Tescom®

XA-200P SERIES

UPS's

XA-240P
XA-245P

40 – 45 kVA

3 Phase Input – 1 Phase Output

USER MANUAL

CONTENTS

SAFETY

This manual contains important instructions for XA-200 series UPS that should be followed during installation and maintenance.

IMPORTANT NOTICES

1. Read instructions carefully before operating the UPS

2. All warnings in the manual should be adhered to.

3. All operating instructions should be followed.

4. The unit should be supplied by a grounded outlet. Do not operate the unit without ground source.

5. Power cord of the UPS should be routed carefully so that they are not to be walked on.

6. Please save this manual.

7. Please save or recycle the packaging materials.

WARNING!

- Do not insert any object into ventilation holes or other openings.
- To reduce the risk of fire or electric shock, install in temperature and humidity controlled indoor area free of conductive contaminants.
- To reduce the risk of fire, replace fuses with the same type and rating when necessary.

CAUTION!

- **Only qualified personnel should install or service UPS/batteries.**
- **Risk of electric shock, do not remove cover. No user serviceable parts inside, refer servicing to qualified service personnel.**
- The output may be energized when the unit is not connected to a mains supply.
- **Risk of electric shock hazardous live parts inside this unit are energized from the battery supply even when the input AC power is connected.**
- To reduce the risk of electric shock, disconnect the UPS from the mains supply before installing a computer interface signal cable. Reconnect the power cord only after signaling interconnections have been made.

ABOUT THE BATTERY

- A battery can present a risk of electric shock or burn from high short circuit currents. The following precaution should be observed when working on batteries: *
  Remove watches, rings or other metal objects.
  * Use tools with insulated handles.
- The batteries in this UPS are recyclable. Batteries must be disposed of according to local environmental laws. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly.
- Do not dispose of batteries in a fire. The batteries will explode. Do not open or mutilate the batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes. If electrolyte comes into contact with the skin the affected area should be washed immediately.
- The internal energy source (the battery) cannot be de-energized by the user.

I. GENERAL DESRCIPTION

Thank you for selecting this uninterruptible power supply (UPS). To choose the XA-200 series as your equipment protector was a wise investment. It includes many features to protect your critical equipments.

The XA-200 series UPS system is connected between mains and critical loads, such as computer systems, telecommunication systems, computerized instruments etc.

The advantages of using UPS:

- Increased power quality:
  The UPS has its own internal voltage and frequency regulator circuits which ensure that its output is maintained within close tolerances independent of voltage and frequency variations on the mains power lines.

- Increased noise rejection:
  By rectifying the input ac power to dc power, and then converting it back to ac, any electrical noise that may present on the input mains supply line is effectively isolated from the UPS output, therefore the critical load sees only clean power.

- Power blackout protection:
  If the mains power fails, the UPS continues to power the critical load from its battery source, leaving the load immune from power disturbances.

1.1 System Description

Features:

- **On-line** technology with pure **sine wave** output.
- PWM and IGBT technology.
- **Microprocessor controlled main controller board.**
- Static (STS) and maintenance by-pass.
- LCD (Liquid Crystal Display) display.
- **Alarm history (Memory for max. 64 alarms.)**
- **Automatic battery testing (optional).**
- **High quality maintenance-free lead-acid type batteries.**
- **High nonlinear load capacity, special for computers.**
- Accessories :
  - **Optional UPS monitoring software (T-MON, RUPS□□, RUPSII□□, UPSILON□□) SNMP devices, compatible to any operating system.**
  - Remote Monitoring Panel (RMP) available: You can observe the UPS status and parameters without using a computer at a remote location up to 200 meters away (via RS485 interface).
  - UPS Port Sharer available

XA-200 Series Uninterruptible Power Supplies (UPS) are advanced true On-Line Sine wave devices with static transfer switch which provide reliable, regulated, transient-free AC power to sensitive equipment.

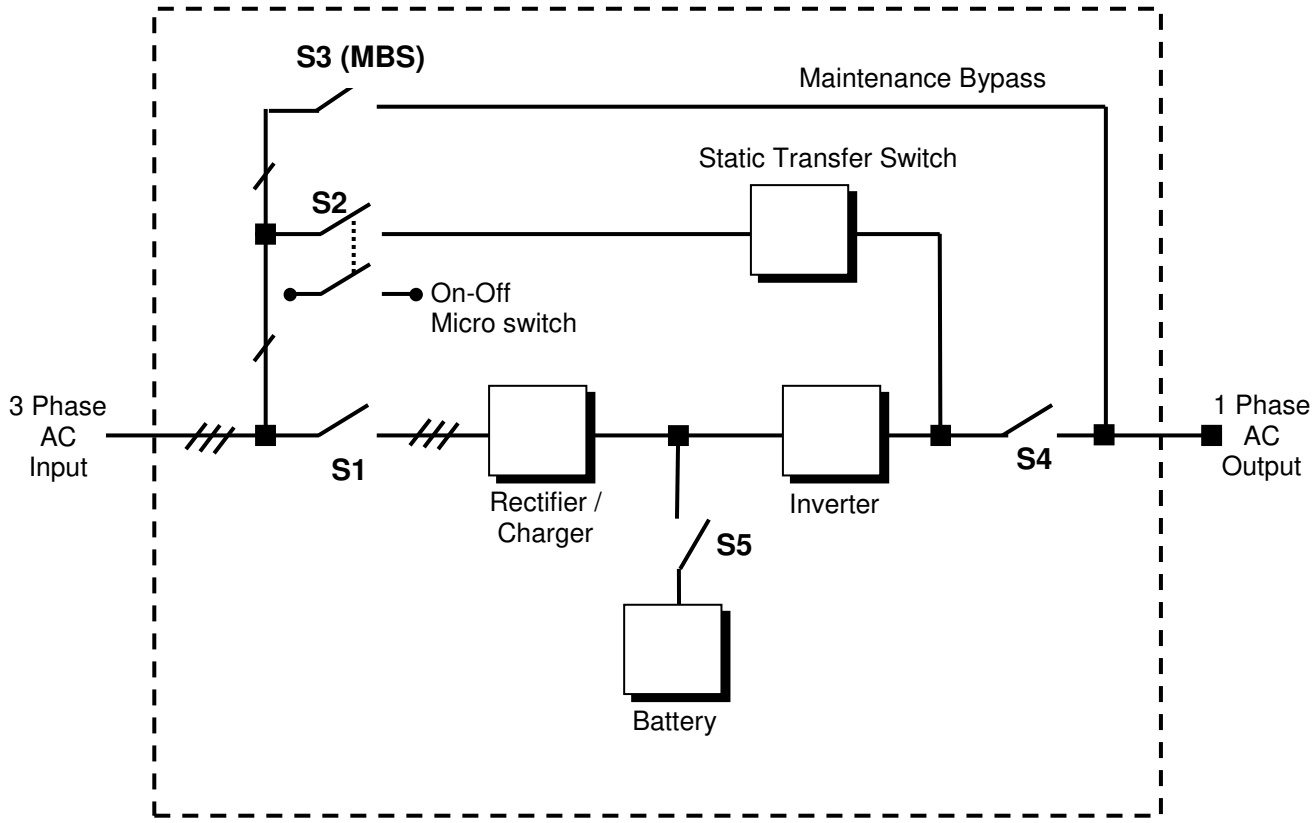
Since the UPS is a true On-Line system, conditioned power is provided continuously to the connected equipments. Unlike standby power systems, the UPS is constantly regulating and filtering the output power. When incoming power is interrupted, the UPS protects the computers instantaneously without any transfer time.

The XA-200 Series has high non-linear load capability (i.e. Crest Ratio 3:1) and this is suitable for powering special loads such as switching power supplies or highly capacitive inputs like computers.

The system's static transfer switch (STS) provides by-pass power as its standby source. During an overload condition, the S.T.S will switch the customer's load over to the bypass line with no interruption. The S.T.S will

transfer back to the inverter automatically when the overload condition has been cleared. If the inverter fails internally, the unit switches to bypass within a few milliseconds.

1.2 XA-200P UPS block diagram



Şekil 1.1 Electrical Block Diagram

General description of UPS parts:

RECTIFIER/CHARGER: The first conversion stage (from AC to DC) uses a 3 phase, 6 pulse, fully controlled rectifier to convert the incoming mains supply into a regulated DC BUS BAR. The DC BUS BAR produced by the rectifier provides both battery charging power and power to the inverter section.

BATTERY GROUP: It keeps as an reserve DC power supply, for the inverter in case of mains failure.

Note: To increase the lifetime of the batteries keep them in room temperature (20°C-25 °C).

