

Version

1

EFFEKTA POWER SYSTEMS

Emergency Power Supply EPS150D – EPS2000D

Manual

EFFEKTA POWER SYSTEMS

Emergency Power Supply

EPS150D – EPS2000D

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Introduction

EPS-D stands for **E**ffekta **P**ower **S**ystems **D**igital and is a series of wall mounted static inverters from Effekta Power Systems AB. These come in 9 different sizes and are designed to supply emergency lighting for at least 1 hour with 230 VAC/50 Hz.

EPS - D is a microprocessor-based emergency power supply unit and is available in sizes 150/300/450/600/750/900/1200/1500/2000 VA. These inverters can be loaded from 120W / 150VA, on the smallest unit, up to 1600W / 2000VA on the largest unit. The smallest size that can handle a load of up to 120W / 150VA is called EPS150D . The largest unit, called EPS2000D, can handle a load up to 1600W / 2000VA.

These Units are offered as a low cost alternative to larger units, installed typically on a floor by floor basis as a wall mounted unit. Standard alarm outputs allow easy integration to building Management Systems

EPS-D can be used both for luminaries with electronic ballasts and luminaries with conventional ballasts. However, in the case of luminaries conventional ballasts they have to be compensated up a power factor of at least 0.8. In case of uncompensated luminaries, please refer to your retailer for advice. The EPS-D is dimensioned to supply the maximum load for at least the duration of 60 minutes.

The unit has four individually controlled outputs for a maximum freedom of choice to connect maintained and non-maintained lighting. The outputs can be loaded with 4A RMS.

Each output is fused and has a fuse monitoring. They are also continuously monitored against overload and earth leakage (selectable 30mA-100 mA -300mA). Factory setting is 30mA. The monitoring of the earth leakage can be turned off. These models have built-in inputs for test / fire alarm / energy saving / sub-central. If activated the inputs either are lighting up all the outputs of the network, start load supplied by battery or switch off all outputs.

Load and battery monitoring is automatically performed each week by self-test. The load is monitored with the 45W deviation tolerance as standard on all outputs. When the using LED luminaries as load the deviation tolerance can be set to detect that one LED luminary goes out. Suggested setting for the tolerance is 2W.

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There is also battery circuit monitoring with a deep discharge protection as standard, to maximize battery life. The unit also has a temperature compensation circuit connected to the battery voltage.

The monitoring of the system is kept simple with a text display and four color LEDs in the front, to easily measure and diagnose the operation and display possible deviations.

Is available in several languages.

Performs an annual test in accordance to EN50172.

The load change is presented per output.

Many of the settings can easily be changed on site, through a simple operation.

Earth relay for 4-pole switching (TN-S).

System parameters

The following are factory settings, visible on the unit's front display:

EPSD: 10/20/30/40/50/600/80/100/140

Software version: LV6-16

Inverter voltage: 230 VAC

Soft start inverter: Yes

Delayed start-up: Yes

Earth leakage monitor: Yes

Is auto-testing connected? Yes

Fire alarm function: Yes

Auto-test/weekday: Monday at 12 noon

Annual test/month/date: Delivery month and day 01

Battery Ah-value

EPS150=12Ah;

EPS300=28Ah

EPS450=33Ah

EPS600=45Ah

EPS750=55Ah

EPS900=70Ah

EPS1200=80Ah

EPS1500=110Ah

EPS2000=150Ah

Earth leakage: 30 mA

Line (out port) setting = 1 W - 85 W (45.0 W as standard at HF or magnetic reactor load).

Installation

Mechanical

- Units in the sizes EPS150D-EPS900D should be wall-mounted using the mounting angles provided. The bigger units; EPS1200D-EPS2000D are in floor-cabinets but can also be mounted on wall if so is necessary.
- Adequate arrangements should be made for the ventilation / temperature control of the surrounding area. The unit is designed for a temperature at around 20 °C ambient with relative humidity <90 % non-condensing. Higher temperatures can shorten the lifetime of both components and batteries
- Access to the unit should be provided so that authorized persons could regularly monitor the unit.
- The door key is to be stored in such a manner that no unauthorized individual can access the inverter.

Charger

- The Charger terminals are rated for maximum 2.5 mm² cable. A 3-core cable should be supplied with the earth connected to the terminal rail provided
- The supply is connected directly to a terminal on the PCB, labeled JP31.
- This supply should be fed from the mains source that is to be monitored – in other words, failure of this supply will cause the Unit to start operating – supplying power to the load from the Inverter.
- The Charger supply feeds the battery charger and the load (if there are maintained loads selected).
- The charger is internally protected by a **5 Amp** fuse. The supply should be suitably rated for both Charger & Maintained loads.

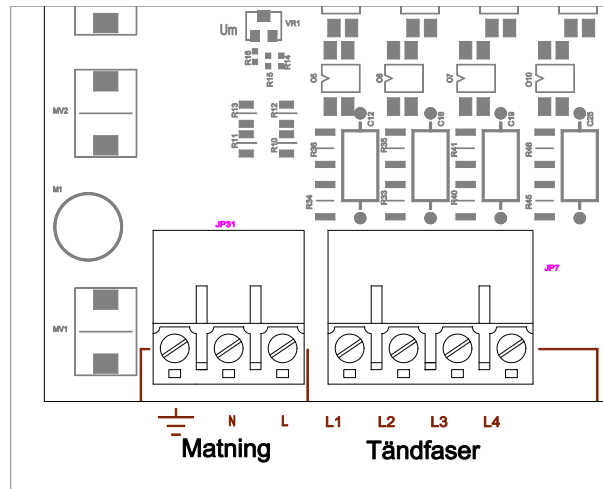
Fuse monitoring

- The unit has a fuse monitoring sensing system. If one of the output fuses is blown, this will be indicated by a red LED for the relevant output.

Maintained / Non-maintained output

- There are 4 separate load lines that can be configured as maintained (if Power is applied to the incoming terminal on that line) or Non-Maintained (if the incoming power terminal is left open). *Please note: the load power is always fed from the Charger input supply – allowing the signal to the input terminals to be supplied from any phase.*
- The maintained input lines are numbered L1 to L4 on the JP7 and correspond to the four Output together with their matching neutrals.
- The maintained input lines are opto-coupler connected and the power is drawn from the charger input.
- The neutral is common for all outputs.
- The maintained inputs can be independent from the phase used for the charger.
- Each load line can feed 100% of the rated load – *as long it's lower than the specific output max current of 4A*. In other words you can put all the load on to one line if required or spread it out amongst the 4 load lines to suit. – when earth leakage detection is required, the load neutral's must be connected to the neutral terminals alongside the Output Lines.
- The Load terminals are rated for maximum 2.5 mm² cable. (3 core cables should be supplied with the earth connected to the terminal rail provided).

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24 Volt output

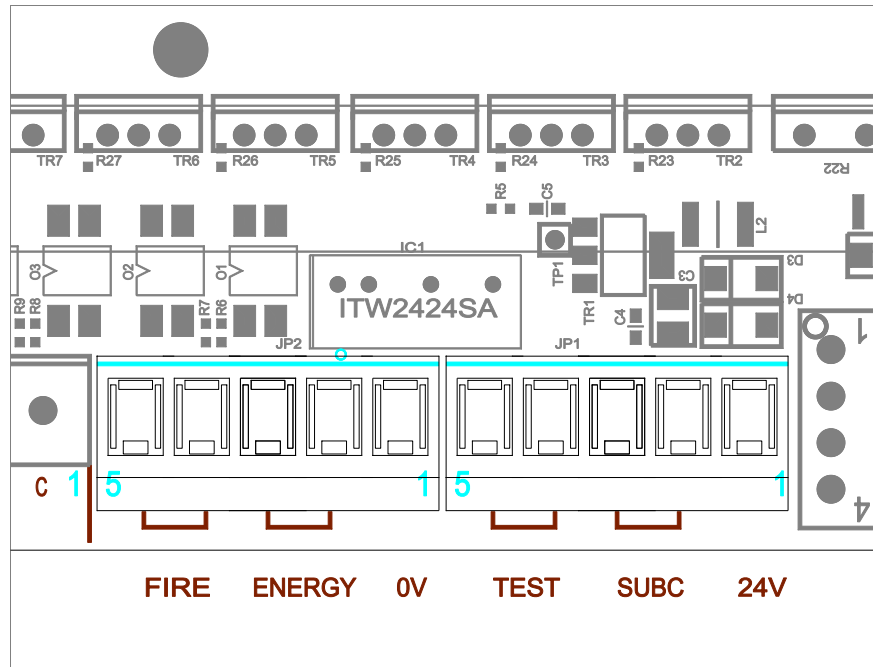
- EPS-Digital has a Volt output placed on terminals JP1 and JP2.
- This DC output is a low power output, and not designed to power any external loads.
- The output is isolated from the systems internal 24 Volt power supply.

