APC
by Schneider Electric

MGE Galaxy PW

150–225 kVA 480 V

Installation

Table of Contents

Safety

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the Galaxy PW™ that must be followed during operation of the equipment.

WARNING: Opening enclosures expose hazardous voltages. Always refer service to qualified personnel only.

WARNING: As standards, specifications, and designs are subject to change, please ask for confirmation of the information given in this document.

Note: The equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct interference at user's own expense.

WARNING: To reduce the risk of fire or electric shock, install in a temperature and humidity controlled indoor area free of conductive contaminants. This equipment is intended only for installation in RESTRICTED ACCESS LOCATION.

WARNING: HIGH LEAKAGE CURRENT. Earth connection essential before connecting supply.

Symbols used

WARNING: Indicates an electrical hazard, which, if not avoided, could result in injury or death.

Caution: Indicates a hazard, which, if not avoided, could result in injury or death.

Note: Indicates important information.

See: Indicates that more information is available on this subject.

Installation Procedure

1. Unpack and position the unit.
2. Connect the mains/utility power.
3. Connect the power circuits.
4. Call Schneider Electric and wait for the service engineer to complete the installation.
5. The Schneider Electric service engineer finalizes the installation and the start-up process.

Installation Overview

General Description

The cabinets are cooled by forced ventilation. The air enters via the doors and grids at the bottom and is discharged through the roof, which means the cabinets can be positioned against the back wall.

Connections are made through the bottom (connections through the top are an available option).

The connection cables may be run in three ways:

- In a trench running under the cabinets
- Under a false floor
- On the floor under the cabinets, in the free space equal to the height of the feet; in this case the cables should be run side by side to avoid blocking the flow of air for ventilation.

The cables should be connected:

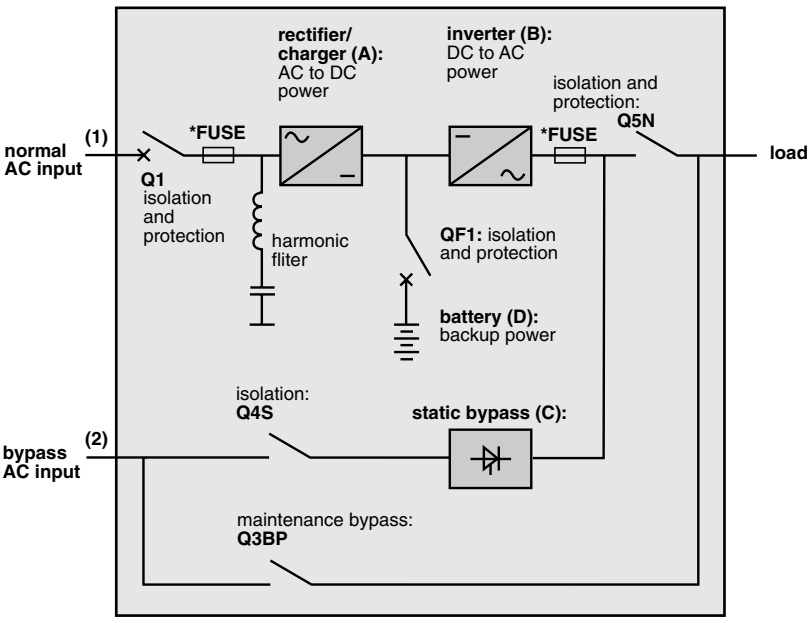
- To the normal AC input terminals
- To the bypass AC input terminals
- Between the battery and UPS cabinets (power and control cables)
- Between the bypass AC-source transformer in an auxiliary cabinet and the UPS cabinet

Only the wires for the inter-cabinet control connections between parallel-connected UPS units are supplied.

The other power cables for connections between the cabinets are not supplied.

Major System Power Components

Single UPS system

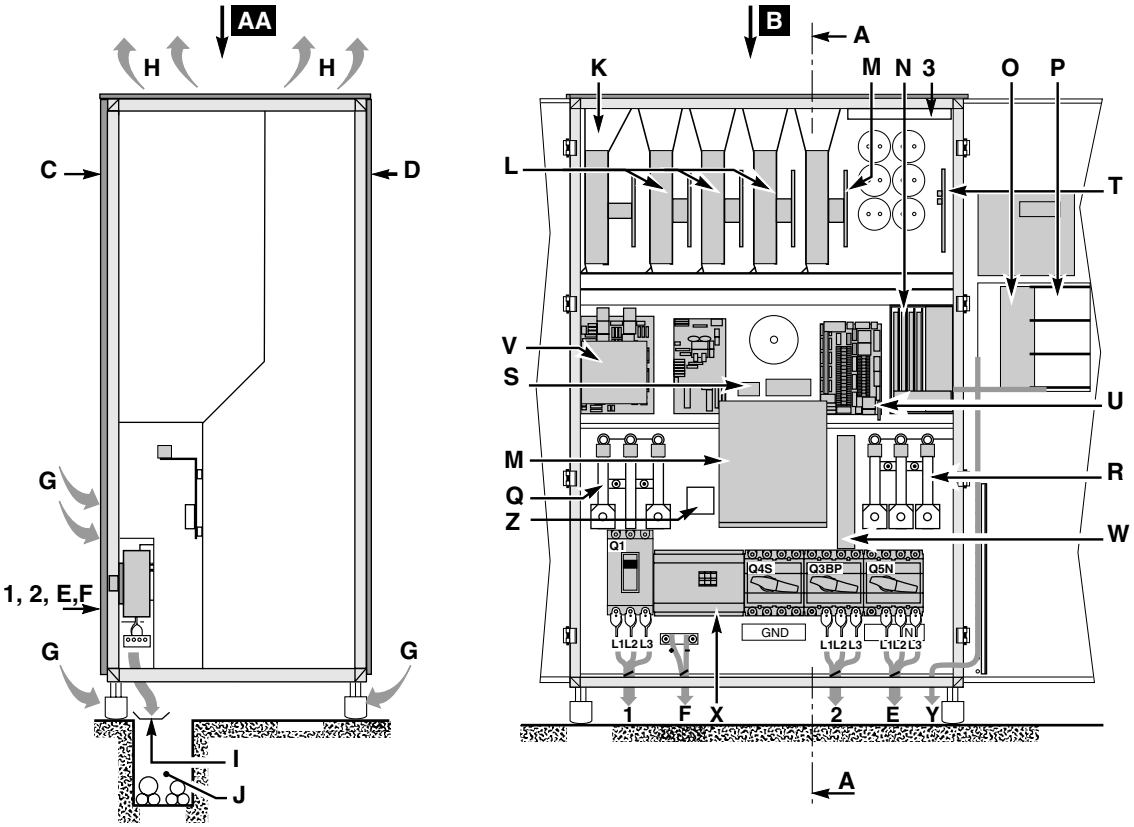


Component	Description
Rectifier/charger module (A)	Converts 3–phase AC power from the normal AC source supply (1) into DC power for the normal inverter input and float charges or recharges the battery.
Battery unit (D)	Provides backup power for the inverter in the event of a voltage drop or a normal AC source failure.
Inverter module (B)	Converts the DC power supplied by the rectifier/charger module or the battery unit into 3–phase AC power for the load.
Static bypass module (C)	Ensures the instantaneous transfer of the load to the bypass AC source input in the event of an inverter shutdown (initiated by the user or by a protective device) or a sudden load.
Maintenance bypass	Isolates the UPS for maintenance and transfers the load to bypass AC source input without interrupting the supply of power. The maintenance bypass is made up of three manual switches (Q3BP, Q4S and Q5N).
External bypass	Option for parallel UPSs and hot-swapping.
Q1 (molded circuit breaker NA)	Isolation of the rectifier/charter (A) from the normal AC source (1).
QF1 (circuit breaker)	Battery (D) protection and isolation.
Q5N (switch)	Isolation of the UPS system from the load.
Q4S (switch)	Isolation of the static bypass (C) from the bypass AC source.
Q3BP (switch)	Bypass for maintenance.