INVERTER: It is made by utilizing the latest technology of power transistor (IGBT) and pulse width modulation (PWM). Inverter converts dc bus voltage into (second conversion) an alternative voltage like line voltage. And provides this voltage and frequency being fixed.

STATIC TRANSFER SWITCH (STATIC BY-PASS): The circuit block annotated contains an electronically controlled switching circuit, which enables the critical load to be connected either to inverter output or to a by-pass power source via the" static by-pass line".

MECHANIC TRANSFER SWITCH (MAINTENANCE BY-PASS): Manually controlled, "maintenance by-pass" supply is also incorporated into the UPS design. Its purpose is to enable the critical load to be powered from the mains (by-pass) supply while the UPS is shut down for maintenance or troubleshooting.

Switches

S1	: (Rectifier) input power switch
S2	: Static by-pass & On-Off switch
S3	: Maintenance by-pass power switch
S4	: UPS Output switch
S5	: Battery circuit breaker (optional)

- **S1 – (Rectifier) input switch**

These switches connect the line input to the input of the rectifier/charger. All power supplies in the equipment connected to this switch.

- **S2 – Static Bypass & ON – OFF switch**

S2 is basically a fuse on the bypass input line and it has an integrated micro switch which is used for turning ON and OFF the UPS. Therefore, S2 will be mentioned as ON – OFF switch.

- **S3 (MBS) – Mechanical maintenance bypass switch**

There is no fuse on the line of mechanical by pass.
When the UPS is faulty or during the maintenance period this switch is used to connect the load, directly to the bypass line.

- **S4 – UPS Output switch**

This switch connects the output of the UPS to the load. This switch must be turned OFF after the maintenance bypass switch is turned on properly according to its procedure. Maintenance bypass line is connected to the output of this switch.

- **S5 – Battery circuit breaker & fuse**

Located at the input side of the device. It protects the other side of the system against any faults may occur on the battery or the device.

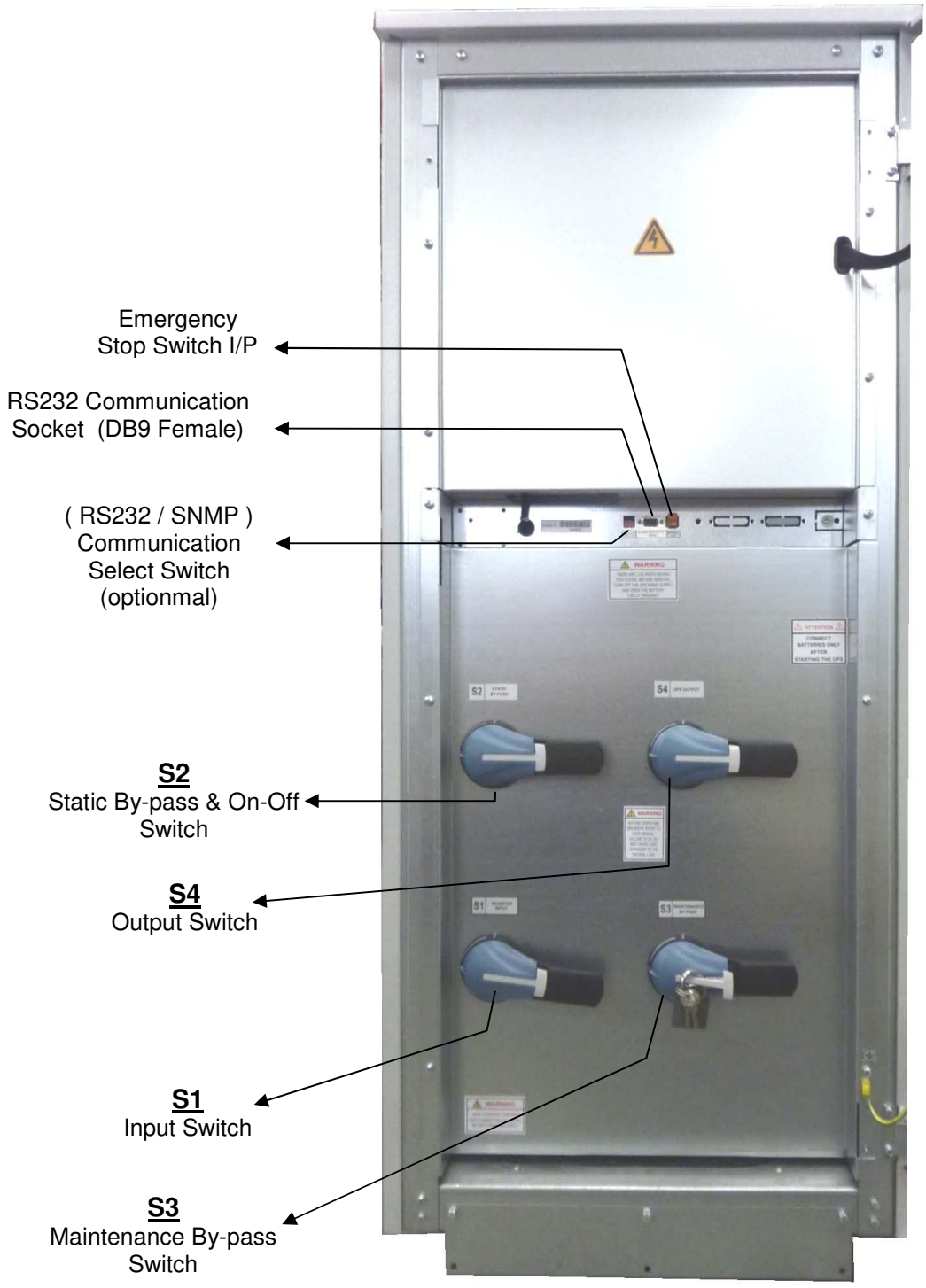


Figure 1.2 Fuse and Switch Locations

1.3 Technical Specifications

MODEL	XA-240P	XA-245P
Output kVA	40	45
Output kW	28	31,5
Output Power Factor	0,7	
Parallel Operation	Up to 4 UPS's (optional)	
Battery charging temperature compensation	Optional	
Serial Communication	RS232 (optional SNMP, RS485 or MODBUS)	
INPUT		
Input voltage	220/380 Vac 3 Phase, N	
Voltage tolerance	± %15	
By-Pass voltage	220 Vac , N	
Input frequency	50 Hz. ±%5	
RFI Level	EN62040-2	
OUTPUT		
Nominal output voltage	220 Vac , N	
Voltage regulation tolerance	±%1	
Nominal output frequency	50 Hz.	
Output frequency tolerance (Line syncron)	±%1	
Output frequency tolerance (Free running)	±%0,2	
Efficiency 100% Load	%87-88	
Load Crest factor	3:1	
Overload	%100-%125 load 10 min. %125-%150 load 1 min. > %150 by-pass	
Total Harmonic Distortion (THD)	<%3	
BATTERY		
Number of	30	
Float charge voltage	405 Vdc	
End of charge voltage	300 Vdc	
ENVIRONMENT		
Maximum Temperature	0°C - 40°C	
Audible noise	<60dBA	
Weight (Battery less)	335 kg	
Dimensions (HxWxD) (mm)	1390x575x820	
OTHER		
Serial communication	RS232 (standard) RS485 (optional)	
Alarm contacts	Standard	
UPS SNMP Adaptor	Optional	
Remote Monitoring Panel	Optional	

II. FRONT PANEL

WARNING! The messages in this section are applicable for equipments having software version Y11P. If the version changes, the messages and functions will change as well.

2.1 Introduction

The front panel of UPS, consisting of a 2 lines alphanumeric display, 2 status lamps, plus 4 function keys, allows the complete monitoring of the UPS status. The mimic flow diagram helps to comprehend the operating status of the UPS. By using the function keys operator can move on menus and change some parameters.

