

# PDB 20000

Parallel board PDB 20000 for two Protect D.6000/ D.10000 UPS

EN



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## 1 General Information

### 1.1 Validity

This manual complies with the technical status of the unit at the time of publication. This manual is a component part of the system. Legal claims arising from this contractual relationship shall only be recognised by AEG Power Solutions GmbH subject to the terms agreed under the warranty obligation in the main contract.

### 1.2 Appropriate Use

The parallel board is used to construct a parallel operation system consisting of two Protect D.6000 or D.10000 UPS for a power of 2 x 6 kVA or 2 x 10 kVA respectively.

The parallel board can also be used as an external bypass field for just one of the UPS types mentioned above. It is not applicable to retrofit the existing low voltage main distribution (LVMD) when a parallel board is used. The load is connected via a subdistribution which is to be constructed downstream by the customer.

The parallel board is only intended for this use. Any other use constitutes misuse and can endanger personal safety.

## 2 Safety

### **Attention:**

The safety instructions in the Protect D.6000 or D.10000 operating instructions must be observed.

The general directives for correct use of electrical equipment must be followed.

### **Safety Signs and Warning Notices on the Equipment**

Safety signs and warning notices are located in the vicinity of danger spots. They provide information about electrical hazards and residual hazards associated with working on and with the equipment.

Safety signs and warning notices must always be in perfect condition and clearly legible. You must comply with safety signs and warning notices whenever you are working on or with the equipment.


### 3 Scope of Delivery

Check that the following components are delivered with the unit:

- 1x parallel board with:
  - 6x TE cable connections
  - 2x detection cables (bypass)
  - 1x bus cable for parallel operation (15-pin)
  - 1x installation kit for 19" rack (incl. busbars and fastening brackets)
  
- Technical documents:
  - Operating Instructions
  - Circuit diagram

#### Available to order

To place an order, please contact:

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## 4 Information on the Unit

### 4.1 Structure

The parallel board is delivered preassembled and ready for connection and is constructed for use in cabinets or rack substation structures designed for accommodating 19" components.

### 4.2 Indicators and Operating Elements

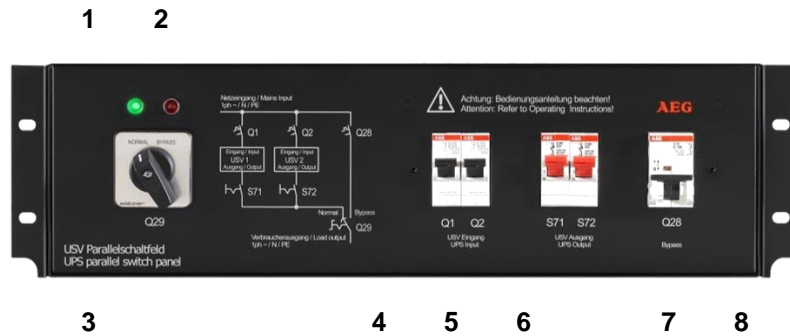


Figure 1 - Display and operating elements  
(with protective cover removed)

No.	Name	Function
1	Green LED	Normal operation (load is supplied via UPS output)
2	Red LED	Bypass operation (UPS bypassed)
3	Q29 selector switch	Operating mode selector switch (NORMAL/manual bypass operation)
4	Q1 toggle switch	UPS 1 input ON/OFF
5	Q2 toggle switch	UPS 2 input ON/OFF
6	S71 toggle switch	UPS 1 output ON/OFF
7	S72 toggle switch	UPS 2 output ON/OFF
8	Q28 toggle switch	Bypass supply ON/OFF

Table 1 - Operating elements

## 5 Function

The PDB 20000 parallel board makes parallel switching of two Protect D.6000 or Protect D.10000 UPS possible for increasing the power or for achieving active redundancy for maximum availability.



