

# PEC 5068

## **BDFB**

1-10 Loads, 500A Max/Load  
-48V, 2000A Max Load/Bay

Product Manual Part Number: 438 5068PD  
Issue 32, March 2010  
Engineer: H. D.  
Approved: H. D.

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# Foreword

This manual is intended to help the user of the PEC 5068 BDFB to install, test, troubleshoot, and understand the system. If you should have any questions or problems, please contact one of the following sources:

**SERVICE** - If for any reason further assistance is needed on any power equipment, complete engineering and field service groups are available in Galion, Ohio, to assist you in any way possible.

CALL: 419.468.7700 Field Service OR 800.999.PECO (7326) and ask for Field Service

**PARTS ORDERING** - Replacement parts for power equipment may be obtained by forwarding a Purchase Order to:

PECO II, Inc OR Fax to: 419.462.8180  
P. O. Box 910  
Galion, Ohio 44833

Include the following information:

- A. PECO II part number and engineering level of equipment
- B. If part is electrical, give circuit reference numbers and PECO II part numbers.
- C. If part is mechanical in nature, give description as to where it is used.

**RETURN & REPAIR** - Equipment may be returned to the Factory for repair. In order to do this, the procedure must be as follows:

- A. Call: 419.468.7700 Field Service OR 800.999.7326 and ask for Field Service
- B. Request a Returned Material Authorization (RMA) number for the defective equipment.
- C. Return material prepaid to:

PECO II, Inc  
1376 State Route 598  
Galion, Ohio 44833

Attn: Field Service Dept

# Product Information

Please take a moment when the product is new to fill in this information. This data will allow faster service when calling PECO II to order accessories, spare parts, or request field service.

First, locate the product information label. This is typically located on the upper front of the equipment frame, or on the rear of the frame. Fill in the part number, as it appears on the label, in the space below.

<b>PART NUMBER</b>	<b>DATE CODE:</b>
<b>SERIAL NUMBER</b>	<b>ECN Level: 8_____P</b>

## Warnings

1. Electrical shock hazard. Do not attempt to remove, maintain, or install this equipment with power applied. Personnel that attempt to work on this equipment with the power applied may subject themselves or others to electrical shock that may cause serious injury or death.
2. The use of this equipment by unauthorized or untrained personnel should not be attempted. Personnel that work on this equipment without the proper training may subject themselves or others to electrical shock that may cause serious injury or death.
3. Do not attempt to work on this equipment if it is, or has been, exposed to a high moisture condition. It is recommended the equipment be returned to PECO II to be properly tested. Working on this equipment during a high moisture condition subjects the user to electrical shock that may cause serious injury or death.
4. Use of an attachment other than one approved by PECO II will void any and all warranties, implied or other, and will increase risk of fire, or may possibly cause electrical shock, injury, or death to personnel.
5. Do not operate this equipment if it has been dropped or otherwise damaged. Trying to operate this equipment if it has been damaged subjects yourself or others to electrical shock that may cause serious injury or death.
6. Before you proceed, ensure the input source is not live and the input circuit breaker(s)/fuse(s) has been tripped or removed. If these procedures have not been followed and the input/output power is live, serious personnel injury or death may occur.
7. A rack/shelf may contain several operating systems. If there is another system in the general area you want to install this system, be cautious of any exposed connectors or wires and, with permission, remove power to the other systems. Failure to take the necessary safety precautions subjects the installer or maintenance personnel to severe electrical shock that may cause serious injury or death.
8. This equipment may connect to lead-acid batteries. Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. **Wash hands after touching batteries.**

## Cautions

1. Follow proper grounding instructions.
2. If connecting batteries, remove the battery-box-fuse or trip the circuit breaker. Check batteries and connections for proper polarity and power before connecting the batteries to the system
3. To remove the circuit breakers or fuses, the DC and/or AC input to the system will need to be disconnected, thereby disabling the system output to the load(s). Take the necessary precautions and inform the plant engineer that the system output power to the loads will be disabled.
4. Before performing any maintenance, ensure AC or DC power is not applied to the system.
5. Fuse holders, fuses, and circuit breakers are not to be loaded to more than 80 percent of their ampere rating.