The normal AC input and the bypass AC input have different functions and, depending in the installation, may be protected differently upstream and/or come from different sources.

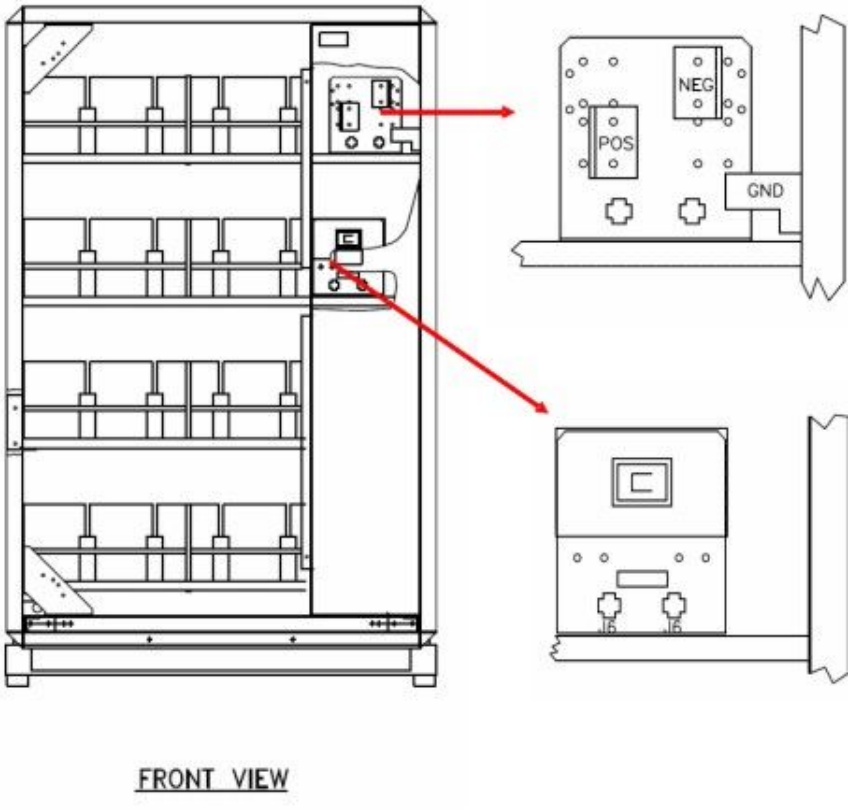
When increased power is required, several UPS units may be connected in parallel (up to four). In this configuration, an isolation function is added for the UPS system as a whole for maintenance purposes, without interrupting the supply of power to the load.

Galaxy PW Cabinet



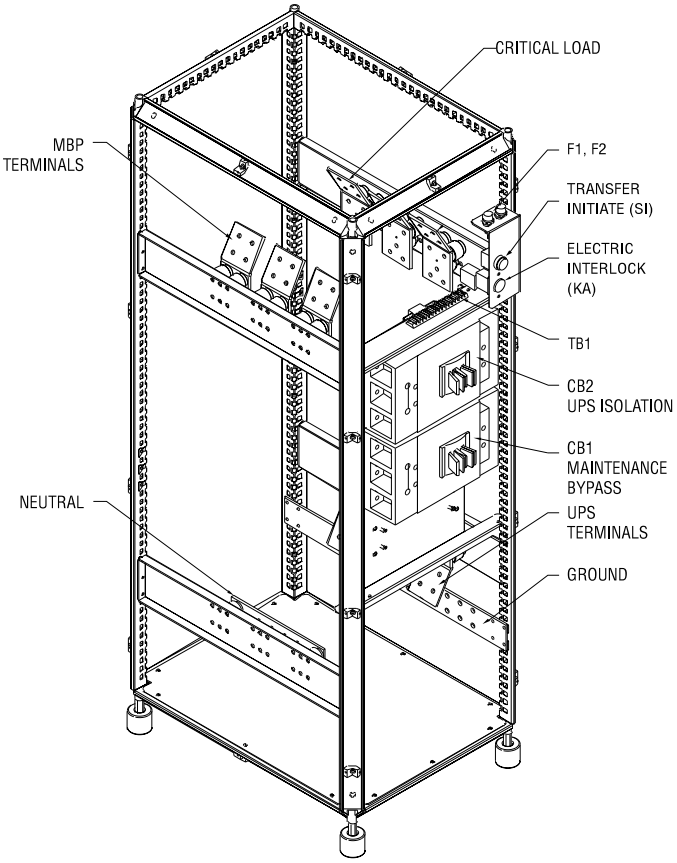
AA: Cross-sectional view of the cabinet	N: Rack containing electronic boards
B: Front view of the cabinet	O: Media Contacts 11 board
C: Front panel	P: Slot for communication boards
D: Rear panel	Q: FUE input fuses
1: Normal AC input connection	R: FUS output fuses
2: Bypass AC input connection	S: RALI board
E: Load connection	T: UPOZ board
F: Battery connection	U: MUSI board
G: Air inlets	V: Backfeed protection (contactor)
H: Air outlets	W: Control wire routing
I: Cable exit through the bottom	X: Fuses for overvoltage protection RC circuit on bypass
J: Trough, if applicable	Y: Control-wire connection (auxiliary “Media Contacts 11” circuits and communication options)
K: Rectifier/charger module	Z: EP0I board
L: Inverter module	3: VETI board
M: Static-bypass module	

Battery Cabinet

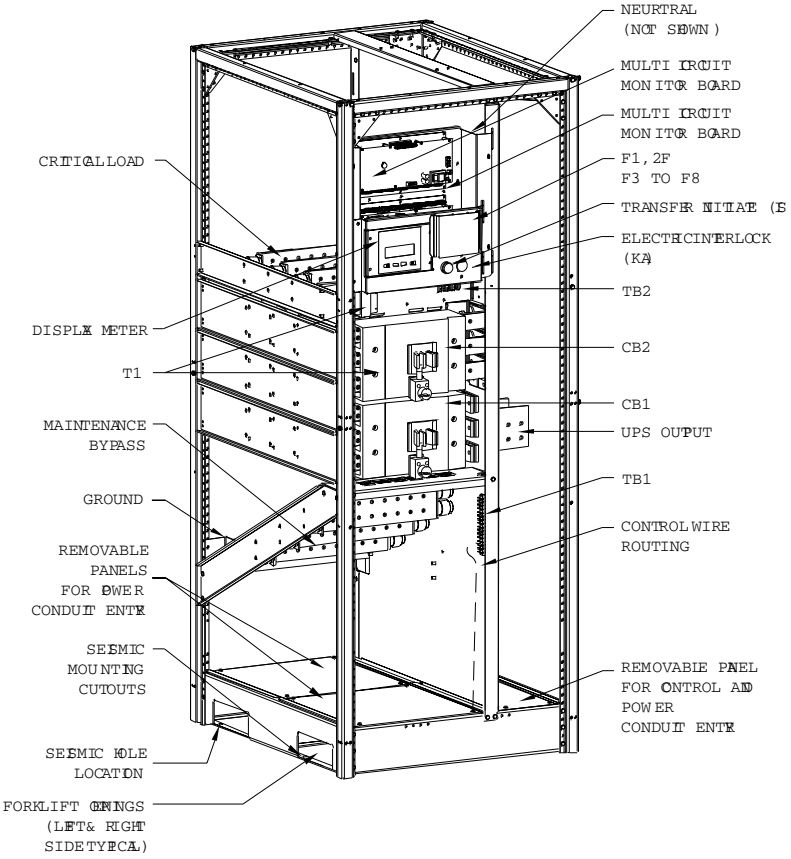


External Maintenance Bypass Cabinet

350A



1200A



Specifications

Electrical Parameters for Selecting Protective Devices

Normal AC Source

The parameters given in the table below can be used to determine the required rating of the upstream protective circuit breaker on the normal AC input for one single-UPS or parallel-UPS unit.

