Outdoor Integrated UPS Solution

User Manual

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INTRODUCTION

The Willo cabinet facilitates the requirements for outdoor UPS applications such as Wireless ISPs, CCTV, environmental monitoring etc in a one box solution. It's IP45 rating and double skin are designed to ensure equipment inside is protected from the elements.

The cabinet contains 3 tiers, the bottom tier suitable for housing up to 3x 12V 100Ah batteries. The middle tier houses customer equipment, or can be used for an additional battery tier. The upper tier houses the UPS and / or further customer equipment housed behind a door containing the electrical protection by means of circuit breakers with power distribution.

The unit has a lockable door and can be bolted to the floor for added stability and security. A thermostatically controlled integrated AC fan is also present in order to prevent excessive heat build up within the cabinet.

⚠ WARNINGS

1. Installation of the cabinet should only be undertaken by trained and competent personnel.
2. Hazardous AC Voltages appear within the Willo Cabinet. Although the risk of accidental contact is minimised with the use of covers, access to the cabinet should only be performed by personnel trained in the risks involved.
3. The Willo cabinet is designed to hold high capacity batteries. Depending upon the configuration this may involve DC voltages in excess of 50V which may have exposed terminals. Access to the cabinet should only be performed by personnel trained in the risks involved.
4. High Capacity batteries impose a very real risk of burns or fire if accidentally short circuited. Extreme caution must be taken during installation. Please bear the following safety points in mind when installing batteries:
    a. Keep the battery terminal covers on until making the electrical connection.
    b. Use a single ended insulated spanner to tighten the battery terminals. If not available, a good idea is to ensure that the spanner length is less than the battery width to remove the possibility of contact with an already installed battery.
    c. Connect each battery one at a time. Do not have multiple people connecting batteries in case of accidental shorting through the Willo chassis.
    d. Take care when installing and removing batteries to ensure that the terminals do not short against the shelf above the batteries.
    e. Never transport the Willo Cabinet with batteries in-situ.
5. The batteries are heavy. Observe proper handling procedures and take extra care not to trap fingers.

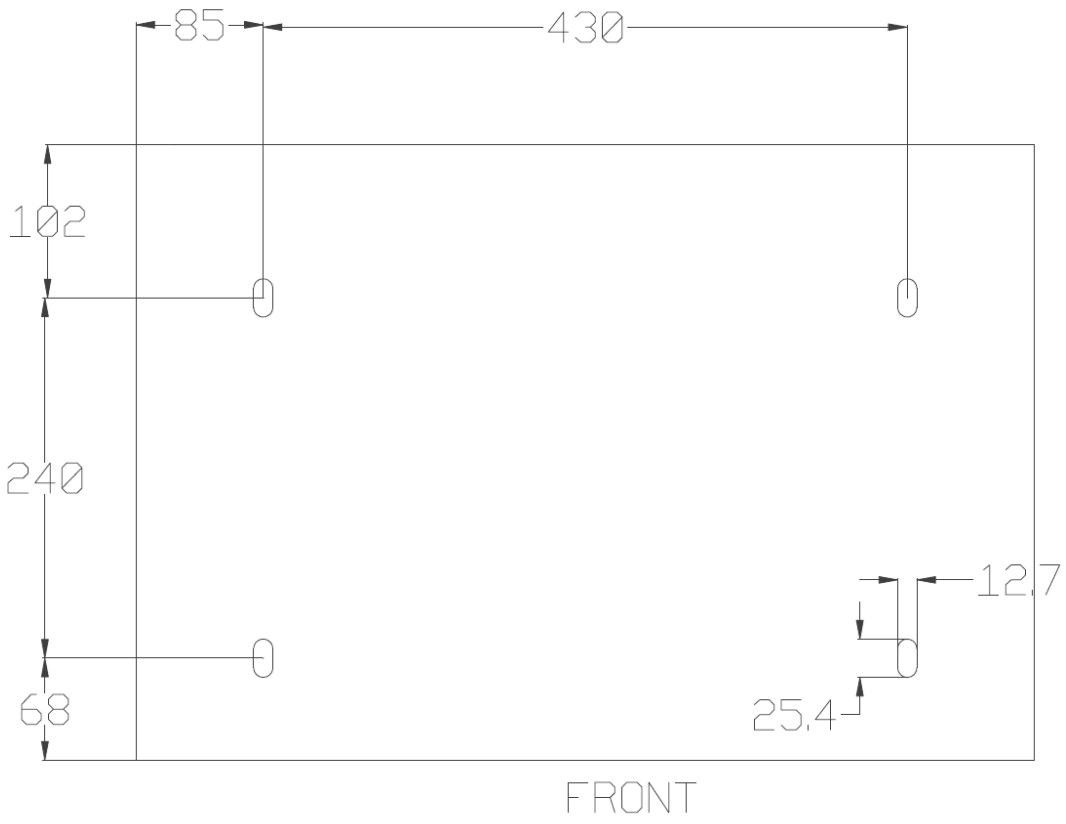
INSTALLATION

Location.