# SECTION 1: SPECIFICATIONS

## 1.1 GENERAL.

The PEC 5068 Battery Distribution Fuse Bay (BDFB) is designed to provide protection (Circuit Breaker or Fuse Distribution) of -48 VDC to Central Office Equipment, etc. Visual alarm signals are given whenever any circuit breaker or fuse "fails". The PEC 5068 bay (BDFB) can be top or bottom fed to facilitate ease of installation.

The PEC 5068 is a distribution bay in two (2) widths to mount 19" and 23" fuse panels. These bays are provided in heights of 7'-0", 9'-0", and 11'-6". The standard depth is 16", and an optional depth of 12", is available if required.

The PEC 5068 BDFB Bay can accommodate up to ten (10) load centers. Each load center is rated at 500 Amps, 2000 Amps maximum and consists of the following:

- A. Ground Bus Assembly (Rated at 2000 Amps).
- B. Circuit Breaker Panel consisting of:
  - 1. 23" mounting panel for 24 Circuit Breakers (maximum).  
**or**  
19" mounting panel for 19 Circuit Breakers (maximum).
  - 2. Common Bus Bar (500 Amps).
- C. Fuse Panel Assembly consisting of the following:
  - 1. 23" mounting panel for 17 TPS fuse holders (maximum).  
**or**  
19" mounting panel for 13 TPS fuse holders (maximum).
  - 2. Common Bus Bar (500 Amps).
- D. Meter & Alarm Panel Assembly consisting of the following:
  - 1. Digital Meter Assembly.
  - 2. Rotary Switch- six (6) position or (eleven) 11 position.
  - 3. Fuse Holder Assembly - five (5) position.
  - 4. Fuse Alarm PWB Assembly.
  - 5. One to ten 500 Amp Shunts (located remotely).
- E. Fuse Alarm Panel Assembly consisting of the following:
  - 1. Alarm Extension Module.
  - 2. Fuse Alarm Lamp.

Additional equipment available on an as required basis is as follows:

- A. Circuit Breaker Kit (for additional distribution).

- B. Fuses (for additional distribution).

## 1.2 BAY ALARM PANEL

The Bay Alarm Panel monitors any fuse alarm (FA) from either Distribution Fuse or Circuit Breaker Panels within the bay. The Bay Alarm Panel provides the following:

- A. ALARM EXTENSION MODULE

1. The module operates using either (+) or (-) polarity with a voltage range of 20 to 60 VDC.
2. Terminal 1 is the input GND termination point.
3. Terminal 15 is the Fuse Alarm (FA) input termination point.
4. Terminal 2 is the Unit Fail alarm (UF) input termination point.
5. Terminals 9 thru 11 and 12 thru 14 are available for Fuse Fail Alarm outputs. The outputs are two (2) Dry "Form C" contacts.
6. Terminals 3 thru 5 and 6 thru 8 are available for Unit Fail Alarm outputs. The outputs are two (2) Dry "Form C" contacts.

- B. FUSE ALARM PANEL. The Fuse Alarm lamp (Red), located on the Bay Alarm Panel, will light during a Fuse or Circuit Breaker failure within the Bay. It remains "ON" until the failure has been corrected.

- C. ALARM INDICATORS

1. Distribution Fuse Alarms (FA): If any Distribution Fuse should "open" the following will happen:
  - a. FA LED (Red) will light on the Distribution Fuse Panel associated with the "open" fuse.
  - b. FA LED (Red) will light on the Digital Meter & Alarm Panel.
  - c. FA lamp (Red) on the Bay Alarm Panel will light.
  - d. FA relay on the Alarm Extension Module should operate and activate the external office alarms (if connected).
2. Distribution Circuit Breaker Alarms (FA): If any Distribution Circuit Breaker should "trip" the following should happen:
  - a. FA LED (Red) will light on the Distribution Circuit Breaker Panel associated with the "tripped" circuit breaker.
  - b. FA LED (Red) will light on the Digital Meter & Alarm Panel.
  - c. FA LED (Red) will light on the Bay Alarm Panel.
  - d. FA relay on the Alarm Extension Module should operate and activate the external office alarms (if connected).