Note: It is essential to choose the type of circuit breaker according to its breaking capacity and the prospective short-circuit current at its place of installation. This choice must also be made so as to protect the static-switch semiconductors with respect to the maximum permissible currents and ensure discrimination between the UPS output fuses and the downstream protection devices.

Rated output in kVA	Normal AC source			
	Rated current		25% overload[3]	50% overload[3]
	With battery at start of cycle[1]	Without battery[2]		
150	245	236	295	354
180	295	283	354	425
200	328	316	395	474
225	332	320	400	480

Notes:
[1] The rated normal AC source currents (In) have been determined for a rated phase-to-phase voltage of 480 V, a battery with a 10 minute backup time at the beginning of its charge (412 x 1, 2 = 494 Volts) and full rated load with a power factor of 0.9.
[2] The rated normal AC source currents (In) have been determined for float charging voltage and full rated load with a power factor of 0.9.
[3] The normal AC source currents given for an overload of 25% or 50% are maximum values. They have been determined for a battery with float charging voltage and a load power factor of 0.9. When choosing the circuit breaker rating, use the "rated current" column and check that the circuit breaker tripping curves are compatible with the values in the overload columns.

Bypass AC Source

The parameters given in the tables below can be used to determine the required rating of the upstream protective circuit breaker on bypass AC input.

Note: If the installation includes a transformer on the bypass AC input, allow for the inrush current caused by magnetization of the transformer windings.

Rated output in kVA	Bypass AC source		
	Rated current	25% overload	50% overload
150	180	236	270
180	217	283	325
200	241	316	362
225	271	320	407
Notes: The bypass AC source currents have been determined for a rated phase-to-phase voltage of 480 V, a load power factor of 0.9 and for full rated load as well as overloads of 25% or 50%. When choosing the circuit breaker rating, use the "rated current" column and check that the circuit breaker tripping curves are compatible with the data in the overload columns. See table and chart below.			

UPS output in kVA	Maximum permissible current
150	33 In for 20 ms
180	27 In for 20 ms
200	25 In for 20 ms
225	22 In for 20 ms

Recommended Current Protection

Upstream Protection

The information provided here is purely indicative for a single UPS unit. Check that all the criteria under electrical parameters are taken into account.

Rated UPS output in kVA	CB in normal AC input		CB in bypass AC input	
	Circuit Breaker	Control unit	Circuit Breaker	Control unit
150	250 A	250 A	250 A	250 A
180	250 A	250 A	250 A	250 A
200	400 A	400 A	400 A	400 A
225	400 A	400 A	400 A	400 A

Downstream Protection

These protection devices ensure discrimination for each of the output circuits. If the recommended downstream protection is not installed and a short-circuit occurs, the result may be a break longer than 20 ms on all the other output circuits.

Rated UPS output in kVA	Downstream circuit breaker(s)	
	Circuit Breaker	Control unit
150–225 kVA	100 A	63 A curve C, 100 A curve B

Parallel UPS Units

For installations with redundant units, take into account only the units required to supply the load power (e.g. for an installation with three parallel-connected UPS units, one being redundant, only two units are used to determine bypass AC source and load currents and cable cross-sections.

Rated unit output in kVA	Number of parallel-connected units	Total UPS rated output in kVA	Bypass AC source or load line current in Amps
150	2	300	360
	3	450	540
	4	600	720
180	2	360	434
	3	540	651
	4	720	868
200	2	400	482
	3	600	723
	4	800	964
225	2	450	542
	3	675	813
	4	900	1084

Connect the Power Cables

WARNING: Before making connections, check that switches Q1, Q4S, Q3BP, Q5N and QF1 are in the "open" position.

Note: For parallel UPS with an external bypass unit, the power connections between each UPS cabinet and the external bypass cabinet must imperatively be of the same length. Separate the auxiliary control wiring from the power cables.

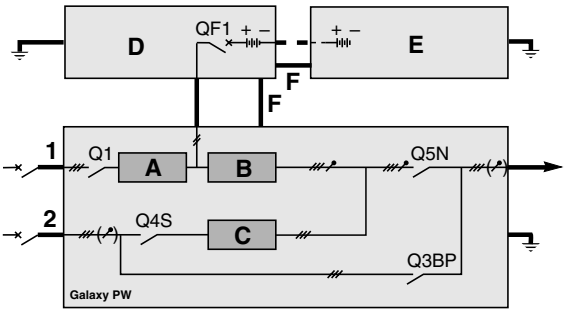
1. Open the doors.
2. Remove the lower terminal shields (secured by screws to the cabinet chassis).
3. Connect the power cables according to the wiring diagram for your specific system.
4. Connect ground cables to each cabinet.

Wiring Diagrams

Single UPS

The single UPS wire diagram is for typical UPS installations shown below. The heavy lines represent the cables that must be connected (F).

1	Normal AC source
2	Bypass AC source
A	Rectifier/charger module
B	Inverter module
C	Static-bypass module
D	Battery cabinet next to the Galaxy PW™ UPS cabinet
E	Additional battery cabinets
F	The equipotential bonding connection between cabinets

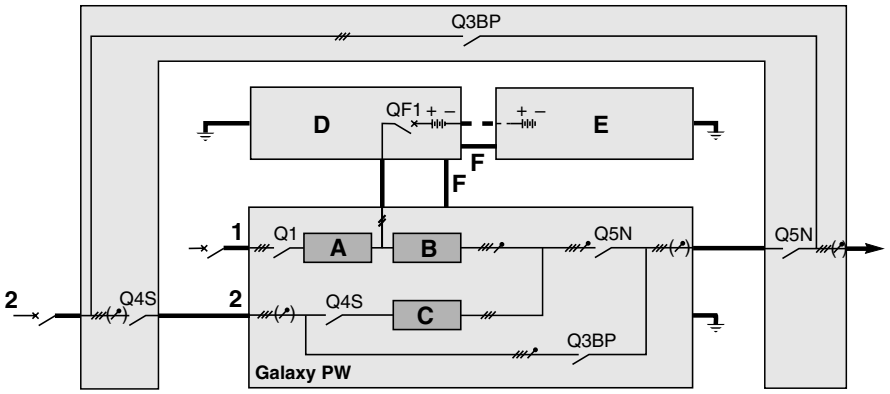


Single UPS with External Bypass

The external bypass may be used to construct a bypass outside the UPS, thus making it possible to shutdown the UPS for maintenance purposes.

Power cables for UPS-to-bypass connections are not supplied.