24 Volt input

- There are 4 separate inputs that can be used to activate or deactivate the load. The inputs are called "Fire Alarm" / "Energy Save" / "Sub C" / Test.
- The inputs located on terminals JP1 and JP2.
- The inputs are controlled by 24 Volt. Both external or internal power can be used for the inputs.

Configuration:

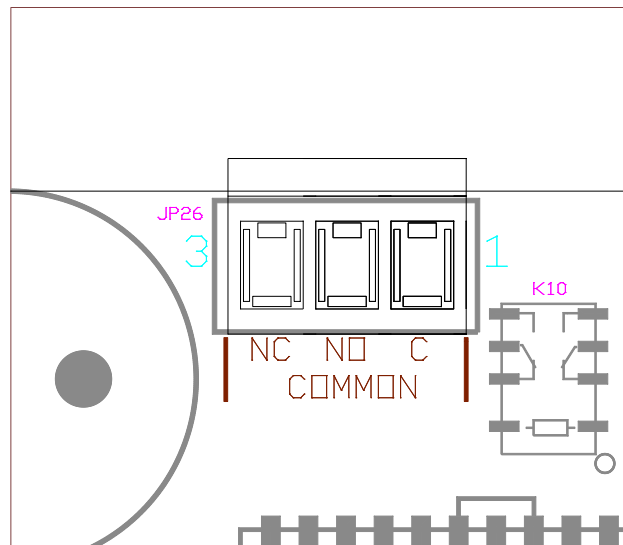
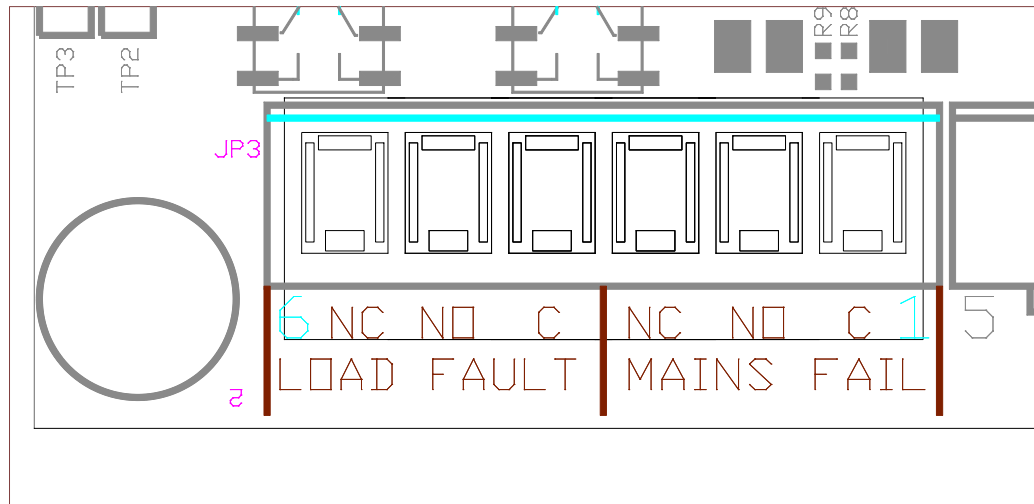
24 Volts Low Power Output	-	JP1 pin 1 and JP2 pin 1
SUBC – Sub Central Input	-	JP1 pin 2 and JP1 pin 3
TEST – Test Input	-	JP1 pin 4 and JP1 pin 5
ENERGY – Energy Save Input	-	JP2 pin 2 and JP2 pin 3
FIRE – Fire Alarm Input	-	JP2 pin 4 and JP2 pin 5





Alarm Outputs

- There are 3 different alarms.
- The alarms are Common Alarm, Load Fault and Mains Failure. The Common alarm is activated for all alarms that are shown in the display, including Load Fault and Mains Failure.
- Each alarm has an alternating potential free relay that is designed to handle 0,5A @ 24VDC or 1A @ 100VAC.



First start-up of the unit

- Perform a visual inspection for mechanical damage.
- Check that the cables have not being damaged against the chassis.
- Check that all lighting (also other loads) has been power factor corrected to at a minimum $\cos \phi$ 0.8.
- Switch the supply phase on. All of the load should light up.
This is a safety mode, where the entire load is on bypass. This means that even if the unit isn't operational, it will deliver power to the entire load.
Note that each of the four output ports has been equipped with separate fuses.
- The Display is still off.
- Switch on the battery breaker. . The display should light up, indicating the correct time and SYSTEM OK. Only the maintained load should be lit.
- By pressing the buttons on the front, the display will show the different values and settings on the display.
 Check that the correct time and date have been set. Also check that the test time is Acceptable.
- The unit has been pre-programmed for normal use. There is no need to re-program it. See '**settings**' if necessary.
- If the unit has maintained lighting fittings connected to it, the autotest will not work for 24 hours. This allows the sensing to stabilize the VA value.
- To update the memory with a new load (VA), press both buttons simultaneously for 5 seconds. The unit will enter test mode. Then press the left button for 'self test'. After the test has finished, press the A button to make that load the reference load.
- Allow batteries to charge for 72 hours to reach full capacity.
- An immediate test may be performed to determine that all functions exist.
- Perform the battery test by breaking the incoming supply phase or by pushing both buttons for 5 sec and then selecting 'annual test'.
- In case of doubts with regard to certain HF ionisers, check with the supplier. Also see our data pamphlet 212.10.00 for more information. Note that the display shows RMS.
- Switch the feed on again and note that the DC Charge current will increase slowly to approximately 10% of the battery size,
32 Ah = 3 A. The battery must be charged to 27.4 V \pm 0,2 V.

Settings routine

The settings routine can only be used when the electronics are switched on from the beginning, achieved by switching the battery off and removing the supply fuse (or remove input supply). Then connect the mains/fuse and switch the battery on. The electronics will start up and the door display will indicate FAMOSTAR. During this period, approximately 5 seconds, pressing both door buttons simultaneously can start the Setting Routine.

NOTE: DO NOT INTERRUPT THIS ROUTINE, RATHER COMPLETE THE SETTING EVEN IF AN INCORRECT SETTING SHOULD BE DISCOVERED. PERFORM IT AGAIN ONCE THE UNIT HAS STARTED.

Pressing the right-hand button (according to symbol >) will change the selection to N (no) and then pressing the left-hand button will take you directly to the following setting

The following settings exist and have to be set:

- 1) < **OK French** > - This is the language that will be displayed. English can be chosen.
- 2) < **Set Clock? – Y/N** >: will be indicated. This setting provides the unit clock with a new setting, including time and date

< **OK Year 00** >: use right-hand button to choose year (0-99 and around). Then press left-hand button to accept the choice.

< **OK Month 01** >: select 0-12 using the right-hand button, accept using the left-hand button.

< **OK Date 01** >: select date 01-31 depending on month, the display will scroll the number of days existing in the selected month, also for leap years.

< **OK Day Sun** >: select relevant weekday using right-hand button, confirm using left-hand button.

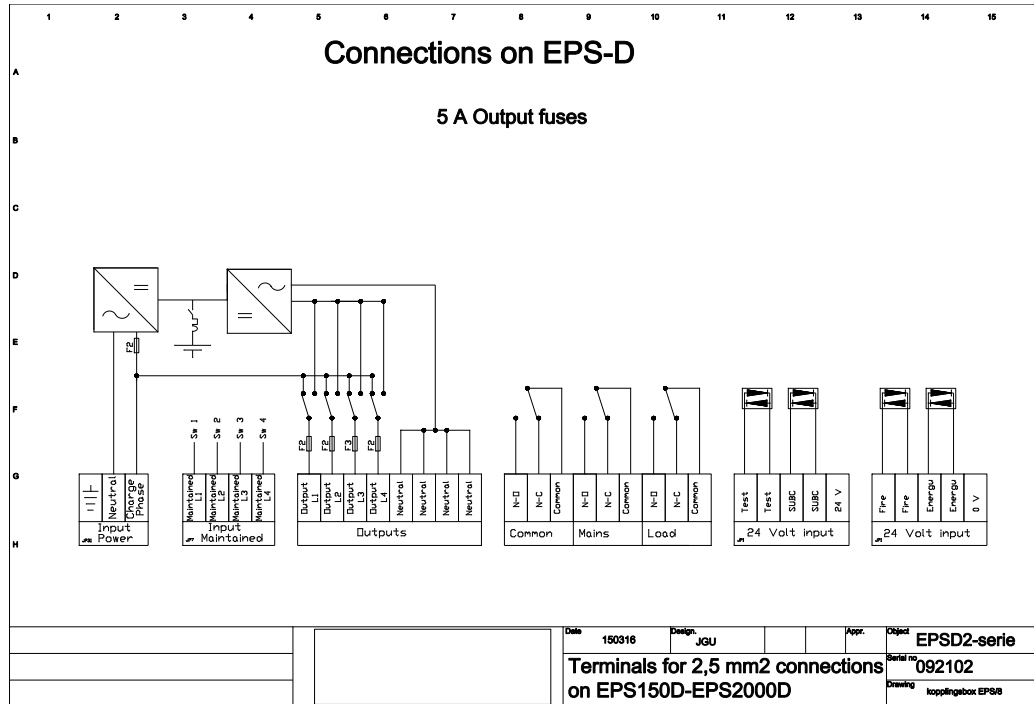
< **OK Hour 00** >: select the hour of day.