*Only connect the same UPS types – do not mix.*

Each UPS can be isolated separately on the input side from the mains and on the output side from the secured busbar without interrupting the power supply of the connected loads.



For maintenance, one or both UPS can be isolated via the parallel board at any one time.

The detection cables of the bypass circuit which is designed to prevent operating errors also ensure uninterrupted supply of the loads from the SBS circuit if both UPS are disconnected. The respective operating state is signalled potential-free via a changeover contact.

## 6. Transport

Delivery is made in conventional outer packaging.  
The unit weighs approx. 20 kg.

## 7 Installation

	 <b>DANGER</b>
	<p><b>Contact with voltage</b> Risk to life due to electric shock.</p> <ul style="list-style-type: none"> <li>➔ Move the victim away from live parts using dry insulating material.</li> <li>➔ Contact the person responsible for the unit and seek medical assistance.</li> <li>➔ Disconnect the equipment safely.</li> </ul>

### 7.1 Diagram

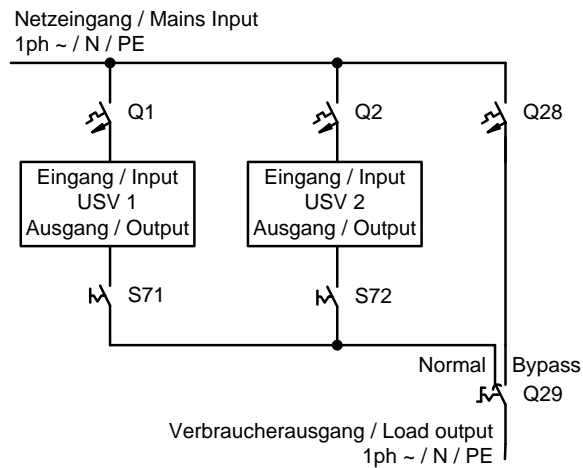


Figure 2 - Circuit diagram

The parallel board is established logically between the two Protect D UPS which are to be connected.

Arrangement of the units → BAL Protect D chapter 10 Parallel Operation.

### 7.2 Connections

Before the connections to the Protect D UPS can be established, they must be defined as UPS 1 and 2 in order to ensure a clear allocation for operation.



*It is essential that you follow the wiring sequence specified!*



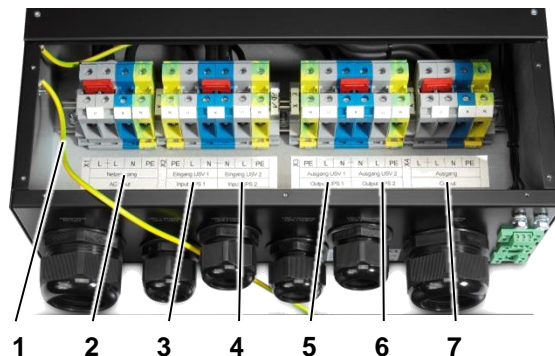


Figure 3 - Power connections (back housing cover removed)

- 1 PE cable to housing cover (not shown here)
- 2 Mains input (L, N, PE)
- 3 UPS 1 input (PE, L, N)
- 4 UPS 2 input (N, L, PE)
- 5 UPS 1 output (PE, L, N)
- 6 UPS 2 output (N, L, PE)
- 7 Load circuit output (L, N, PE)

Connection	Design	
	2x Protect D.6000	2x Protect D.10000
Input voltage	230 V AC (176 V AC – 276 V AC)	
Mains fuse	63 A	100 A
Connection cross-section mains/load	16 – 35 mm <sup>2</sup>	25 – 35 mm <sup>2</sup>
Connection cross-section UPS 1/UPS 2	4 – 10 mm <sup>2</sup>	6 – 10 mm <sup>2</sup>
Recommended maximum UPS fuse output	10 A	16 A
	Observe trigger characteristic "B"	

Table 2 - Power connections

Detection cables are also required for detecting the status of the bypass and for control.