**NOTE:** Circuit Breaker Mod Kits (lists 100-113) does not generate an alarm when manually turned "OFF". An alarm is only generated when the circuit breaker is "electrically" turned "OFF".



### 1.3 DIGITAL METER AND ALARM PANEL

The Digital Meter and Alarm Panel is designed to monitor the volts and current of the one to ten 500 Amp loads of PEC 5068 as follows:

- A. To read volts, the meter switch should be in the "VOLTS" position. A rotary selector switch is provided to switch the current monitoring device (50 MV Shunt) to the voltmeter. The switch positions are as follows:

ROTARY SELECTOR SWITCH		
SW POS.	6-POS. SWITCH	11-POS. SWITCH
1	Shunt "A" Bus	Bypass
2	Shunt "B" Bus	Shunt "A" Bus
3	Shunt "C" Bus	Shunt "B" Bus
4	Shunt "D" Bus	Shunt "C" Bus
5	Spare	Shunt "D" Bus
6	Spare	Shunt "E" Bus
7		Shunt "F" Bus
8		Shunt "G" Bus
9		Shunt "H" Bus
10		Shunt "I" Bus
11		Shunt "J" Bus

**NOTE:** During the time that the Volts/Amps switch is in the "VOLTS" position, the bus voltage will be read, depending on the position of the rotary switch.

- B. To read current, the meter switch should be in the "AMPS" position. A common resistor network is provided to properly read a 500 Amp (50 mV) Shunt with the digital voltmeter.

**NOTE:** During the time that the Volts/Amps switch is in the "Amps" position, the bus current will be read, depending on the position of the rotary switch.

#### C. ALARM BATTERY SUPPLY (ABS) FUSE HOLDER ASSEMBLY

The Alarm Battery Supply (ABS) Fuse Holder Assembly provides the following:

1. Fused battery power for alarm circuits and miscellaneous light loads.
2. Battery source for alarming if an ABS fuse "Opens".
3. The input source (Battery) is brought in on terminal "C" of the fuse block. Individual fused outputs leave on Terminal "B" of each fuse holder. Terminal "A" is the alarm out connection if a fuse "opens".

#### D. FUSE ALARM PWB ASSEMBLY

The Fuse Alarm PWB assembly is located on the Digital Meter & Alarm Panel. When a fuse alarm signal is received from any fuse or circuit breaker panel in the PEC 5068, the following will happen:

1. Fuse Alarm LED (FA) will light.
2. FA relay (K1) will operate.
3. Visual Fuse Fail alarm output signal will be extended through the Dry "Form C" contacts of the FA relay at terminals TS1-4 (Com), TS1-3 (NC), and TS1-5 (NO).

4. Audible Fuse Fail alarm output signal will be extended through the Dry "Form C" contacts of FA relay at terminals TS1-9 (Com), TS1-8 (NC), and TS1-10 (NO).

**NOTE:** To silence the Audible Alarm (if equipped) during a Fuse Alarm condition, depress ACO switch (S2). Relay K2 (ACO) will operate, silencing the Audible Alarm. The (ACO) relay K2 will remain operated until the alarm signal has been "removed".

5. Terminal TS1-2 is the GND termination input point.
6. Terminal TS1-1 is the GND output point to the fuse alarm lamp (DS1-R), located near the top of bay.
7. Terminal TS1-6 is the -48 VDC termination point to the fuse alarm lamp and "FA" input to Alarm Extension Module, located on the Fuse Alarm Panel Assembly.