1. Ensure good ventilation, avoiding dust as much as possible and avoid areas which may be subject to excessive standing water.
2. The cabinet should be placed on a firm flat surface with minimal inclination.
3. The cabinet should be located away from any source of volatile gases.
4. Do not place anything on top of the cabinet.

Mounting & Securing

1. The cabinet may be secured to the base by driving 4xM10 bolts into a securing plate on a 430 x 240mm square. Note the bolt locations are not symmetrical front to back to the cabinet.
2. The bolts should not extend by more than 35mm or they will enter the cabinet and foul with the battery.
3. The cabinet can be hoisted into position using the removable lifting eyebolts on the roof.

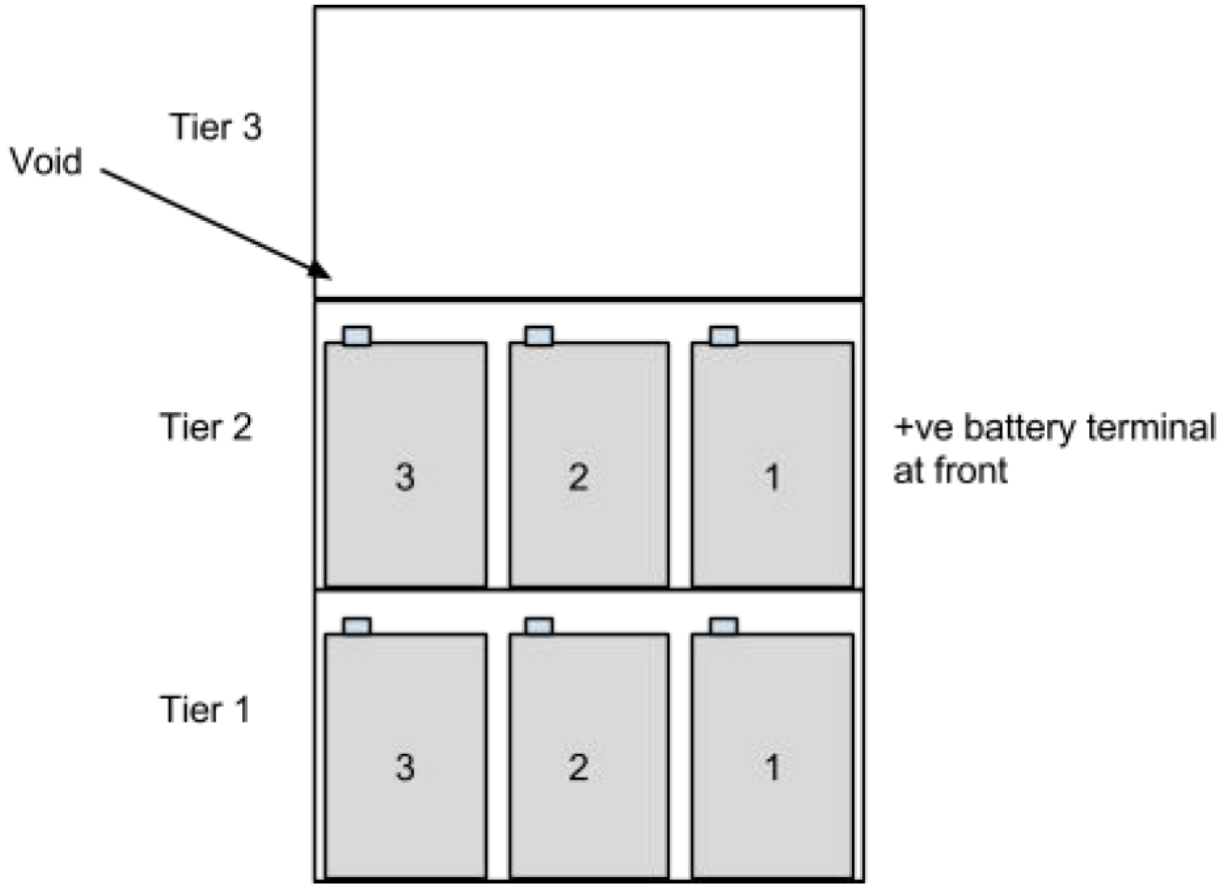


Grounding

The Willo cabinet should be grounded to the local earthing system using 2.5mm cable minimum.