1	Normal AC source
A	Rectifier/charger module
2	Bypass AC source
B	Inverter module
C	Static-bypass module
D	Battery cabinet next to the Galaxy PW™ UPS cabinet
E	Additional battery cabinets
F	The equipotential-bonding connection between cabinets

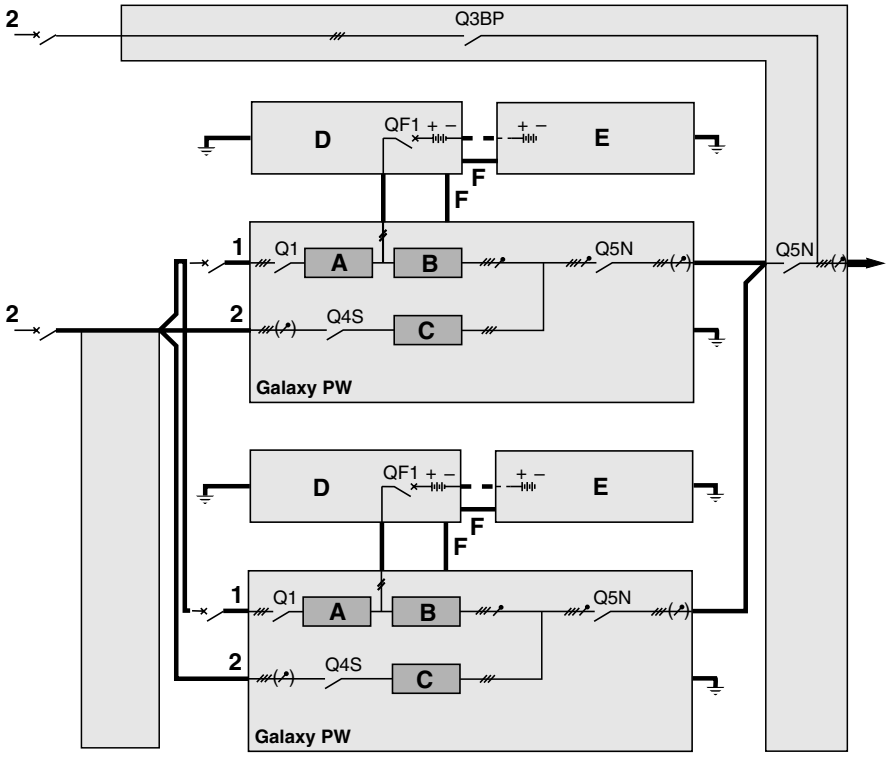


Parallel UPS

The external bypass may be used to construct a bypass outside the UPS, thus making it possible to shutdown the UPS for maintenance purposes.

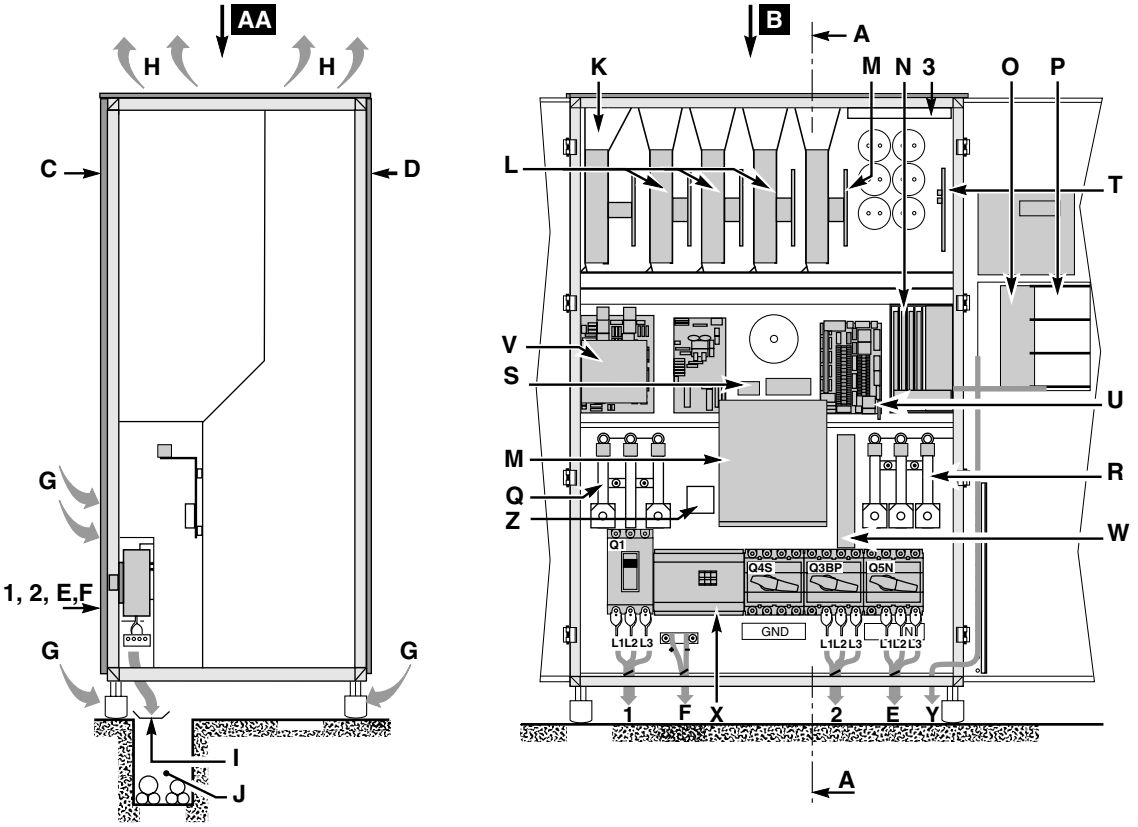
Power cables for UPS-to-bypass connections are not supplied.

1	Normal AC source
2	Bypass AC source
A	Rectifier/charger module
B	Inverter module
C	Static-bypass module
D	Battery cabinet next to the Galaxy PW™ UPS cabinet
E	Additional battery cabinets
F	The equipotential-bonding connection between cabinets



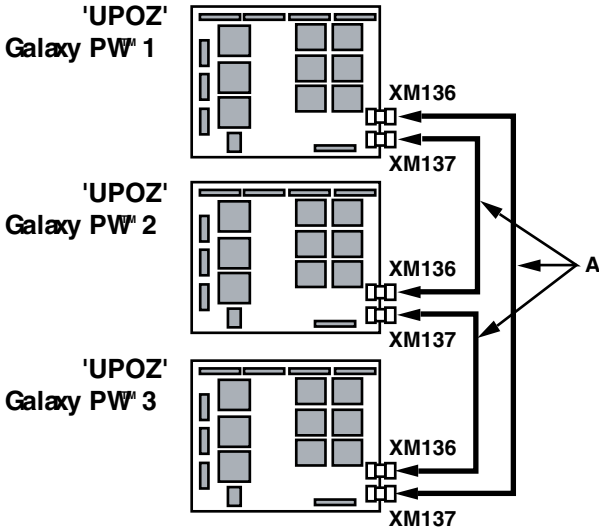
Connections between Cabinets

The connections between the cabinets are made on the UPOZ board (marked T) and MUSI board (marked U).



Connect Cables Between UPOZ Boards

These connections are made using the supplied cables. The purpose of the connection is to make a loop.



1. Connect cable from XM138 on the first UPOZ board to XM137 on the next board.
2. Continue until you connect the cable to XM137 on the last UPOZ board.

3. On the last UPOZ board, connect cables from XM138 to XM137 on the first UPOZ board.

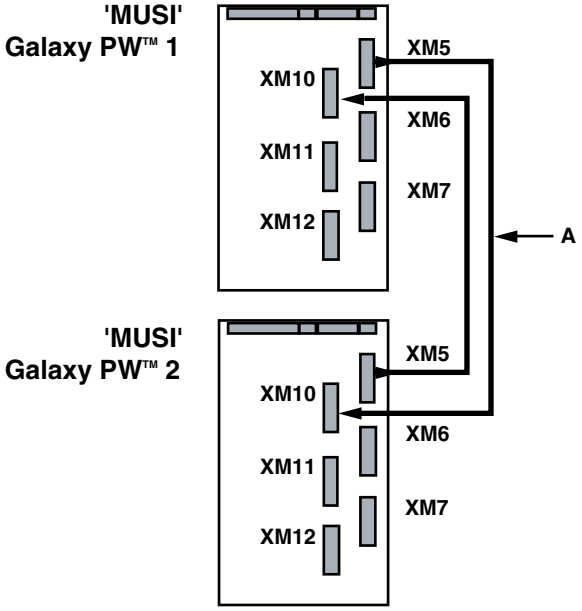
MUSI Board Connections

Note: Group the "UPOZ" inter-board and "MUSI" inter-board connections with the inter-cabinet auxiliary connections, and separate this wiring from the power cables.

