

Installation Instructions

Model PSC-17C

17 Amp Power Supply (S54505-B11-B1, S54505-B11-C1)

INTRODUCTION

The Model PSC-17C from Siemens Industry, Inc. is a high current power supply that provides the Fire Alarm system (Sprachalarmsystem E100) with primary regulated 24 VDC. It is rated at 17 A and has a built-in charger that is capable of charging up to 100 Ah batteries. It also has a microprocessor-controlled transfer circuit that allows the PSC-17C to switch the system power to stand-by batteries during loss or reduction of AC power.

The PSC-17C incorporates a 24 A circuit breaker on the battery input.

The PSC-17C communicates directly to the PMI-S to report fault conditions and allows the PMI-S to query the status of the power supply. It has one common trouble relay and two programmable relays. The common trouble relay is defaulted to activate when communication between DAC and PMI or DAC and power supply is lost.

The PSC-17C mounts at the back of the enclosure of the E100 system and occupies 1/4 of the E100 Mounting Plate MP-M.

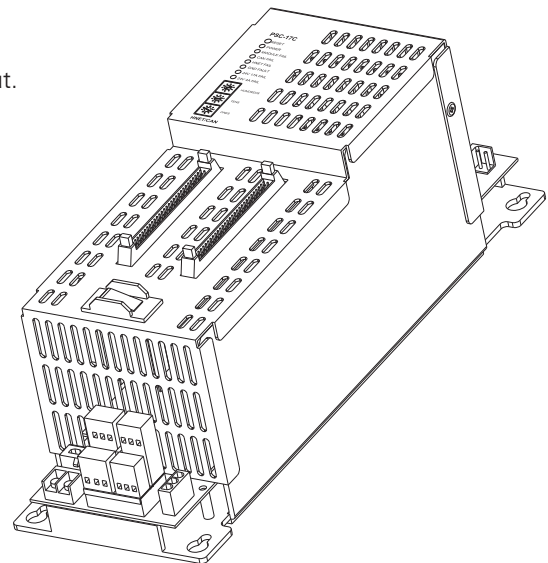


Figure 1
PSC-17C 17 Amp Power Supply

Features

The PSC-17C features are as follows:

- Universal AC power input 120 VAC - 240 VAC @ 50 Hz / 60 Hz
- Off-line Switch Mode Power Converter
- Power Factor Correction
- Built-in Battery Charger
- Total Output power of 17 A @ 24 VDC
- Two separate power output terminals: one power limited terminal with 4 A max @ 24 VDC capacity and one non-power limited terminal with 17 A @ 24 VDC capacity (total not to exceed 17 A)

- AC Input Supervision with Battery Back-up: In the event of reduction or cut off of AC power, the microprocessor controller transfer circuit will switch the system power to stand-by batteries.
- Both output terminals have current measurement capability
- Auto resettable current protection circuits for overload and short circuit
- Access to CC-5/CC-2 System bus
- Supplies 6.2 VDC @ 2 A max. (power limited) to the system bus
- Supplies 24 VDC @ 2 A max. (power limited) to the system bus (subject to a 17 A total current limit)
- Communicates via CAN protocol
- One common trouble relay and two programmable relays with 2 A ratings

OPERATION

The PSC-17C occupies one network address in the CAN network and has four functional components: the Controller, the Charger, the Power Supply and the Interface Board.

The Controller determines the activation of the Charger and monitors the status of the Power Supply (ground fault conditions, loss of network communication, 24 VDC terminal overload and the status of the battery). This information is relayed to the User Interface, when applicable, and communicated to the PMI-S for system reporting. The Controller also allows the PMI-S to query the state of the power supply and its current load and can send a diagnostics command to the PSC-17C. It also provides the control of the relays.

The Power Supply has an Off-line switch mode power converter and power factor correction circuit to improve conductive RF emission at low frequency. It is designed to take voltage inputs of 120 VAC - 240 VAC at 50 Hz/60 Hz and has one resettable circuit breaker that can also be used as a battery power switch.

The Charger monitors and maintains the battery. This circuitry utilizes several charging modes, depending upon the state of the batteries. The Charger monitors the batteries and determines which of the charging modes to activate. It also has the capability to check the state of the battery through diagnostic testing.

Terminal Blocks,
Controls and Indicators

The PSC-17C has one reset switch, seven LEDs, three rotary switches located directly below the LEDs to set the CAN network address, one circuit breaker, four terminal blocks, four terminal connections, two 60 pin flat ribbon connections and a battery selection jumper as shown in Figure 2. The ribbon cable connections are used to connect the PSC-17C with the PSX-17C or a Card Cage (CC-2/CC-5).

A reset switch is located on the top of the front panel. Pushing the reset switch re-initializes the PSC-17C operation.

The LEDs located at the top left of the module and are defined as follows:

POWER -	(Green)	Normally ON When illuminated, indicates that the PSC-17C is powered from the AC mains. When flashing, indicates that the PSC-17C is powered from the battery.
MODULE FAIL -	(Yellow)	Normally OFF When illuminated, indicates that the module microprocessor has failed.