- 3) < **OK Batt A/H 011** >: Press right-hand button and select relevant battery size, confirm using left-hand button.
- 4) < **Fire alarm 1/2/3** >: Position 2 is standard. **This lights up all the load on mains if the fire-alarm is activated.**

- 5) < **OK Weekly Test? Y/N** >: select yes or no. This test comprises a weekly test, performed on a set date or day depending on setting, see annual test. (compare to factory setting).
- 6) < **Batt + VA** >: select yes or no. Refers to whether the load and battery should be tested each week. If no, only the battery will be tested.
- 7) < **Annual test Y/N** > : select yes or no. Comprises an annual test (1 hour). The following settings are required if the selection is **Y** (yes): month (annual test), date (annual test), day (weekly test) hour (weekly test), (compare to factory setting). If selecting **N**, only month and date can be selected for annual test, if selecting **Y** but the annual test is **N**, only day and time can be selected for the weekly test
- 8) < **OK Line 1 (2-3-4) 45 W** >. The test level can be set from 1.0 W to 60 W in increments of 1 W. This is setting of the deviation tolerance for the load.
The factory setting is set to 45 W.
- 9) < **Clear memory** > **Y/N** > If **Y**, the memory is cleared of potential annual test mark and ref load
(Used when changing PCB)
- 10) < Month 01 > Can select 01-12 as the annual test month.
- 11) < Date 01 > Can select 01-31 as the annual test date.
- 12) < Day Mon > Can select Mon-Sun as the weekly test weekday.
- 13) < Hour 12 > Can select 00-23 as the weekly test hour.
- 14) < Min 00 > Can select as the weekly test minute.
- 15) < **EPS 10** >: select unit size, (see data panel)
- 16) < **Inverter 230 V** >: Select output voltage for battery operation, usually 230 V but 220 V and 240 V can be selected.
- 17) < **Inv Ctrl fast** >: This is for the lighting fittings with HF ionisers that regulate at the unit's pace. Can be set at fast (2 times/period) or slow. (1 time/period).
- 18) < **Soft start? N/Y** >: This selection determines whether the inverter (while battery powered) should start at full pulse width immediately, or start softly over 0.5 seconds.

- 19) < **Delay? N/Y**>: This selection determines whether there should be a pause of 200mS after a power outage before the inverter starts
- 20) < **Earth leakage? N/Y**>: select. This selection determines whether the earth leakage monitor should be used
- 21) < **EL Level 30 mA**>: This is the common setting for earth leakage. 100mA and 300mA can be selected as needed

Principal drawings

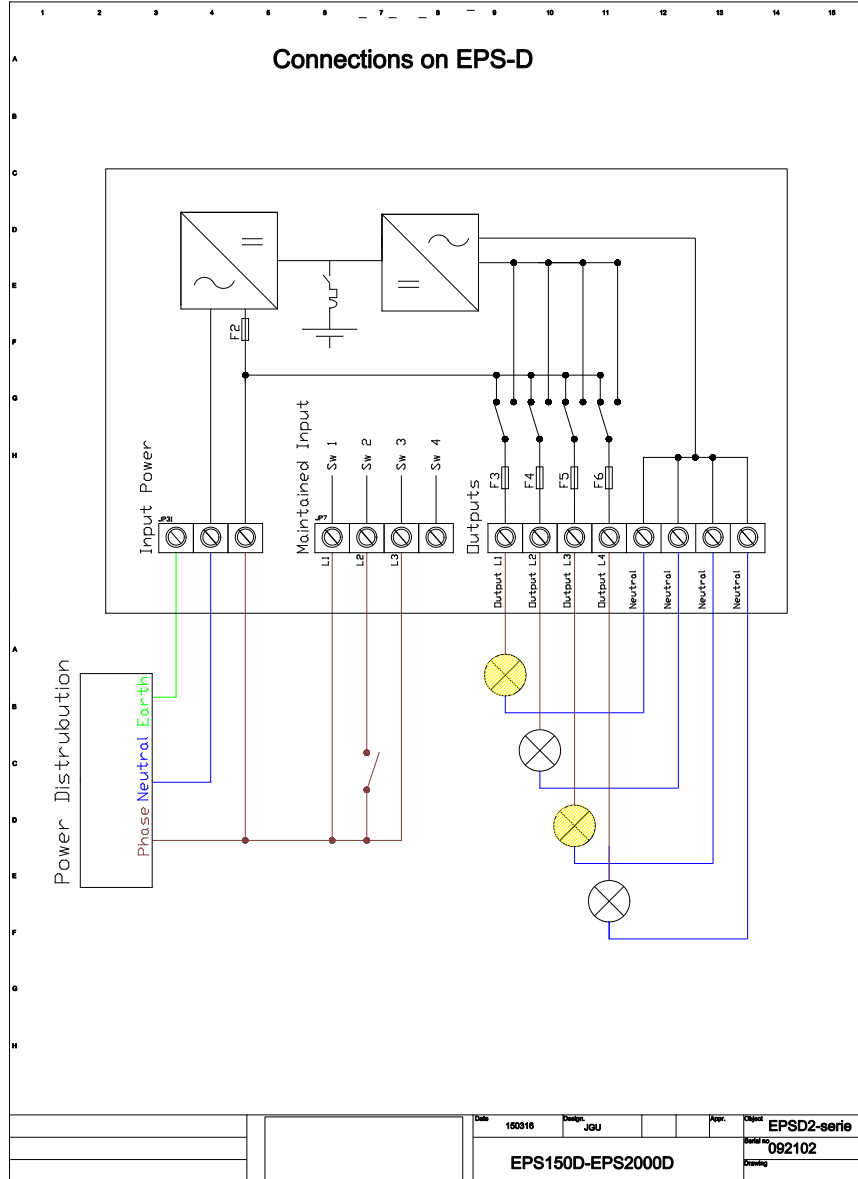


Suggested connections made with the internal 24 Volts power-supply:

JP1 pin 1 connected to JP1 pin 2 JP2 pin 1 connected to JP1 pin 3	<u>SUBC- SUBCENTRAL</u> ACTIVATES ALL OUTPUTS
JP1 pin 1 connected to JP1 pin 4 JP2 pin 1 connected to JP1 pin 5	<u>TESTINPUT</u> ACTIVATES ALL OUTPUTS
JP1 pin 1 connected to JP2 pin 2 JP2 pin 1 connected to JP2 pin 3	<u>ENERGYSAVEINPUT</u> DEACTIVATES ALL OUTPUTS
JP1 pin 1 connected to JP2 pin 4 JP2 pin 1 connected to JP2 pin 5	<u>FIREALARMINPUT</u> ACTIVATES ALL OUTPUTS