Connectors XM5, XM6 and XM7 on the MUSI board are used to transmit signals.

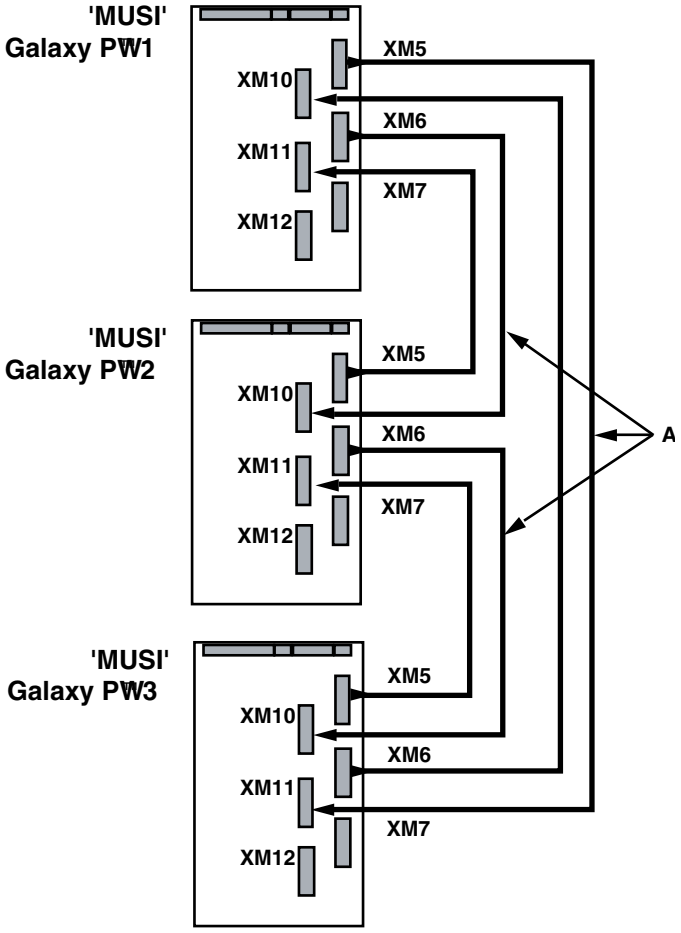
Connectors XM10, XM11 and XM12 on the MUSI board are used to receive signals.

Connect Cables Between MUSI Boards with Two Parallel UPS Units



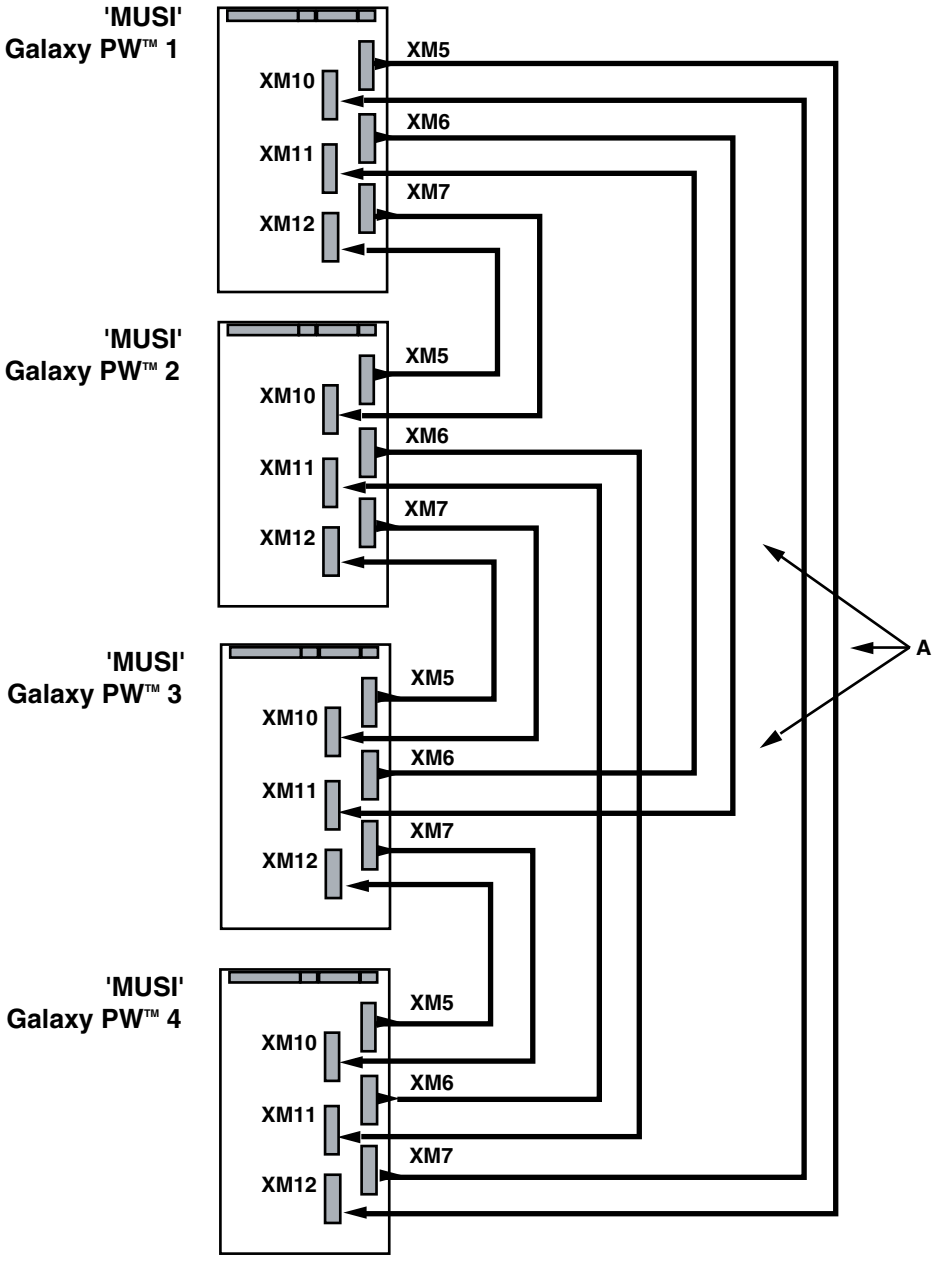
1. Connect cable from XM5 on the MUSI board of the first UPS to XM10 of the MUSI board of the second UPS.
2. Connect cable from XM5 on the MUSI board of the second UPS to XM10 of the MUSI board of the first UPS.

Connect Cables Between MUSI Boards with Three Parallel UPS Units



1. Connect cable from XM5 on the MUSI board of the first UPS to XM11 of the MUSI board of the last UPS.
2. Connect cable from XM6 on the MUSI board of the first UPS to XM10 of the MUSI board of the second UPS.
3. Connect cable from XM5 on the MUSI board of the second UPS to XM11 of the MUSI board of the first UPS.
4. Connect cable from XM6 on the MUSI board of the second UPS to XM10 of the MUSI board of the last UPS.
5. Connect cable from XM5 on the MUSI board of the last UPS to XM11 of the MUSI board of the second UPS.
6. Connect cable from XM6 on the MUSI board of the last UPS to XM10 of the MUSI board of the first UPS.