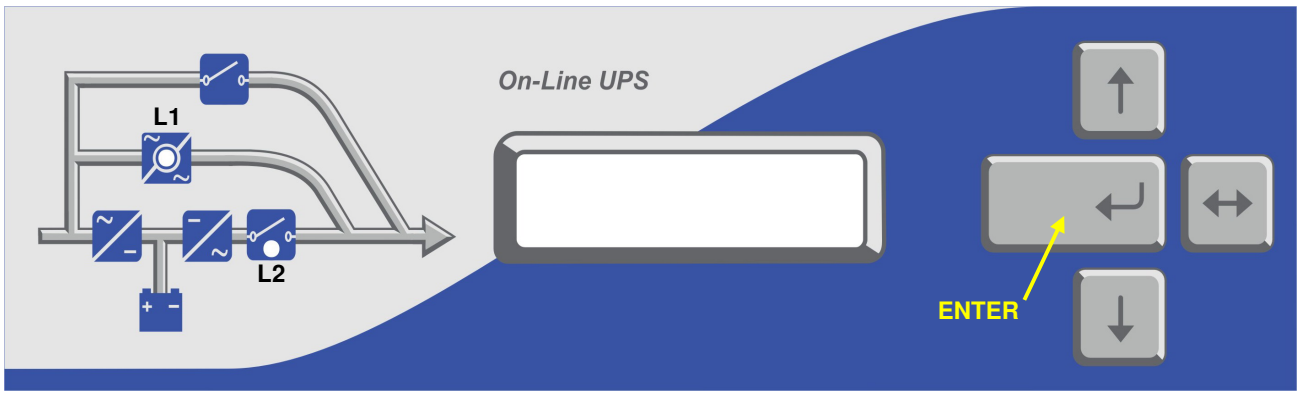


Figure 2

L1 : If lamp is lit static bypass is active and load is connected to mains voltage
L2 : If lamp is lit inverter supplies the load

There are 4 function keys on front panel these are ENTER, UP, DOWN and (↔).
UP and DOWN keys help moving on menus, (↔) key selects options, ENTER key means the selected option or menu is valid.

NOTE : During parameter settings, "+" sign will change into "—" sign if "↔" button is pressed for 3 seconds and the parameter values will start decreasing.

2.2 Front Panel Menu Descriptions

By using menu buttons on the front panel you can move on main menu functions. You can enter the submenu of the item seen on the LCD panel (MEASURES, ALARMS, INFORMATION) and navigate within it by using again ↓, ↑, ↵ **(Enter)** buttons.

MEASURES submenu
LD% (output load percentage)
OPV (output voltage)
FREQU (output frequency)
IPV (input voltages)
BYP (bypass source voltage)
BATT (battery voltage and current)
..... etc

SAMPLE menu selection:
If you want to go to MEASURES menu use UP and DOWN keys and find MEASURES MENU ,press ENTER key ,now you can move on MEASURES menu subitems by UP and DOWN keys.
At the end of sub menus ENTER (EXIT) message is available and while reading this message, if you press ENTER key you can go back to MAIN menu.
In ALARMS MENU you can see LOG HISTORY ,log events are recorded with event time and date.
PASSWORD Menu is used for service purposes. This menu requires a three digit password and should be used only by qualified service personnel..

2.2.1 Main Menu

Main menu items are described below, navigation through them can be performed using up and down buttons.

Main menu items	Function
STATUS	The status message which shows the UPS status
COMMAND MENU	→ Enter "go to Command submenu"
MEASURES MENU	→ Enter "go to Measures submenu"
ALARMS MENU	→ Enter "go to Alarms submenu"
USER OPTIONS	→ Enter "go to User Option submenu"
TIME MENU	→ Enter "go to Time submenu"
CALIBRATION MENU	→ Enter "go to Calibration submenu"
ADJUST MENU	→ Enter "go to Adjust submenu"
INFORMATION MENU	→ Enter "go to Information submenu"
Go to STATUS MENU	

2.2.2 COMMAND Menu items

This menu is used to give commands to the UPS or perform tests on it.

	Submenu item	Function
1	**SOUND : ON/OFF (is available)**	Used for turning on/off alert sound. If you press ENTER key the option will change ,one press ON ,one press OFF. If the OFF option is selected sound alert is turned off but if a new alarm, UPS changes the option to ON state.
2	**ENTER <BYPASS>**	If you press ENTER for 3 seconds, the load is transferred to BYPASS automatically and the submenu item changes to ENTER <INVERTER> this time. If you press ENTER for 3 seconds, the load is transferred back to Inverter.
3	**ENTER B.TEST>405**	If you press enter for 3 seconds battery test starts and lasts for 15 seconds. If battery test fails **A6 BATT FAULT** message is shown on panel and this message stays until you press ENTER key for 3 seconds. The value on at the right shows the battery voltage during battey test. Starting time of battery test recorded to log event menu if the test is successful you can see only **BATTERY TEST** message on log records..
4	**ENTER <BOOST>**	If you press ENTER key for 3 seconds boost charge starts. The given time for boost charge is 10 hours. At the end of this time UPS stops the boost charge. If the boost charge is active this submenu item changes to **STOP BOOST> 005H** message the 005H shows that boost charge is going on for 5 hours. If the number is 10 boost charge stops. If you press ENTER key boost charge stops immediately. Boost charge starting and boost charge end times are recorded to log event menu. If boost is active UPS beeps each 15 seconds

	Submenu item	Function
5	**SIMULATION OFF**	The purpose of this submenu to check dry contact connections. Normally to check line failure contact you must turn off mains power. This is not necessary with this utility. 3 options are available. **SIMULATION OFF** simulation mode is off **SIM:LINE FAILURE** if you press ENTER key for 3 seconds the line failure lamp on interface board is turned on. **SIM:LIN.F+BT.LOW** if you press enter key for 3 seconds the line failure and battery low lamps on interface are turned on. **SIM:BYPASS** if you press ENTER key for 3 seconds the bypass (aux) lamp on interface board is turned on. So you can check dry contact connections
6	**ENTER FAULT RESET**	Faults reset selection.
7	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.3 MEASURES Menu items

All the measurements of the UPS can be monitored via this menu, navigation through the items is performed using up and down buttons.

	Submenu item	Function
1	**LD%: 060**	Output load percentage
2	**OP CURR : 011A**	Output current
3	**OPV: 230**	Output voltage
4	**IPV: 400 400 400**	3 Phase input voltages
5	**BATT: 405 V**	Battery voltage
6	**BYP: 230**	By-pass voltage
7	**FREQU: 50.0 Hz 50.0 Hz**	Input frequency – Output frequency
8	**TEMP: 030 c**	UPS Internal temperature
9	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.4 ALARMS Menu items

The last 64 events can be monitored in this menu.

	Submenu item	Function
1	**UPS STATUS**	Alarm status at that instant.
2	**000>311201 23:15**	Monitoring past alarms: First 3 digit number indicates the event number, 000 event is the last one. Date is in ddmmyy and time is in hh:mm format. On the second line, the alarm events on the first line are listed. Using ↔ button 128 events can be viewed.
3	**PARR.ERR.NR : 017**	Parallel controller board error (If parallel hardware exists) If this value is 0 then the parallel is OK
4	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.5 USER OPTIONS Menu items

From this menu the users selects some important parameters and apply them.

	Submenu item	Function
1	**MODE: ONLINE**	4 Operating modes can be selected using up and down buttons. **ONLINE**: normal operating mode. **PARALLEL**: Symmetric parallel operation mode of 2 UPS's. **HOT STANDBY**: 1 UPS is master and 1 UPS is redundant operating mode. **REDUNDANT**: 2 UPS's redundant operating mode. → Press ENTER for 3 seconds to save the selected mode.
2	**UPS No : 001**	By using PLUS and MINUS keys you can change number 0 to 3. In parallel operation select different numbers for each UPS. If you select the same number DUBL UPS NUMBER message tells the fault. → press ENTER for 3 seconds and then the selection is valid
3	**BYP.PROTECT ON**	By using ↔ key you can change on and off options. **ON**: if the bypass source is out of tolerance, UPS turns off load power in case of a fault or overload.. **OFF** : UPS turn off load power only during bypass moves. If bypass period is completed UPS continues to supply the load. → press ENTER for 3 seconds and then the selection is valid
4	**RESTART:ON/OFF**	By using ↔ key you can change on and off options. **ON** : during mains failure at the and of battery discharge UPS shutdowns ,after mains restored UPS starts again. (battery trip out is on every time) **OFF**: after mains restoration UPS doesn't start again. (battery trip out is off) → press ENTER for 3 seconds and then the selection is valid
5	**REMOTE : ENABLE**	By using ↔ key you can change enable and disable options. **Enable** : remote battery test, shutdown and bypass functions are enabled **disable** : these functions are disabled → press ENTER for 3 seconds and then the selection is valid
6	**CENTER-EDGE LANGUAGE**	Turkish – English is selected.
7	**BOOST TIME**	Quick charge period of 1-15 hours is configured. Boost is disabled if 0 is entered while boost charge.
8	**BOOST**	Manual – automatic modes are selected using ↔ key. Normal charge mode operates in manual selection. In automatic mode, if the line is off, at each time input line voltage is restored the boost charge starts automatically.
9	**DIREK START: ON**	ON: UPS at the beginning starts automatically. OFF: The inverter is in standby. The inverter starts and the output forms when ENTER is pressed. Until this moment the load is supplied from the by-pass.
10	**XFER MOD: CURRENT**	CURRENT : Switches into bypass without delay when the current is zero DELAY : If the UPS is not synchron , switching into bypass takes place with 15 ms. Delay.
11	**RELAY COMMON**	
12	**RL4 COMMON**	Alarms : COMMON ,RL4, BATT. LOW, OUTPUT HİGH, OVERLOAD, LİNE FAILURE, OVER TEMP., OVER CURRENT, OUTPUT LOW, BATTERY HİGH, BATT. FAULT, BY-PASS BAD, BOOST CHARGE, MANUEL BYP, ROT. PHASE, OUTP. OFF, UPS FAILURE. RL4 relay can be defined for any desired alarm.
13	**RL5 COMMON**	Alarms : COMMON ,RL4, BATT. LOW, OUTPUT HİGH, OVERLOAD, LİNE FAILURE, OVER TEMP., OVER CURRENT, OUTPUT LOW, BATTERY HİGH, BATT. FAULT, BY-PASS BAD, BOOST CHARGE, MANUEL BYP, ROT. PHASE, OUTP. OFF, UPS FAILURE. RL5 relay can be defined for any desired alarm.
14	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.6 TIME Menu items

You can see date and time of RTC (real time clock) on UPS. And you can adjust date and time.

