts.

4.6.2 Connections



This is where you can view the assignment of the digital inputs and relay contacts.

4.6.3 Files

4.6.3.1 Transfer



Event History:

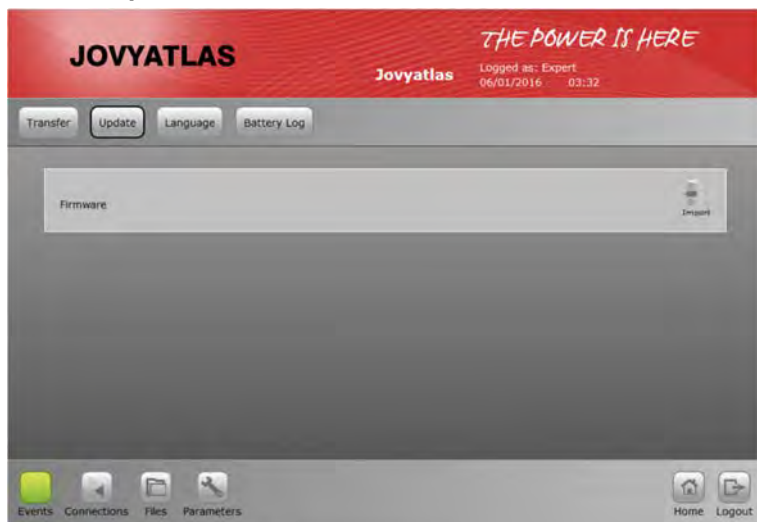
- Export/read fault memory as a text file. (filename extension must be changed from *.log to *.txt)

- Clicking "Clear" deletes the memory.

Configuration:

- Configuration export/import

4.6.3.2 Update



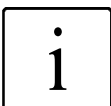
For upgrading T4S firmware.
"Import" allows you to upload the
new firmware.

4.6.3.3 Language



– Selection of menu language.
– Three languages can be stored,
updated, changed or deleted.

4.6.4 Parameters



New parameters must be confirmed using <<Save>>, otherwise the old values will be retained. (Changes can only be made in EXPERT access mode.)

NOTE:

4.6.4.1 Monitoring



Monitoring includes:

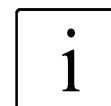
- Time
 - Date and time settings
- Regional settings
 - Language selection
 - USP name
 - USP location
 - logout time
- Passwords
 - Password change
- Network
 - Parameterisation of Ethernet connection
- Temperature sensors
 - Configuration of temperature compensation (battery)
- Alarms
 - Enable / Disable Alarms

4.6.4.2 Modbus



ModBus RTU includes:

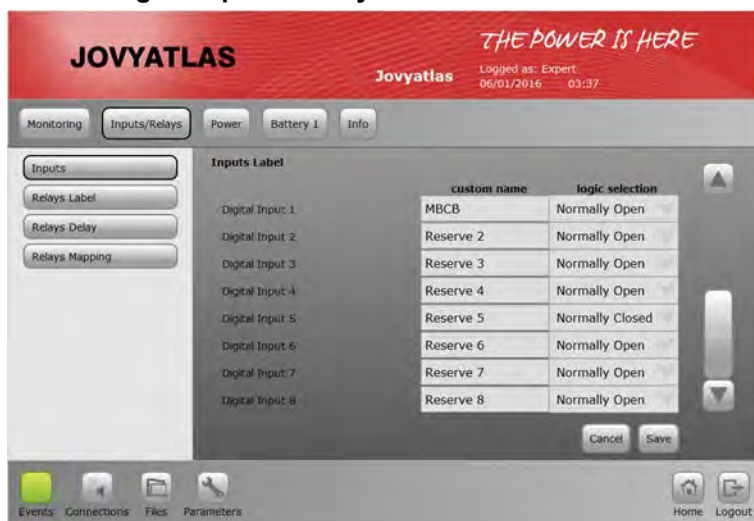
- RTU slave
 - Enable or disable
- Slave address
 - Adressrange: 1-254
- Baud Rate
 - The following rate are supported: 9600, 19200, 38400, 115200 and 460800
- Parity
 - None, even or odd
- Stop bit(s)
 - 1 or 2
- Tables version



HINWEIS:

The modbus-addresses are available in an additional document

4.6.4.3 Digital inputs / Relays



Inputs/Relays includes:

- Inputs Label
 - Naming of the digital inputs (1-8)
- Relays Label
 - Naming of the pontantial free message contacts (3-8)
- Relay Delay
 - time delay until the alarm appears
- Relays Mapping
 - Assigning and programming of alarms

4.6.4.4 Power



Power includes:

- General
 - Total number of modules
 - Number of redundant modules
 - Number of battery circuits
- AC In A
 - Input voltage configuration
- DC Group
 - DC group configuration
- AC Out
 - Output voltage configuration
- Other
 - Configuration of special properties

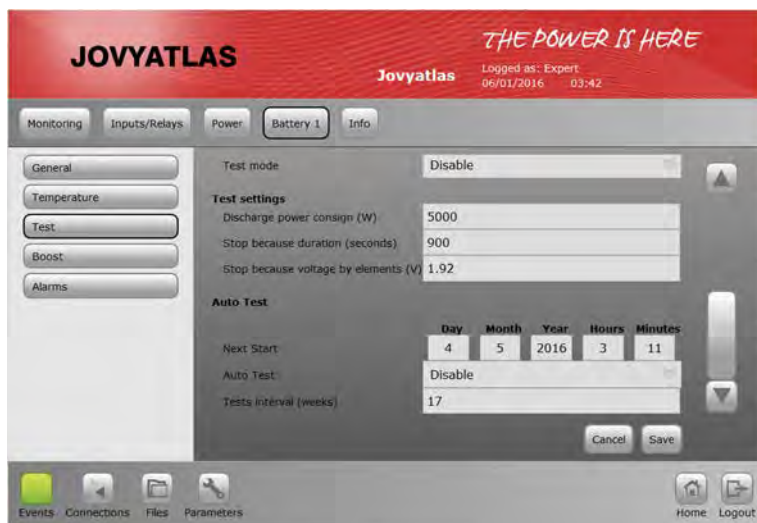
4.6.4.5 Battery 1 / 2



Battery 1 / 2 includes:

- General
 - Cells number
 - Cell floating voltage
 - Max. Current [A]
 - Charging allowed (enabled / disabled)
 - Capacity [Ah]
- Terperauture
 - Temperature coefficient
 - Min. and Max. Temperature compensation
- Test
 - Battery test configuration
- Boost
 - Boost load configuration
- Alarms
 - Alarms configuration

4.6.4.5.1 Battery-Test



Battery-Test:

Test settings

Test mode

Enabled / Disabled

Discharge power consign (W)

Active power, which is taken from the battery during the test.