Figure 4 - Connections on the back of the parallel board

- 1 Parallel board nameplate
- 2 Potential-free signalling contact (operating mode Q29 (changeover contact))
- 3 Connector sockets for UPS bypass detection cables
- 4 Ground potential connection via additional screw connections on the parallel board housing
- 5 UPS detection cables (in the scope of delivery)

## 7.3 Wiring

### Preparation

- Disconnect the system
- Install rack busbars and parallel board in the cabinet.  
(Parallel board should preferably be mounted directly above the Protect D systems)
- Allow access to the already installed Protect D connection units. (Disconnect/remove battery module(s) of the UPS units)

### Implementation



*Always observe the information in the Protect D operating instructions.*

1. Remove the back housing cover of the parallel board.
2. Connect inputs and outputs of the UPS 1 and 2 to the connections on the parallel board  
→ BAL Protect D, chapter 6 Electrical Connection = Central Supply (SINGLE INPUT).



*Ensure that the connection cables are **the exact same length**.*

3. Connect the load subdistribution to be constructed downstream by the customer to the central output of the parallel board (connect the load circuit).
4. Connect the mains supply/supply line.
5. The installation of the cables in the parallel board is now complete.
6. Once installation is complete, check all cables are correctly connected.



*Do not confuse inputs and outputs of the UPS units under any circumstances.*

*Check the phase and neutral conductors.*

*Confusion will inevitably cause a short-circuit.*

7. Close the housing cover after correct connection.
8. Establish the connection of the detection cables between the parallel board and both UPS units  
(→ BAL Protect D, 13 – Changeover Contact).
9. Connect both Protect Ds with the bus cable for parallel operation (→ BAL Protect D 16 – Parallel Port).
10. Insert the units into the rack and fasten them.
11. Re-connect the battery modules.

The parallel board installation is now complete.

## 8 Start-up Preparation

- Remove the protective cover in front of the toggle switches 2 – 6 (undo the knurled screws on the right and left and lift the cover).

### Implementation

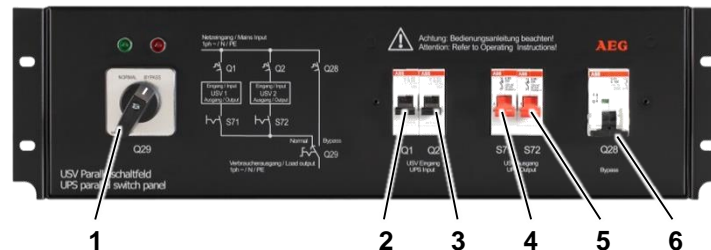


Figure 5 - Switch position at the beginning of start-up

No.	Setting
1	Operating mode selector switch (Q29) >> BYPASS
2	Input fuse (Q1) UPS 1 >> OFF (toggle switch at bottom)
3	Input fuse (Q2) UPS 2 >> OFF (toggle switch at bottom)
4	Output isolator (S71) UPS 1 >> OFF (toggle switch at bottom)
5	Output isolator (S72) UPS 2 >> OFF (toggle switch at bottom)
6	Bypass fuse (Q28) as central overload protection >> OFF (toggle switch at bottom)

Table 3 - Switch position at start-up

- Establish the switch position on the parallel board in accordance with table 3.
- Switch on the power supply of the parallel board (use the mains supply).
- Insert the input fuses Q1 and Q2 one after the other for UPS 1 and 2 (switch the toggle switch upwards). The UPS units are started up and after a short installation phase, the message "UPS On" appears in the display (→ BAL Protect D).

**UPS is still not switched on at this time.**

- On the UPS, first set the parameters for the external relay contact according to the Protect D operating instructions (→ chapter 7.3.6 - "Relay Configuration" Settings >> carry out "bypass operation" assignment).



