

USER MANUAL

UNITY/I Three-phase

UT31 O-UT3220



**Best
Power**
UNINTERRUPTIBLE
POWER SYSTEMS

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for your UNITY/IT™ UPS.

IF THE UPS IS SOUNDING AN ALARM, go to Section 206. To silence the audible alarm, press the silence alarm key shown at the right. If you do not silence the alarm, it will automatically silence itself after 30 seconds. *Silencing the audible alarm does not correct the problem that caused the alarm.*



The installation and use of this product **must** comply with all national, federal, state, municipal or local codes that apply. If you need assistance, please *have* your *UPS model and serial number available* and call BEST's Worldwide Service at 1-800-356-5737 (U.S.A. or Canada; elsewhere, call your local BEST office).

You can find additional product information on the Best Power World Wide Web site at <http://www.bestpower.com>

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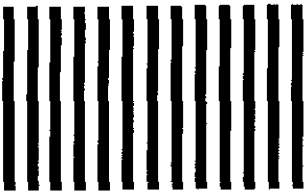


BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 6 Necedah, WI

POSTAGE WILL BE PAID BY ADDRESSEE

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BEST POWER
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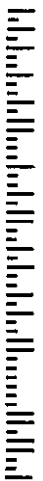


TABLE OF CONTENTS

Introduction	1
00 1 Storing the UNITY/I and Batteries	1
00 2 If You Have A Question	1
Section 100: Startup and Shutdown	2
Section 200: Operation	3
201 The Display Unit	..3
202 Operating Modes	6
203 Using the Keys	7
204 Displaying Measurements	8
205 User Parameters	...9
206 Alarms11
207 Displaying the Alarm Log	19
208 Displaying the Events Log	2 0
Section 300: Preventative Maintenance	21
301 Preventative Maintenance Check	2 1
302 Battery Monitor Test	2 1
303 Battery Capacity Test	2 2
304 Internal Bypass Switch (50 Hz Models Only)	2 3
Section 400: Specifications	24
Section 500: Options2 5
Section 600: Warranty	27
Section 700: Glossary2 8

INTRODUCTION

An uninterruptible power system (UPS) protects sensitive equipment against unacceptable disturbances from the mains (AC line) supply. The **UNITY/IT™** Three-Phase UPS has the capacity to serve a wide variety of electrical equipment — **from** mainframe computers to enterprise-wide EDP installations to production lines. The UNITY/I Three-Phase UPS provides true on-line, single-conversion technology and harmonics isolation.

This user manual explains how to use these models: UT3 10, UT3 15, UT320, UT330, UT340, UT360, UT380, UT3 100, UT3 120, UT3 160, and UT3220.

001 Storing the UNITY/H and Batteries

You can store the UNITY/I between -4° and 104° F (-20° and 40° C). However, BEST recommends that you store the unit and batteries between 59° and 77° F (15° and 25° C). ***Recharge stored batteries every 90 to 120 days.***

002 If You Have a Question

Best Power is committed to outstanding customer service. Our Worldwide Service center is happy to help you with any problems or answer any questions you may have. A service technician is available 24 hours a day, 365 days a year. Just call the telephone number below or your nearest BEST office. (See the addresses at the beginning of this manual; you can also send a fax to the BEST office nearest you.) Please have your unit's model and serial number available when you call. You can find both numbers inside the unit's front door on the ID label.

Worldwide Service	1-800-356-5737 (U.S.A. and Canada) or 1-608-565-2100
Bulletin Board Service:	1-608-565-7424

For more product information, you can also visit the Best Power World Wide Web site at <http://www.bestpower.com>.

SECTION 100: *STARTUP AND SHUTDOWN*

CAUTION!

To avoid possible personal injury or equipment damage, assume that there may be AC voltage at the UPS's output terminals / receptacles any time AC input power or DC battery voltage is applied. The UPS can provide output voltage from the batteries even when there is no AC input line voltage. When AC voltage is present, the UPS can provide output voltage even when the batteries are disconnected. If you want to be certain that there is no UPS output voltage, always disconnect the AC input source, switch off the UPS, **AND** switch off the DC. **TEST BEFORE TOUCHING!**

Some units have been programmed at the factory for autostart. When this parameter is programmed to be on, the unit will automatically switch on **whenever** mains (AC line) is applied. To switch this parameter off, see Section 205.

For safety reasons, only qualified service personnel should do a complete startup or shutdown of the UPS whenever this is necessary. The qualified service person should follow the instructions *in* the Planning and Installation Manual. The UPS must be completely shut down before service or before the UPS is taken out of operation for more than 24 hours.

Although users cannot completely start or shut down the unit, they can switch the UPS into standby mode and return it to normal operation by *following* the instructions below. (*In* standby mode, the UPS does not provide output voltage.)

To put the unit into standby mode, press the red control button inside the unit's front door.

To take the unit out of standby and switch it back to normal operation, press the green control button inside the unit's front door.

NOTE: Make sure the UPS operates in the normal mode for at least 12 hours every three months to recharge the batteries.

SECTION 200: OPERATION

201 The Display Unit

The display unit on the front of the UPS includes a display, an alarm LED, and a keypad to help you communicate with the UPS and to help the UPS notify users of operating conditions.

Figure 1 below shows the display unit for the UT3 10 through UT3 100. Figure 2 on the next page shows the display unit for the UT3 120 through UT3220. Figure 3 on page 5 shows the optional LED panel that is available for the UT3 120 through UT3220.

Figures 1, 2, and 3 all point out the display, Alarm LED, and keypad. Using the **keypad**, you can show parameters, alarm messages, measured values, and the events log on the **display**. You can also use the **keypad** to program UPS parameters.