Stop because duration

Time after the test will stop

Stop because voltage by element

(V) When the voltage per cell falls below the set value, the test stops

Auto Test

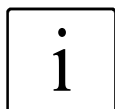
The values set determine the automatic battery test at intervals

The UPS is usually delivered with deactivated battery test, say test mode and Auto test are "Disabled". To be able to activate the battery test, you have to go to the expert level.



Attention:

The activation of the battery test is only allowed by trained personnel



Note:

The battery test is only one time per week possible

4.6.4.5.2 Boost floating



Boost:

Boost mode

Enabled/Disabled

Voltage by element

Starkladespannung pro Zelle

Start voltage by element

Sobald die Spannung pro Zelle unter den eingestellten Wert sinkt, startet die Starkladung

Start current (A)

Sobald der Strom über den eingestellten Wert steigt, startet die Starkladung

Start period (seconds)

Die Starkladung startet periodisch nach der eingestellten Zeit

Stop current (A)

Sobald der Strom unter den eingestellten Wert sinkt, stoppt die Starkladung

Stop duration (seconds)

Die Starkladung stoppt nach der eingestellten Zeit

Start by:

Voltage, current, period

Enabled/Disabled

Stop by current

Enabled/Disabled

The UPS is usually delivered with deactivated Boost, say Boost mode, start by: voltage, current and period and stop by current are "Disabled".

To be able to activate the Boost, you have to go to the expert level.



Attention:

The activation of the battery test is only allowed by trained personnel

4.6.4.6 Info



Info includes:
-T4S

-Information's about the software versions

5 Start-up and shutdown procedures

The procedures explain what to do when starting up, shutting down and switching between normal operation/bypass operation of the UPS. The sequence of actions must be adhered to exactly. Not adhering to the sequence may lead to serious faults and/or destruction of the UPS. In the event of queries, please contact our Technical Support Service (see contact details).

5.1 Functions of the LEDs on the module

[1] Power capacity utilisation per phase 25-100%

[2] On/off switch to start up/shut down the module

[3] Status of input voltage:

Green: OK

Orange: Input voltage being checked

Red: Error

[4] Status of output voltage:

Green: OK

Orange: Output voltage being synchronised

Red: Error

[5] Status of battery:

Green: OK

Orange: Status being checked

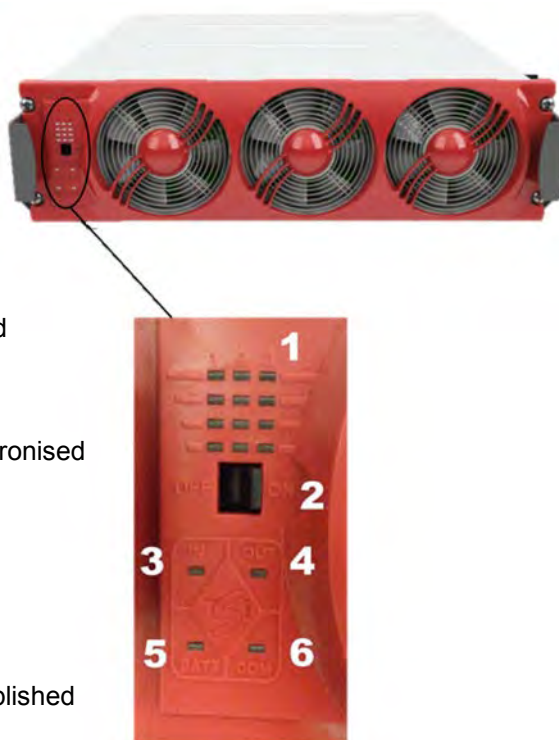
Red: Error

[6] Status of communication:

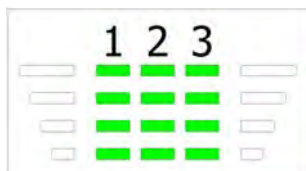
Green: OK

Orange: Communication being established

Red: Error



5.2 Power capacity utilisation per phase



Each segment represent 25% load per phase, per module
0-25% / 25,1-50% / 50,1-75% / 75,1-100%



The load can differ between the 3 phases in one module.
The load can differ in one phase in several modules.
In this example:
L1 = 75,1-100% Load
L2 = 25,1-50% Load
L3 = 0-25% Load



In case of overload, the LEDs flash as follows:
100-125% → 0-25% LEDs
125,1-150% → 0-50% LEDs
In this example:
L1 = 100-125% Overload
L2 = 125,1-150% Overload
L3 = No overload

5.3 Operating principle of the LEDs on the SBP module

[1] Status of output voltage

Green: OK

Red: Fault or checking output voltage

[2] Status of input voltage:

Green: OK

Red: Fault or checking input voltage

[3] Input and output in sync:

Green: OK

Off: Input and output not in sync

[4] SBP feeding load

Green: OK (module's fans are running)

Off: UPS feeding load, SBP on standby

[5] Switch between online VFI mode/ECO mode (currently not operational)

[6] Status indicator for static bypass

Alarm

Green: OK

Amber: Communications fault

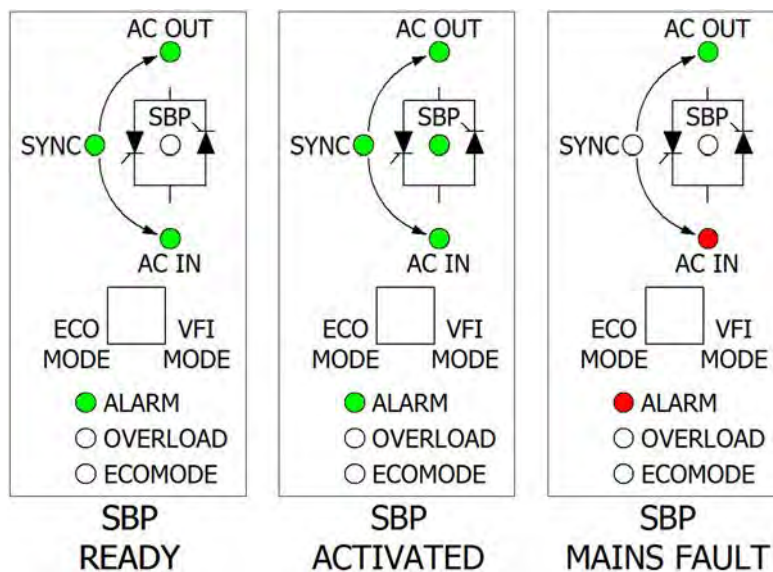
Red: Fault, see fault memory

Overload

Red: Module overload.