*Settings which have been made on a UPS are transferred to the second UPS via the parallel cable.*

- The bypass symbols in both UPS displays must light up as a status display. If this is the case, release the output of the UPS units to the secured busbar using the S71 and S72 toggle switches (switches switched upwards one after the other).

6. Initially, leave the loads which are connected to the output of the parallel board switched off.
7. Switch bypass fuse Q28 on (switch toggle switch upwards). The red "bypass" LED lights up = mains supply (bypass active).
8. Turn the Q29 selector switch to the "Normal" position. (Supply of the loads switches to the secured busbar).
9. Switch on one of the two UPS, i.e. set it to continuous converter operation. This command is automatically recognised by the other UPS via the parallel operation cable, and both systems change over to the secured VFI operating state after the synchronisation phase is complete via (display: mains connector symbol).  
The green LEDs on the UPS units and on the parallel board show that the UPS system is operating correctly and the parallel board is in normal operation.
10. As the last step of start-up, connect the loads to each other and ensure that the maximum load is not exceeded. Each UPS may only be loaded up to 50% in redundancy operation.
11. Finally, to avoid inadvertently pressing the toggle switches (fuses/isolators), install the protective cover.

## 9 Operation

The unit operates as previously described with the Q29 switch set to the "Normal" position. All fuses and toggle switches are activated (all toggle switches in the upward position).

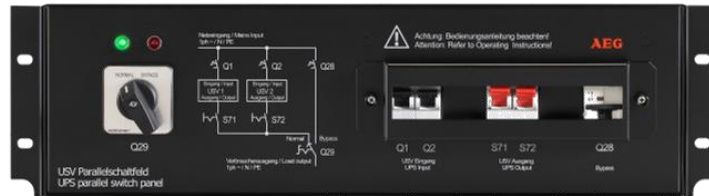


Figure 6 - Parallel board in normal operating state with installed protective cover

### 9.1 Disconnecting/Bypassing the UPS

A selected UPS can be switched off via the menu on the UPS operating panel using "Switch off a parallel operation UPS". This functions as long as the load of each UPS is less than 50% i.e. redundancy operation is guaranteed. This UPS menu item is suppressed if the condition is not fulfilled.

The disconnection of the UPS in question via the parallel board is made via Q1 or Q2, the isolation of the secured busbar via S71 or S72.

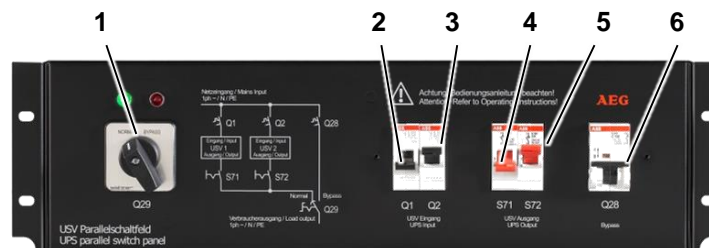


Figure 7 - Switch positions e.g. when UPS 1 is insulated

No.	Setting
1	Operating mode selector switch Q29 remains in the "NORMAL" position (secured load supply still via UPS output)
2	Input (Q1) UPS 1 >> OFF (toggle switch downwards)
3	Input (Q2) UPS 2 >> OFF (toggle switch remains at the top)
4	Output (S71) UPS 1 >> OFF (toggle switch downwards)
5	Output (S72) UPS 2 >> ON (toggle switch remains at the top)
6	Bypass fuse (Q28) as central overload protection >> ON (toggle switch remains at the top)

Table 4 - Switch positions e.g. when UPS 1 is insulated



*Attention: Only take the selected UPS from the secured busbar, otherwise there is a risk of losing the power supply altogether.*

1. To bypass both UPS (e.g. UPS systems in power-increasing parallel operation), first switch the UPS system to bypass operation.
2. Bypass both UPS units by changing the operation mode selector switch Q29 to the "BYPASS" position.
3. Both UPS units are completely disconnected via toggle switches Q1, Q2, S71 and S72.  
(Reactivation → chapter 8 - (Initial) Start-up).