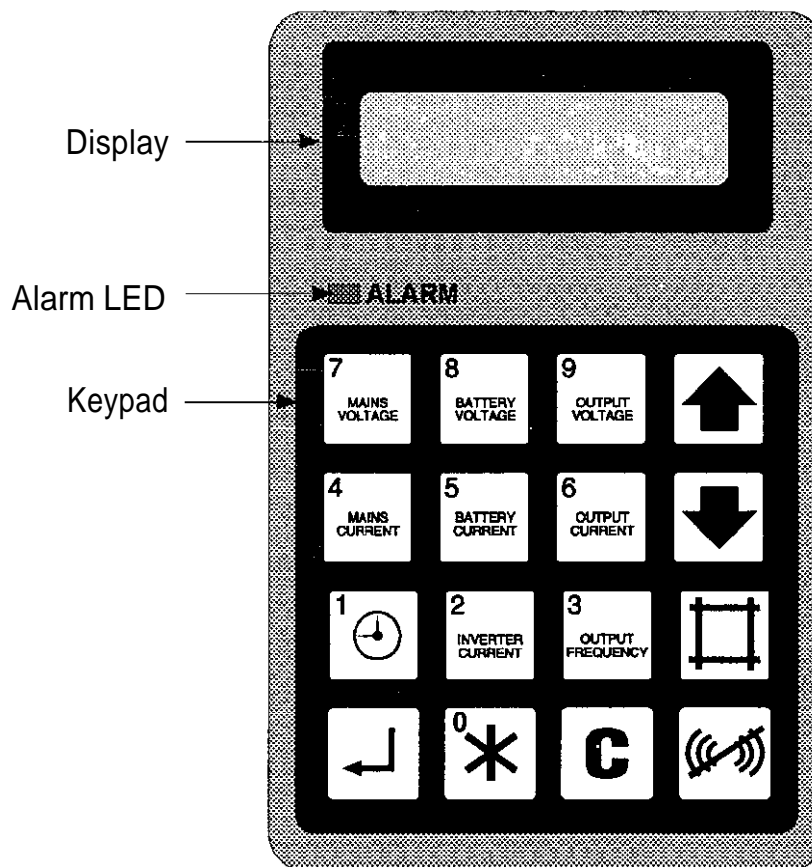


Figure 1: Display Unit for the UT310, UT315, UT330, UT340, UT360, UT380, and UT3100

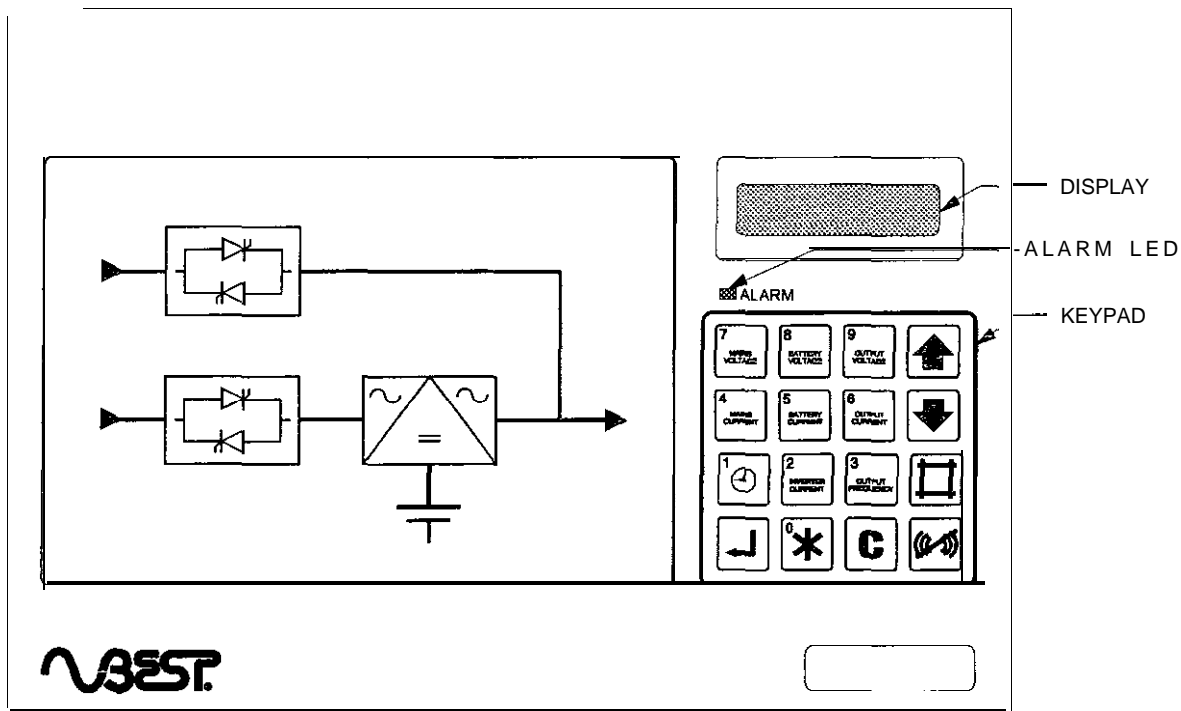


Figure 2: Standard Display Unit for the UT3120, UT3160, and UT3220

An optional LED panel (shown below) is available for the UT3 120, UT3 160, and UT3220. This panel gives you information about the unit's operation modes and about the cause of alarms. The drawing below shows the panel and points out each LED (light) on the panel. Table 1 explains what each LED means when it is green and what it means when it is red.