	Submenu item	Function
1	**TIME : 23 :15**	time
2	**DATE : 11-10-2001**	date
3	**SET HOURS: 11**	(+) and (-) adjust hours (0-23)
4	**SET MINS : 38**	(+) and (-) adjust minutes (0-59)
5	**SET DAY : 21**	(+) and (-) adjust day (1-31)
6	**SET MONTH : 06**	(+) and (-) adjust month(1-12)
7	**SET YEAR : 2001**	(+) and (-) adjust year (2000-2099)
8	**ENTER <UPDATE>**	→ Enter update new date and time
9	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.7 CALIBRATION Menu items

This menu is used to adjust time and date of the UPS.

	Submenu item	Function
1	(Password required)	System adjustments.
	ENTER <EXIT>	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.8 ADJUST MODE submenu

This menu is used to adjust time and date of the UPS.

	Submenu item	Function
1	(Password required)	System adjustments.
	ENTER <EXIT>	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.2.9 INFORMATION Menu items

This menu gives information about the UPS

	Submenu item	Function
1	**COMM :OK SYNC :OK**	If the UPS is operating syncron to mains SYNC:OK ,if not syncron SYNC:-- If communication is active COMM:OK ,if not active COMM:--
2	**POWER: 20000 VA**	The maximum power rating of the UPS
3	**VERSION : Y11P1-TX100**	Shows the UPS software version
4	**SPARE MASTE 006**	
5	**ENTER <EXIT>**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.3 STATUS Messages

This message group simply shows the UPS STATUS at the upper line of LCD PANEL.

RECTIFIER START ! **:** UPS started the rectifier
ENTER START **:** Press ENTER to start the UPS.
INVERTER START ! **:** UPS started the inverter.
MAINT SWITCH ON ! **:** Maintenance bypass switch is on
STATUS NORMAL ! **:** UPS is operating.
EMERGENCY STOP ! **:** External emergency stop signal is applied to UPS.
WAITING SYNC ! **:** Inverter started waiting for mains synchronization.
STATUS FAULT ! **:** Fault status

RECTIFIER START :
At start up the UPS controller board checks for input voltage ,frequency ,battery voltage for starting ,if these parameters normal, UPS starts.

INVERTER START :
If the inverter stops from any reason, controller board tries to start inverter again ,during inverter start this message appears on first line of LCD PANEL

MAINT SWITCH ON:
Maintenance bypass switch is connected from input to the output of UPS directly .İf the maintenance bypass switch is on (1 position) controller stops inverter for accidental short circuits between mains voltage and inverter output. If the user turn off maintenance switch inverter starts again.

EMERGENCY STOP :
If an external EPO switch is installed to system (connected to interface board) ,to stop all UPS parts (rectifier ,static bypass ,inverter ,etc….) is possible . After pressing EPO switch all parts of the UPS stops ,for restart turn off S1 (inverter input) switch and turn on again.

FAULT STATUS :
In some cases controller checks events but can not find solutions, in this case controller decide to stop system, for restart user must turn off S1 (inverter input) switch and turn on again.

2.4 SHUTDOWN MESSAGES :

XA-200P series UPS's can operate interactive with operating system, you can send commands to UPS from operating system by using some softwares .UPS takes this commands and produces some messages these are:

WAITING SHUTDOWN : Shutdown command is performed from operating system and UPS is waiting for a certain delay for shutdown.
UPS SHUTDOWN : UPS is in shutdown status
WAITING RESTART : UPS is shutdown but it is waiting for a certain delay for restart
PAR.SHUTDOWN : In parallel system the other UPS send shutdown command and UPS is in shutdown status**.**
CANCEL SHUTDOWN : Shutdown command is cancelled.

Only operating system or a PC computer can send this commands.
If the shutdown command is performed during line failure UPS shutdowns and is the mains is okay UPS starts again automatically.

2.5 Fault messages and quick troubleshooting

All alarms contained in Y11P version are listed in the following table.

ALARM	POSSIBLE CAUSE
A1 BYPASS FAILURE	Bypass system failure. Bypass elements may be broken.
A2 INVERTER FAILURE	Inverter digital start system is failed. Call the service.
A3 3 OVERTEMP	Overtemperature in UPS repeated 3 times in 30 min. 1) Check for UPS air inlets and outlets for any blocking by dust etc. 2) Fan failure 3) Bad UPS location 4) Check for Overload
A4 OUT FAILURE	UPS output voltage is out of tolerance at 3 times in 30 min. Call the service.
A5 BATT AUT END	Batteries are completely discharge wait for restoration of electric power input.This message occurs only at line failure
A6 CHARGER FAULT	Rectifier could not produce DC bus voltage.
A7 BATTERY LOW	Battery voltage is low. 1) UPS operation for a long time when line out 2) Charger system failure
A8 OUTPUT HIGH	Inverter output voltage is over than max. tolerated value. Inverter is stopped 1) Inverter failure
A9 OVERLOAD	UPS loaded over than max. %100 load level.
A10 LINE FAILURE	Line failure. 1) Maybe line out 2) Check 3 input phases. 3) Check UPS input fuses.
A11 HIGH TEMPER	Over temperature. (inverter or rectifier section) 1) Overload for inverter 2) Over temperature 3) Fan failure or dirty air inlets 4) Bad UPS settling. There is not enough ventilation area.
A12 OVERCURRENT	Inverter output system failure 1) Internal overcurrent 2) Short circuit. 3) UPS failure. Call the service.
A13 OUTPUT LOW	Inverter output voltage is below the min tolerated value. Inverter is stopped.
A14 BATTERY HIGH	Battery voltage is over than max. tolerated value. If the mains is off the tolerance when switching into bypass. The UPS turns off the output voltage and waits until the inverter starts again to prevent the load.
A16 BYP INPUT BAD	During transfer to bypass ,Voltage or frequency value of bypass source is incorrect and the UPS turns off the load power. During normal (inverter) operation some times you can see this message. During bypass if the bypass protection option is on, and if the bypass source is out of tolerance UPS turns off the static bypass for load protection.
A19 REPLACE BATT	Battery test aborted. And batteries are not OKAY UPS gives beep sound within 15 sec You can clear this message by pressing 3 seconds to ENTER key 1) Rectifier fault 2) Damaged battery cells 3) POOR battery connections
A20 BOOST CHARGE	Boost charge is active for 10 hours. At the end of this time UPS stops the boost charge. UPS gives beep sound every 15 sec

ALARM	POSSIBLE CAUSE
A21 ROTATE PHASE	UPS input phases sequence is not correct 1) Turn off the UPS and rotate phase sequence 2) Turn on UPS again
A22 OUTPUT OFF	Output OFF alarm - Output switch may be off. - A fault may be in the output. Check the output components.
A23 MODE FAILURE	In parallel operation the slave device tries to operate as the same mode as the master device, If the modes are different this message will appear. Change the mode of the slave UPS from USER OPTION MENU. Press ENTER button for 3 seconds after mode selection, then restart the UPS.
A24 P.FAILURE 10	RS485 failure
A25 PAR. PSP FAIL	Power supply error in parallel controller board.
A26 4 CABLE FAIL	Master-Slave digital cable connection error.
A27 P.FAILURE 13	Parallel controller board failure, online UPS found in parallel system.
A28 PLUG IN DIG.	Digital connection cable plug in failure
A31 DUBL UPS NUMBER	Parallel UPS numbers are same change one of them
A40 CANT FIND PR	Parallel mode is selected but main controller could not find parallel control board. Select ONLINE mode from SETTING MENU. Turn off the ups and turn on again.
A41 P.BAL.FAILURE	In parallel operation current sharing is not okay
A42 BATTERY TEST	Performing battery test
A43 P.SYNC.FAIL	In parallel system SLAVE UPS is not synchronized to MASTER UPS 1) Wait for 10 seconds the UPS will be restart
A48 STATIC BYPS.	Load is transferred statically to bypass
A50 EMERGE.STOP	Emergency stop button is pressed.
A51 MAINT SW.ON	Maintenance bypass switch is open. (optional)
A53 CHECK +6V	Check +6V on them main controller board.
A54 CHECK DC1	Battery voltage is below the lower limit.
A55 PDLY FAIL	Parallel delay fault
A59 REF FAILURE	2.5 V ADC reference voltage on MPB211 main controller board exceeds predefined tolerances.