Shutdown as per technical data

ECO mode (currently not operational)



The LEDs represent the current status of the module.

The first image show the normal state. The UPS power the load.

The second picture, the switched through state. The load is supplied by the mains. The message "SBP feeds load" is displayed in the system.

The third image corresponds to a bad state.

This caused e.g. by a mains failure. Appropriate error messages are displayed.

5.4 Start-up

Certain important points should be checked in advance in order to prevent faults during start-up:

- All wiring and connections have been connected properly
- The battery is connected with the poles correctly positioned and the battery voltage is in order
- The voltages and phase sequence of the mains connections are correct
- The modules are all correctly installed in the rack and screwed in place

No.	Action	UPS status
1	Close ICB	The operational modules (switch #2) begin the start-up procedure.
2		The modules begin the start-up procedure. The four LEDs flash orange
3		Communication has been established. LED 6 (COM) on all modules is lit green
4	Close BCB	Attention: Additionally reset <u>optional</u> "battery symmetry monitors" using the Reset button.
5		The input and battery voltages have been checked and are OK. LED 3 (IN) and 5 (BAT) lit green
6		Only LED 4 (OUT) is still flashing between orange and green This means that the inverter is already running but the output has not yet been enabled.
7		The modules enable the outputs. LED 4 (OUT) and the power indicator are lit green.
8	Close OCB	
9		The UPS is supplying the load.
10		Measurement data can then be read from the display.

5.4.1 Problems during start-up

This paragraph contains essential information should an alarm occur during the start-up procedure. If the problem cannot be solved using this information, please contact our Technical Support Service.

1. *No LED on modules lit after ICB closes*
 - Check whether the input voltage and frequency are within tolerances
 - Check input fuses F1-F2-F3 (if fitted)
2. *If the UPS stops the start sequence after step number 3 and one or more alarms occur*
 - Turn switch 2 on one of the modules OFF and back ON again once
 - Check displayed alarms and rectify the cause
 - Restart the UPS by closing the ICB

5.5 Shutdown

Shutting down the UPS leads directly to an interruption in the power supply to the consumer. The following steps should therefore only be carried out if necessary/wished.

No.	Action	UPS status
1	Open OCB	
2	Open BCB	The battery is disconnected from the modules.
3	Open ICB	The modules are shut down. All LEDs go out.
4		The LEDs and fans turn off
5		After 180 seconds the capacitors are discharged enough for the modules to be safely removed.
6		End of shutdown procedure

5.6 Start-up from the internal manual bypass

This switchover procedure starts the UPS from the internal manual bypass. Before doing so, the precondition must be checked:

- The MBCB is closed.

No.	Action	UPS status
1	<i>Close ICB</i>	The operational modules (switch #2) begin the start-up procedure.
2		The modules begin the start-up procedure. The four LEDs flash orange
3		Communication has been established. LED 6 (COM) on all modules is lit green
4	<i>Close BCB</i>	Attention: Additionally reset <u>optional</u> "battery symmetry monitors" using the Reset button.
5		The input and battery voltages have been checked and are OK. LED 3 (IN) and 5 (BAT) lit green
6		Only LED 4 (OUT) is still flashing between orange and green This means that the inverter is already running but the output has not yet been enabled.
7		The modules enable the outputs. LED 4 (OUT) and the power indicator are lit green.
8	<i>Close OCB</i>	
9	Open MBCB	Attention: This must happen <u>within 5 seconds</u> after the outputs have been enabled.
10		The UPS is supplying the load.
11		Measurement data can then be read from the display (optional).

5.7 Shutdown to the internal manual bypass

Once the procedure has been carried out successfully the consumer is switched to the internal manual bypass without interruption.



Attention: The input voltage from the mains is still live at the input terminals of the UPS. To ensure that the UPS is completely voltage free, the input voltage must additionally be disconnected from the UPS.

Before doing so, the precondition must be checked:

- The voltages between the input and output system, per phase, must not be higher than 40V.

No.	Action	UPS status
1	Close MBCB	The load is supplied via the manual bypass.
3	<i>Open OCB</i>	Attention: This must happen <u>within 5 seconds</u> after the MBCB closes.
4	<i>Open BCB</i>	
5	<i>Open ICB</i>	The modules are shut down. All LEDs go out.
6		The display (optional) goes blank; the UPS has been disconnected.

5.8 Start-up of an additional 20kVA CUBE module

If the system has free slots for 20kVA CUBE modules, apply the following procedure. This instruction applies where the UPS is supplying the load (ICB, BCB, OCB closed/ MBCB open).



Attention: The exposed copper rails are live!

No.	Action	UPS status
1	Remove front cover	If fitted.
2	Turn switch 2 on new module to OFF	
3	<i>Insert new 20kVA CUBE module in slot</i>	Slot the module in quickly so as to avoid damaging the contacts
4	<i>Secure the module by the four screws</i>	
5		The module initiates the start-up sequence. All parameters are applied and checked. All LEDs are lit orange.
6		All parameters have been checked. LED 3 (IN), LED 5 (BAT), LED 6 (COM) lit green.
7	<i>Turn on the module at switch 2</i>	
8		The module enables the output. LED 4 (OUT) and the power indicator are lit green.
9		The additional power is now available

5.9 Replacing a smart bypass module

Before doing so, the precondition must be checked:

- The voltages between the input and output system, per phase, must not be higher than 40 V.

No.	Action	UPS status
1	Close MCB	The load is supplied via the manual bypass.
2	Open OCB	Notice: This must happen <u>within 5 seconds</u> after the MCB closes.
3	Remove the 4 screws from the module.	
4	Remove the SBP module.	Remove the module quickly so as to avoid damaging the contacts.
5	Delete the SBP module in the menu.	See chapter: <i>Deleting a missing module from the program</i>
6	Slot in the new SBP module.	Slot the module in quickly so as to avoid damaging the contacts.
7		The module initiates the start-up sequence. All parameters are applied and checked. The LEDs will at first light up red.
8		All parameters have been checked. LED 1 (AC OUT), LED 2 (AC IN), LED 3 (SYNC) and LED 4 (SBP) light up green.
9	Close OCB	
10	Open MCB	Notice: This must happen <u>within 5 seconds</u> after the outputs have been enabled.
11		LED 4 (SBP) goes out. The UPS is supplying the load.