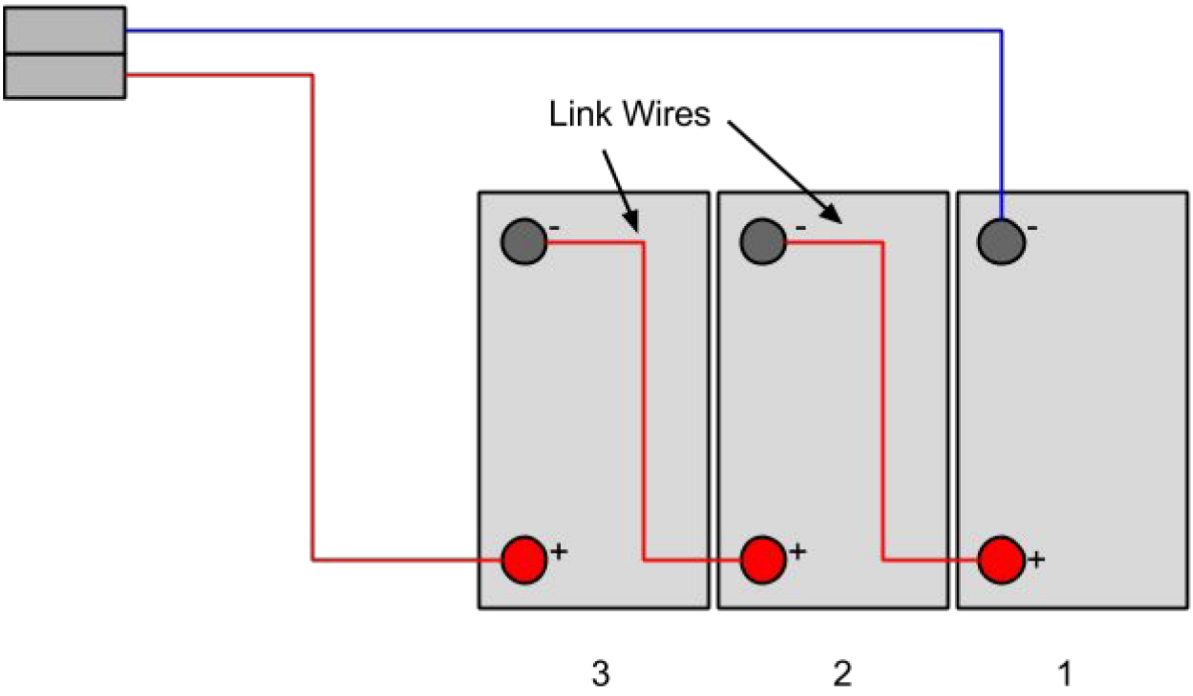
Battery Assembly

1. WARNING: Take all precautions to ensure that the risk of short circuit is eliminated during the assembly of the battery. Read the warning section in this manual.
2. The Willo cabinet can house up to 6 x 100Ah batteries in the lower 2 tiers.
3. For ease of assembly and for safety, batteries should be installed one at a time and in the same orientation as follows:



4. Using the supplied Anderson cable, connect the negative end (coloured blue or black) to battery 1, and insert battery 1 into the right hand side of the cabinet (as you look at it from the front). Do not remove the cover from battery 1 positive terminal.
5. Using the link wire provided, connect to the negative terminal of battery 2. Ensure that the cable is orientated so as to have no chance of touching the positive terminal. Do not remove the cover from the positive terminal.
6. Insert battery 2 into the cabinet as shown.
7. Remove the cover from battery 1 positive terminal and connect the link wire from battery 2 -ve terminal to battery 1 +ve terminal.
8. Using the link wire provided, connect to the negative terminal of battery 3. Ensure that the cable is orientated so as to have no chance of touching the positive terminal. Do not remove the cover from the positive terminal.