III. PARALLEL OPERATION

3.1 Introduction

Two of XA-200P UPS can be used in parallel mode ,the purpose of parallel use::

- Redundancy
- Power increment purpose.

3.1.1 Redundancy

Even if UPS designs are perfect sometimes some failures are possible. Also the lifetime of batteries and some parts are limited. In such a case, the second UPS installed on the system will be working on.

3.1.2 Power Increase

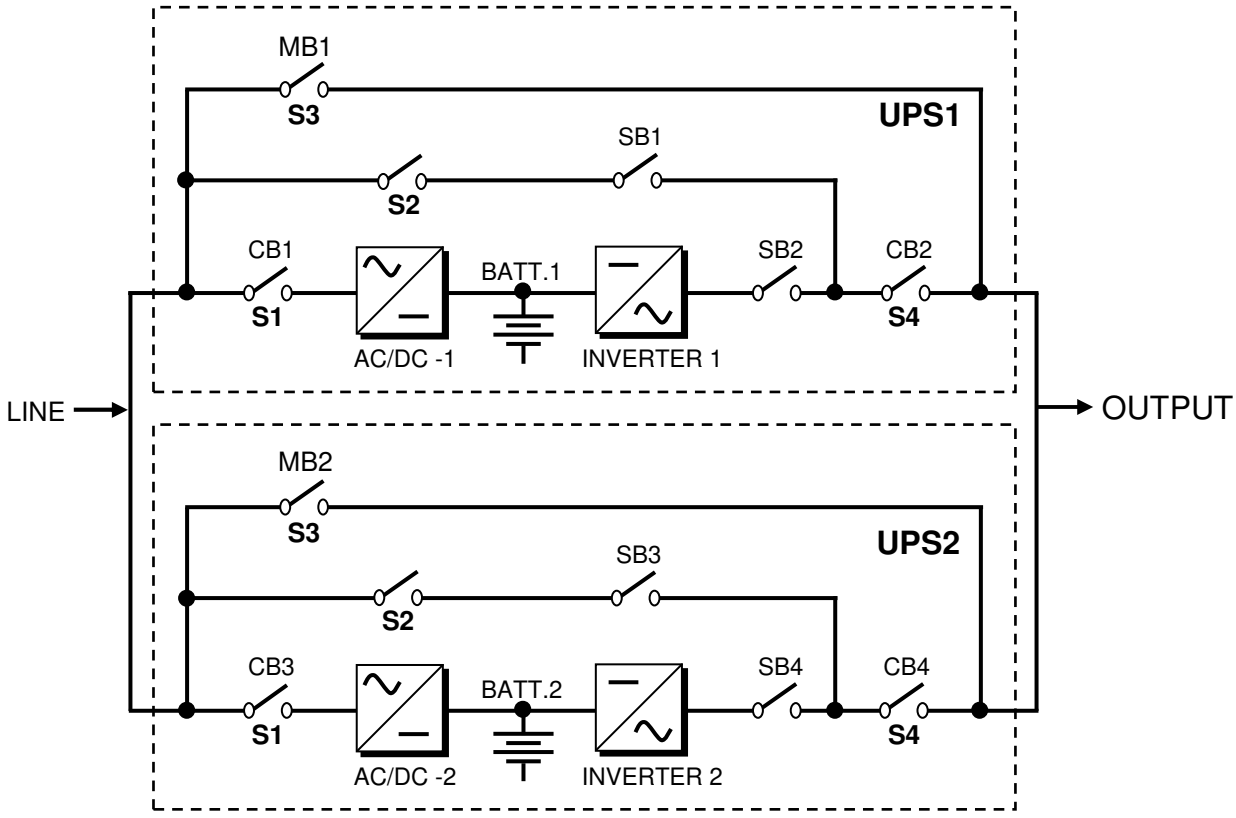
Some load systems always develop and the power need increases, the cheapest solution is to install one more UPS to the system.

3.2 Parallel Operation Mode

NOTE: Parallel control board and some accessories are not installed in a standard XA-200P series UPS, but parallel operation option is available for these models.

User can select parallel operation mode as an option according to purpose. If parallel control board is installed in your UPS, you can select operation mode from SETTINGS MENU. In this chapter you can find parallel operation mode information.

The general diagram of parallel connection is shown below:



Şekil 3.1 Parallel connected UPS's

3.2.1 Redundant Parallel Mode

At this mode if one of the UPS's fails the other UPS continues to supply the load.
Assume that UPS1 on figure 3-1 is failed ,SB1 and SB2 static switches will turn off and the UPS 1 is isolated from load. The SB4 static switch of the UPS 2 will stay in conducted position and it continues to supply the load.
If UPS 1 is okay after a delay this UPS will join the system.

If two UPS's are in failure SB1 and SB3 static switches will turn on and load is transferred to bypass

This is a 3 level redundancy UPS1+UPS2 ,UPS2 ,mains
Current sharing is active in this mode.

In this mode the power of load must be lower than 1 UPS power.

3.3 Parallel Operation Mode Fault Codes

A23 MODE FAILURE	The modes of the two UPS's are different, change the modes. The SLAVE UPS always requires to be in the same mode with MASTER UPS. Change the mode of SLAVE UPS to be the same as the MASTER's mode. Do not forget to press ENTER key. Turn off the SLAVE UPS and then turn on.
A24 P.FAILURE 10	RS485 failure between parallel UPS's.
A25 PAR. PSP. FAIL	Parallel board failure.
A26 4 CABLE FAIL	Parallel digital cable failure.
A27 P.FAILURE 13	Another ON-LINE UPS exists.
A28 PLUG IN DIG	Socket unplugged,
A31 DUBL UPS NR.	The same UPS number is selected for SLAVE UPS, you must assign different UPS numbers to each one in parallel systems. Go to SETTINGS menu and change the UPS number. Do not forget to press ENTER key. Turn off the SLAVE UPS and then turn on.
A40 CANT FIND PR	Parallel mode was selected from the front panel but the main controller couldn't find parallel control board. Select ONLINE mode from SETTINGS menu (ENTER key for 3 Sec.) Turn off then on.
A41 P.BAL.FAILURE	Current sharing failed in parallel operation.
A43 P.SYNC.FAIL	In parallel system SLAVE UPS is not synchronized to MASTER UPS

3.4 Parallel System Accessories

At standard XA-200P series there is no installed parallel components but they can install. For parallel operation the following parts are necessary:

- Parallel control board
- Digital connection cable (PCC04)
- Parallel interface board