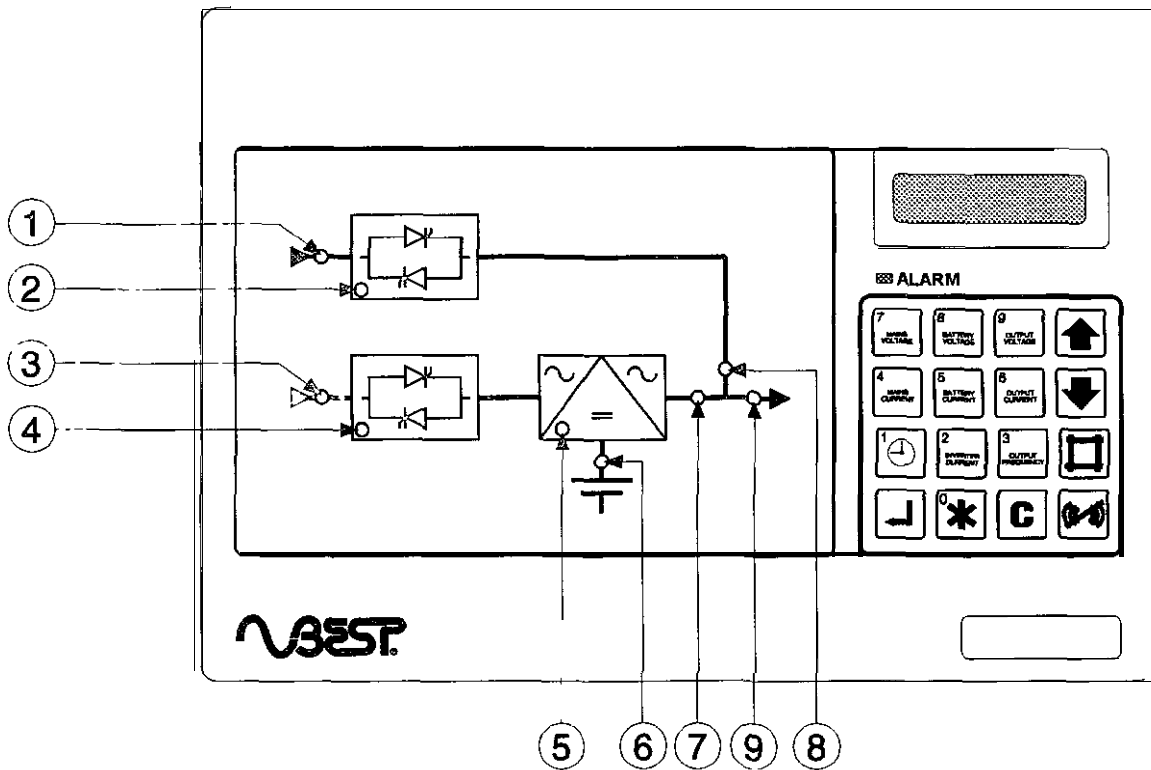


Figure 3: Display Unit with Optional LED Panel for the UT3120, UT3160, and UT3220

TABLE 1 - Optional LEDs

LED	What It Means When It's Green	What It Means When It's Red
1	The bypass mains (voltage) is acceptable.	The bypass mains (voltage) has failed.
2	This LED is never green.	There is a bypass static switch alarm.
3	Mains (AC input) is acceptable.	Mains (AC input) has failed.
4	This LED is never green.	There is a mains static switch alarm or charge regulation error alarm.
5	This LED is never green.	There is an inverter alarm.
6	The battery is connected and working.	The battery is disconnected or there is a battery alarm.
7	The inverter is on.	This LED is never red.
8	The bypass is on.	This LED is never red.
9	Output voltage is acceptable.	Output voltage is outside tolerance: it is outside of the unit's programmed limits.

















202 Operating Modes

The UNITY/I display automatically shows the mode the unit is operating in. Table 2 below shows sample displays and explains what they mean.

TABLE 2 - Operating Modes









Mode Displayed (Sample Display)	What It Means
Normal operation load power ###%	The UPS is in the normal operation mode. During normal operation, mains (AC line) passes through the UPS and out to the load. The unit's inverter regulates the output and charges the batteries. The second line of the display shows the % load on the phase (leg) that is most fully loaded.
Battery operation time ## minutes	The UNITY/I has <i>switched</i> to battery operation. This happens when AC input (mains) is out of tolerance (when it is outside of the unit's programmed limits). The main static switch opens, and the inverter draws power from the batteries. The power is then sent out to the loads. If the batteries are depleted, the unit will switch to standby mode (see below) and wait for mains to return in tolerance. Then, if autostart is programmed to "On," the unit will automatically start about 30 seconds after mains returns. If autostart is programmed to "Off," you must start the unit manually by pressing the green button inside the front door. (See Section 205 to program the autostart parameter.)
Bypass operation	In <i>this</i> mode, the AC input (mains) passes unregulated through the bypass static switch, through the main transformer, and out to the loads. The UPS inverter is in the standby mode and is synchronized to the mains, ready to transfer the unit to battery operation if mains voltage goes out of tolerance (see the Glossary). For 50 Hz units, this display may mean that the internal bypass switch is in the "Bypass" position; see Section 304.
Economy mode	The unit has been programmed to operate in economy mode. The AC power flow is the same as in bypass operation, except that the unit will periodically transfer into normal operation to charge the batteries (default is every 7 days). The inverter is in standby and is synchronized to the mains, ready to transfer to battery operation if mains voltage goes out of tolerance (see the Glossary). The output voltage is not regulated in this mode, but efficiency increases. If you would like to program your unit for economy mode, phone BEST's Worldwide Service or the nearest BEST office for more information.
** Stand-by **	Both static switches are open. The unit is not supplying output voltage. You can switch the unit on by pressing the green button inside the front door.