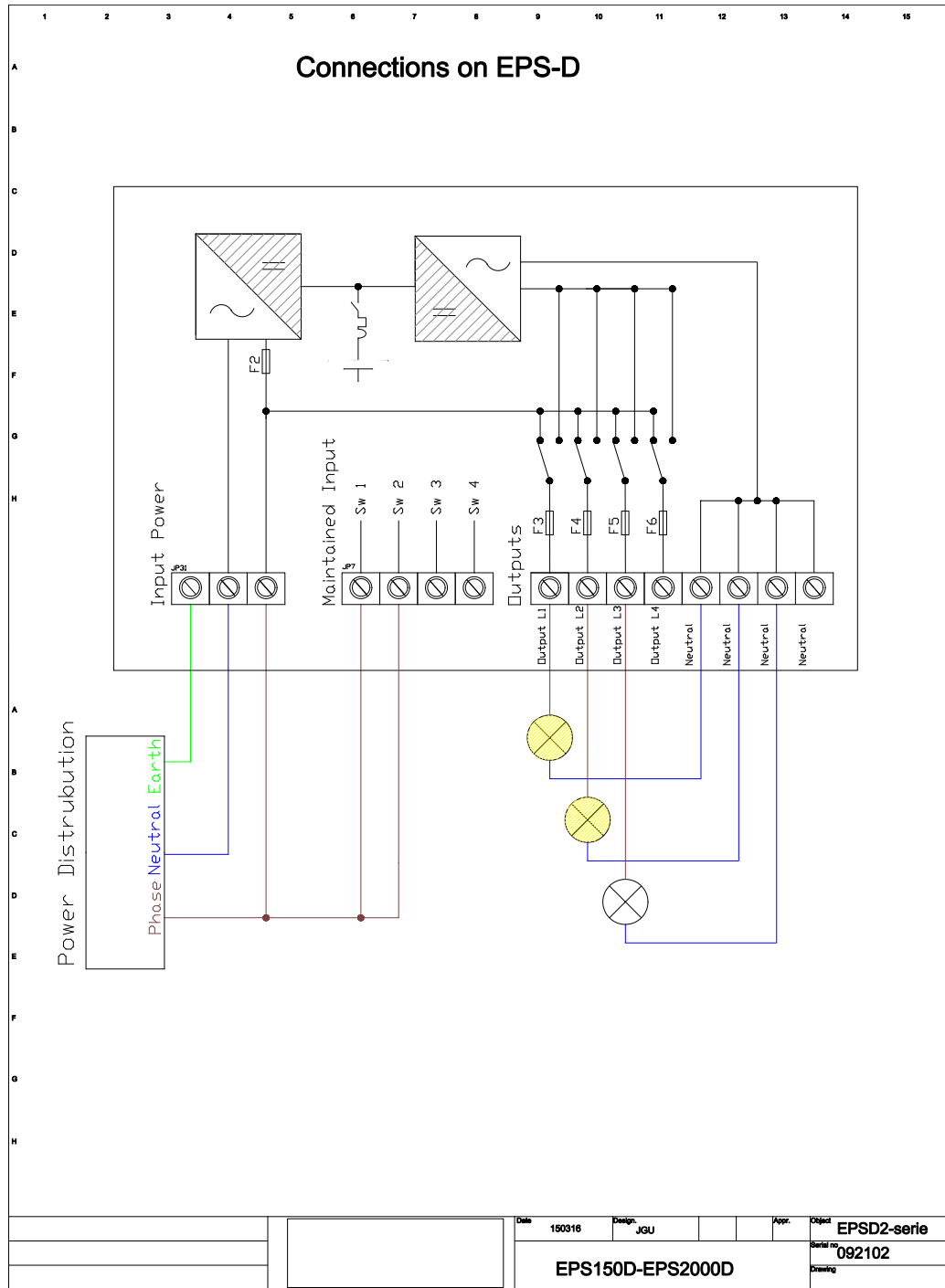
Connection examples

Exempel A-1:



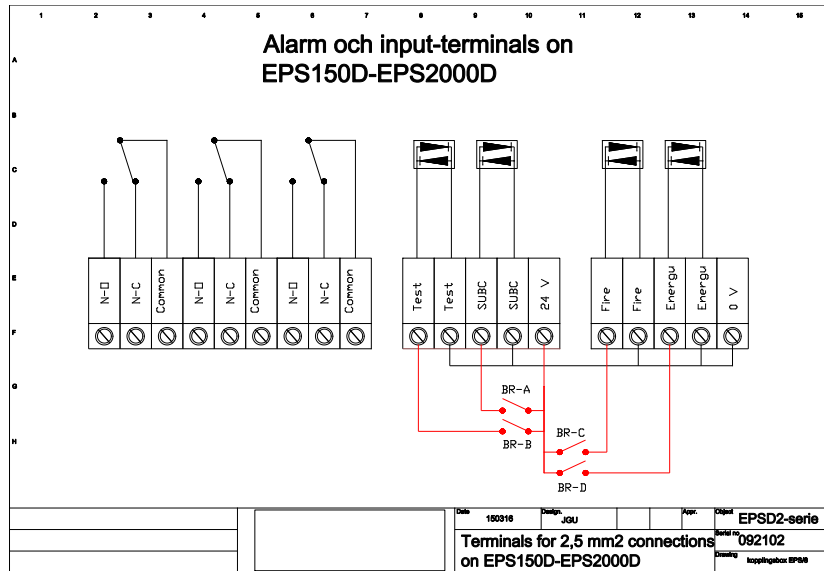
- Output 1: Always activated.
- Output 2: Activates when BR1 is closed or at mains failure, tests and 24V inputs.
- Output 3: Always activated.
- Output 4: Deactivated. Activates at mains failure, tests and 24V inputs.

Example A-2:



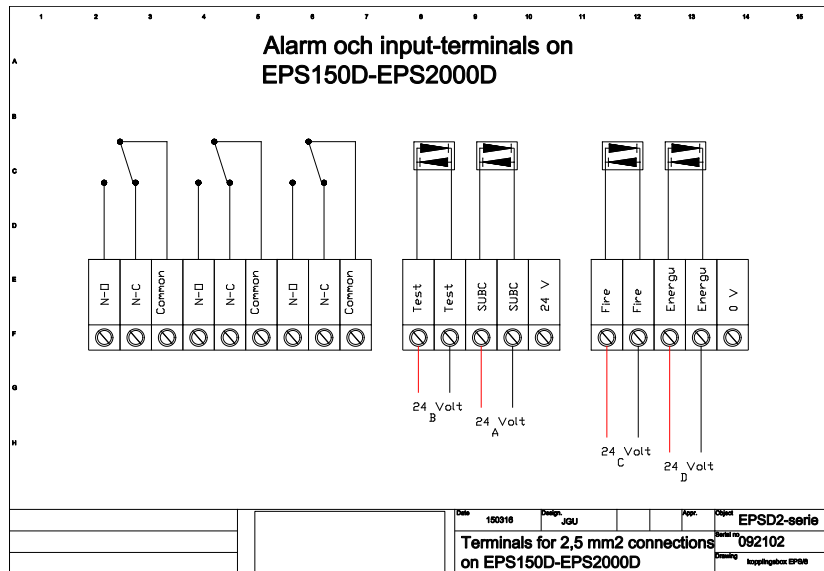
- Output 1: Always activated.
- Output 2: Always activated.
- Output 3: Deactivated. Activates at mains failure, tests and 24V inputs.

Example B-1



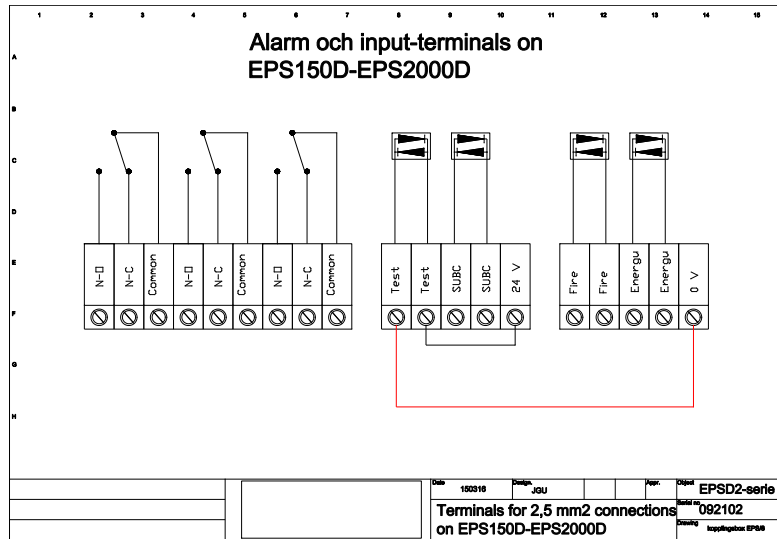
- BR-A: For sub-centrals. Closing of the switch activates all the outputs.
- BR-B: For testing. Closing of the switch activates all the outputs.
- BR-C: For fire-alarm. Closing of the switch activates all the outputs.
- BR-D: For energy-save. Closing of the switch deactivates all the outputs.

Example B-2



- 24V-A: For sub-centrals. External 24 Volts activates all the outputs.
- 24V-B: For testing. External 24 Volts activates all the outputs.
- 24V-C: For fire-alarm. External 24 Volts activates all the outputs.
- 24V-D: For energy-save. External 24 Volts deactivates all the outputs.

Example B-3



Testplug:
JP1 pin 1 connected to JP1 pin 4
JP2 pin 1 connected to JP1 pin 5

This can be used to activate all of the outputs for maintenance purposes. The outputs will be activated as long as the connections are present and the display will show that an external input is active. The outputs are supplied by mains and the batteries continue being charged.