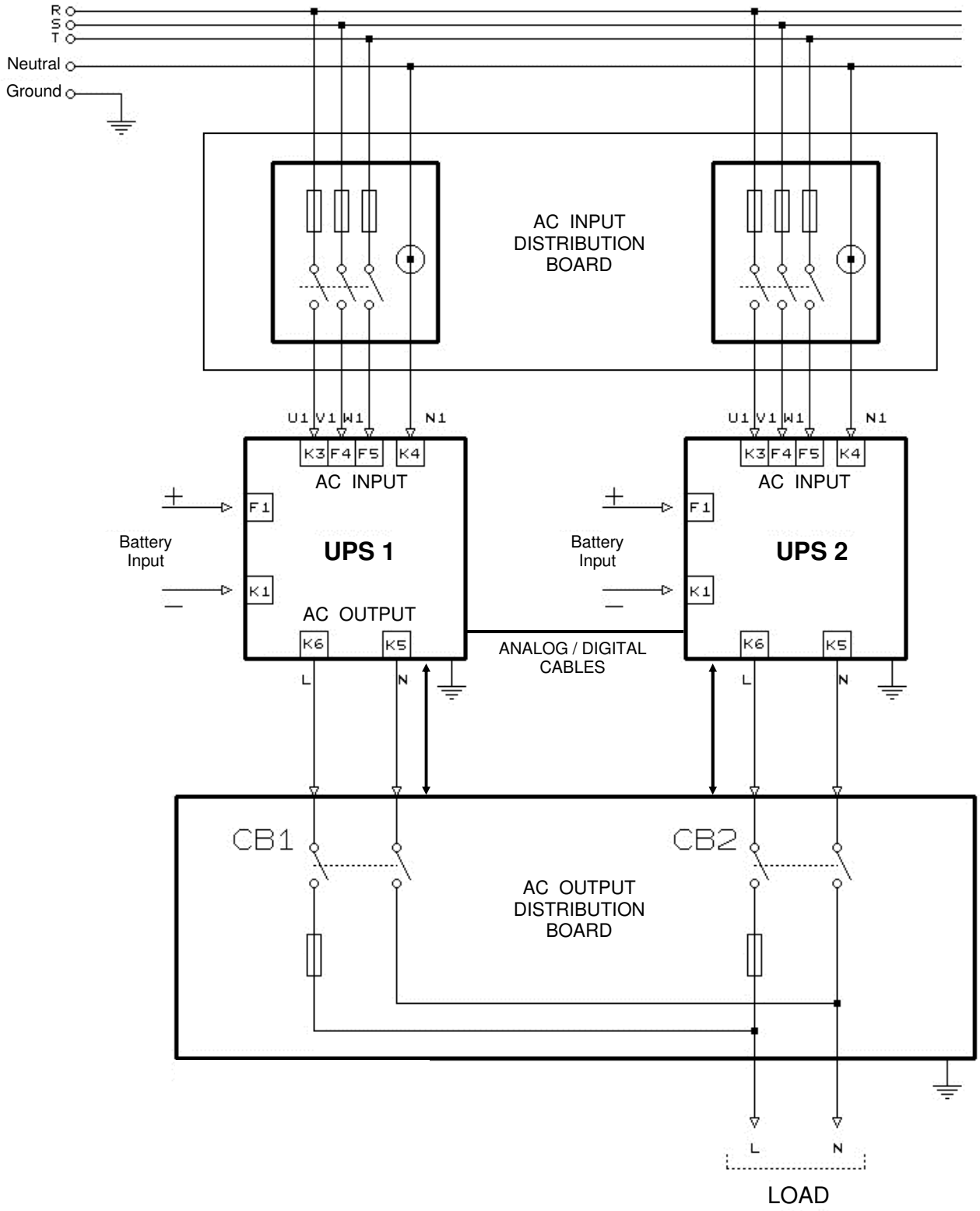
During order, the customer should give information about any options and accessories, to factory.

IMPORTANT NOTE: Parallel system installation is much more complex from stand-alone UPS installation, it needs qualified service personnel.

You have to keep 2 m distance between two UPS's for service purposes.

Add 20% tolerance to power cable sizes, fuses and circuit breakers in parallel connection.

In figure 3-2, the connections of 2 parallel UPS's and load distribution panel are shown.



NOTE : OUTPUT CONNECTIONS MUST BE OF EXACTLY THE SAME LENGTH.

CAUTION : During operation do not turn off CB1 or CB2 , first turn off the UPS output switch then turn off the CB1 or CB2.

Figure 3.2 Parallel UPS Connection.

3.5 Effects of the parallel configuration on XA-200P series UPS

If the parallel card is installed on a XA-200P series UPS some calibrations of the UPS will be changed. (e.g.: output voltage and symmetry adjustment)

Do not select ONLINE mode if the UPS is parallel configured, please select REDUNDANT MODE, in this case, if digital PARALLEL communication connector is not connected the UPS, it gives A28I PLUG IN DIG. Alarm. To cancel this alarm some modifications must be done. These are:

1) If digital parallel communication (PCC04) cable is given connect this cable to the parallel digital communication plug and select REDUNDANT mode.
2) If digital parallel communication cable is not given connect pin 15 and pin 16 to each other on this plug and select REDUNDANT mode.
3) Take off parallel configuration and work at ONLINE mode.

NOTE: The above condition occurs when a parallel UPS operates alone in ONLINE mode.

XA-200P series requires only a parallel control board to operate in parallel mode.

3.6 Taking off the parallel devices from a UPS

1) Shift to the ON – LINE mode.
2) Switch off the UPS (all switches must be in 0 position)
3) Remove the parallel connection cable.
4) Remove the connection between CN3 on MPB211 main controller board and CN7 on PARA22-R1 parallel controller board.
5) Remove the source cable from PARA22 parallel controller board (CN8 – CN9).
6) Turn on the UPS.

NOTE : The output voltage of the UPS will be changed if the parallel board is disconnected from main board please re adjust the output voltages of the inverter

In this status the main controller board controls all functions of the UPS.

NOTE: After take off the parallel ports from UPS for stand alone online operation you must connect maintenance switch and manual bypass switch to the VCS3P board.
CN6 pin 2-4 maintenance bypass switch
CN6 pin 3-4 manual bypass switch
UNPLUG CN2 from PARA22 board, plug to VCS3P CN6.
IN ONLINE MODE OUTPUT SWITCH IS NOT CONNECTED.

IV. UPS INSTALLATION

4.1 Introduction

WARNING!!!

- Do not apply electrical power to the UPS equipment before the arrival of authorized service personnel.
- The UPS equipment should be installed by a qualified service personnel.
- The connection of the batteries and the maintenance should be done by the qualified service personnel.
- Do not make short- circuit to the batteries poles. Because of the high short-circuit current, it has the danger of electrical shock or burn.
- Eye protection should be worn to prevent injury from accidental electrical arcs. Remove rings, watches and all metal objects. Only use tools with insulated handles. Wear rubber gloves.

This chapter contains location installation information of the UPS and the batteries. All the establishments have their own specialties and needs. So in this part the installation procedure is not being explain step by step. Instead general procedure and the applications are explained for the technical personnel.
.

4.2 Unpacking

The UPS is packed and enclosed in a structural cardboard carton to protect it from damage.
1) Inspect for damage that may have occurred during the shipment If any damage is noted, call the shipper immediately and retain the shipping carton and the UPS.
2) Carefully open the carton and take the UPS out.
3) Retain the carton and packing material for future use.

Unit package contents:
1) A user manual and Guarantee certificate.
2) Battery cabinet and/or shelf (Optional)
3) Battery connection cables.
4) Battery Circuit Breaker (Optional)

4.3 Equipment Positioning

1) The equipment's installation place must be an easy serving place.
2) Install the UPS in a protected area with adequate air flow and free of excessive dust.
3) You must therefore allow for a minimum gap of 250 mm behind the unit to allow adequate air flow
4) Select a suitable place (temperature is between 0°C and 40°C) and the relative humidity (%90 max)
5) It is recommended to air-conditioned the room (24°C)
6) Temperature is a major factor in determining the battery life and capacity. Battery manufacturers quote figures for an operating temperature of 20°C. On a normal installation the battery temperature is maintained between 15°C and 25°C. Keep batteries away from main heat sources or main air inlets etc.
7) In case of an operating the UPS in a dusty place, clean the air with a suitable air filtration system.
8) Keep out of your equipment from the explosive and flammable items.
9) Avoid direct sunlight, rain, and high humidity.

WARNING!!! Check the capacity of the forklift if it is available for lifting.
DO NOT MOVE THE BATTERY CABINET WHILE THE BATTERIES ARE INSTALLED.

4.4 Connecting The UPS Power Cables

WARNING!!! A separate line should be used to supply the UPS AC input. Never use the same line to supply another electrical devices. Do not use any additional cable to increase the length of the UPS's input cable. It is advised to use an MCCB suitable for the input current on the UPS's input line.

The connection of the electrical panel should be supplied by a grounded outlet. Otherwise, the UPS and the load connected to the output will be left ungrounded. The grounding system must be controlled, and must be strengthen if required. Potential difference between ground and neutral must be less than 3V AC.

Descriptions of the UPS input output cable connection terminals are shown in figure 4.1

Plugs connected to the UPS must be different from regular plugs. Advised input line cable and fuse types are given in the table below.

WARNING!!! This series of UPSs are A class. These devices can interfere with other equipment. In these cases the use must take additional precautions.

UPS Power (kVA)	**NOMINAL CURRENT : Amperes / Recommended cable cross-section (mm^2)**				
	Input line Full capacity recharge		**Bypass/output** At full load		**Battery** At min. battery voltage
	380V	400V	220V	230V	
	A / mm^2	A / mm^2	A / mm^2	A / mm^2	A / mm^2
40	115A / 35	120A / 35	127A / 50	121A / 50	140A / 70
45	120A / 35	115A/35	144A / 50	137A / 50	110A / 70

NOTES: The neutral conductor should be sized for 1,5 times the output/bypass phase current. The Earth conductor should be sized at 2 times the output/bypass conductor (this is dependent on the fault rating, cable lengths, type of protection etc.) These recommendations are for guideline purposes only and are superceded by local regulations and codes of practice.