## 1.4 GROUND BUS ASSEMBLY (Two (2) Options)

- A. EXTERNAL GROUND BUS ASSEMBLY (Beneath a raised floor or on the plant superstructure)

The External Ground Bus Assembly can be supplied with either 4" or 6" bus bars. Two (2) different arrangements of the Bus Bars can be made and are as follows:

1. Stacked Bus Bars for the number of Gnd Returns on an "as required" basis.  
**or**
2. Sandwiched Bus Bars, which increases the thickness of the bars providing greater Ampere Rating. These Bus Bars can also be stacked, as in Item 1 above.

**NOTE:** See drawing J4385068P for options and crimp lug capacity.

- B. INTERNAL GROUND BUS ASSEMBLY (Top of Bay). The Internal Ground Bus Assembly is equipped with a 2000 Amp Ground Bus Assembly. The Ground Bus Assembly has four (4) copper bus bars as follows:

1. "A" BUS BAR consists of the following:
  - a. Five (5) sets of lug mounting holes (3/8" on 1.0" centers) to accommodate ten (10) incoming cables "back" to "back" of 500 MCM cable.
  - b. Eleven (11) sets of holes (1/4" on 5/8" centers) to provide distribution for 22 loads "back to back".
2. "B", "C", "D" BUS BARS consists of the following:

Twenty-five (25) sets of holes (1/4" on 5/8" centers) to provide distribution for 50 loads "back to back".
3. BOTTOM FEED BUS BAR (Optional) consists of the following:

Three (3) sets of lug mounting holes (3/8" on 1.0" centers) to accommodate six (6) incoming cables "back to back" of 500 MCM cable.

## 1.5 CIRCUIT BREAKER PANEL

The Circuit Breaker Panel is equipped with a common bus bar rated at 500 Amps. This common bus bar extends to the side and rear of the bay where the input "Battery" leads are terminated. Two (2) sets of lug mounting holes (3/8" on 1.0" centers) provided.

The Circuit Breaker Panel has 24 positions (side by side) for 0-100 Amp Circuit Breakers to be mounted as follows:

- A. (24) 0-50 Amps Circuit Breakers (mounted side by side).
- B. (12) 60, 75, and 100 Amp Circuit Breakers (mounted every other position).

**NOTE:** Circuit Breakers are equipped as noted on J-4385068P.

## 1.6 DISTRIBUTION FUSE PANEL

The Distribution Fuse Panel is equipped with a copper bus bar rated at 500 Amps (Similar to Section 1.5 above).

The Distribution Fuse Panel has seventeen (17) positions to mount fuse holders. Fuses are equipped as noted on J-4385068P.

**NOTE:** Number of fuses and fuse holders depends on type of fuse and width of panel.

## 1.7 ENVIRONMENTAL RATINGS

- A. OPERATING AMBIENT TEMPERATURE RANGE:  
0EC to 50EC (+32EF to +122EF)
- B. STORAGE TEMPERATURE RANGE:  
-40EC to +85EC (-40EF to +185EF)
- C. ALTITUDE:
  - Sea Level to 4800 ft: 0EC to +50EC (+32EF to +122EF)
  - 4800 ft to 7000 ft: 0EC to +45EC (+32EF to +113EF)
  - 7000 ft to 10,000 ft: 0EC to +40EC (+32EF to +104EF)
- D. HUMIDITY: This system is capable of operating in an ambient relative humidity range of 0 to 95%, non-condensing.
- E. SHOCK: This equipment, in its shipping container, withstands shock developed when one edge of the container is dropped six (6) inches while the opposite edge is resting on the ground, or is dropped two (2) inches on any surface without physical damage or degradation of the electrical performance.
- F. VIBRATION: This equipment, in its shipping container, withstands vibration encountered in shipping without physical damage or degradation of the electrical performance.
- G. VENTILATION REQUIREMENTS: For continuous operation, the system ventilating openings should not be blocked and the ambient temperature of the air entering the units should not exceed 50EC.