Operating-modes

Normal Operation – Under normal operation, the unit will show "System OK" and a "Mains supply on" green light diode will be alight. Once every 90 minutes, the system will check that the battery is connected. If the battery is disconnected or there is inadequate connection in the battery circuit, 'Battery off' will be displayed. The alarm will sound simultaneously. The alarm will be automatically acknowledged once the battery is connected

Mains Failure – If the mains voltage falls below 65 % of rated voltage, or the frequency changes by >2 % from 50 Hz, red LED diodes "Charger off" and "Battery supply on" will light up, and the green LED diode "Mains" will be turned off. The alarm will sound. The inverter will start in accordance with the preset values of "Soft start" and "Delay". The inverter gives a nominal voltage $\pm 2\%$, measured with an RMS instrument, as well as $50\text{ Hz} \pm 0,1\%$.

When the inverter is running, the display will show "Low battery" when then battery is at 22 V.

When the battery voltage reaches 19 V, the inverter is shut down to enter into sleep mode. This enables minimal power to be drained from the battery. The display is shut down and the unit will wait until mains power is restored, at which point it will restart automatically.

Mains power restored – When the mains power exceeds 80% of the nominal value, a green LED diode "Mains ok" is lit, and the red LED diode "Charger Fault" is turned off. At this point, the inverter will synchronize with the Mains to ensure a soft transition. The inverter will subsequently transfer the load to the Mains with a delay of approximately 0.5 sec. The red LED diode "Battery power" will be turned off and the battery will be recharged.

Shutting down – When servicing or maintaining the unit. Turn off the battery circuit breaker and remove the supply phase fuse. Note. The relays of the four individual load paths will function independently of the rest of the unit. When the unit is shut down, these relays will relax and provide power to all output ports using power from the supply phase. NOTE earth leakage monitoring only works when the unit is in use.

Functions

Fire-alarm 1 function – if 24VDC is connected to the fire alarm input terminal, the unit will simulate a mains failure, and activate all the outputs on battery mode.

Fire-alarm 2 function – if 24VDC is connected to the fire alarm input terminal, the unit activate all the outputs on mains.

Fire-alarm 3 function – if 24VDC is connected to the fire alarm input terminal, the unit deactivate all the outputs.

Autotest – Battery test – If this function is selected in the settings, the unit will test the status of the batteries every week, for a period of 10 minutes. The battery power during discharge is compared to the selected battery size and the final battery voltage. The point of departure for the test is that the battery is fully charged and that the load is stable during the entire test. Once the test has been performed, the unit will return to normal mode and display an error message if the test has not been approved. Press the <Accept> button to approve. The under voltage protection low battery (22 V) is active and will, if necessary, finish the test and display an error message.

Autotest – Load monitoring – The load monitoring is described by the following procedure.

Load monitoring for mixed lighting fitting types. When selected the battery- test and load monitoring will be performed simultaneously.

- The unit must have been installed and autotest selected (the load needs to be > 24 hours to provide a constant load, not applicable to LED lights). The electronics will use the first autotest as a reference, and will store this information. Note that the information will be stored even if the unit is shut down.
- At the following autotest, lasting 20 minutes and performed with mains power, the load will be read during the last 7 minutes, and this value will be compared to the above reference.
- If the deviation is acceptable, <45W per output port, or the set value, no changes will occur'
- If the error is unacceptable, >45 W per output port, an error message "Load change" is displayed and the alarm relay "load error" will change. The top line of the display will indicate <Accept xxxx W>, with + or – depending on the change. Under Ref load, the out port where the error has occurred will be displayed (scrolling).
NOTE. The limit, per output port, may be changed in the start-up menu, from 1 W to 85 W. If the load consists of light diode lighting fittings with a low VA value, the output port(s) with this load connected can be changed. Avoid using incandescent lights as a load, since the VA value will change according to the mains voltage and may instigate an error alarm.
- By pressing <Accept>, the unit will return to initial mode and will accept the next test as the correct reference load.
- Do not accept an incorrect load. Press the right-hand button and the change will not be saved. At the next test, the unit will compare the load to the previous test value.

Manual test function – During normal operation, both buttons may be pressed simultaneously, bringing up a selection between WEEKLY TEST and ANNUAL TEST.

If selecting WEEKLY TEST (left-hand button), a load test will be performed for 20 minutes, indicated by a red LED diode TEST. Afterwards, a battery test will be performed for 10 minutes, indicated by red LED diodes TEST and BATTERY MODE.

If selecting ANNUAL TEST, the unit will perform a one-hour battery discharge, with a countdown on the right side of the display. If the battery cannot take 1 hour (to low battery alarm), the unit will interrupt the test and sound an alarm, and keeps the number of remaining minutes in the display. If the buttons are pressed once again during the test, the unit will finish the test without updating the memory.

Note that if the battery is not charge to 100 %, values may differ, resulting in an alarm.

Annual test– If selected in the Setting Routine, the battery will be tested annually for 60 minutes each time, and will indicate this in the display. The point of departure for the test is that the battery should be fully charged. The test cannot be performed if there has been a power outage <20 hours before testing time. In this case, the test is moved by 24 hours.

Once the test has been performed, the unit will return to normal mode. If the test was approved, it will be stored in the clock (RTC) for checking. It will be indicated as "last annual test". The under voltage protection low battery (22,0 V) is active and will finish the test if necessary and indicate an error message as Battery error and Annual test error. <Accept> will also be displayed to enable acknowledgment of the alarm. The test will not be stored in the clock as an approved test. The test can be interrupted (after 1 minute), by pressing both buttons simultaneously. Nothing will be stored in the clock.

Battery disconnect function – The battery power is checked constantly, and the entire battery circuit is checked every 65 minutes. An error message will be initiated in case of an interruption.

Overload monitoring – This function works in two ways.

During mains power. The entire load is checked. If it exceeds 150 VA or 120 W per size (e.g. EPS600=600 VA or 480 W) for over 5 seconds, overload will be displayed and the alarm will sound. To return to normal operations, reduce the load and press <Accept>.

In case of a load short circuit, the output port fuse shall fail 5 A/FF (breaks at 11 A on 0.4 sec (2530 VA / W). Check that all output ports are working after fixing.

During battery power. If the battery watt value exceeds 158 W per size +150 W (e.g. EBS 750 = 5x158+158= 940 Watt) for more than 5 seconds, the out voltage will be reduced until the load is the maximum allowed, or until the out voltage reaches 150 V, at which point the inverter will be shut down. The alarm "overload" will sound and remain until the load has been reduced and the <Accept> button has been pressed.

Note that the value to the right of the <Accept> button is the VA value that existed just before the alarm was triggered. When the <Accept> button has been pressed, all the unit's parameters can be accessed and pressed. Note that if the overload remains, the AC voltage will be lower than the nominal to enable only the maximum power the unit can deliver, either VA or W. While "overload" is on, the alarm relay "load" will be on.

Short circuit monitoring – This function monitors the 4 output ports individually while using mains power, and the total load while using battery power (15 A / DC per size).

If a short circuit occurs while using mains power, the output port fuse shall fail 5 A/FF (breaks at 11 A on.4 sec (2530 VA / W).

Saturation (power stage protection) – This function monitors that the power stage MOSFETs open properly. If opening incorrectly, the inverter will stop and an alarm will be displayed. This may sometimes happen at large start currents, or if one or several transistors are damaged. This way, no further damage can occur.

Front panel

Display – The EPS-D is equipped with an easy to use display. The Display has 4 LEDs for status indication and 2 buttons marked A and B. In case of an alarm, the unit will activate a buzzer to alert the user of the situation.

The A and B buttons are used to browse through the information in the display. Button A is used to browse to the left and the B button is used to browse to the right. If the unit isn't started in a settings mode and no alarm is active, then nothing can be altered through the use of the buttons.

By pressing the right button following information will be presented in the display:

Version – indicates the PCB version, e.g. LV6, and the firmware version e.g. 16.

Load VA – indicates the load in VA.

Watt Cos fi - 15 Watt 0.87 VA: indicates the load in watt, as well as its $\text{pf}(\cos f)$.

Ref load – indicates the load that has been saved as reference load for the weekly test.

Battery Voltage – usually 27.4 Vdc ± 0.2 V is displayed when the battery is fully charged.

Discharge – indicates the direct current from the battery during battery operation.

Charge – indicates the charging current to the battery. Usually, 0-1 Ampere is displayed when the battery is fully charged.

Mains – shows the supply phase voltage, typically 230 V.

Invert – indicates true RMS load voltage during power outages. Displays zero when grid is present, and typically 230 V during battery operation.

EL - indicates set value for the earth leakage monitor (30 mA) and true earth leakage, e.g. 4 mA.

****Testday** – if automatic battery testing has been selected under “Setting routine” (or factory set), otherwise, choose EBS size. Test date weekday.

****TestTim** – indicates the time when the automatic test will begin. NOTE The test will begin within 1 minute of set time, and will last for 30 minutes.

Unit Size – indicates the unit size in Watts, compare with the load table and data plate.