9. Insert battery 3 into the cabinet as shown.
10. Remove the cover from battery 2 positive terminal and connect the link wire from battery 3 -ve terminal to battery 2 +ve terminal.
11. Remove the cover from battery 3 positive terminal and connect the +ve cable from the Anderson lead (coloured red or brown) to battery 3 positive terminal.
12. Using a multimeter confirm that the voltage on the Anderson connector terminals is the correct polarity and of the correct voltage (usually 36V nominal).
13. Push the Anderson connector through the void in shelf above Tier 2 into the top tier and connect the Anderson connections (BATT1).
14. If a second tier of batteries is required, assemble as per above.
15. Ensure the voltage and polarity are correct as above and connect to BATT2 in the top tier, provided the voltages are similar to BATT1.Connecting a discharged battery string to a fully charged battery string may cause the breaker to trip. If the battery voltages are dissimilar by more than 2V, then the discharged battery string should be charged first.



Battery Wiring Diagram.

AC Power Connections

1. The AC input and output power cables are fed into the Willo cabinet through the oval cut outs in the floor of the unit at the front.
2. The AC input and output terminals are located on the door of the shelf of Tier 3. Remove the cover to access the terminals.
3. Connect the AC input and output power cables to the appropriate terminals, marked L, N, PE (Live, Neutral & Protective Earth). We recommend the cables are ferruled or fitted with ring or fork crimps.
4. Other AC equipment can also be connected directly to the output terminals of the UPS if required.

Equipment Installation

1. Note that it is not advisable to dissipate more than 200W within the cabinet as excessive temperature build up could arise, diminishing battery life and affecting unit performance.
2. Customer equipment can be located in the middle tier, or, if taken by batteries and if small enough, in the upper tier along with the UPS.
3. A DIN rail is provided in the top tier to mount DIN rail equipment

UPS Installation

1. Remove the battery connection terminal plate from the rear of the unit.
2. Place the UPS into the top tier of the Willo cabinet.
3. Ensure all breakers are in the OFF position.
4. Connect the IEC C13 cable (with unexposed conductors) into the UPS input.
5. Connect the IEC C14 cable (exposed conductors) into one of the UPS output connectors.
6. Connect the Anderson cable marked “UPS” into the battery terminal of the UPS. Ensure a good fit.

Operation

Starting Up

1. Check all connections.
2. Switch the Surge Protection Device (SPD) breaker ON.
3. Switch BATT breaker ON.
4. Switch the AC input ON.
5. Confirm UPS starts up.
6. Switch output breaker ON and confirm operation of attached equipment.

Please refer to UPS manual for detailed operation of the UPS.

Switching Off

1. Power down the attached loads.
2. Open the door over Tier 3, and press and hold for 2 seconds the OFF switch on the UPS.
3. Open the battery breakers.
4. Open the AC output breaker.
5. Open the AC input breaker.
6. The UPS should now be completely switched off, and the loads will be off.
7. Before carrying out any maintenance on the power distribution panel, ensure that the AC supply feeding the Willo cabinet is disconnected.

Maintenance

1. Maintenance should only be carried out by competent persons and involves checking live AC sources.
2. Check Surge Protection Device Inspection Windows are Green. If RED, it requires replacement.
3. Check external fan activates, by placing a shorting link over the terminals of the thermostat. It is advisable to disconnect the AC power before fitting the link (usually via the AC Output Breaker).
4. Check the integrity of connections on both the front panel AC terminals, and the breaker terminations.
5. Ensure battery terminations are tight and robust.
6. Check battery integrity for signs of any leaks or cracks, or any distortion to the battery casing.
7. Check battery voltage.
8. Ensure batteries hold up by disconnecting the AC input breaker.

Appendices

Surge Protection Device

The distribution panel of Willo contains a Surge Protection Device (SPD) based upon Metal Oxide Varistor (MOV) technology connected between live, neutral and the earth conductors to protect the internal electronics from over voltage surges caused in particular by nearby lightning strikes.

Under normal voltage, MOV is in a high-impedance state (open circuit) and won't impact the normal operating of the line. The fault window indicates green.

When a transient pulse over-voltage occurs due to lightning or other causes, the module conducts within nanoseconds, clamps the voltage and diverts the surge current to earth. When the over-voltage disappears, the module automatically resumes the high-impedance state.

Should the module be subject to sustained over voltage, over temperature protection devices within the module will activate to prevent the MOV from catching fire. Overcurrent protection also exists and should any of these protection devices activate, the fault window will indicate RED. In this event the Surge Protection Device is no longer functional and requires replacement.