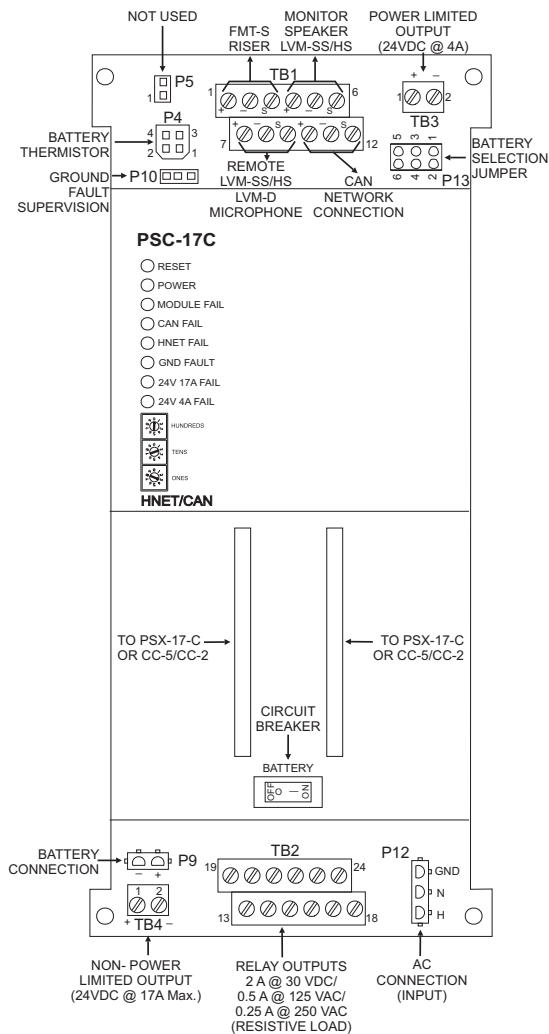


Figure 2
Terminal Blocks, Controls and Indicators

- CAN FAIL - (Yellow) Normally OFF
When illuminated, indicates that CAN communication with the PSC-17C has terminated.
- HNET FAIL - (Yellow) Normally OFF
Not used for E100 applications.
- GND FAULT - (Yellow) Normally OFF
When illuminated, indicates that the PSC-17C has detected either a negative or positive ground fault on its outputs.
- 24 V 17 A FAIL - (Yellow) Normally OFF
When illuminated, indicates that the 24 VDC non-power limited output (TB4) has a trouble condition or the PSC-17C has disconnected the 24 VDC output due to current overload or short circuit.
- 24 V 4 A FAIL - (Yellow) Normally OFF
When illuminated, indicates that the 24 VDC power limited output (TB3) has a trouble condition or the PSC-17C has disconnected the 24 VDC power output due to current overload or short circuit.

Three rotary dial switches located directly below the LEDs are used to set the CAN network address of the PSC-17C.

The terminal blocks of the PSC-17C are defined as follows (See Figures 2, 3 and 4):

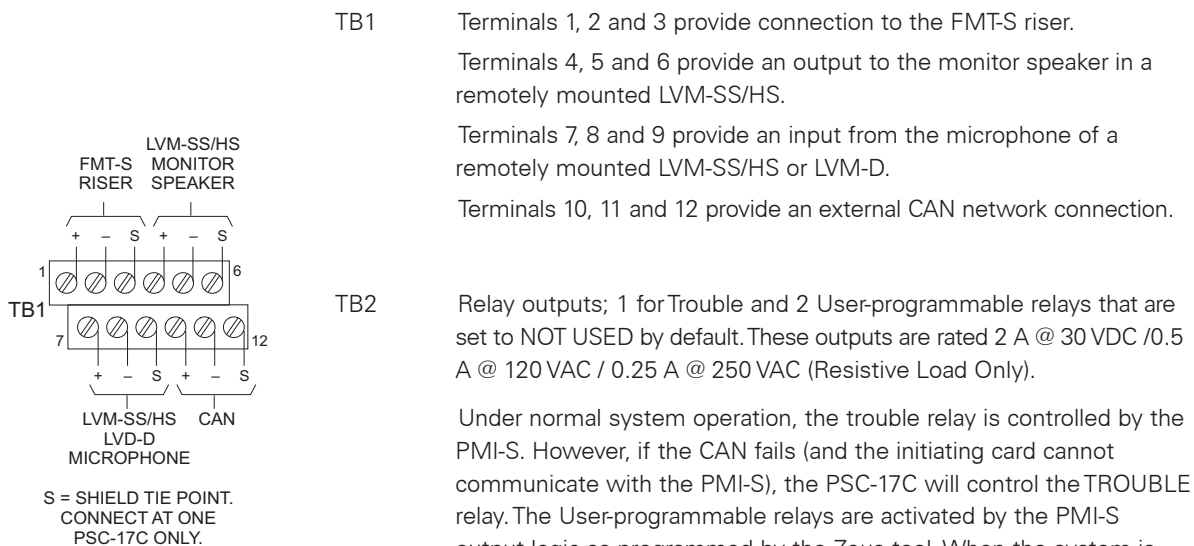


Figure 3
TB1 Wiring Diagram

- TB1
 - Terminals 1, 2 and 3 provide connection to the FMT-S riser.
 - Terminals 4, 5 and 6 provide an output to the monitor speaker in a remotely mounted LVM-SS/HS.
 - Terminals 7, 8 and 9 provide an input from the microphone of a remotely mounted LVM-SS/HS or LVM-D.
 - Terminals 10, 11 and 12 provide an external CAN network connection.

- TB2
 - Relay outputs; 1 for Trouble and 2 User-programmable relays that are set to NOT USED by default. These outputs are rated 2 A @ 30 VDC / 0.5 A @ 120 VAC / 0.25 A @ 250 VAC (Resistive Load Only).

Under normal system operation, the trouble relay is controlled by the PMI-S. However, if the CAN fails (and the initiating card cannot communicate with the PMI-S), the PSC-17C will control the TROUBLE relay. The User-programmable relays are activated by the PMI-S output logic as programmed by the Zeus tool. When the system is operating normally, these relays are controlled by the output logic only (See Figure 4).