Batt – indicates the battery capacity, must correspond to existing battery (in relation to temperature) to prevent battery overcharge/undercharge.

Next annual test – indicates the date of the next annual test (automatic scrolling)

Las annual test – indicates the date of the previous successful (1 hour use) annual test.

If no successful tests exist, the display will indicate *****. (automatic scrolling)

Fire-alarm 1/2/3 – indicates type of selected fire alarm.

Effekta Power Syst. +4640946020 – Shows Company name and number

Date/Month/Year/Day – indicates current date.

Time – indicates current time, equipped with summer/winter crossover.

** Only visible when autotest has been selected.

LEDs – On the front there are placed 4 LEDs, for a simple overview.

Mains power – green: The mains voltage exceeds 80 % of the standard 230 Volts and the frequency is 50Hz \pm 2%.

Charger Fault – red: Mains below 65 % (during 5 ms or longer) and has not returned to >80 %, or battery over voltage (>28.5 V DC). This should also activate if the charger experience an internal charger problem.

Battery Mode – red: The inverter is running. This can be due to mains failure or an autotest. If it' due to mains failure, this LED diode will be lit up when the mains returns and while the unit is synchronising with the mains. The unit will then make a pause for 4 seconds, during which time the mains must be stable.

TEST - red : The unit is auto-testing

Alarm – When an alarm has occurred, the display will show what the active alarm is. If an alarm is present, the unit will activate one or several alarm relays, depending upon what's the active alarm.

Some of the alarms can be accepted or rejected like loadchange, battery fault etc. By pressing the left button (A) the alarm will be acknowledged and accepted. The unit will then go back to normal operation and the alarm relay will go back to the normal position. By pressing the right button (B) you will acknowledge that you have seen the alarm, but not accepted it. This will mute the buzzer without resetting the alarm.

The unit will then stay this way until the unit has been restored to normal operation.

OBS, with the load change alarm active the B button will reject the latest measurement of the load. It will then reset the alarms from the system, both in the display and on the alarm relays. .

Some of the alarms can't be accepted like earth leakage, mains failure and overload.

They can be acknowledged and by that the buzzer will be silenced, but the alarms will stay active. These alarms will stay active until they've been corrected. Due to the severity of the faults, some of the faults need a restart of the system to reset.

IMPORTANT: An active alarm doesn't necessarily mean that there's something wrong with the unit. The unit will also activate alarms for failures that outside the unit. Examples of those kinds of faults can be load change, mains failure, overload, earth leakage.

För enklare översikt av larmen och deras innebörd följer en larmlista med orsak och förklaring på följande sida.

Skulle fel dyka upp som inte finns med på denna lista så vänligen kontakta Effekta för konsultation.

Alarm
Cause
Action

Load Change:

Accept – (alt. +) XXX VA

The unit has performed a weekly test. It has discovered that the load differs from the reference load more than the set tolerance value. This can be on one or several output. Possible causes are if a luminary stops working, if an output fuse burns or some other changes of the load.

- 1) Accept the load measurement as a new reference load: Push the left button and the last measured value on the outputs will become the new reference load. This means that all the future tests will be measured against this value.
- 2) Reject the last load measurement: Push the right button and the unit will keep the original reference load. This means that all the future tests will be measured against the last accepted load value on the reference load.

Battery fault:

The unit has performed a test and found that the battery capacity isn't enough to maintain the load during the units set backup time.

Replace the batteries and control the settings

Mains failure:

The unit experiences that the supply voltage (230 Volt) to the charger is outside the tolerance level. The unit starts the inverter and supplies all load from batteries.

Make sure that the main (230 V) to the unit is present. If the main is present, check F1 on the PCB

Overload:

Accept XXX VA

The unit has found that the load it supplies is larger than what it has been designed for.

Remove load until it's within specifications for the unit. If the unit gives of this alarm on with the inverter on idle, notify your retailer.

Short Circuit:

The unit has during battery mode discovered a short circuit on the load, or that it has a substantial overload

Remove the short circuit or the overload. Restart the unit.

If the alarm appear when idling on battery mode or if the load is else way measured and controlled, contact your retailer.

Saturation detect:

The unit has a problem to supply the load during battery mode.

Remove the load that's causing the problem. Press the right button to reset the alarm and try to restart the load using the battery mode.

If the alarm appears when idling on battery, contact your retailer.

Earth fault:

The unit has discovered a difference between the output current to the load in comparison to the received current from the load in the neutral. If this current exceeds the chosen setting, the unit will shut of the load one output at a time until it has found the cause of the problem.

The unit has to be shut down completely and restarted to reset this alarm.

Remove the earth leakage on the load or remove the output where it's located. It's also possible to change the setting of the earth fault 100 mA or 300 mA.

Then restart the unit.

Multiple Earth fault:

The unit has discovered a difference between the output current to the load in comparison to the received current from the load in the neutral. If this current exceeds the chosen setting, the unit will shut of the load one output at a time until it has found the cause of the problem.

If the unit can't locate the fault to one single output it will shut down all the outputs and give the alarm multiple earth fault.

The unit has to be shut down completely and restarted to reset this alarm.

Remove the earth leakage on the load or remove the output where it's located. It's also possible to change the setting of the earth fault 100 mA or 300 mA.

Then restart the unit.



Intermittent Earth fault:

The unit has discovered a difference between the output current to the load in comparison to the received current from the load in the neutral. If this current exceeds the chosen setting, the unit will shut of the load one output at a time until it has found the cause of the problem.

If the problem disappears before the unit can locate what output it is located on, it will shut down all the outputs and give the alarm Intermittent earth fault.

The unit has to be shut down completely and restarted to reset this alarm.

Remove the earth leakage on the load or remove the output where it's located. It's also possible to change the setting of the earth fault 100 mA or 300 mA.

Restart the unit.

Charger fault:

The unit has found a problem with the charger and shut it down.

The unit has to be shut down completely and restarted to reset this alarm.

If the alarm returns, contact your retailer.

DC Overvoltage:

If the battery voltage to high, the unit will switch off the charger and give the alarm DC Overvoltage. This alarm will reset when battery voltage goes back below an accepted value.

If the alarm keeps returning, contact your retailer.

Battery Low:

When the battery voltage reaches a voltage close to the shutdown level, the unit will give this alarm. Either the charger has gone inactive or the unit is running in battery mode. This alarm can also appear if the unit recently has drained its batteries in a test or a mains failure.

If the unit has run on battery mode recently and is in a state of recharging the batteries, then wait 12 hours to see if the alarm resets itself.

Check the mains and the charger. If there's an acceptable mains but the charger doesn't work, contact your retailer.



Battery Off:

Every 90 minutes the unit checks if the batteries are connected. If the alarm is active and the batteries are connected and the battery breaker is on, then the fault might lay with the batteries. If the conditions of the batteries are very poor, the unit can perceive them as not connected.

Turn on the battery breaker, check the status of the batteries.

Ext Firealarm:

If the fire alarm input on JP2 has been activated, the unit will activate the fire alarm operation. The unit will then activate all the outputs on mains or on battery mode, depending upon the selected setting.

Remove the activation on JP2.

Troubleshooting

The load is connected, but the lights aren't activated:

Make sure that the correct input are connected and has appropriate voltage.

Make sure that the output fuses are intact.

Shut down the electronics and the load should activate on mains.

The Display turns on but is blank:

Shut down the unit and make sure that the processor is mounted firmly in its place.

Restart the unit

Specifications

Charger:

Voltage: 230 VAC $\pm 10\%$

Frequency: 50Hz $\pm 2\%$

Protection: Mains fuse/Battery fuse/Output fuse/Polarity protection for the battery (Diode), DC Overvoltage & Deep discharge.

Battery Charge Current: C/10 A/DC – automatically set through battery size.

Battery Voltage: 24 Vdc.

Battery voltage adjustment: 27.4 Vdc $\pm 0.1\%$ - adjustable through potentiometer.

Low battery alarm: 22.0 Vdc (reset at 25.5 Vdc).

Under voltage shutdown, battery: 19 Vdc (reset at 24.2 Vdc).

Temperature compensation: Checks and adjusts the charging voltage.

Inverter:

Voltage: 220/230/240VAC

Static Adjustment: $\pm 2\%$ True RMS (Selected software) - 90 % of nominal when low battery.

Dynamic Adjustment: max 10% - return to nominal < 5 seconds

Frequency: 50 Hz $\pm 0.1\%$ - own crystal – under mains fail 50 Hz $\pm 2\%$ - when mains present.

Slew rate: 0.1 Hz/second

Curve form: Quasi (modulated square) or sine.

Under voltage shutdown: 150 Vac.

Overload while Mains powered: The rated size. EPS600D = 600 VA

Overload while battery powered: 180 W per size +50 W for own power (while the out voltage exceeds 150 Vac) e.g. EPS750D = $5 \times 180 + 50 = 950$ W.