4.4.1 Safety Earth

The safety earth cable must be connected to the earth BUS BAR and bonded to each cabinets in the system and also the earthing and neutral bonding arrangements must be in accordance with the local laws.

ATTENTION!!! Failure to follow adequate earthing procedures can result in electric shock hazard to personnel, or the risk of fire.

4.4.2 Cable connection procedure

WARNING!!! All connections of the UPS must be done by a qualified service personal.

After positioning the UPS, the cables must be connected as described below:

1. Verify all switches of the UPS in **"0"** position.

2. Connect the AC input coming from the mains distribution panel to the input terminals in correct phase sequence.

WARNING!!! Make sure phase order is correct.
If there is any incorrect connection in the phase sequence, the UPS will not run. In this case the phase sequence must be corrected.

If A21 ROTATE PHASE, message appears on the LCD panel, change the phase sequence.

3. Connect the output of the UPS to the load distribution panel.

4. Connect the battery group, refer to battery installation section.

WARNING: DO NOT TURN ON THE BATTERY FUSE (S5) BEFORE STARTING THE UPS

5. Connect the copper earth bus, which is under the safety earth and the cables power connection.

Note: The earth and the neutral connections must be in accordance to the local Rules.

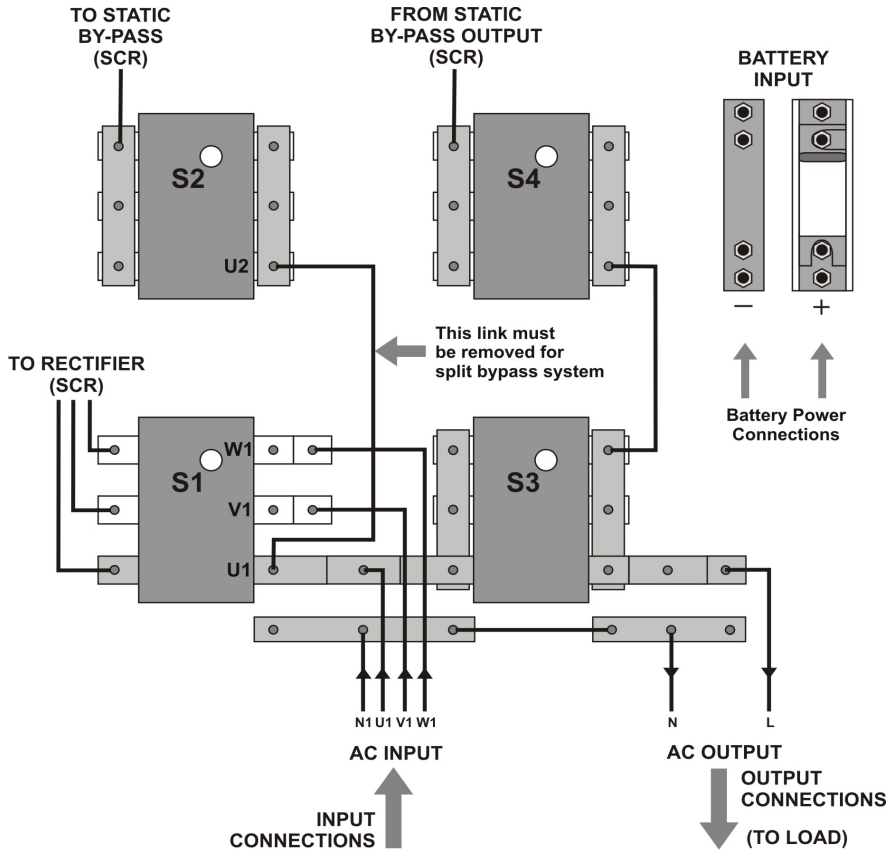


Figure-4.1 45 kVA UPS Power Connections

4.4.3 Battery Installation

<u>WARNING!!!</u> Becareful while connecting batteries.

<u>ATTENTION!!!</u> Remove the battery fuse before making the connection of the battery circuit breaker box during the battery installation.

The batteries associated with the UPS equipment are usually contained in a purpose-built battery cabinet, which sits alongside the main UPS equipment. Sealed, maintenance-free batteries are normally used in this type of installations.

Where battery racks are used, they should be sited and assembled in accordance with the battery manufacturer's recommendations. In general, batteries require a well-ventilated, clean and dry environment at reasonable temperatures to obtain efficient battery operation.

In general a minimum space of 10 mm must be left on all vertical sides of the battery block. A minimum clearance of 20 mm should be allowed between the cell surface and any walls. A clearance of minimum150 mm should be allowed between the top of the cells and the underside of the shelf above (this is necessary for monitoring and servicing the cells). All metal racks and cabinets must be earthed. All live cell connections must be shrouded.

1. Unpack each battery and check its terminal voltage. If any battery has terminal voltage less than 10,5 V it must be charged before continuing.

2. Please check the battery connecting hardware.

3. Please locate suitable number of batteries at each rack.

4. Start locating the batteries from top to the bottom on the racks.

5. Becarefull about the connection between the racks and polarities.

6. After interconneting the batteries, connect the (+) and (-) poles to the battery input terminals on the UPS. Be careful to connect the batteries correctly and do not turn on (S5) before checking all connections and turn S5 on only after starting the UPS.

V. OPERATING INSTRUCTIONS

5.1 First operating and Power ON :

1. Battery switch must be off. (“0” position)

2. MBS (Maintenance by-pass) switch must be in “0” position.

3. S1 switches must be in “1” position.

4. Turn S4 (Output) switch into “1” position.

5. Turn S2 (ON – OFF) switch into “1” position. (The front panel will run)

WARNING: Energy will form at the output through the static by-pass.
RECTIF START message will appear on the front panel.

5. When START message appears on the front panel, turn F! battery switch into “1” position.

6. Press enter button in the front panel, INVERTER START message will appear.
After a few seconds the bypass LED (red) will turn off and the UPS LED (green) will turn on.
The UPS is ready when “STATUS NORMAL/ONLINE MODE” message appears on the front panel.

5.2 Power down:

1. Turn S4 output switch into “0” position.

2. Turn S5 battery switch into “0” position.

3. Turn S2 (ON – OFF) switch into “0” position.

4. Trun S1 switches into “0” position.

5.3 Switching into maintenance bypass mode

1. Press down button until COMMAND MENU appears, then press enter. Press down button until ENTER (BY-PASS) message appears, Again press enter button. The UPS will switch into by-pass mode. “MANU-AL BYPASS” and “A52 MANU:BYPASS” messages will appear on the screen.

2. Remove the lock of MBS (Maintenance bypass) switch and turn it into “1” position.

3. Immediately turn off S1-S2-S3-S4-S5 switches.

5.4 Switching from maintenance bypass into normal operation:

1. Turn S1 switches into “1”position.
2. Turn S4 (Output) switch into “1” position.
3. Turn S2 (ON – OFF) switch into “1” position.
4. After static by –pass LED lights, turn MBS switch into “0” position, and lock it.
5. Turn S5 battery switch into “1” position when (ENTER) START message appears on the screen.
6. Press enter button, “INVERTER START” message will appear. After a few seconds by-pass LED (red) will turn off and the UPS LED (green) will turn on.
“STATUS NORMAL/ONLINE MODE” message will appear when the UPS is ready, loss on the load.

NOTE: Switching between maintenance by-pass and UPS will not cause any power unless the mains line is off.

VI. MAINTENANCE

WARNING!!! DO NOT OPEN the cover of the UPS because there is no part that can be maintained by the user. DO NOT TOUCH battery leads. There is high voltage even if the UPS is off. Therefore no one should open the cover of the UPS except the service personal. Otherwise, serious injuries may occur.

6.1 Scheduled Maintenance

Some semiconductor devices inside the UPS do not require any maintenance. Only cooling fans are moving parts. If the environment is clean and cool enough, the planed maintenance program will be at minimum level. Even though, periodic check and maintenance based on a well prepared documents (a good guide) will increase the performance of the UPS and prevent some small faults (errors) to become unhandlable ones.
The equipment was designed to require little amount of maintenance numbers. The user should do the following instructions.

6.2 Daily checks

Check the UPS everyday and becareful about the following:

1. Check the operator control panel. Verify that all LEDs and parameter measurements are normal and there is no alarm message on the indicator panel.
2. Check if the device is overheated.
3. Check the cooling fans' rotations.
4. Check if there is any change in the equipments noise level .
5. Check if there is any stoppage on the ventilation path. If so, clean the dust using a vacuum cleane.
6. Make sure that there is nothing placed on the UPS.