SPD Specifications:

Part Number	DXH06-FCS/1 + 1R40
Maximum Continuous Voltage	385VAC
Nominal Discharge Current	20KA (8/20μs)
Maximum Discharge Current	40KA (8/20μs)
Voltage Limitation	1.8KV
Protected Modes	L - N, N - PE
Warning	Status Window, Remote Switch Connection
Response Time	25ns

SNMP

The UPS inside Willo may be fitted with an internal SNMP card. This allows communication with the UPS over a network.

The SNMP device allows some control of the UPS via the network:

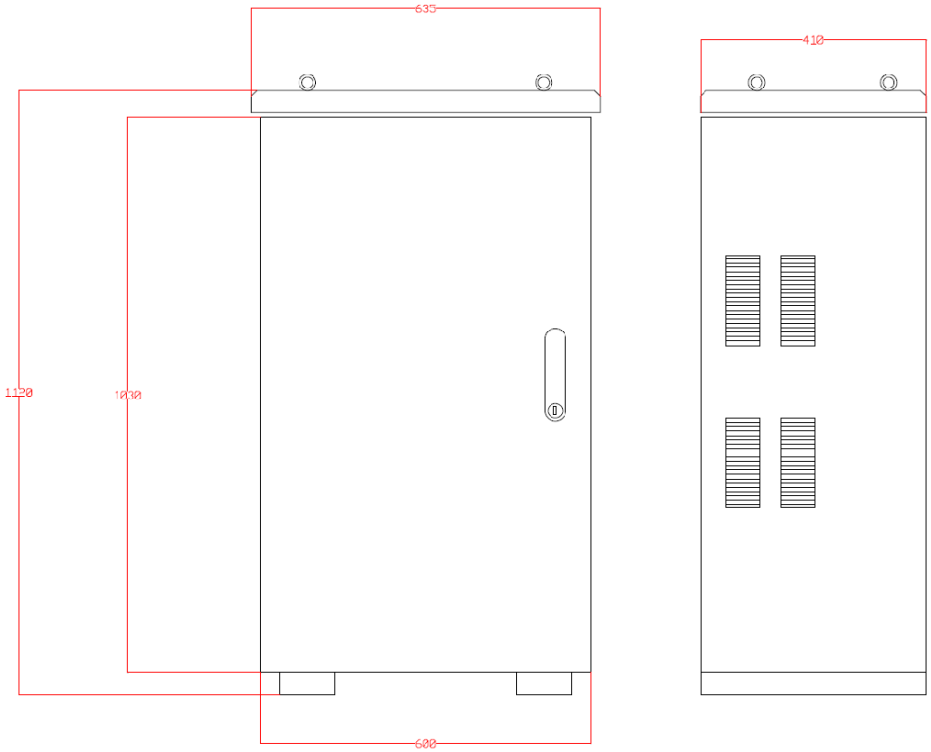
Remote Battery Test

The UPS can be instructed remotely to perform a battery test, either for 10 seconds, a set number of minutes, or until the battery reaches a certain threshold. There are limitations with this test however.

1. The unit cannot perform a battery test if it is in ECO mode. This is a factory-set configuration.
2. The test does not stop AC power from feeding the UPS. This means the UPS internal chargers are active and producing DC. Therefore the UPS inverter will only start to take power from the batteries, and hence test them, if the output power of the load is in excess of the power output of the chargers. If not, the test will most likely always report a pass.
3. If the test is performed and no event log is recorded, it is likely the UPS aborted the test due to an issue but has not alarmed. In all probability there is a problem that needs investigating.
4. If the test is performed and fails, then output power from the UPS is likely to be lost for a few moments. Depending upon how connection is made to the UPS SNMP card, then communications with the UPS may also be lost.

Key Specifications

Cabinet Dimensions	
Total	635 x 410 x 1120
Usable	600 x 410 x 1000
Weight (Cab Only)	70kg
IP Rating	45
UPS	
Rating	1KVA / 900W
Voltage Rating	230V Nominal (160V – 295V input window)
Battery String	36V
Battery Charger	2x 4.5A
Weight:	7kg
DC Supply (Option)	
24Vdc	2x 100W
Notes	1. The DC outputs are isolated from each other and can be connected in series to produce a 48V outlet, or in parallel to create a 200W 24V supply. 2. Note the maximum power is 700W so if 200W of DC power is used then 500W of AC power is available.



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