Short circuit while mains powered: Fuse fail 5 A/FF (breaks at 11 A on.4 sec (2530 VA / W)

Short circuit while battery powered: 240% for EPS10D – EPS60D, 210% on EPS80D, 170% on EPS100D, (within 0.4 sec.) or fuse break depending on what comes first.

Alarm – Two connections are placed next to the heatzinks. The third is placed above the processor.

Relay contact data: 1A @ 24 Vdc or 0,24 @ 125 Vac.

All contacts drawn in normal position. (in normal operation, under voltage, without alarm).

- INV. = Inverter mode (Battery mode), due to the fact that the unit has entered inverter mode and is being powered from the battery.
- LOAD = Load error. Caused by earth leakage, overload or short circuit.
- COMMON= Summary alarm. Caused by any above errors and fire alarm.

Display

- Dot Matrix display – 2 lines x 16 characters.
- 4 LED – Mains power / Charge error / Battery power/ Test ongoing
- Buzzer active during all active alarms, if chosen.
- Clock – accuracy <1 minute/ month at 20°C.

Functions

- Battery Test Function – selectable through the software.
- Sleep function during lengthy power outage – automatic restart.
- Fuse monitoring – control of the output fuses
- Load monitoring – selectable through software weekly / monthly.
- Earth leakage monitoring- reacts to 30 mA (or 100 mA / 300 mA) reaction time <0.4 sec.
Switch-off time < 0.4 seconds. factory set to 30 mA.
- Fire alarm functions. May be integrated in existing monitoring systems (BMS)
- Energy saving for night-time switch-off

Environment / Encasing

- Temperature range: 10°C - 30°C.
- Relative humidity: 40% - 90% non-condensed.
- Altitude: 1000 m maximum.
- Steel encasing / Powder enameled IP23.

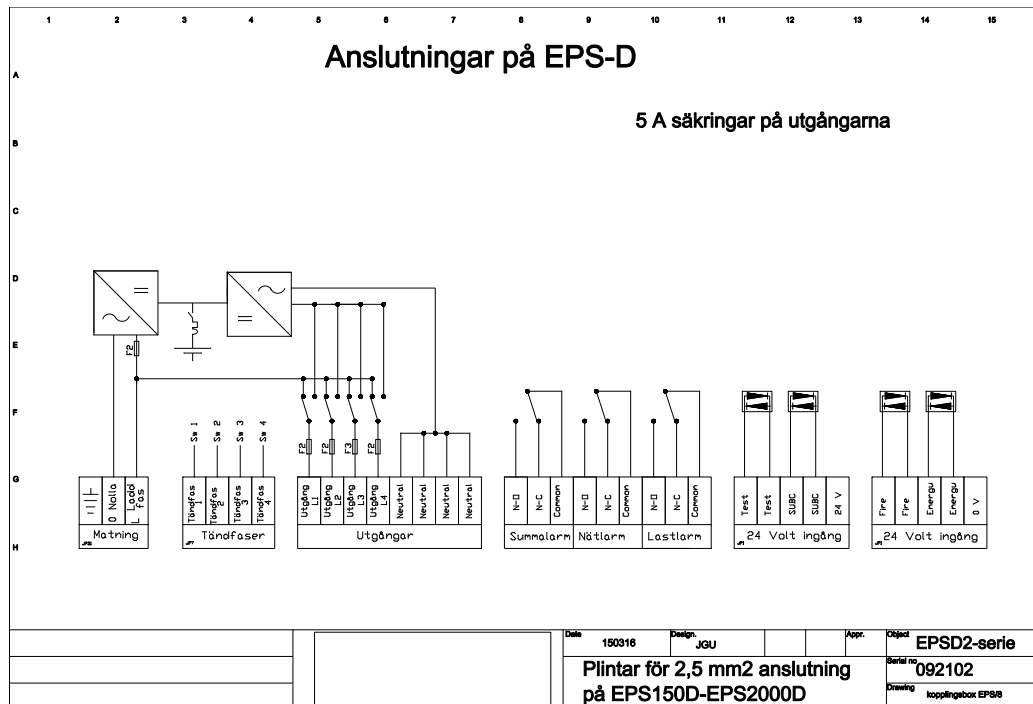
Changeovers

Mains to inverter – The inverter starts, synchronized to the mains, between 5 and 20 ms after detection of the mains outage, to ensure a safe load changeover (when load is maintained). The changeover is also determined by the soft start and delay settings.

Inverter to Mains – The inverter locks towards the mains (synchronizes) and will, after a short pause, transfer the load to the mains with a maximum interruption of 0.5 sec.

Earth relay– This relay switches between input neutral and earth while under battery power. This output neutral is earthed while under battery power, preventing output voltage from floating in relation to earth. Thus the 4-contact break will work without an additional transformer.

Load connections. –Each output port is individually fused, using a 5 A fast. It breaks at 11 A on 0.4sec. (2530 VA/W).



Maintenance

1 General

There's no special maintenance required for the day to day operation. But the unit should still be controlled with regular intervals to make sure that there's no loose connections, external damage or overheating.

2 Fans

The life of the fans used to cool the power parts is dependent on the using and environmental conditions (temperature, dust).

The expected lifespan of the fans are 20 000-40 000 hours operation.

A high ambient temperature or dusty environment will shorten the fans life.

Preventive replacement by an authorized technician is recommended within four years (in normal operating conditions)


A worn fan can reduce the output power or shorten the units life expectancy.



Only fans supplies by Effekta are to be used in EPS-systems.

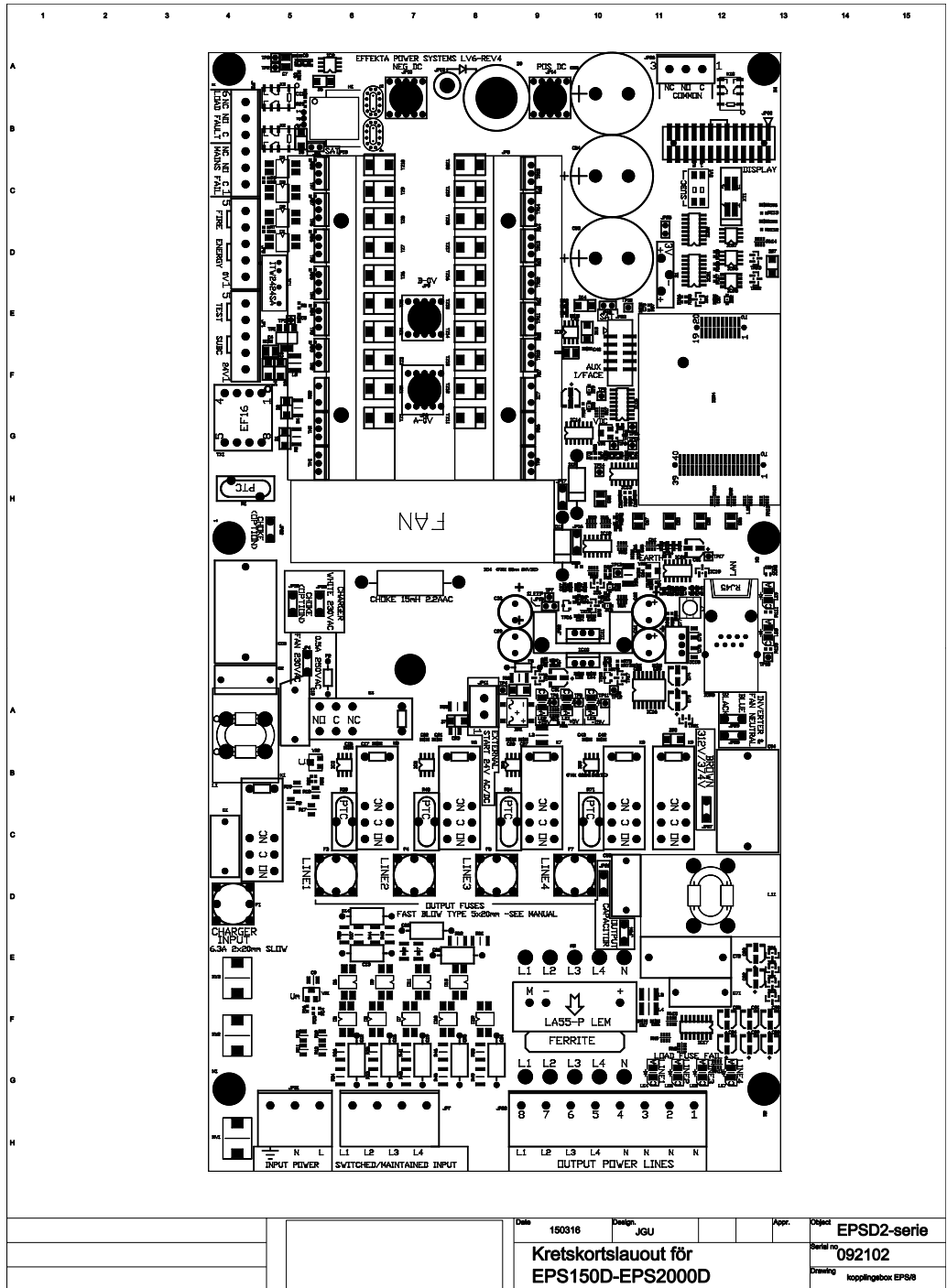
3 Batteries

The batteries mounted in the EPS-Digital units are classified under Eurobat 1999 "10-12 years - High Performance". The real lifespan is very dependent on operating conditions (number of charging cycles, deep discharge, temperature, etc.). At high ambient temperatures the life of the battery may be reduced down to one / some years, so always check the temperature in the rooms where the batteries are placed.