203 Using the Keys




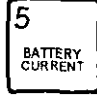




Key	What It Does	Key	What It Does
	Scrolls up through lists such as the parameters, the alarm log, or the events log. See Sections 205,207, and 208.		Displays the time and date. If the unit is in parameter mode, this key changes the setting of a parameter from “OFF” to “ON.” See Section 205.
	Scrolls down through lists such as the parameters, the alarm log, or the events log. See Sections 205,207, and 208.		Displays inverter current. See Section 204.
	Enters a value or exits a mode. See Sections 205, 207, and 208.		Displays output frequency. See Section 204.
	Displays the alarm log. If the unit is in parameter mode, this key changes the setting of a parameter from “ON” to “OFF.” See Sections 205 and 207.		Displays mains (AC input) current. See Section 204.
	Displays user parameters. See Section 205.		Displays battery current. See Section 204.
	Silences audible alarms. See Section 206.		Displays output current. See Section 204.
	Not used		Displays mains (AC input) voltage. See Section 204.
			Displays battery voltage. See Section 204.
			Displays output voltage. See Section 204.

204 Displaying Measurements

As it operates, the UNITY/I measures several values that you can display by pressing one or two keys. This section shows you what keys to press to display the measurements, what a sample display of each measurement looks like, and what the displays mean. If two keys are shown press them at the same time. **The display values shown below are samples that are typical for some 60 Hz models. Actual values vary depending on the unit's size, frequency, and voltage.**

Key	Sample Display	What the Display Means
	Mains 1. voltage 210 210 210 Vac	Mains (AC line) voltage is 3 x 210 VAC (L_{1-2} , L_{2-3} , L_{3-1}).
	Mains 1. current 21 21 21 Aac	Mains (AC line) current is 3 x 21 AAC (I_1 , I_2 , I_3).
	Battery voltage 216 Vdc	Battery voltage is 216 VDC.
	Battery current 2 Adc (-30Adc)	Charging current is (+) 2 ADC. Discharging current is (-) 30 ADC
	Inverter current 12 12 12 Aac	Inverter current is 3 x 12 AAC.
	Output voltage 208 208 208 Vac	Output voltage is 3 x 208 V (L_{1-2} , L_{2-3} , L_{3-1}).
	Output current 15 15 15 Aac	Output current is 3 x 15 AAC (I_1 , I_2 , I_3).
	Output frequency 60 Hz	Output frequency is 60 Hz.

When two keys are shown, press them at the same time.

Keys	Sample Display	What the Display Means
 	50 Hz Models Only: Mains 2. voltage 385 385 385	50 Hz Models Only. Bypass mains voltage is 3 x 385 VAC (if the bypass mains option is installed).
 	Battery temp. 25 C°	Battery temperature is 25 C (77°F) (This display is only for units with battery temperature compensation. Battery temperature compensation is standard for UT310-UT330 models with internal batteries and is optional for all units with external batteries.)
 	Output peak curr 19 19 19 Aac	Output peak current is 3 x 19 AAC
	Normal operation load power xx%	Returns to “Normal operation” display and indicates the % load of the most fully loaded phase (leg).
	95.12.16 10.22.13 UTC	Year, month, day. Hour, minute, second. UTC = Universal Time Coordination. (This may be programmed to your time.)

205 User Parameters

User parameters allow you to define some of the information the UPS uses to operate. You can view and program the parameters listed in Table 3 on the next page. The parameters are easy to access and program; simply follow the **five** steps below. **Make sure that you fully understand a parameter before attempting to change it.** If you need help, phone BEST’s Worldwide Service or the nearest BEST office. (See the beginning of this manual for addresses and telephone numbers.)







1. Press  to display the **user** parameter list.
2. Press  or  to scroll through the list
3. To switch a parameter “ON,” press 
4. To switch a parameter “OFF,” press 
5. To exit the parameter list, press 

TABLE 3 - User Parameters

PARAMETERS	FACTORY SETTING	COMMENTS
Second Language	OFF	If you select ON, the UNITY/I displays all messages in its second language. (For 60 Hz systems, this language is Spanish.) The following languages are available, but they must be ordered from the factory: Danish, Dutch, Finnish, French, German, Italian, Polish, and Portuguese.
Adaptive slewrate	ON	OFF is used when mains frequency (AC input frequency) is unstable. Phone BEST before changing this parameter.
Battery monitor reset	—	ON will reset the battery monitor alarm and remove battery monitor alarm messages from the alarm log. ON also resets all battery information (such as runtime); run a battery monitor test again (see Section 302) to set battery information to the correct levels. (This parameter is only active on units with a battery monitor. This is standard for UT310-UT330 models with internal batteries and optional for UT310-UT3220 models with external batteries.)
Battery monitor test	—	This test calculates the condition of the batteries. See Section 302 for more information. (This parameter is only active on units with a battery monitor test option; the monitor is standard for UT310-UT330 models with internal batteries and optional for UT310-UT3220 models with external batteries.)
Battery capacity test	—	This test determines how much backup time (runtime) is available. See Section 303 for more information.
M3 startup	—	Not applicable.
Boost charge	OFF	ON sets the unit for 8 hours (programmable) of continuous boost (equalize) charge. If you would like to change the time to more or less than 8 hours, call BEST's Worldwide Service.
Bypass operation	OFF	ON switches the system into static bypass operation. The unit must be programmed for static bypass operation before an external bypass switch is activated. If this is not done, power to the loads may be disturbed. When you operate the UPS in bypass, it will not charge the batteries.
Autostart	OFF	If this is set to ON, the unit will automatically start whenever mains (AC line) is applied after 30 seconds. (Some units have been programmed for autostart at the factory.) ⚠ CAUTION: When this parameter is on, the unit automatically switches on and provides power to the loads whenever mains is available. When you are servicing the unit or loads, make sure this is set to OFF.