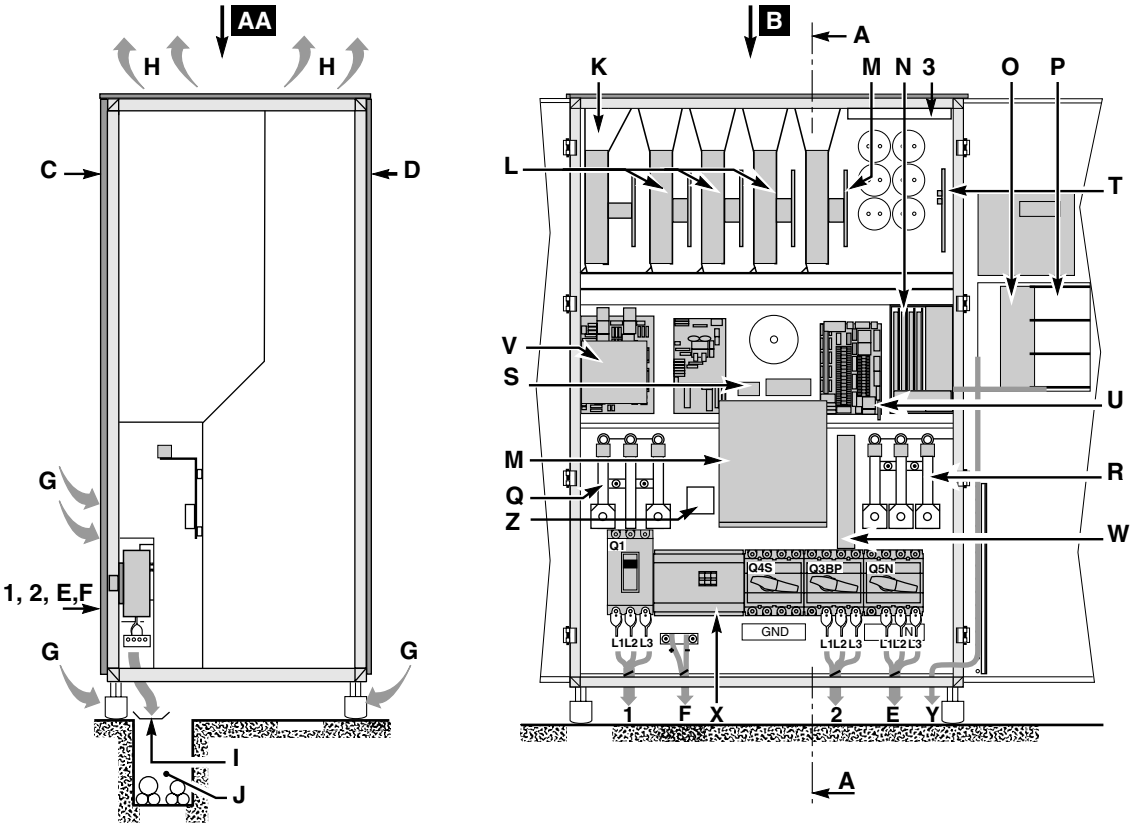
Connect Cables Between MUSI Boards with Four Parallel UPS Units



1. Connect cable from XM5 on the MUSI board of the first UPS to XM12 of the MUSI board of the last UPS.
2. Connect cable from XM6 on the MUSI board of the first UPS to XM11 of the MUSI board of the third UPS.
3. Connect cable from XM7 on the MUSI board of the first UPS to XM10 of the MUSI board of the second UPS.
4. Connect cable from XM5 on the MUSI board of the second UPS to XM12 of the MUSI board of the first UPS.
5. Connect cable from XM6 on the MUSI board of the second UPS to XM11 of the MUSI board of the last UPS.
6. Connect cable from XM7 on the MUSI board of the second UPS to XM10 of the MUSI board of the third UPS.
7. Connect cable from XM5 on the MUSI board of the third UPS to XM12 of the MUSI board of the second UPS.

8. Connect cable from XM6 on the MUSI board of the third UPS to XM11 of the MUSI board of the first UPS.
9. Connect cable from XM7 on the MUSI board of the third UPS to XM10 of the MUSI board of the last UPS.
10. Connect cable from XM5 on the MUSI board of the last UPS to XM12 of the MUSI board of the third UPS.
11. Connect cable from XM6 on the MUSI board of the last UPS to XM11 of the MUSI board of the second UPS.
12. Connect cable from XM7 on the MUSI board of the last UPS to XM10 of the MUSI board of the first UPS.

Optional Communication Card Installation



Installation of boards setup notes:

- Boards should not be installed with the UPS on.
- Boards must be pushed to the end of the slots to ensure correct installation.
- Board front plates must be screwed to the protective "Media Contacts 11" board cover.
- Wire routing holes are provided in the support for the "Media Contacts 11" board for tying down the wires.
- The control wires must then be routed through the cableway marked "W".

Media Contacts 11 Board

Terminals XR2, XR3, XR4 and XR5 on the "Media Contacts 11" board of each type of unit can be used to receive signals from the operating environment and to transmit signals concerning the operating status of the UPS.

Signal Reception

The signals should be provided by volt-free contacts.

Signal	Description
Emergency off	An NC contact causes shutdown of the inverter and the rectifier/charger, opening of the battery circuit breaker, blocking of the static bypass and activation of a relay contact on the "Media Contacts 11" board.
Battery room ventilation fault	A ‘NO’ contact causes shutdown of the rectifier/charger.
Battery circuit breaker QF1 closed	A ‘NO’ contact prevents inverter start-up if the circuit breaker is open.
Battery temperature	A PC-board, placed near the battery, supplies information on the battery temperature, thus enabling the rectifier/charger to regulate the battery voltage.
"Auxiliary" signals	Depending on the selected settings, these signals may be used to provoke: • forced shutdown of the inverter (whatever the status of the bypass AC source) • protected shutdown of the inverter (load transfer to the bypass AC source) • limiting of the current drawn by the rectifier/charger (programmable value) when supplied by an engine generator set with an insufficient power rating. The additional power required by the inverter is supplied by the battery which discharges • limiting of the battery charge current (programmable value) if the normal AC source is replaced by an engine generator set with an insufficient power rating