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## SECTION 2: DIMENSIONS

The PEC 5068 BDFB bay is available in the following configurations:

	<u>LIST 2</u>	<u>LIST 5</u>	<u>LIST 8</u>
Height:	7'-0"	9'-0"	11'-6"
Width:	30"	30"	30"
Depth:	16"	16"	16"
Mounting:	19"	19"	19"
	<u>LIST 1</u>	<u>LIST 4</u>	<u>LIST 7</u>
Height:	7'-0"	9'-0"	11'-6"
Width:	30"	30"	30"
Depth:	12"	12"	12"
Mounting:	19"	19"	19"
	<u>LIST 3</u>	<u>LIST 6</u>	<u>LIST 9</u>
Height:	7'-0"	9'-0"	11'-6"
Width:	34"	34"	34"
Depth:	16"	16"	16"
Mounting:	23"	23"	23"
	<u>LIST 130</u>	<u>LIST 131</u>	<u>LIST 132</u>
Height:	7'-0"	9'-0"	11'-6"
Width:	40"	40"	40"
Depth:	16"	16"	16"
Mounting:	23"	23"	23"

The basic bays listed above comes equipped with Fuse Alarm Panel, Digital Meter & Alarm Panel, rear covers, and mounting hardware.

**NOTE:** See Drawing J-4385068P for details.

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## **SECTION 3: INSTALLERS CONNECTIONS**

### **3.1 GROUND BUS BAR (TOP FEED)**

In-coming ground cables from the power plant connect to the first (5) two-hole positions on "A" load ground bus bar.

### **3.2 GROUND BUS BAR (BOTTOM FEED)**

In-coming ground cables from the power plant connect to the first (3) two-hole positions of the bottom feed ground Bus Bar.

### **3.3 BATTERY BUS BARS (A, B, C, & D)**

In-coming Battery Cables from the power plant connect to their associated battery bus bars near the rear of the bay.

### **3.4 GROUND BUS BAR & BATTERY (Distribution)**

Distribution connections made from the Circuit Breaker or fuse panel and the ground bus bar assemblies are typical for the different bays.

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## SECTION 4: INSTALLERS CONNECTIONS

**CAUTION:** It is essential to read and understand all warnings, cautions, and notes before any connections are made to the unit or system. If further assistance is needed, contact PECO II, Inc. Field Service at the number located in the front of this manual.

### 4.1 INSTALLERS INFORMATION NOTES

A.

LOAD CENTER INPUT BUS			
Bus Bar Capacity	Terminal Type	Wire Size	Fuse Size
500 Amp	(2) sets of holes for 3/8" Hdwe on 1" centers.	As req'd	As req'd

B.

INTERNAL GND RETURN BUS (COMMON)		
Bus Bar Capacity	Terminal Type	Wire Size
1300 Amp	(5) sets of holes for 3/8" Hdwe on 1" centers.	As req'd

C.

CIRCUIT BREAKER OUTPUT		
Terminal Capacity	Terminal Type	Wire Size
2 Ga.	Crimp Lugs	As req'd

TPS FUSE OUTPUT		
Terminal Capacity	Terminal Type	Wire Size
2 Ga.	Crimp Lugs	As req'd

D.

GROUND RETURN BUS		
Terminal Capacity	Terminal Type	Wire Size
2 Ga.	Crimp Lugs	As req'd

E.

ALARMS		
Terminal Capacity	Terminal Type	Wire Size
22 to 12 Ga.	Pressure Strip	As req'd

F.

FRAME GROUND (Top of Box Frame)		
Terminal Capacity	Terminal Type	Wire Size
As req'd	Hole 2 Lug 1/4" x 5/8", Ctrs.	6 Ga. Min.

G. The symbol Ø indicates Installer wiring.

H. Wire sizes are based on voltage drop considerations and National Electric Code Table 310-16 for copper wire.

I. Frame or Chassis Ground WIRE size based on recommendations of National Electric code Table 250-95.

J. Load circuit breakers and/or fuses should not be loaded to more than 80% of their ampere rating.

K. Installation of the power plant should be in areas accessible only to qualified personnel.

L. All units should be secured to the building structure before operating.

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# Attachments

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