206 Alarms


The UNITY/I is designed to alert you to certain UPS conditions. If the unit detects an alarm condition, it:



- lights the red alarm light in the upper left corner of the display unit, and
- sounds a 30-second audible alarm.


To silence the audible alarm, press this key: 

If you do not silence the alarm, it will silence itself after 30 seconds. *Silencing the audible alarm does not correct the condition that caused the alarm.*


To find out why the UPS sounds an alarm, display the alarm log by following steps 1-4 below. This log shows all alarms that are active now. Note each alarm!

1. Press  to access the alarm log.

2. Press  or  to move through the alarm log.

3. If you press  after displaying the last active alarm, the display shows this:

“No further alarm.”

4. To exit the alarm log press 

Once you have identified the active alarms, find each alarm message in Table 4 on the next few pages. The table will tell you what each alarm message means and what you should do in response to the alarm. In some cases, the table will tell you to phone BEST's Worldwide Service or the nearest BEST office. Before you call BEST, make sure you do the following:

- Have the unit's model and serial number ready.
- Display the alarm log as described above; note all alarms.
- Display the events log (see Section 208) and note the ten most recent events.

Because the UPS can operate in many modes, Table 4 may not describe your unit's exact circumstances. If you have any questions or if you need more information, call BEST's Worldwide Service or the nearest BEST office.

TABLE 4 - Alarm List

Alarm Message	What It Means	What to Do
<p>Battery MCB is off</p> <p><i>(This alarm is normally for units with external batteries. It can be caused by incorrect installation.)</i></p>	<p>The DC disconnect circuit breaker is open. If bypass voltage is within tolerance (see Glossary), the unit transfers to static bypass operation. If not, the unit transfers to standby and does not supply output voltage.</p>	<p>At the DC disconnect, you must first turn the precharge/discharge switch to the precharge position and hold it until the LED turns off. Precharge is very important to prevent damage to your equipment. After precharge, switch the DC disconnect circuit breaker on.</p>
<p>Battery Monitor Alarm</p>	<p>The battery monitor test has found that the battery pack is near low runtime capacity or that the battery pack may have a problem. The unit's status does not change, but when the unit operates on battery, runtime will be seriously reduced.</p>	<p>Phone BEST's Worldwide Service to schedule battery maintenance.</p>
<p>Battery Monitor Warning</p>	<p>The battery monitor test has found that battery capacity is reduced (typically below 80%). The unit's status does not change, but the unit will not be able to operate as long on battery (it will have reduced runtime).</p>	<p>See Section 205 to display the parameters. Then, change the "Battery monitor reset" parameter to "ON." This will clear the Battery Monitor Warning. Next, do a battery monitor test (see Section 302). If the alarm starts again, phone BEST's Worldwide Service to schedule battery maintenance.</p>
<p>Bypass freq. is out of tolerance</p>	<p>The bypass frequency is out of tolerance (too high, low, or unstable). The unit may transfer to battery or standby operation; it cannot operate in static bypass.</p>	<p>Ask an electrician to make sure that the correct input frequency is being supplied to the UPS. If so, phone BEST's Worldwide Service.</p>
<p>Bypass is moment. out of tolerance</p> <p><i>(This alarm is normal when there is a power outage.)</i></p>	<p>The bypass voltage was momentarily out of tolerance (see the Glossary). The unit may transfer to battery or standby operation; it cannot operate in static bypass.</p>	<p>Ask an electrician to make sure that the correct input voltage is being supplied to the UPS. If so, and if this voltage is within the range accepted by the UPS, phone BEST's Worldwide Service.</p>
<p>Bypass is out of tolerance</p> <p><i>(This alarm is normal when there is a power outage.)</i></p>	<p>The bypass voltage is out of tolerance (too high or low). The unit may transfer to battery or standby operation; it cannot operate in static bypass.</p>	<p>Ask an electrician to make sure that the correct input voltage is being supplied to the UPS. If so, phone BEST's Worldwide Service.</p>
<p>Charge reg. error</p> <p><i>(reg. = regulator)</i></p>	<p>Failure in charge regulation. The unit transfers to battery until the "Low DC shutdown" alarm; then, it transfers to standby and does not supply output voltage.</p>	<p>Phone BEST's Worldwide Service.</p>
<p>External service switch activated</p>	<p>The external service bypass switch is in the line position. The unit is in standby and does not supply output voltage. However, the loads may be receiving power from the external manual bypass.</p>	<p>Phone BEST's Worldwide Service.</p>