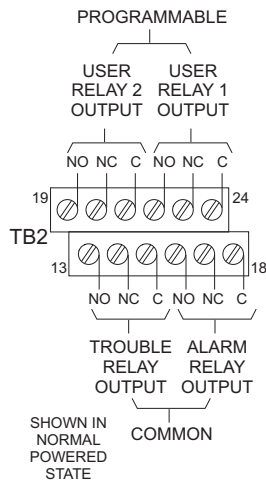


Figure 4
TB2 Wiring Diagram

TB3 24 VDC Power Limited Output Terminal.
This terminal output is limited to 4 A. When it is exceeded, it will shut down, light its associated diagnostics LED and send a fault condition to the PMI-S.

This output is normally connected to the modules and cards located on the door of the enclosure or to remote CAN network modules. This output is power limited. All wiring must be in accordance with local building codes. (See Figure 2.)

- Output Voltage: 24 VDC
- Output Current: 4 A max
- TB3-1: (+) terminal
- TB3-2: (-) terminal

TB4 24 VDC Non-Power Limited Output Terminal.
This terminal is non-power limited and can supply up to 17 A. When the current draw is exceeded, it shuts down, lights its associated LED and sends a fault condition to the PMI-S.

This output is normally connected to the inputs of the CC-5 or Zone Amplifier Modules. This output must remain within the enclosure. All wiring must be in accordance with local building codes (See Figure 2).

- Output Voltage: 24 VDC
- Output Current: 17 A max
- TB4-1: (+) terminal
- TB4-2: (-) terminal

- P4** Thermistor to sense the battery temperature
- P5** Not used
- P9** Connects the back-up battery to the PSC-17C. Battery size has to be calculated to ensure that the battery size can support the system load during battery back-up condition. Refer to the Battery Calculation form to determine the required battery size of the system.
- P10** For systems with multiple PCS-17Cs in a single enclosure, ground fault supervision must be enabled on only one PSC-17C. Set the jumper on P10 to the DISABLE or right-hand position on all but one PSC-17C.
- P12** AC input connector
- 60-pin** Connects the PSC-17C to the system. It is a straight-through connection between the two connectors and provides the 24 VDC rated at 2 A and 6.2 VDC rated at 2 A that powers the CC-5/CC-2 modules. It also contains all the communication signals and system signal bus that is necessary for the proper operation of the system. If a 60-pin ribbon cable is used to connect the PSC-17C to another module, the supplied ribbon cable ferrite should be placed around the cable.

These connectors are power limited.

- Output Voltages: 24 VDC , 6.2 VDC
- Max Current : 2 A @ 24 VDC
- Max Current : 2 A @ 6.2 VDC



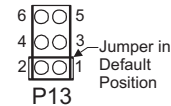
The total cumulative sum of the 24 VDC output (Power limited TB3 and non-power limited TB4 and power limited System bus 60-pin) must not exceed 17 A. Over current draw will initiate a PSC-17C shut down.

P13 Battery backup is required. The PSC-17C can charge a battery up to 100 amp hours (12 amp hours is the minimum size for the PSC-17C). These battery models are for use with the system:

- Battery 2 x 12 V/12 Ah (V24069-Z103-A12)
- Battery 2 x 12 V/25 Ah (GBI:13013)
- Battery 2 x 12 V/40 Ah (V24069-Z103-A6)
- Battery 2 x 12 V/65 Ah (V24069-Z103-A7)
- Battery 2 x 12 V/100 Ah (Optional—requires separate enclosure)

In order to provide the proper charging current to the battery that is selected, the battery selection jumper P13 should be set as follows:

- No jumper for 12 Ah
- Jump 1 and 2 for 25 Ah
- Jump 3 and 4 for 40 Ah
- Jump 5 and 6 for 65/100 Ah



Always remove power before changing jumper position.

ACCESSORY PACK

The PSC-17C installation kit has the following components:

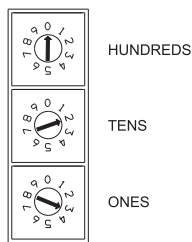
INSTALLATION KIT COMPONENTS	
1 AC power - cable	600-234831
1 DC wire red / blue	600-250361
1 Thermistor with cable , l = 3000mm	555-134792
1 SET Battery cable	600-234845
1 Ribbon cable 60 Pins, l = 165mm	555-133036
1 Ribbon cable 46 Pins, l = 2200mm	555-134834
1 Ribbon cable 46 Pins, l = 850mm	555-134829
4 Flat head screws	545-034832
1 Contact washer	545-034832
3 Round clamp ferrites	A5Q20003575
1 Round clamp ferrite	A5Q20003585
1 Flat ribbon cable ferrite	A5Q20003573

The following part is optional:

If the PSC-17C is not located on the same mounting plate MP-M as the PSX-17C, CC-5 and/or CC-2 it is connected to, an extended 60-pin flat ribbon cable, Model FCL (C24200-K28-B6), is required.

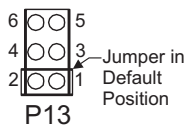
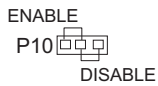
PRE-INSTALLATION

The following components must be set prior to installing the module in the enclosure:



HNET/CAN

- **Battery Circuit Breaker:** Set this circuit breaker to the OFF position.
- **CAN Network Address Switches:** Set the three-digit CAN network address for the PSC-17C using the three rotary dial address switches located below the LEDs on the front panel. (Refer to Figure 2 for the location of the switches.) The address for the PSC-17C must be the same as the address selected for it in the Zeus Programming Tool. To set the address, turn the pointers on each of the three dials to the numbers for the selected address. For example, if the address is 023, set the pointer for the HUNDREDS dial to "0," set the pointer for the TENS dial to "2," and set the pointer for the ONES dial to "3." The range of allowable addresses is from 001 to 099 (leading zeros must be used).