6 Servicing

6.1 Replacing a module

The 20 kVA modules can be replaced in sequence during live operation. When doing so, be sure to check that enough power reserve is available.

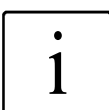
The modules are connected on the rear to a system of copper rails and a communications port.

6.1.1 Removal

On the left-hand side of each module are visual displays and an On/Off switch. Set the switch on the module you are replacing to OFF.

Then remove the four screws and disconnect the module from the ports in one action. It will then take about 180 seconds for the DC voltage in the module to shut down so the module can be transported safely. In that time you can erase the old module in the controlling of the system:

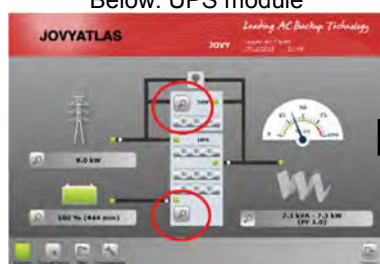
6.1.2 Erase missing module from the controller



NOTE:
Erasing of modules can only be done by trained people and only in expert mode of the T4S.

1. Go to "module selection table"

Above: SBP module
Below: UPS module



2. Select the module to be removed (highlighted in grey).



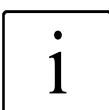
3. Erase the module with a click on the "X"



6.1.3 Installation

The new module can be inserted after removing and erasing the old one, or after removing the dummy cover plate from a reserve slot. Slot the modules in quickly so as to avoid damaging the contacts (see section Start-up of an additional 20kVA CUBE module).

6.1.4 Replacing a fan/resetting the interval



Note:
Only trained personnel are permitted to replace fans.
The interval can be reset in expert mode only.

1. Navigate to
Module selection table



2. Select the module to be reset.



3. Clicking the symbol resets the counter.



6.2 Maintenance

To maintain constant availability and operational reliability, we recommend that you carry out regular visual and functional tests on the UPS as well as inspecting the battery charge status. A log should be kept for verification. The fans must be replaced every 45,000 operating hours.



CAUTION:

Maintenance work must sometimes be performed when the UPS is connected to the power supply. Always observe the safety regulations and secure the work area!

6.2.1 Visual inspection

During visual inspections, check for:

- Unusual noises or odours
- Mechanical damage or foreign bodies in the unit
- Conductive dirt or dust deposits inside the unit
- Accumulations of dust that affect heat dissipation
- Fault messages in the display

The intervals between visual inspections depend first and foremost on the conditions in the location where the devices are installed.

6.2.2 Function test

The functional testing of the UPS should be performed every six months and involves the following tasks:

- Activate the manual bypass
- Disconnect the UPS and check the following functions when restarting the system:
 - Displays (fault messages)
 - Correct start-up of all modules
 - Check output and battery voltages

6.2.3 Battery inspection

If the UPS is out of operation for a prolonged period, maintenance-free batteries must be recharged at three-monthly intervals. Please observe the battery manufacturer's instructions!



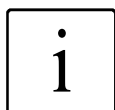
CAUTION:

Acid vapours emitted in the battery compartment can cause burns upon contact with body parts and when inhaled. The applicable protective measures must be complied with in accordance with the safety regulations of VDE 0510, Part 2.

The following items must be measured and logged every three months:

- Battery voltage between B+/N and B-/N
- If possible, the voltage of the block batteries, otherwise of the battery racks

The voltage of all block batteries must be measured and logged on an annual basis. The firmness of all screw connections must be checked annually. All checks must be performed in accordance with DIN 43539 Part 1. Special checks, such as those in accordance with DIN VDE 0108, must also be observed. Additional testing by means of automatic testing equipment is not permitted except with the written approval of the battery manufacturer.



NOTE:

If the battery voltage is not within the stated range and/or the battery cannot be charged successfully, please inform our Technical Support Service and if necessary have the battery replaced by our specialists.

6.3 Repairs

Despite the use of predominantly wear-free components, we recommend that you should store spare parts that are relevant to the operation of the UPS unit. This will assist the permanent operational readiness of your UPS. When ordering spare parts, please quote the designation (code) and order/device number.

6.3.1 Spare parts list

Spare parts list – WÄRTSILÄ JOVYCUBE 160kVA			
Code	Description	Number (installed)	Type / Value
35-5460	20 kVA UPS module	1-8	3/3
35-5469	PCB 138_004X BUS BOARD	8	
35-5468	PCB 138_160/X HUB board	1	
35-5441	TSI-T4S-Monitoring-central-unit-DIN-Rail	1	
16-1871	Battery fuse*	3	NH3 500A
N1085624	Input fuses*	3	NH1 250A
35-5192	Switched-mode power supply unit, DR 15-12	2	360898
16-1600	Fuses for A100/A101	2	10 x 38mm 2A
21-1562	Fan, axial,230V/50Hz	3	UF-15KM23
16-1600	Fuses for E1-E3	3	10 x 38mm 2A

*(optional)

7 Troubleshooting

The following table show the events and how to remove them. If it's not possible, contact the Service of **Wärtsilä JOVYATLAS EUROATLAS GmbH**.

Alarm	Description	Cause	Solution
MODULE EVENT			
ACin not conform	AC input voltage not conform	This occurs when the instantaneous voltage drops near 0V	Check grid voltage
back feed error	The ACin is supplied by the ACout of the module	Grid is not present and there is a short circuit between ACin and ACout	Check connections of ACin and ACout to see if there is a short circuit. Replace inverter
Boost failure	The boost function has a failure	A failure is detected inside the boost function	Hardware problem. Replace inverter
Boost not ready	The boost function is not allow at this time	Less than 5 min., after previous boost action; AC_IN Frequency or voltage different to AC_OUT	Wait 5 minutes to recover the situation; check the cables Input/output
Bus A failure	Failure on bus A	communication on bus A fail	Contact Wärtsilä JOVYATLAS EUROATLAS GmbH crew
Bus A not present	Bus A present connection not detected	In one cabinet, there is a bus present connection which must be short-circuited	Verify the module is properly inserted. Check bus A connection. Check bus A present connection. Replace module.
Bus B failure	Failure on bus B	communication on bus B fail	Contact Wärtsilä JOVYATLAS EUROATLAS GmbH crew
Bus B not present	Bus B present connection not detected	In one cabinet, there is a bus present connection which must be short-circuited	Verify the module is properly inserted. Check bus B connection. Check bus B present connection. Replace module.
bus conflict	Conflict in the address of the module	2 modules share the same address	This problem should disappear by itself
BUS FAIL	T4S is not able to communicate with the CUBE modules.	T4S does not see any CUBE on the communication bus.	Check bus A connection; Replace defective modules; Replace T4S.
Bus Failure	The inverter doesn't see itself on the bus	Communication problem	Hardware problem. Replace inverter
Bus not OK	Communication is not operational	The stage in alarm need to have a proper communication to work properly and wait until communication is OK to restart.	Solve any communication problem (see output status)
Bus Not Present	Bus present connection not detected	In one cabinet, there is a bus present connection. This problem happens if this connection is not done, if the module is badly inserted or if the bus is badly connected.	Check if the module is properly inserted. Check the bus present connection. Check the bus connection. Replace the module.