Alarm Message	What It Means	What to Do
Fan fault	If the fan monitoring option is installed, this alarm sounds if one or more of the fans are slowing down. The unit's status does not change, but the problem may cause other high-temperature alarms that could change the unit's status.	Phone BEST's Worldwide Service.
Fatal Error RAM1 data error	Components on the main controller board have failed.	Phone BEST's Worldwide Service.
Fault in int. power supply	There is a fault in the internal power supply unit (PSU). UT3120-UT3220 models do not change status because they have a redundant power supply. Standard UT310-UT3100 models transfer to standby and do not supply output voltage ; these models come with one power supply, but you can order multiple power supplies as an option.	Phone BEST's Worldwide Service.
High Battery Temperature	The ambient battery temperature is higher than the set alarm level. The unit's status does not change, but battery life could be affected. This alarm is often caused by high room temperature.	Make sure the room temperature is below 80° F (27° C). If not, cool the room. If the temperature was below 80° F (27° C) when the alarm sounded, find the exhaust vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent . If the fans are not operating, call BEST's Worldwide Service.
High DC Warning	The monitored battery voltage is higher than the unit's shutdown setpoint.	Phone BEST's Worldwide Service.
High DC Shutdown	The monitored battery voltage is higher than the unit's shutdown setpoint. The unit will switch to battery power to reduce DC bus voltage.	Phone BEST's Worldwide Service.
High output voltage <i>(This alarm is usually only listed in the events log.)</i>	The output voltage is higher than the alarm setpoint. The unit stays in the normal operation mode. If the alarm is not cleared, the unit will transfer to static bypass operation if bypass is within tolerance (see the Glossary). If bypass is not within tolerance, the unit will transfer to standby and will not supply output voltage .	If the alarm is still active, put the UPS into bypass by displaying the user parameters and changing "Bypass Operation" to "ON." (See Section 205.) Then, call BEST's Worldwide Service.
High temp. choke	The temperature in the main choke is too high. If the problem is not corrected soon, the unit will transfer to battery operation.	Find the exhaust vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent . If the fans are not operating, call BEST's Worldwide Service.

Alarm Message	What It Means	What to Do
High temp. transformer	The temperature in the main transformer is too high. If the problem is not corrected soon, the unit will transfer to standby and will not supply output voltage.	Find the exhaust vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.
Inverter fuse blown	One or more of the fuses at the output of the inverter are blown (FO04, F005, F006). If bypass is within tolerance (see the Glossary), the unit transfers to static bypass operation. If not, the unit transfers to standby and does not supply output voltage.	Phone BEST's Worldwide Service.
Inverter voltage error	<p>The output voltage is too high or too low. If the alarm was caused by high output voltage, the unit transfers to static bypass operation if bypass is within tolerance (see the Glossary). If bypass is not within tolerance, the unit transfers to standby and does not supply output voltage.</p> <p>If the alarm was caused by low output voltage, the unit transfers to static bypass operation if bypass is within tolerance. If bypass is not within tolerance the unit transfers to battery for five seconds and then transfers to standby and stops supplying output voltage.</p>	If the UPS is in standby, restart the UPS by pressing the green button inside the door. If the UPS will not restart, a user may have started an emergency power off (EPO) shutdown. Find out if the EPO shut down the UPS; if it did, find out why and make sure the emergency has passed. Then, you can reset the EPO and restart the unit by pressing the green button inside the door. If the unit still will not restart, call BEST's Worldwide Service.
<p>Low DC shutdown</p> <p><i>This alarm is normal when the UPS has run on battery for a long time.)</i></p>	The UPS has been running on battery power because of a power outage or problems in the AC input. Battery voltage has dropped below the shutdown setpoint , and the UPS has shut down. If bypass is within tolerance (see the Glossary), the unit will transfer to static bypass operation. If not, the unit will transfer to standby and will not supply output voltage.	If the UPS is programmed for autostart, it will automatically restart when the power outage ends and AC input is again available. If the UPS is not programmed for autostart, you can restart the UPS when the power outage ends by pressing the green button inside the door.
<p>Low DC warning</p> <p><i>This alarm is normal when the UPS has run on battery for a while.)</i></p>	The UPS has been running on battery power for a while because of a power outage or problems in the AC input. Battery voltage has fallen to the warning alarm setpoint. If the UNITY/I is operating on battery, the unit's status will not change, but battery voltage will eventually drop to the shutdown setpoint. At this point, the unit will shut down and sound a "Low DC shutdown" alarm. If the "Low DC warning" alarm happens during a battery capacity test, the unit transfers back to normal operation. <i>If the unit has not been running on battery power, call BEST</i>	If possible, restore AC input power to the UPS. If you cannot do this, prepare for a possible Low DC shutdown by shutting down the loads (protected equipment) connected to the UPS.

Alarm Message	What It Means	What to Do
<p>Mains freq. is out of tolerance</p>	<p>The mains (AC input) frequency is out of tolerance (see the Glossary). The unit transfers to battery operation. If mains frequency comes back within tolerance, the unit transfers back to normal operation. If not, the unit continues to run on battery until "Low DC shutdown." Then, if bypass is within tolerance, the unit transfers to bypass. If not, the unit transfers to standby and does not supply output voltage.</p>	<p>Ask an electrician to make sure that the correct input frequency is available to the UPS. The electrician must correct any problems in input frequency. If input frequency is correct, phone BEST's Worldwide Service.</p>
<p>Mains is moment. out of tolerance</p> <p><i>(This alarm is normal during a power outage.)</i></p>	<p>The mains (AC line voltage) was momentarily too high or too low. The unit transfers to battery; if mains returns within tolerance, the unit transfers back to normal operation.</p>	<p>If possible, restore AC input power to the UPS. If AC input is available to the UPS, ask an electrician to make sure that 1) the correct input voltage is available to the UPS, and 2) this voltage is within a range the UPS will accept.</p>
<p>Mains is out of tolerance</p> <p><i>(This alarm is normal during a power outage.)</i></p>	<p>The mains (AC input) voltage is too high or too low, so the unit transfers to battery operation. If AC input returns to normal, the unit transfers back to normal operation. If not, the unit continues to run on battery until the "Low DC shutdown" alarm. Then, if bypass voltage is within the range programmed into the UPS, the unit transfers to bypass. If not, the unit transfers to standby and does not supply output voltage.</p>	<p>If possible, restore AC input power to the UPS. If AC input is available to the UPS, ask an electrician to make sure that 1) the correct input voltage is available to the UPS, and 2) this voltage is within a range the UPS will accept.</p>
<p>OFF Button Pushed</p> <p><i>(If the alarm was caused by the Off button, it will only appear in the events log.)</i></p>	<p>A user pushed the red "Off" button or activated an emergency power off shutdown. The unit switches to standby mode and does not supply output voltage.</p>	<p>Restart the unit by pressing the green button inside the door. If the unit will not restart, the alarm was caused by an emergency power off (EPO) shutdown. Find out why this shutdown was activated and make sure the emergency no longer exists; then, you can restart the unit by deactivating the emergency power off shutdown.</p>
<p>Output freq. is out of tolerance</p>	<p>The output frequency is too high, low, or unstable (out of tolerance). The unit transfers to battery operation and runs on battery until the "Low DC shutdown" alarm. Then, the unit transfers to bypass if bypass is within tolerance. If not, the unit transfers to standby and does not supply output voltage.</p>	<p>Ask an electrician to make sure that the correct input frequency is being supplied to the UPS. Then, phone BEST's Worldwide Service.</p>
<p>Output is moment. out of tolerance</p>	<p>The output voltage was momentarily too high or too low (out of tolerance). If bypass is within tolerance, the unit transfers to static bypass operation. If not, the unit transfers to standby and does not supply output voltage.</p>	<p>If other alarms are also active, troubleshoot these alarms first. If this is the only alarm, phone BEST's Worldwide Service.</p>