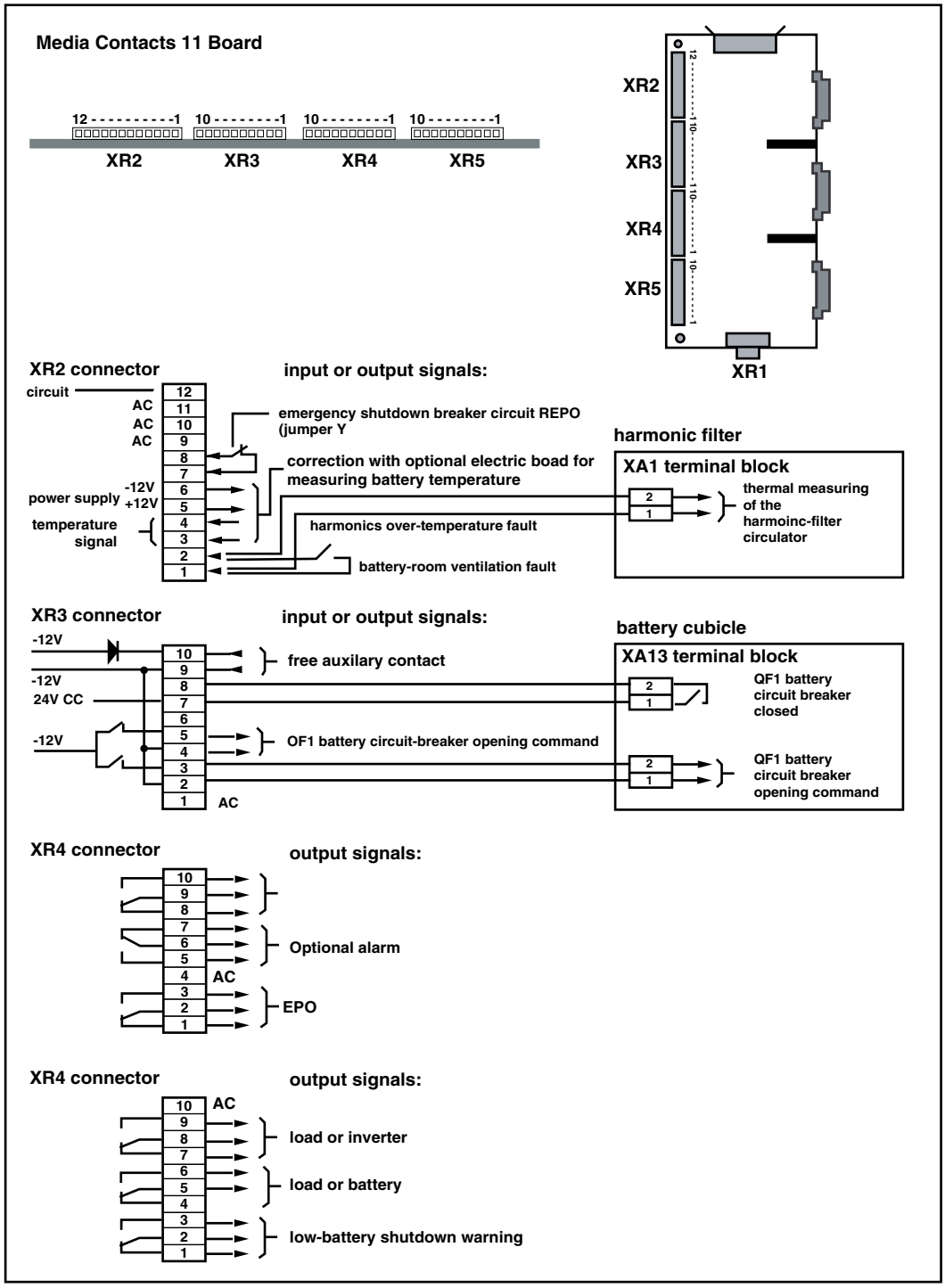
Signal Transmission

An auxiliary 24 V power supply	Isolated and backed up, is used to supply: • the undervoltage release of the battery circuit breaker(s) QF1 • the board that measures the temperature in the battery room
"low battery" warning signal:	(Volt-free changeover contact) indicating that battery time is about to run out. The warning threshold may be personalized.
"load on UPS" signal:	(Volt-free changeover contact) indicating that the load is supplied by the inverter. For a single UPS unit, one volt-free changeover contact may be used to indicate that the load is supplied by the bypass AC source.
"load on battery power" signal:	(Volt-free changeover contact) indicating that the inverter is supplied by the battery in the following cases: • normal AC source outage or voltage drop • rectifier/charger shutdown • rectifier/charger current limiting This signal, which may be used to initiate process saving and shutdown procedures, is time-delayed 30 seconds to avoid unnecessary operations following micro-breaks.
"Maintenance position" signal:	(Volt-free changeover contact) indicating that: • maintenance bypass switch Q3BP is closed • bypass AC source input switch Q4S is open • inverter output switch Q5N is open • battery circuit breaker QF1 is open
Signal to open battery circuit breaker(s) QF1:	In the event the "emergency off" button is pressed or to avoid an excessive battery discharge (lasting more than three times the rated backup time plus two hours).
Repo Contact:	(Volt-free changeover contact) used to trip switching devices in the event of an emergency shutdown.
”General Alarm" information:	(Volt-free changeover contact) which includes: • internal faults • information on temperatures outside tolerances in the battery room (optional) • overload information (> In) • static-switch ventilation and power-supply faults

Note: The maximum breaking capacity of the changeover contacts is 5A at 250V.

Standard Auxiliary Circuits Connection

Recommended cable cross-section: 1 mm². The male connectors that fit the female connectors on the board (XR2 to XR5) are supplied. The contacts are volt-free and are shown in the diagram under the following conditions: UPS on, contact at rest. Contact breaking capacity: 250 V, 5 A.



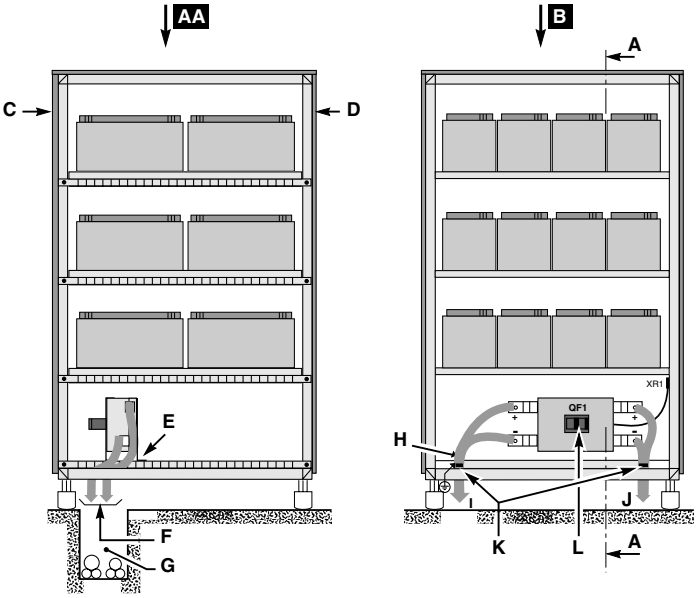
Battery Circuit Breaker "QF1" Connection

Connect the cable from connector XR3 (pins 2 to 8) on the "Media Contacts 11" board in the UPS cabinet to connector XR1 in the battery cabinet containing battery circuit breaker QF1.

Installation of the Temperature Monitor

Install the Temperature Monitor in the Battery Cabinet

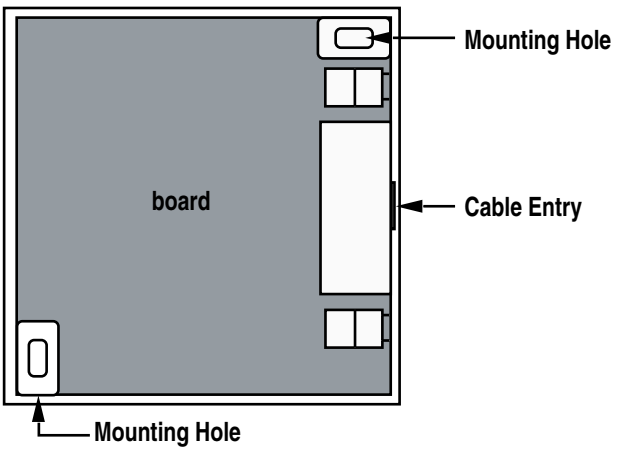
The temperature monitor unit is placed inside the battery cabinet housing circuit-breaker QF1. The temperature sensor MUST be placed at the top of the cabinet to work properly.



1. Open the unit cover.
2. Fix the unit on the plate using the self-adhesive sticker and a screw (nut and washer combination, diameter 4 mm, length 16 mm, not supplied).
3. Connect and put back the cover.
4. Tie the connecting cable to the cabinet upright so that it does not pull on the unit.