Alarm	Description	Cause	Solution
MODULE EVENT			
Calib start error	Error during the auto-calib procedure at starting	internal error	Hardware problem. Replace inverter
comm. bus noise	Noise on the communication bus	This alarm can occur when there are a lot of manipulations on the bus (several deplug/hot-plug) in a short time. It can also occur if there is a source of noise near the system which perturbs the system or if a module has a problem.	if the system has been manipulated, wait until the alarm disappears ; remove the noise source; replace the failure module
Derating Temperature	Output current derated due to temperature	The temperature is too high. The available output power is reduced.	Check temperature inside inverter. Check room temperature. Replace FAN. Replace inverter
Driver Dc- error	Failure inside the module		Hardware problem. Replace inverter
Driver Dc+ error	Failure inside the module		Hardware problem. Replace inverter
Driver Fault	Failure inside the module		Hardware problem. Replace inverter
Driver In Error	Failure inside the module		Hardware problem. Replace inverter
Driver Not Ready	Failure inside the module		Hardware problem. Replace inverter
Driver Out Fault	Failure inside the module		Hardware problem. Replace inverter
Driver Out Fault	Failure inside the module		Replace the module
Driver Out Not Ready	Failure inside the module		Hardware problem. Replace inverter
Driver Out Perturbation	Failure inside the module		Replace the module
Driver perturbed	Failure inside the module		Hardware problem. Replace inverter
Eeprom error	The eeprom has a problem		Replace Inverter
FAILURE	Internal T4S failure	Temperature, Watchdog, EMC	Replace T4S
Fan Failure	Failed fan or speed inappropriate	Dust on FAN or FAN failure	Replace Fan or clean it
Flash check error	The internal software is corrupted		Replace the module
FLASH ERROR	Flash of T4S is corrupted and fail	T4S failure	Update T4S software; Replace T4S
Freq ACin Too High	AC input frequency is too high		Check grid frequency
Freq ACin Too low	AC input frequency is too low		Check grid frequency
Front Switch OFF	The inverter are set OFF through the front switch	Inverter is switched OFF by the ON/OFF switch on the front of the module	Switch on the ON/OFF switch
IGBT driver alarm	Alarm coming from the IGBT driver	IGBT driver generates an alarm signal	Hardware problem. Replace inverter
IGBT error			Replace the module
IRQ STACK HIGH	Controller RAM memory is saturated	T4S software	Update T4S software

Alarm	Description	Cause	Solution
MODULE EVENT			
Load Sharing High	The inverter gives more power than other inverter in parallel		This alarm should disappear by itself. If it stays permanently, the module probably has a problem
Load Sharing Low	The inverter gives less power than other inverter in parallel		This alarm should disappear by itself. If it stays permanently, the module probably has a problem
LOG NEARLY FULL	Give alarm with code and text "Log Nearly full" when the condition is true	This item will be set as, No alarm, Minor or major alarm. (see configuration file)	Log file must be cleared
MAIN SOURCE LOST	AC source is not present	Breaker trip. Grid failure or out of tolerance	Reconnect AC IN or check live value.
MODULE(S) ABSENT	The number of modules in the installation is lower than configuration requirement	Some modules have been removed; Defective module; Configuration is not correct	Replace defective inverter or adapt configuration
NO TRANSMISSION	Write an event "No Transmission" in log file when a module is not anymore seen by the T4S.	Alarm from the T4S - does not see any - all modules - system alarm or when the T4S does not see one of the modules. The module has been removed from the cabinet	Replace defective module
Out fuse Open	Output fuse of the module is open	The output current of the module is zero while other modules in // detect some load	Reset the module and try again. If the problem still happens, replace the module
Out of Sync	The inverter cannot synchronize on the other modules on the bus	Communication problem	Hardware problem. Replace inverter
Overcurrent	ACin-, ACout- or DC-current too high	Internal protection activated due to a too high current	Try to restart the module. If it makes the same problem, replace inverter
Overload	The load current is bigger than the current available from inverter	Load too high or some inverter are failing	Reduce load or add inverter on the system.
Overload not ready	The overload capability is not available	The overload capability of the CUBE is only available for a limited time. After that time, the CUBE recovers before allowing a new overload.	Reduce load or add inverter on the system.
Overload Too Long	Output voltage went under a threshold voltage (user configurable) during a certain time (user configurable)	The output voltage dropped due to a short circuit at the output or a big overload. This short-circuit was not cleared by the boost or the overload capability	Check load. Remove short circuit then restart the modules
parameter mismatch	Configuration file incompatible with CUBE	Problem with parameters	Check configuration file and re-send it

Alarm	Description	Cause	Solution
MODULE EVENT			
Phase Not ready	Phase configuration not available	Inverter not configured on the phase	Configure the inverter phase
Power derating	Output current is reduced because the output power is too high	The max power in VA allowed by the CUBE is higher than the max power in W. When the maximum power in W is reached, the output current is reduced and this alarm is generated	Reduce load or add inverter on the system.
REDUND + 1 LOST	The number of working module is lower than configuration requirement	Lost of inverter redundancy + 1 inverter	Replace defective inverter(s) or adapt configuration
REDUNDANCY LOST	The number of working module is lower than configuration requirement	Lost of inverter redundancy	Replace defective inverter or adapt configuration
Remote OFF	Inverters are set OFF remotely	Inverter are switch OFF by remote function	Start inverter by REM ON/OFF terminal
Replace Fan	The running time for the fan is elapsed	Fan running time is higher that preset value to advise fan replacement	Replace FAN and actualize the counter time
SEC SOURCE LOST	DC source is not present	Fuse failure. Battery failure.	Reconnect Battery or check live value.
switch off	front switch is in off position		Switch on the switch at the front of the module
Sync Bus A failure	Failure in the synchronization of bus A	communication on bus A fail	Contact Wärtsilä JOVYATLAS EUROATLAS GmbH crew
Sync Bus B failure	Failure in the synchronization of bus B	communication on bus B fail	Contact Wärtsilä JOVYATLAS EUROATLAS GmbH crew
sync filter error			Hardware problem. Replace inverter
SYS SATURATED	The load is above the configurable set point	Load increased. Failed module.	Reduce load or add inverter on the system, or change the alarm level trigger.
temp sensor fail	Failure in the temperature sensor		replace the module
TempTooHigh	Temperature on heat sink to high	Temperature to high in the room or bad cooling, or component defective inside inverter	Check temperature inside inverter. Check room temperature. Replace FAN. Replace inverter
Too Many start	Too many start in 1 minute (10 times in 1 minute)		Correct the problem: increase the input power, reduce the load, and increase the voltage hysteresis... Then, turn the module OFF to clear the error and back ON (or, if you have no access to the supervision, deplug and replug the module)
USER STACK HIGH	Controller RAM memory is saturated	T4S software	Update T4S software
Vac Too High	AC input voltage too high		Check grid voltage
Vac Too Low	AC input voltage too low		Check grid voltage