- **P10:** Set P10 jumper for ground fault supervision. For systems with multiple PSC-17Cs in a single enclosure, ground fault supervision must be enabled on only one PSC-17C. Set the jumper on P10 to the DISABLE or right-hand position on all but one PSC-17C.
- **P13:** Set P13 jumper to select type of battery being used. In order to provide the proper charging current to the battery that is selected, the battery selection jumper P13 should be set as follows:
 - ◇ No jumper for 12 Ah
 - ◇ Jump 1 and 2 for 25 Ah
 - ◇ Jump 3 and 4 for 40 Ah
 - ◇ Jump 5 and 6 for 65/100 Ah

INSTALLATION



Disconnect BATTERY and AC prior to working on equipment.

The PSC-17C can occupy any position on the mounting plate. When the PSC-17C is mounted correctly on the Mounting Plate it will be flush on the top, bottom, and right with the Mounting Plate and the mounting screw holes of the PSC-17C will align with the threaded posts.

1. Install four M5 screws in the threaded posts at the mounting position. Screw each of the M5 screws into the threaded posts 5-6 turns.
2. Place the PSC-17C over the four screws on the Mounting Plate and slide it down or towards you to rest on the four screws. (Refer to Figure 6.) When the PSC-17C is in the correct position it will be flush with the top, bottom and right side of the Mounting Plate.
3. Tighten the four screws.

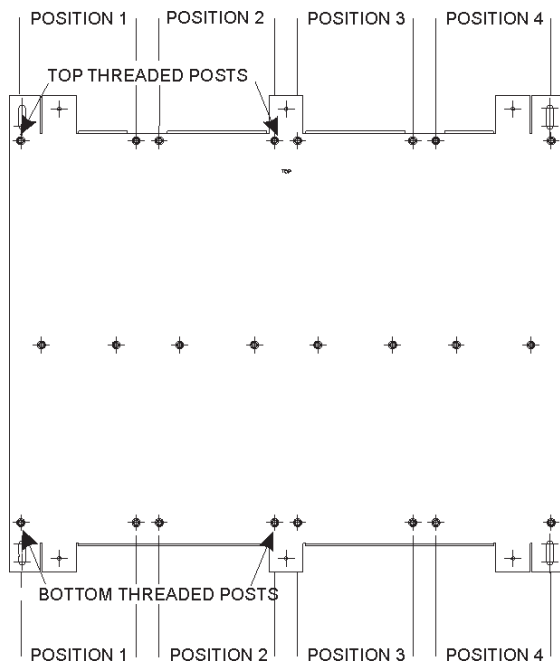


Figure 5
Location Of The PSC-17C On The Mounting Plate MP-M

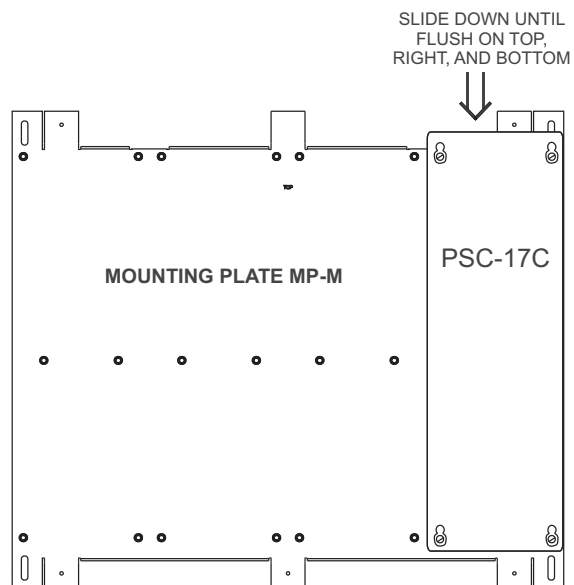


Figure 6
Mounting The PSC-17C On The Mounting Plate MP-M

WIRING

Use the ferrites provided on all cables as shown in Figures 8 and 9. All cables are to be wrapped around the ferrites once and the two battery wires are to be braided together. The PSC-17C has removable terminal blocks and connectors at the top and bottom of the module. The terminals and connectors at the top of the PSC-17C are power limited. The terminals and connectors at the bottom of the PSC-17C are non-power limited. (Refer to Figure 7.)

Use a separate or dedicated circuit breaker and run the earth ground from a suitable source to the PSC-17C. Check local requirements.



Conduit is not an acceptable Earth Ground Conductor.

Wire in accordance with local codes.