	<p>When changing the batteries, always use the same type and configurations.</p> <p>The replaced batteries should be submitted to an authorized collection point for recycling.</p> <p>Do not touch the hazardous material inside, do not open up the plastic casing of the batteries</p>
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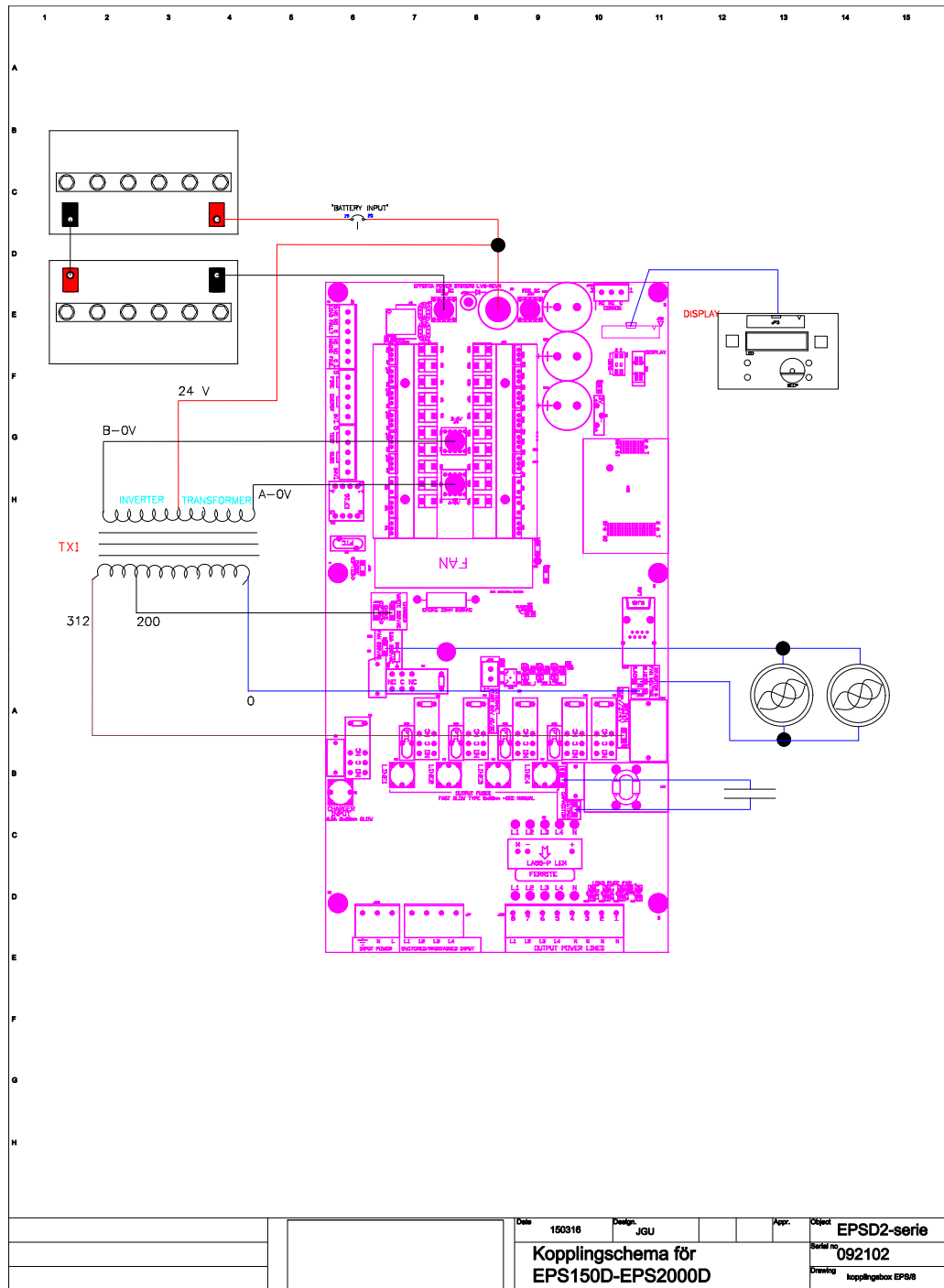
The real status of the units components will be evaluated at a preventive maintenance.

USERMANUAL EPS-D


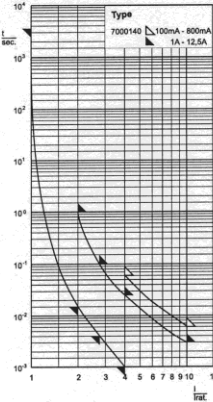




Technical specifications and data are subject to change without any prior notice.

USERMANUAL EPS-D



Technical specifications and data are subject to change without any prior notice.

	G-Sicherungseinsätze verwechselbar	Fuse-links interchangeable	Fusibles cartouches interchangeables																														
Strom-Zeit-Kennlinien Current Time Characteristics Caractéristique courant/temps 	Aufbau Keramikrohr undurchsichtig mit Löschmittelfüllung Kontaktkappen Messing vernickelt Verpackung 100 Stück (10 x 10) oder 1000 Stück (Industrieverpackung = IP) Schmelzeit-Grenzwerte	Construction Ceramic tube non-transparent with filling End caps brass nickel-plated Packing 100 pcs. (10 x 10) or 1000 pcs. (industrial packs = IP) Fusing time limits	Construction Tube céramique non transparent avec remplissage Capsules laiton nickelé Emballage 100 pcs. (10 x10) ou 1000 pcs. (emballage industriel = IP) Temps de fusion limité																														
	Bemessungsstrom Rated current Courant nominal 100 - 800 mA 1 - 12,5 A	<table border="1"> <tr> <td></td> <td>2 x I_n</td> <td>2,75 x I_n</td> <td>4 x I_n</td> <td>10 x I_n</td> </tr> <tr> <td></td> <td>min.</td> <td>max.</td> <td>min.</td> <td>max.</td> </tr> <tr> <td>1 h</td> <td>-</td> <td>-</td> <td>-</td> <td>60 ms</td> </tr> <tr> <td>1 h</td> <td>1 s</td> <td>4 ms</td> <td>100 ms</td> <td>1 ms</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>25 ms</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>3 ms</td> </tr> </table>		2 x I _n	2,75 x I _n	4 x I _n	10 x I _n		min.	max.	min.	max.	1 h	-	-	-	60 ms	1 h	1 s	4 ms	100 ms	1 ms					25 ms					3 ms	
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	Sondertyp Special type Type spécial	5 x 20 mm	250 V	FF (sup'flink) (very qu.- acting) (très rap.) Type 7000140																													
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		Bei Verwendung dieser G-Sicherungseinsätze ab 6,3 A ist auf ausreichende Wärmeabfuhr zu achten. When using this type from 6.3 A up, consideration should be given to heat Ce type de fusibles, utilisé à partir de 6,3 A nécessite une évacuation de chaleur.																															



CE CONFORMITY DECLARATION

We, Effekta Power Systems AB
Sadalgatan 6, 213 77 MALMÖ, Sverige

declare under sole responsibility that the below products:

EPS150-2000BAS, EPS150-2000D, EPS150-2000DP, EMN2 (0211-1011),
EMD (0111-1011) and Output box with 16 lines.

to which this declaration relates is in conformity with the following
standards LVD (2006/95/EC) and EMC-directive (2004/108/EC) and all
their enclosures.

The following standards have been used:
EN 50171, 50172, 50081-1, 50082-2 och 60598-2-22

Malmö, 2015-08-28

Effekta Power Systems AB

A handwritten signature in blue ink, appearing to read "Pontus Lindbergh", written over the printed name.

Pontus Lindbergh
Product Manager

EFFEKTA POWER SYSTEMS AB

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