Alarm	Description	Cause	Solution
MODULE EVENT			
Vcap too high	Internal capacitor has a too high voltage	Too much energy has been injected inside the module	The module restarts automatically. If the problem persists, replace inverter
Vcap too low	Failure inside the module		Reset the module and try again. If the problems still happens, replace the module
Vdc too high	DC+ and DC- voltage are too high		Check battery voltage
Vdc- too high	DC- voltage too high		Check battery voltage
Vdc too low	DC+ and DC- voltage are too low		Check battery voltage
Vdc- too low	DC- voltage too low		Check battery voltage
Vdc+ too high	DC+ voltage too high		Check battery voltage
Vdc+ too low	DC+ voltage too low		Check battery voltage
Vout Too Low	Output voltage is under threshold	In case of very big overload or short circuit, the output voltage drops under a threshold. If this condition remains active for a certain time the CUBE stops its output.	Reduce load or add inverter on the system.
VoutloutTooLow	Output voltage and output current are too low	This is an abnormal conditions which occurs when the module has a failure	Reset the module and try again. If the problems still happens, replace the module
VoutMPi2Err	Error in the self-test during the starting process	This can be caused by a problem on the IGBTs	Reset the module and try again. If the problems still happens, replace the module
VoutPi2Err	Error in the self-test during the starting process	This can be caused by a problem on the IGBTs	Reset the module and try again. If the problems still happens, replace the module
VoutPoutTooLow	Output voltage and output power are too low	This is an abnormal conditions which occurs when the module has a failure	Reset the module and try again. If the problems still happens, replace the module
Vref out of range	The internal voltage reference is out of range		replace the module
VrefError	The internal voltage reference is out of range		replace the module
T4S EVENT			
Digin 1-8	Give alarm and appropriate text when digital input 1 change his state	Digital input has changed status	Check devices connected on input digital
TEMP SENSOR	Temperature sensor failed	Wrong connection of the temperature sensor; Defective T4S; Wrong T4S configuration	Check T4S configuration; Check Temp probe connection; Replace T4S

Alarm	Description	Cause	Solution
BATTERY EVENT			
AUX POWER FAIL	One of the +12V auxiliary power supply is not working properly. The supervision system could switch off if AC or DC source is switched off.	Fuse failure	Check +12V auxiliary power supply fuse
BOOST MODE	The battery charger is in boost mode	The battery voltage goes under boost trigger voltage during last discharge state	Wait the end of boost period
CHARGE FAIL	The battery charger is not working	Module failure	Replace module
DISCHARGE	Energy is taken from the battery	AC grid failure; Battery test pending	Check AC power supply
GLOBAL ALARM	A battery alarm is present	A battery alarm is present	Check other battery alarm
LIMITED CHARGE	The battery charger output power is not strong enough to provide the full battery current charge	No enough module to charge the battery; Module ACout overload	Add module; Decrease output load
LOW CAPACITY	Battery capacity is under configured set point	Battery has been discharged during a long period	Recharge the battery
LOW VOLTAGE	Battery voltage is under configured set point	Battery discharge	Check battery
NO CHARGER	No battery charger configured on the battery. The battery cannot be kept charged.	Missing module; Wrong configuration.	Check configuration; Make charger to battery affection (action)
NO TEMP COMP	The battery floating voltage cannot be adjusted in accordance to the temperature	Wrong configuration; Temperature sensor default; T4S error	Check configuration, temperature sensor and TSIO
OVER TEMPERATURE	Battery temperature is over configured set point	Battery is not working properly; Over DC current	Check battery
OVER VOLTAGE	Battery voltage is over configured set point	Error related to battery charger; Wrong configuration	Check battery
SHUTDOWN	The battery voltage reaches a critical point. The CUBE module will soon not be able to supply the output load	Battery discharge. Battery Low capacity.	Restore AC power supply; unload the UPS system
TEST PENDING	Battery test is pending. Battery is currently discharged	User request; Periodic test	Cancel the test or wait the end
TOO LOW VOLTAGE	Battery voltage is under configured set point	Battery discharge	Check battery
UNKNOWN CAPACITY	The battery capacity is not known	T4S is not able to calculate the battery capacity if the battery hasn't yet reached the full load state	Wait battery fully charged state

8 Technical data

8.1 20kVA CUBE module

<u>Model</u>	<u>CUBE</u>
Input power	20kVA / 20kW
Input current max.	3~32A
Output power	20kVA / 20kW (Power reduction while battery charging(adjustable))
Output current max.	3~29A
Short circuit current	4 x nom. current for 20ms at mains operation 2 x nom. current for 20ms at battery operation 1,83 x nom. current by asynchronous mains (15s)
Battery charger	2kW @ 230VAC at 18 kW load
Power factor	>0,99 @80% Last
Dimension	W483 x H133,5 x D600 mm
Weight approx.	24 kg
Ambient temperature	0 to +45 °C / +32°F to +113°F

8.2 Input data

<u>Model</u>	<u>20-160kVA</u>
Input power per module (kVA/kW)	20kVA / 20kW
Max. installed modules	8
Max. power	160kVA
Input current max.	3~256A
Nominal voltage	3x380/220VAC+N, 3x400/230VAC+N, 3x415/240VAC+N
Voltage tolerance	198-264VAC <100% load - no power reduction 150-264VAC <70% load - 30% power reduction 3x343/198VAC+N to 3x457VAC+N for <100% load 3x260/150VAC+N to 3x457VAC+N for <70% load
Frequency	47-63Hz
Power factor	≥0.99 at 25-100% load