Install Temperature Monitor Base in Battery Room

The temperature monitor should be secured against a wall or any vertical support. See illustration below.



Dimensions: 75 x 75 x 21 mm

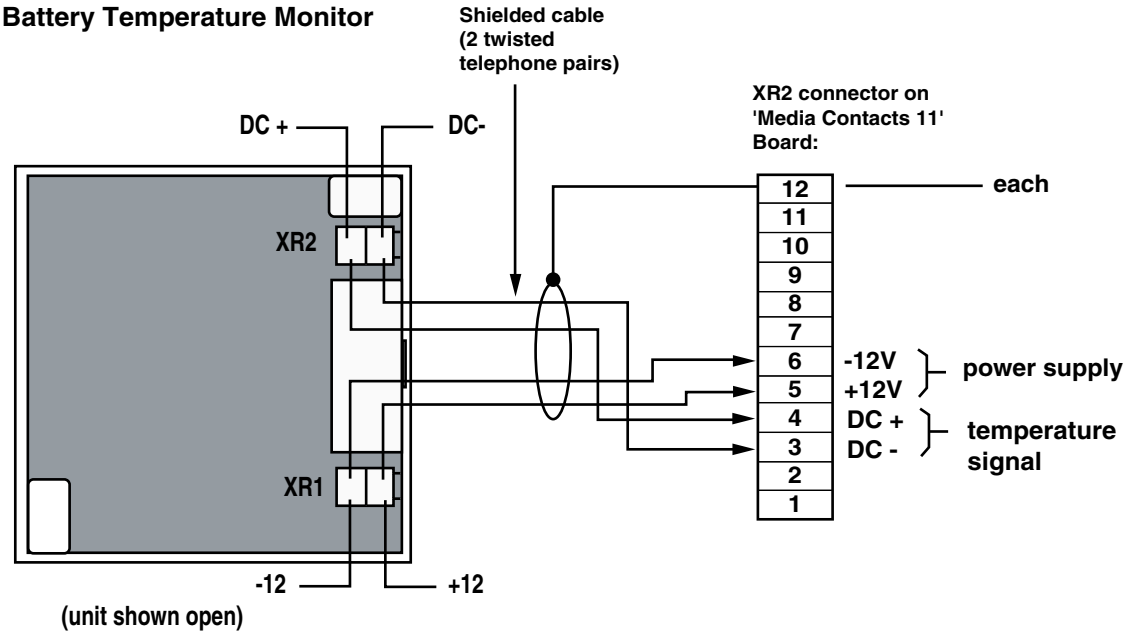
1. Choose a location near the batteries and away from draughts which adversely affect the accuracy of temperature measurements. Dimensions: 75 x 75 x 21 mm.
2. Use the holes provided in the base plate to screw the unit to the vertical support, unless the connecting cable runs on the surface, break the knock-out in the unit base plate provided for cable entry. Secure the cable by suitable means so that it does not pull on the unit.

Connection of the Battery Temperature Monitor

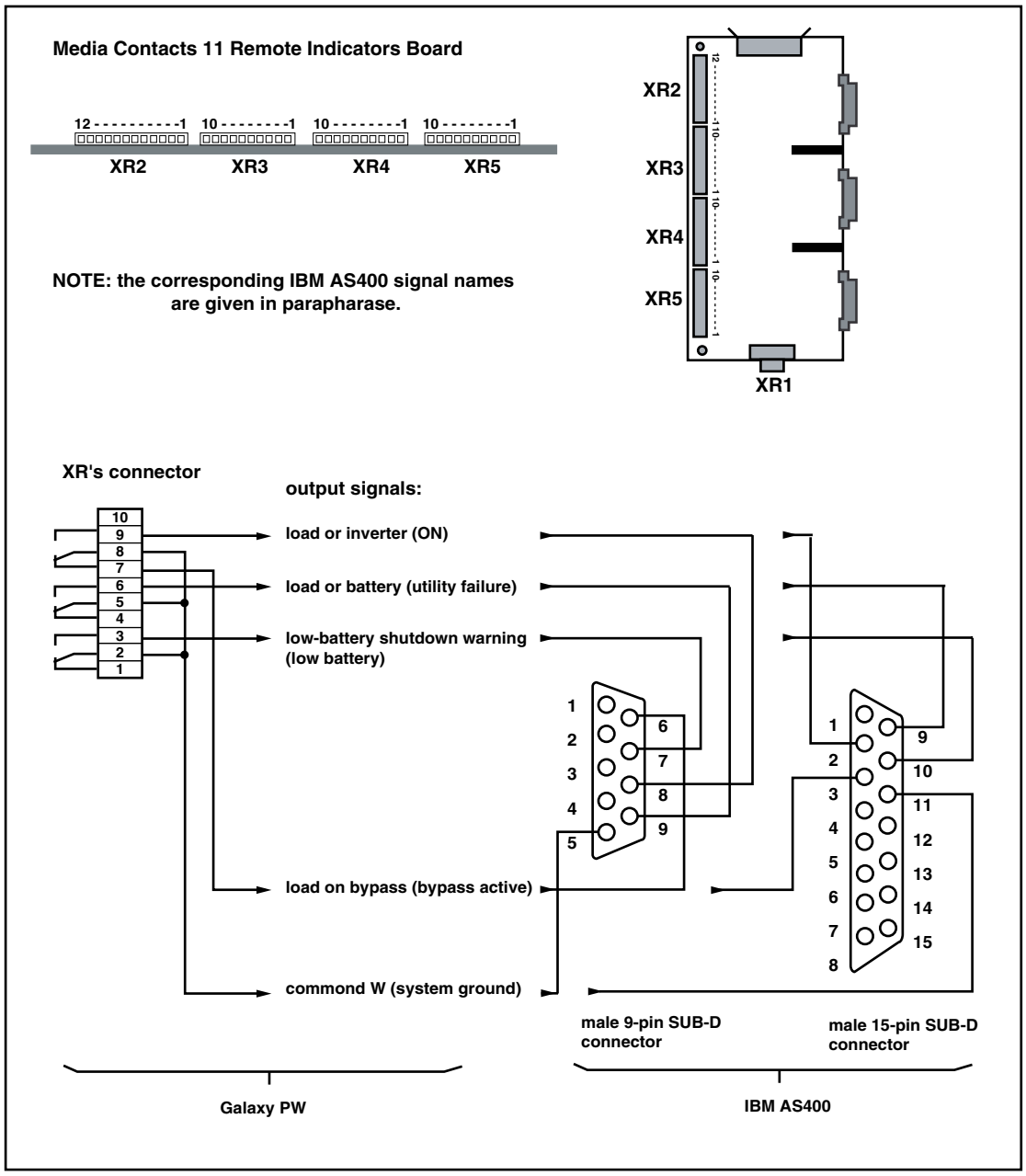
This unit must be connected to the XR2 connector on the remote indications "Media Contacts 11" board of the UPS cabinets.

Use a shielded cable made up of 2 twisted pairs with a conductor cross-section of at least 0.1 mm^2, not longer than 100 m in length. Do not forget to connect the cable shield to ground pin 12 on connector XR2.

Battery Temperature Monitor



Connection to the Media Contacts 11 Board



Final Installation Steps

1. After making the connections, install the front and rear base plates by clipping them to the feet of the cabinets (unless the connecting cables are fed through these openings).
2. Refit the terminal shields of the terminal blocks, switches, and circuit breakers.

Worldwide Customer Support

Customer support for this or any other product is available at no charge:

- Contact the Customer Support Center by telephone or e-mail. For local, country-specific centers: go to www.apc.com/support/contact for contact information.

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