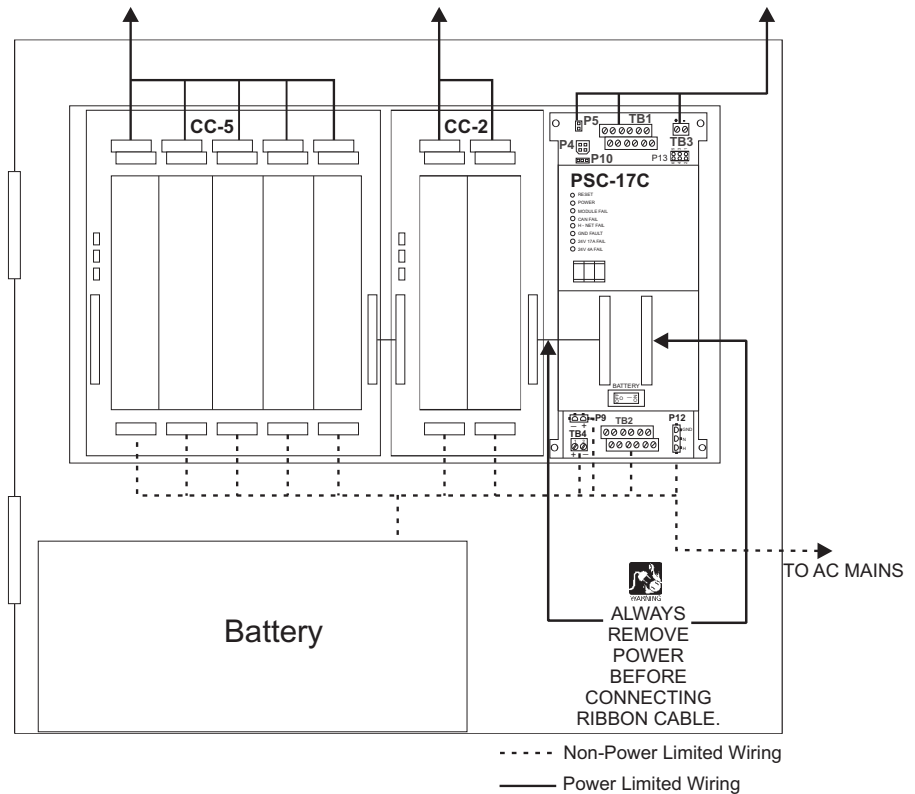


Figure 7
PSC-17C Wiring In The CAB-1/2 and CAB 19-3/6 Enclosures

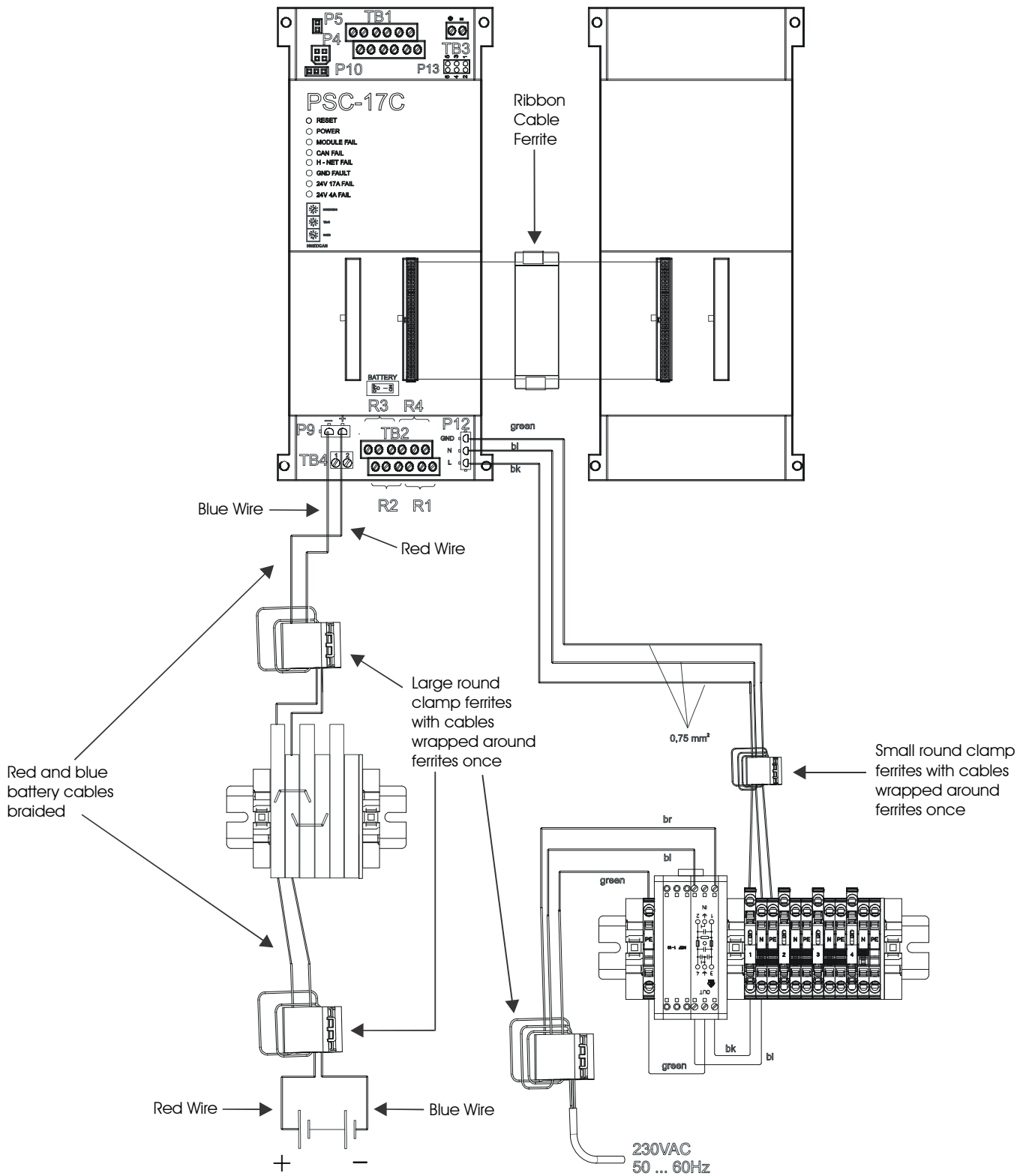


Figure 8
Wiring In The CAB-1/2 Enclosure

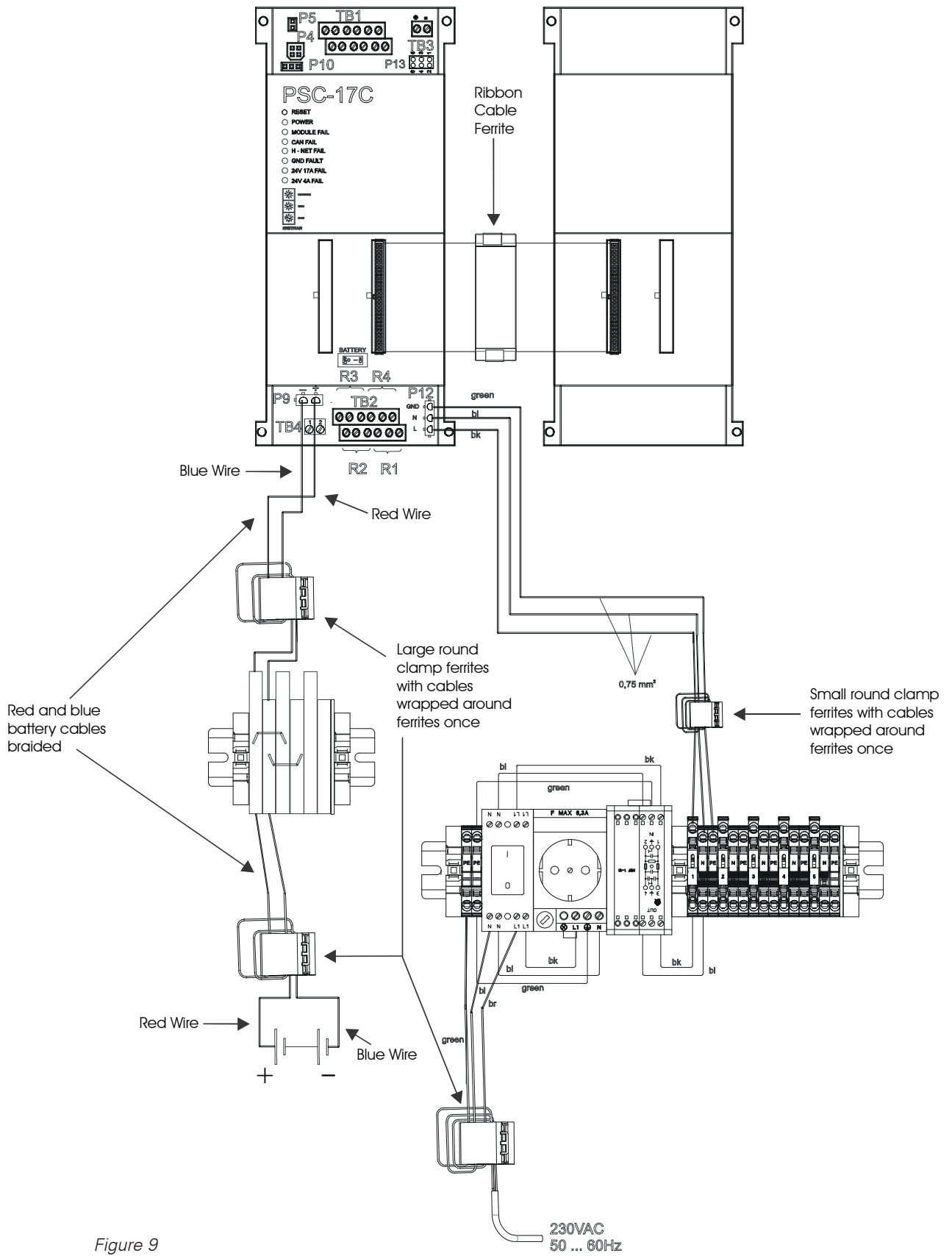


Figure 9
Wiring In The CAB19-3/6 Enclosure

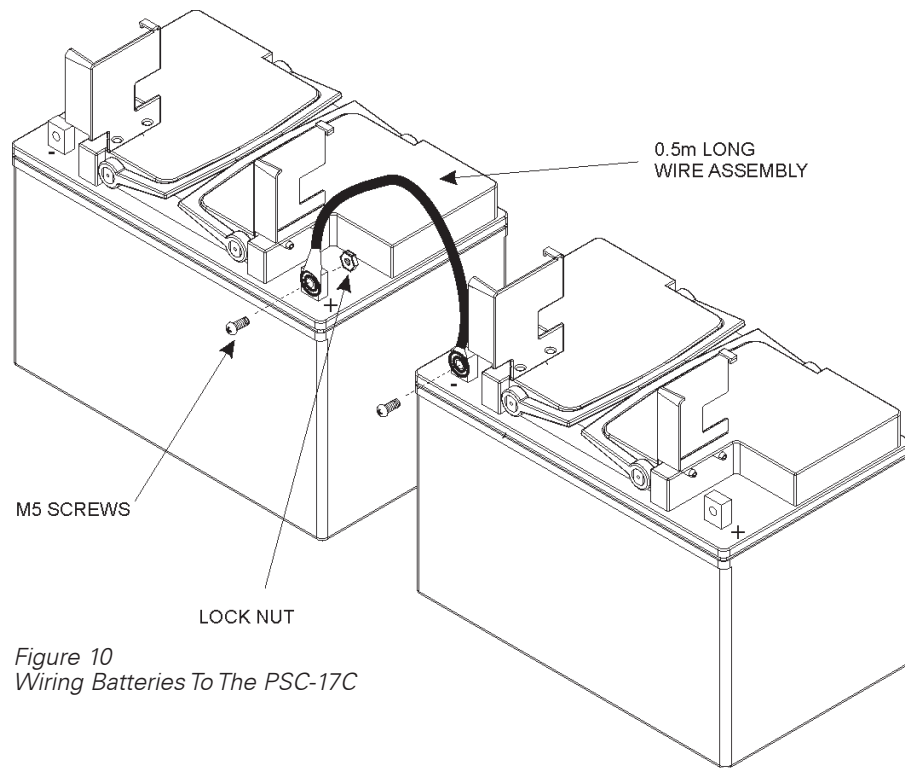


Figure 10
Wiring Batteries To The PSC-17C

Battery Connections

1. Using the 0.5m long wire assembly, connect the two batteries together, as shown in Figure 10. Secure each end of the assembly to the battery with a M5 screw and lock nut.
2. Braid the full length of the red and blue battery cable.
3. Attach the red battery wire using the screw provided on the positive terminal and the blue battery wire on the negative terminal.
4. Close the covers of the battery terminals.