## 9.2 **Connecting the UPS (One Individual Previously Insulated UPS) While Maintaining Maximum Availability**

1. Ensure that all cables have been correctly connected (input/output, phase/neutral conductor).
  - Relay contact correctly programmed and connected to the parallel board.
  - Connection of the parallel operation cable established.
  - The Q29 operating mode selector switch remains in the "NORMAL" position. The green LED on the parallel board lights up.
2. Switch on toggle switch S71 or S72 (switch toggle switch upwards), connects the UPS output to the secured busbar.
3. Close the toggle switch of the Q1 or Q2 fuses (switch toggle switch upwards), supplies the input of the UPS with voltage. Note: The unit detects the second UPS in the network via the parallel operation cable and therefore does not switch to the bypass operation state (as is otherwise usual).
4. Switch on the second UPS. The UPS unit synchronises itself with the secured busbar and engages itself in the network. The load is distributed evenly between both UPS units.

## 10 Maintenance

The owner is responsible for correctly maintaining the unit. This also applies to system components that fall within the responsibility of the grid operator.

In order to ensure uninterrupted availability of the equipment, preventive maintenance work should be carried out based on the timetable. Regular maintenance reduces the risk of breakdowns and disruption due to technical faults.

To maintain the validity of the warranty:

- Regular maintenance must be carried out and documented.
- Only original AEG PS spare parts (or spare parts obtained from and released by AEG PS) may be used.

For further details, please refer to the provisions of the individual contracts.

*The owner must define work instructions for carrying out maintenance work, giving details of:*



- Ambient conditions
- Tools, equipment, means of protection and auxiliary equipment
- Suitable personal protective equipment and organisational safety measures.



*Maintenance work must be carried out in accordance with BGV A3 (DIN VDE 0100/VDE 0105) and DIN 31051 (DIN EN 13306).*

### 10.1 Obligation to keep a Written Record

Inspection results and details of any maintenance work carried out must be recorded in writing. Experience has shown that the best way to document inspection results is in the form of a test report.

The following information must be recorded:

- Timetable/Maintenance schedule
- Date of the measure carried out
- Work performed
- Any special notes on the work performed
- Persons who carried out the work
- Signatures of the persons who carried out the work
- Signature of the person responsible (supervisor)

A correct test report, completed in full, is important for technicians as evidence of exoneration in case of later complaints or for investigations in case of damage. For this reason, test reports should be retained for a long time (around 10 years).

## 10.2 Timetable

Carry out maintenance work as for Protect D.6000/D.10000.  
The operator has an obligation to draw up suitable maintenance and operating instructions for the location and to document everything promptly and in full.



## 11 Decommissioning and Dismantling

Before beginning any work on the equipment, it must be de-energised. For this purpose, the **five safety rules** of electrical engineering in accordance with DIN VDE 0105 (EN 50110) must be observed

### 11.1 Dismantling

- Undo the plug-in module and move the parallel board forward.
- Disconnect the power connections.
- Disconnect the communication and control cables.

### 11.2 Disposal

A unit at the end of its life is electrical scrap.

In commercial contexts, the manufacturer is responsible for the disposal of electrical scrap unless otherwise agreed. Electrical scrap must always be disposed of by an expert.



Electrical and electronic scrap must only be disposed of in compliance with local legislation and regulations (German) ElektroG, 2002/96/EG (WEEE), Basel Convention.

Electronic scrap consists of valuable materials which can be reclaimed as secondary raw materials, but it also contains environmentally harmful substances.

Commercial disposal companies have information on the best way to recycle material (e.g. in the form of a recycling handbook).

For example, it is possible to recycle:

- PCBs and circuit boards
- Electronic components, EPROMs, ICs and relays
- Chips, processors, hard disks and drives
- Batteries

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