6.3 Weekly checks

1. Record the results on the indicator panel.
2. Measure and record voltages on each phase.
3. Measure and record currents on the output of the UPS.
4. Check batteris' status by performing a manual battery test. Use a dry humid gland to clean the cover of the UPS.

Record the observations if possible. Check if there is any difference with the previous records (observations). If the last recorded values are significantly differ from previous records, please check If the load has been changed, and if so please record the type, size, and position of this load. These information will be very valuable in helping the service personal in determining any probable errors.
If there is a significant change in the parameter values without any reason please immediately call the qualified service personal.

6.4 Annual maintenance

To get reliable and efficient performance from the UPS, please call the qualified service personal once a year.

6.5 UPS Storage and transportation

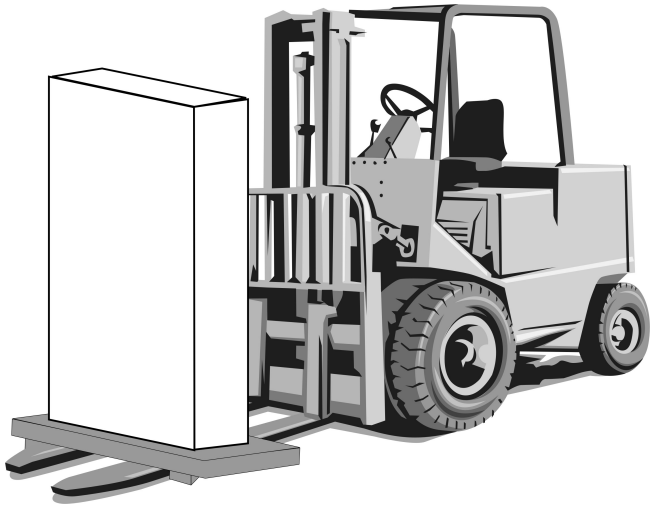
1- Check the batteries charge by performing manual battery test before storage. If the charge is not enough then charge the batteries at least for 12 hours.

2- Qualified service personal should disconnect the connections.

3- Batteries should be charged every six months during storage period.

4- Keep the UPS and batteries in dry and cool place.
UPS ideal storage temp.: 0 ^{0}C ~ 40 ^{0}C max.
Battery ideal storage temp.: 10 ^{0}C ~ 35 ^{0}C max.

5- The UPS must be placed on a suitable palette for transportation purposes.



VII. FAULTS AND TROUBLESHOOTING

7.1 General procedure for fault checking and troubleshooting

UPS contains complicated electronic control circuits. In order to locate any fault occurring circuits, an advanced knowledge about the circuitry and its operation principles must be known. The aim of this section is to give the knowledge required at the first intervention.

There is no practical way to locate any possible fault. Most of the faults do not occur as a performance decrement. Generally, the UPS operates normally or switches into by-pass mode. But in order to determine any change in load or the system the parameters must be recorded regularly as mentioned previously.

Generally, the output voltage can deviate %2 from the predefined values. If values differ more than this percentage then reasons must be investigated.

The following general structure must be systematically followed while trying to indicate the error:

Fault determination: First step is to record the messages, indicator panel LEDs, operating parameter values and last status of switches. This must be done before attempting to press any button.

Fixing interventions: After recording all indications, check the meaning of the fault and alarm messages using “The operator control indicator panel”. If anything related, follow the related procedure.

Reporting the fault: Service personal must clearly report the work done. Hence, if any other error occurs there will be enough information to fix it.

VIII. UPS's REMOTE CONTROL CONNECTION

Following external connections are available at XA-200P series

- Communication By serial port connection
- Dry contact (interface board) connection

8.1 Using Serial Port

A standart Serial communication port is installed to all XA-200P series UPS, by using this port user can take all information about UPS. All measured parameters, alarms can monitor by this port. This port is interactive and some commands for UPS is available these commands are listed below.

- Switch to BYPASS
- Switch to INVERTER
- SOUND on/off
- Adjust UPS time and date
- Start SIMULATION mode
- Quick BATTERY TEST
- BATTERY TEST until battery low alarm
- CANCEL battery test
- Turn off UPS output voltage immediately (SHUTDOWN)
- Turn off UPS output voltage after delay (WAITING SHUTDOWN)
- Turn off UPS output voltage (SHUTDOWN) and turn on UPS output voltage (WAITING RESTART)
- CANCEL SHUTDOWN
- RENAME UPS

Special softwares are required to use the serial port. Some of the commands above are special functions. These can be used only with TMON software.

8.2 Serial port connection cable

RS485 cables connections are as follows:

UPS Side	Panel Side
9 Tx	2 Rx
7 Gnd	5 Gnd
6 Rx	3 Tx

8.3 Remote control/connection with a modem

The UPS connects to a phone line using its RS232 port and a modem. The operator connects to the UPS by a computer containing TMON program and a modem. By this way a modem can be monitored using a telephone line.

8.3.1 Hardware Configuration

All needs for modem connection is as follows:

- PC with modem
- WINDOWS 98
- Available UPS control software
- DUMP modem which is connected to UPS

The UPS, has AT command set to switch the DUMP modem into auto – answer mode. To perform this process go to COMMAND MENU and then goto ENTER:MODEM INIT subitem and press enter button for 3 seconds after installing the hardware. A short warning beep will be heard after pressing the button. Modem's RX and TX LEDs will start operating. Then, the modem will be configured to answer incoming calls. To test this, call the phone number connected to the modem and hear modem's voice.

8.3.2 Functioning Principle

The remote operator, by means of a PC and a modem device and using the remote connection function of the control software, calls the UPS through the number to which this is connected.
The dumb modem device, connected to the UPS, will answer the call and convert the data coming from UPS serial on the telephone line. This way all measures and controls allowed by the RS232 serial port can be carried out.

8.3.3 Modem programming procedure

Smart modem (SM) is the one connected to PC, and (DUMB) DM is the one connected to the UPS. Standard Hayes AT programming language is the suitable language for modems. In applications a modem which uses AT command set must be selected.

The NULL modem connected to the UPS by connecting to a PC should be programmed, Connect the null modem to the PC's modem using a standard modem connection cable, then run Hyperterminal program and send AT commend group to the modem, the AT command set used in configuration is given in the following table:

AT Command	**Description**
ATS0=1	Modem will auto-answer after one ring.
AT&K0	Flow control disable in some modem models (Check for equivalents in other types)
AT&D0	DTR signal usage.
AT&Y0	Load 0^{th} setting values at the modem start.
Speed configuration string	**Look for speed configuration table (Below)**
AT&W0	Save the values in table as 0^{th} setting.

Different modem models can use different command sets. Below communication speed configuration of some modem models are given. Select the one suitable for your mode, if your modem's model is not listed then try each command one by one. If your modem supports the command you will receive <OK> answer from the NULL modem in the hyperterminal, otherwise you will get <ERROR>

Speed configuration table	
Modem model	**Speed configuration string**
US ROBOTICS sportster voice	AT&N3
APACHE AE56SP-R	ATN0S37=6
BOCAMODEM V.32 BIS	ATN0S37=6

The configuration flow in Hyperteminal will be as follows:

ATS0=1 <enter>
OK answer from the modem
AT&K0 <enter>
OK answer from the modem
AT&D0 <enter>
OK answer from the modem
AT&Y0 <enter>
OK answer from the modem
AT&N3 <enter> (US ROBOTICS ICIN)
OK answer from the modem
AT&W0 <enter>
OK answer from the modem

8.3.3.1 Smart Modem (SM) configuration (programming)

Smart modem will configure itself from the program when using TMON.
The default settings are as follows:

B0 E1 F1 M1 Q0 V1 X3
BAUD = 2400 PARITY = N WORDLEN = 8
DIAL = PULSE (TONE which can be programmed)

&A3 &B1 &C1 &D0 &H1 &I0 &K1 &M4
&N0 &R2 &S0 &T5 &Y1

This configuration is done by TMON program.

8.3.4 Modem connection cables

A standard modem connection cable is used to connect SM to a PC. This cable is required if an external modem is used, but instead if an internal modem is used then no need for this cable.

The connection cable between the UPS and DM must as follows:

UPS DB9 Pin	MODEM DB25 Male
6	3
7	7
9	2

8.4 UPS Remote monitoring panel connection

Remote monitoring panel is used to monitor the UPS from 400m distance. This panel is installed to control/monitor room. If the distance is less than 25m then RS232 cable is used, and RS485 for larger distances. Additional adaptor is required for RS485.

The remote monitoring panel transfers the data to the user from the UPS. The remote monitoring panel requires 230Vac 50Hz AC voltage to operate, and it is better to use the output of the ups as a power supply.

AGKK9602 02/2014