POWER SUPPLY CALCULATION

Full Load Calculations

To ensure that the PSC-17C power supply is not overloaded, use the form and follow the procedure listed below.

1. Enter the quantity of each card/module in the enclosure.
2. Calculate both the 24 VDC (Total A and Total B) and 6.2 VDC loads (Total C) for each row.
3. Add up Total A, Total B and 1/3 Total C for each row.
4. Add up the column "Full Load Current" to the Total Full Load Current I_{FL} **(1)**
5. Ensure that all totals are within the power supply output ratings.
 Total A \leq 17 Amps
 Total B \leq 2 Amps
 Total C \leq 2 Amps

FORM 1: Full Load Calculation

Card / Module	Quantity	24 VDC Screw Terminal Current		24 VDC Back Plane Current		6.2 VDC Back Plane Current		Full Load Current
		Per Card/Module	Total A	Per Card/Module	Total B	Per Card/Module	Total C	Total A + Total B + 1/3 Total C
AIC		0	0	25 mA		85 mA + 50 mA per active channel		
DAC-NET		0	0	230 mA		0	0	
FCM-6S		14 mA + 1 mA per active LED		0	0	0	0	
FMT-S		150 mA		0	0	0	0	
LCM-8S		14 mA + 1 mA per active LED		0	0	0	0	
LPB		0	0	25 mA		95 mA + 35 mA per active channel		
LVM-SS/HS		25 mA		0	0	0	0	
LVM-D		100 mA		0	0	0	0	
NIC-C		0	0	120 mA		0	0	
OCM-16		14 mA + 10 mA per active LED		0	0	0	0	
PMI-S		0	0	230 mA		0	0	
RNI		75 mA		0	0	0	0	
RPM		150 mA		0	0	0	0	
SCM-8S		14 mA + 1 mA per active LED		0	0	0	0	
SIM-16		20mA + 20 mA per active relay + 1.2 mA per superv. input		0	0	0	0	
SZC-8IMP		0	0	NA		NA		
SZC-8DC		0	0	100 mA		250 mA		
TZC-8B		280 mA		0	0	0	0	
ZAC-40		150 mA + 53 mA per Watt		0	0	0	0	
ZAC-70		150 mA + 53 mA per Watt		0	0	0	0	
ZAM-180		300 mA + 53 mA per Watt		0	0	0	0	
ZAM-300		330mA + 45 mA per Watt		0	0	0	0	
ZIC-4AC		Usage dependant		250 mA max.		0	0	
				TOTAL	≤ 2 A	TOTAL	≤ 2 A	≤ 17 A
				Total 24 VDC Back Plane Current		Total 6.2 VDC Back Plane Current		Total Full Load Current I_{FL} (1)

To determine the battery size, use FORM 2 to FORM 6.

Standby Current Calculation

To calculate the Standby Current I_{SB} (2) use the FORM 2 and follow the procedure listed below.

1. Enter the quantity of each card/module in the enclosure.
2. Calculate each row across and place the total in the last column.
3. Add up the column "Standby Current" to the Total Standby Current I_{SB} (2)

FORM 2: Standby Current Calculation

Module	Quantity	Standby 24 VDC Card/Module Current	Load Current Per Circuit		
			Additional	Device Current	Standby Current
AIC		50 mA	0	0	
DAC-NET		230 mA	0	0	
FCM-6S		14 mA	0	1 mA per LED	
FMT-S		150 mA	0	30 mA per active handset	
LCM-8S		14 mA	0	1 mA per LED	
LPB		50 mA	0	0	
LVM-SS/HS		25 mA	0	1 mA per LED	
LVM-D		50 mA	0	0	
NIC-C		120 mA	0	0	
OCM-16		14 mA	0	10 mA per LED	
PMI-S		230 mA	0	0	
PSC-17C		150 mA	0	20.0 mA per active relay	
PSX-17C		170 mA	0	0	
RNI		75 mA max	0	0	
RPM		150 mA	0	0	
SCM-8S		14 mA	0	1 mA per LED	
SIM-16		20 mA	1.2 mA per supervised input	20.0 mA per active relay	
SZC-8IMP		NA			
SZC-8DC		160 mA			
TZC-8B		280 mA	0	35 mA per active zone	
ZAC-40		150 mA	1 mA	0	
ZAC-70		100 mA	1 mA	0	
ZAM-180		300 mA	1 mA	0	
ZAM-300		100 mA	1 mA	0	
ZIC-4AC		90 mA	4 mA	0	
Total Standby Current I_{SB} (2)					

Standby Battery Capacity Calculation

To calculate the Standby Battery Capacity Ah_{SB} **(3)** use FORM 3 and follow the procedure listed below.