Alarm Message	What It Means	What to Do
Output is out of tolerance	<p>The output voltage is too high or too low (out of tolerance). If the alarm was caused by high output voltage, the unit transfers to static bypass operation if bypass is within tolerance. If bypass is not within tolerance, the unit transfers to standby and does not supply output voltage.</p> <p>If the alarm was caused by low output voltage, the unit transfers to static bypass operation if bypass is within tolerance. If bypass is not within tolerance, the unit transfers to battery for five seconds and then transfers to standby and stops supplying output voltage.</p>	<p>If the UPS is in standby, restart the UPS by pressing the green button inside the door. If the UPS will not restart, a user may have started an emergency power off (EPO) shutdown. Find out if the EPO shut down the UPS; if it did, find out why and make sure the emergency has passed. Then, you can reset the EPO and restart the unit by pressing the green button inside the door. If the unit still will not restart, call BEST's Worldwide Service.</p>
Overload load is over 100%	<p>The unit is loaded with more than nominal load on one or more phases. The UPS status does not change until it cannot maintain the correct output voltage. Then, the unit transfers to static bypass operation if bypass is within tolerance. If not, the unit transfers to battery for five seconds; then, it transfers to standby and stops supplying output voltage.</p>	<p>Shut down equipment connected to the UPS until the load is below 100%. An electrician must connect these loads to another power source. If the alarm persists, call BEST's Worldwide Service.</p>
static switch 1 temp. shutdown	<p>The temperature on the heatsink for the mains static switch is higher than the shut down level, and the mains static switch has opened. The unit switches to battery operation. When the temperature falls below the shutdown level, the unit transfers back to normal operation. If the temperature does not fall to this level before the Low DC Shutdown, there will be no output to the load equipment.</p>	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>
Static switch 1 temp. warning	<p>The temperature on the heatsink for the mains static switch is higher than the warning setpoint. The unit's status does not change. However, if the temperature continues to rise, the unit will sound a "Static switch 1 temp. shutdown" alarm</p>	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>

Alarm Message	What It Means	What to Do
Bypass static switch 2 temp. shutdown	The temperature on the heatsink for the bypass static switch is higher than the shutdown level and the bypass static switch has opened. The unit switches to battery operation until the temperature falls below the shutdown level; then, it transfers back to normal operation. If the temperature does not fall to this level before the Low DC shutdown, there will be no output to the load equipment.	Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service. If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.
Bypass static switch 2 temp. warning	The temperature on the heatsink for the bypass static switch is higher than the warning setpoint. The unit's status does not change. However, if the temperature continues to rise, the unit will sound a "Static switch 2 temp. shutdown" alarm.	Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service. If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.
Synchronization error <i>(This alarm is normal during a power outage.)</i>	The inverter output is not synchronized to the mains (AC input). The unit will transfer to battery operation until the unit sounds a "Low DC shutdown" alarm. If the unit can synchronize to mains again before that time, it will transfer back to normal operation.	If this alarm happens during the first startup, the electrician must check the phase rotation. If this alarm happens while the unit is connected to a generator, the unit may be having problems synchronizing to the generator. Phone BEST's Worldwide Service. If the alarm does not happen during the first startup and the UPS is not connected to a generator, phone BEST's Worldwide Service.
System in manual bypass <i>(50 Hz models only.)</i>	The internal bypass in 50 Hz units is in the line position. The unit is in standby and does not supply output voltage. However, the loads may be receiving power from the bypass. If you are servicing the unit, this is not the recommended bypass method because hazardous voltages are still inside the unit. See Section 304.	When you are ready to operate the UPS again, turn the bypass switch back to UPS. (This switch is inside the door.) If the bypass switch was <i>not</i> in bypass position when the unit sounded this alarm, call BEST's Worldwide Service.