8.3 Output data

<u>Model</u>	<u>20-160kVA</u>
Output power per module (kVA/kW)	20kVA / 20kW (Power reduction while battery charging(adjustable))
Max. installed modules	8
Max. power	160kVA
Output current max.	3~232A
Short circuit current	4 x nom. current for 20ms at mains operation 2 x nom. current for 20ms at battery operation 1,83 x nom. current by asynchronous mains (15s)
Nominal voltage	3x380/220VAC+N, 3x400/230VAC+N, 3x415/240VAC+N
Voltage stability	Static: ≤±1% Dynamic (load 0-100% and 100-0%): ±3%
Total harmonic distortion (THD)	<2% under linear load <4% under non-linear load (EN63040-3)
Frequency	50Hz or 60Hz (adjustable)
Overload	130% for 15 sec., 100% continuous
Crest factor	2.7:1
Efficiency AC-AC	AC-AC : 96% / 96% / 95% / 93%
100%/75%/50%/25%	
Efficiency DC-AC	DC-AC : 96% / 97% / 95% / 93%

8.4 Smart Bypass

<u>Model</u>	<u>Smart Bypass</u>
Power per module (kVA/kW)	200kVA / 200kW
Max. installable modules	1
Max. current	3~300A
Short circuit current	10 x nom. current for 20ms at mains operation If the short circuit is still present, the system shuts down.
Nominal voltage	3x380/220VAC+N, 3x400/230VAC+N, 3x415/240VAC+N
Transfer time	UPS → SBP Max. 5 ms SBP → UPS 0 ms
Fuse	Depends on the UPS modules installed
Overload per module	300 kVA/10 minutes, 400 kVA/1 minute
ECO mode	not currently available

8.5 Battery data

Voltage	±192VDC (total 384VDC)
Number of cells	192 cells 180-204 cells possible (power-limited)
Temperature compensation	Optional (adjustable)
Boost floating	Optional (adjustable)
Battery test	Optional (adjustable)
Ambient temperature	0° - 25°C

8.6 Touchscreen

Rack-mounting	
Type	7" LCD resistive touchscreen
Resolution	800 x 480 pixels
Input voltage	1 x 12VDC (supplied from T4S)
Terminals	1 x USB, 1 x Ethernet, 3 x status LED
Dimensions	475 x 175mm x 3U
Ambient temperature	0° - 60°C
Relative humidity	Max 95% non-condensing
Weight	2,6Kg
Door-mounting	
Type	7" LCD resistive touchscreen
Resolution	800 x 480 pixels
Input voltage	1 x 12VDC (supplied from T4S)
Terminals	1 x USB, 3 x status LED
Dimensions	L250 x D40 x W160mm
Ambient temperature	0° - 60°C
Relative humidity	Max 95% non-condensing
Weight	1,1Kg

8.7 Controller T4S


DIN (TS35)-rail mounting	
Input voltage	1+1 x 12VDC
Terminals	8 Potential free message contacts Max. 30V/2A (Major, Minor and 6 programmable)
	8 digital inputs
	2 x temperature sensor (battery compensation)
	2 x RS485
	Ethernet (IPv4)
	1 x Module-BUS, 2 x CAN-BUS
Ambient temperature	-25° - 85°C
Relative humidity	Max 95% non-condensing
Weight	0,4Kg

8.8 Ambient conditions and standards

Ambient conditions	
Storage	-30°C - +70°C
Operation	0° – 45°C
Installation elevation	1500m without power limitation
Relative humidity	Max 95% non-condensing
Standards	
Safety	EN62040-1-1, EN60950-1
EMC	EN62040-2, EN61000-3-3, EN61000-6-2, EN61000-6-4
Power class	EN62040-3

9 Appendix

Description	Drawing-no.	page
Cover sheet	U8610900.DB	1
Single line diagram	U8610900.BL	2
Arrangement drawing	U8610900.AZ	3
Cut off drawing	U8610900.EZ	4
Terminal diagram	U8610900.AS	5
Circuit diagram	U861090x.SP	6-10

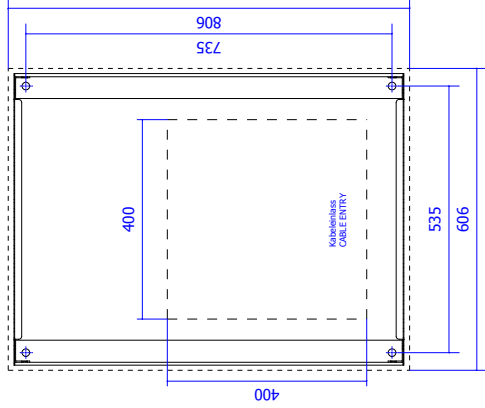
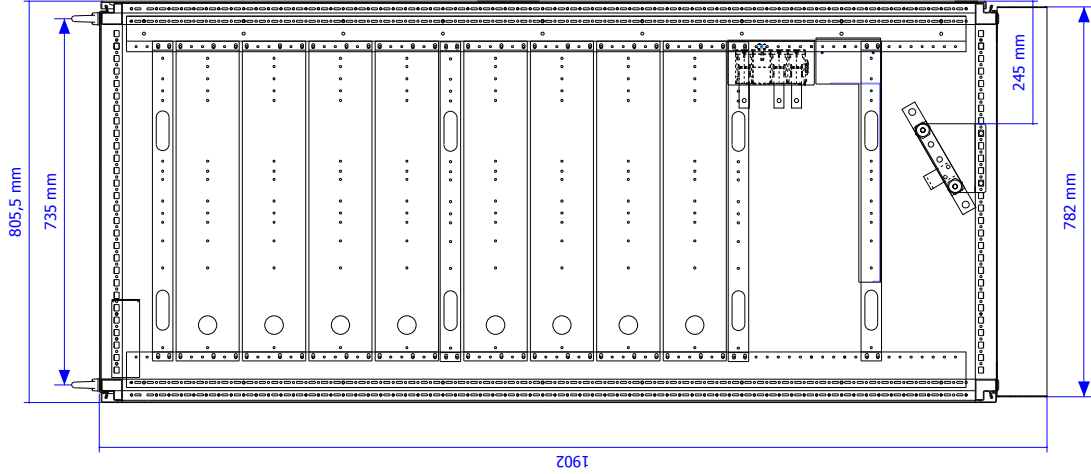
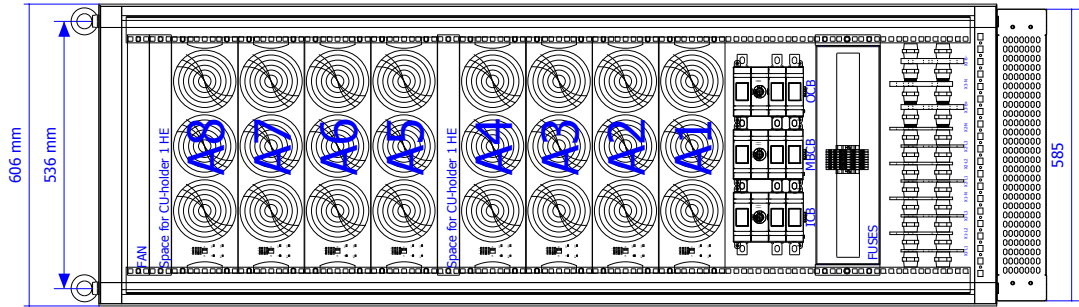
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Die Anzahl der Module variiert von 1-8.
The number of modules vary from 1-8.