1. Enter the Total Standby Current I_{SB} from FORM 2.
2. Select the required bridging time and multiply it with I_{SB} to get the Standby amp hour rating Ah.
3. Select the Battery that exceeds the Standby amp hour rating Ah.
4. Select the Battery Correction Factor for Standby Current (F_{SB}) from FORM 6.
5. To get the Standby Battery Capacity Ah_{SB} **(3)** multiply F_{SB} with the calculated Standby amp hour rating Ah.

FORM 3: Standby Battery Capacity Calculation

Total Standby Current I_{SB} in A		I_{SB} (2)
Standby load bridging time (Power failure)	DIN VDE 0833-2: $I_{SB} \times 4h =$	Ah
	DIN VDE 0833-4: $I_{SB} \times 30h =$	Ah
	DIN VDE 0833-2: $I_{SB} \times 72h =$	Ah
Battery Correction Factor (F_{SB}) Dependent on Standby Current (I_{SB}) and Battery Size - Refer to FORM 6: Battery Correction Factors Table		
Standby Battery Capacity $Ah_{SB} \times F_{SB}$		Ah_{SB} (3)

Full Load Battery Capacity Calculation

To calculate the Full Load Battery Capacity Ah_{FL} **(4)** use FORM 4 and follow the procedure listed below.

1. Enter the Total Full Load Current I_{FL} from FORM 1.
2. Select the required bridging time and multiply it with I_{FL} to get the Full Load amp hour rating Ah.
3. Select the Battery Correction Factor for Full Load Current (F_{FL}) from FORM 6 by using the selected battery in FORM 3.
4. To get the Full Load Battery Capacity Ah_{FL} **(4)** multiply F_{FL} with the calculated Full Load amp hour rating Ah.

FORM 4: Full Load Battery Capacity Calculation

Total Full Load Current I_{FL} in A		I_{FL} (1)
Full load bridging time (Power failure)	$I \times 1/4 h =$	Ah
	DIN VDE 0833-2/EN60849: $I_{FL} \times 1/2 h =$	Ah
	$I_{FL} \times 1 h =$	Ah
	$I_{FL} \times 2 h =$	Ah
Battery Correction Factor (F_{FL}) Dependent on Full Load Current (I_{FL}) and Battery Size - Refer to FORM 6: Battery Correction Factors Table		
Full Load Battery Capacity $Ah_{FL} \times F_{FL}$		Ah_{FL} (4)

Total Battery Capacity Calculation

Finally, add the battery capacity needed for standby and full load. The selected battery capacity must meet or exceed this value.

FORM 5: Total Battery Capacity Calculation

Total battery capacity Ah_{SB} (3) + Ah_{FL} (4)	Ah
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FORM 6: Battery Correction Factors (F_{SB}/F_{FL})

Producer: EXIDE																			
Battery Size	Battery Type																		
12 Ah	S312 / 12S																		
25 Ah	A512 / 25,0 G5																		
40 Ah	S312 / 40 G5																		
65 Ah	P12 V1575																		
100 Ah																			

Battery Size in Ah	Battery Current I(Batt) in A													
12	1.2	2.4	4.8	7.2	9.6	12	14.4	16.8	19.2	21.6	24	30	36	48
40	4	8	16	24	32	40	48							
65	7	13	26	39	52									
100	10	20	40	60										
Factor 20°C (20°...40°)	1	1.09	1.25	1.33	1.44	1.56	1.64	1.74	1.83	1.92	2	2.26	2.52	3
Factor 10°C (10°...20°)	1.03	1.12	1.29	1.37	1.48	1.61	1.69	1.79	1.88	1.98	2.06	2.33	2.6	3.09
Factor 0° C (0°...10°)	1.10	1.20	1.38	1.46	1.58	1.72	1.80	1.91	2.01	2.11	2.20	2.49	2.77	3.30

Battery Size in Ah	Battery Current I(Batt) in A										
25	3	5	10	15	20	25	30	35	40	45	50
Factor 20° C (20°...40°)	1	1.30	1.50	1.82	2.08	2.31	2.38	2.68	3.00	3.17	3.75
Factor 10° C (10°...20°)	1.03	1.34	1.55	1.88	2.14	2.38	2.45	2.76	3.09	3.27	3.86
Factor 0° C (0°...10°)	1.10	1.43	1.65	2.00	2.29	2.54	2.62	2.95	3.30	3.49	4.13

Max. Battery Current I (Batt max) = 1 x PSC-17C plus 3 x PSX-17C / 24V

ELECTRICAL RATINGS**PSC-17C**

Input Voltage	120 VAC/220 VAC/240 VAC +10%, -15%
Input Current	4.0 A max. @ 120 VAC 2.5 A max. @ 220 VAC 2.0 A max. @ 240 VAC
24 V Backplane Current	2 A max.
Screw Terminal 24 V Current	Power Limited: 4 A max. Non-Power Limited: 17 A max.
24 V Standby Current	150 mA

ELECTRICAL RATINGS**Battery System**

Input Voltage	24 VDC
Input Current	17 A max.
Minimum Battery size	12 Ah
Maximum Battery size	100 Ah
Battery Max Charge Current	6 A (full charge mode)

SPECIFICATION REQUIREMENT

Number of devices in the E100 cabinets

CAB-1/2

- Up to 4 PSC-17C/PSX-17C
- Batteries: 2 x 12 V/65 Ah*
- No active cooling (vent)

CAB 19-3/6

- Up to 9 PSX-17C/PSX-17C
- Batteries: 6 x 12 V/65 Ah*
- Target: No active cooling (vent)
- Optional vent

*100 Ah batteries require a separate enclosure.

For CE applications in E100 systems refer to
Installation Instruction A24205-A334-B844 (English) or A24205-A334-A844 (German).

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