Frontansicht
Front view

Seitenansicht
Side view

Schnitt A-A (Sockel USV-Schrank)
Cutaway view A-A (Foundation UPS-Cabinet)



UPS CABINET
MANUFACTURER:
TYPE:
VARNISHING:
PROTECTION DEGREE:
WEIGHT (MODULES INCL.):

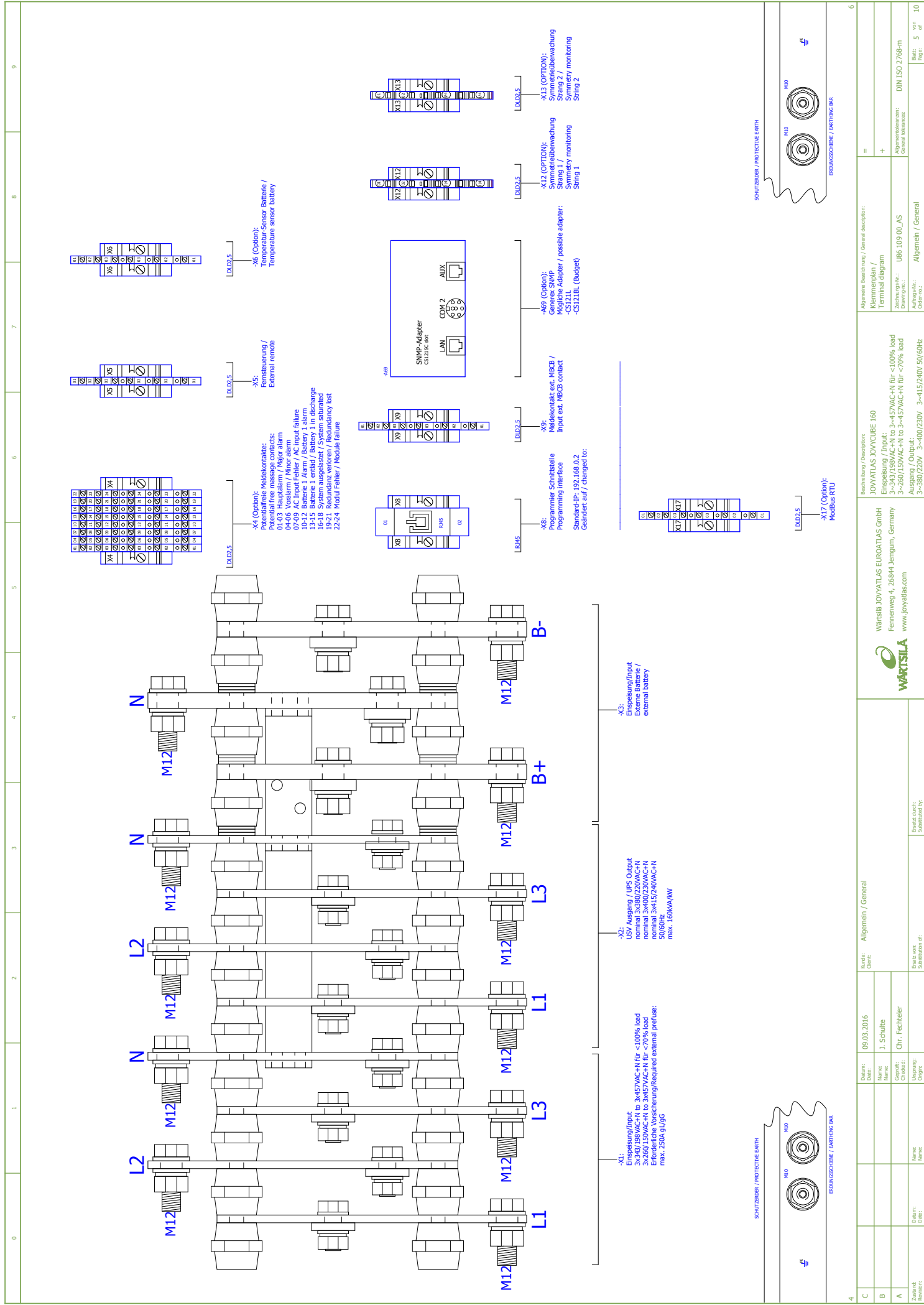
RITTAL
BASED ON TS 8
RAL 7035
IP 20
approx 380kg

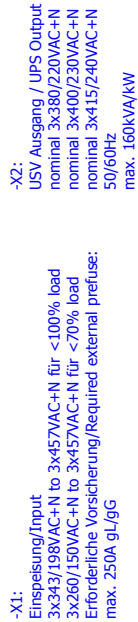
USV-KABINET:
HERSTELLER:
TYP:
LACKIERUNG:
SCHUTZKASSE:
GEWICHT (INKL. MODULE):

RITTAL
TS 8
RAL 7035
IP 20
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B	Datum: Date:			Name: Chr. Fechteler			Kunde: Client:			Allgemein / General			Wartsila JOYVATLAS EUROATLAS GmbH Fennienweg 4, 26844 Jemgum, Germany www.joyvallas.com			Beschreibung / Description: JOYVATLAS JOYCYCLUBE 160 Eingangsleistung / Input: 3~343/198VAC+N to 3~457VAC+N für <100% load 3~260/150VAC+N to 3~457VAC+N für <70% load Ausgang / Output: 3~380/220V 3~400/230V 3~415/240V 50/60Hz			Allgemeine Beschreibung / General description: Ausbruchzeichnung / Cut off drawing			Zeichnungs-Nr.: Drawing No.: U84 211 00_L2			Allgemeindaten: General data:			DIN ISO 2768-m			Blatt: Page: 4			von of: 10		
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