Alarm Message	What It Means	What to Do
TSM 1 temp. shutdown	Inverter module 1 has shut down because the temperature on the heatsink is higher than the shutdown level. If bypass is within tolerance, the unit transfers to static bypass operation. If not, the unit transfers to standby mode and does not supply output voltage.	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>
TSM 1 temp. warning	The temperature on the heatsink for inverter module 1 has exceeded the warning setpoint. The unit's status does not change. However, if the temperature continues to rise, the unit will sound a "TSM 1 temp. shutdown" alarm	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>
TSM 2 temp. shutdown	Inverter module 2 has shut down because the temperature on the heatsink is higher than the shutdown level. If bypass is within tolerance, the unit transfers to static bypass operation. If not, the unit transfers to standby and does not supply output voltage.	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>
TSM 2 temp. warning	The temperature on the heatsink for inverter module 2 is higher than the warning setpoint. The unit's status does not change. However, if the temperature continues to rise, the unit will sound a "TSM 2 temp. shutdown" alarm	<p>Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service.</p> <p>If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.</p>

Alarm Message	What It Means	What to Do
TSM 3 temp. shutdown	Inverter module 3 has shut down because the temperature on the heatsink is higher than the shutdown level. If bypass is within tolerance, the unit transfers to static bypass operation. If not, the unit transfers to standby and does not supply output voltage.	Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service. If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.
TSM 3 temp. warning	The temperature on the heatsink for inverter module 3 is higher than the warning setpoint. The unit's status does not change. However, if the temperature continues to rise, the unit will sound a "TSM 3 temp. shutdown" alarm.	Find the vents for the UPS fans and check to see if the fans are operating. Do not try to open the unit, and do not insert anything into a fan vent. If the fans are not operating, call BEST's Worldwide Service. If the fans are operating, make sure the room temperature is below 80° F (27° C). If not, cool the room. If the room was below this temperature, call BEST's Worldwide Service.

207 Displaying the Alarm Log

The UNITY/I lists all active alarms in an alarm log, with the most recent alarm first. When the alarm is cleared, the unit removes it from the alarm log; however, the alarm will be displayed in the events log. (See Section 208.)

To display the alarm log, follow these steps:

1. Press  to display the alarm log.
2. Press  or  to move through the alarm log.
3. If you press  after you have displayed the last alarm, the display shows "No further alarm."
4. To exit the alarm log press .

208 Displaying the Events Log

The events log is a list of the last 250 alarms and operational modes. This log includes the time and date of each event. **Most entries in this log will be alarms; see Section 206 for explanations of the alarms.** Other entries describe operating modes; the table below lists these mode messages and explains what they mean.

TABLE 5 - Log Messages

Mode	What It Means
Main processor unit (MPU) is reset	The UPS was completely switched off.
Stand-by	The UPS was in standby mode. (See Section 202.)
Normal operation	The UPS was in normal operation. (See Section 202.)
Bypass operation	The UPS was in bypass operation. (See Section 202.)
Battery operation	The UPS was in battery operation. (See Section 202.)
Economy operation	The UPS was programmed to operate in Economy mode. (See Section 202.)

1. To access the events log, press both  and  at the same time

2. Use the  and  keys to scroll through the log.

3. To display the time and date the alarm or other event happened, press 

Sample display: 95.12.16 (Year, month, date)
10.22.13 UTC (Hour, minute, second. UTC = Universal Time Coordination.)

4. If you press **after** displaying the last event in the log, the display shows “No further event.”
E 1

5. To exit the events log, press 

SECTION 300: PREVENTATIVE MAINTENANCE

BEST recommends a periodic preventative maintenance check every six months. BEST also recommends that the cooling fans and batteries be replaced every three years.

301 Preventative Maintenance Check

At the preventative maintenance check, a qualified service technician should:

- Check all wiring connections.
- Inspect and clean the unit.
- Check the batteries.
- Check the AC and DC meter functions.
- Perform a battery capacity or battery monitor test. (See Sections 302 and 303.)
- Check all modes of operation.
- Perform a power outage test.

Safety precautions must be observed while performing maintenance checks. For more information on preventative maintenance checks, or to schedule a maintenance check with a BEST authorized field service representative, call BEST's Worldwide Service or the nearest BEST office.





302 Battery Monitor Test

IMPORTANT: If you are using UPS contacts for a communication link, take the necessary precautions so this test will not cause a premature shutdown. See your software documentation for more information.

The battery monitor is standard for UT3 10-UT330 models with internal batteries and optional for UT310-UT3220 models with external batteries. The steps on the next page tell you how to start a battery monitor test. This test calculates the condition of the batteries and compares it to data programmed in the unit. The test discharges the batteries to about 75% of their capacity. During this test, the unit checks the applied load and the ambient temperature of the batteries. The unit then compares the results of the test with its programmed data. If the unit determines that the condition of the batteries is acceptable, it returns to normal operation. If the test determines that the condition of the batteries is unacceptable, the unit starts either a "Battery monitor warning" alarm or a "Battery monitor alarm" See Table 4 (page 12) for more information on these alarms. If you would like the unit to automatically perform a battery monitor test on a regular basis (default = every 90 days), phone the nearest BEST office for more information.

Note: The information programmed into the unit is based on the size and type of batteries that were installed when the unit was sold. If the battery configuration changes, this test will not be accurate for the new configuration. Phone the nearest BEST office for more information.

To perform a battery monitor test:




1. Press  to display the user parameters.
2. Press  or  to scroll through parameters until the display shows “Battery monitor test.”
3. Press  to start the battery monitor test. The display shows “Batt. operation time > xxx min.” (“xxx” = the minutes of runtime remaining. This number will fluctuate during the test.)
4. When the test is complete, the display shows “Normal operation load power xx%” if the batteries are in acceptable condition. If the test has determined that the batteries are unacceptable, the unit starts either a “Battery monitor warning” or “Battery monitor alarm.” See Table 4 (page 12) for a detailed description of these alarms.

303 Battery Capacity Test

IMPORTANT: If you are using UPS contacts for a communication link, take the necessary precautions so this test will not cause a premature shutdown. See your software documentation for more information.



The battery capacity test discharges the batteries to the “Low DC warning” and displays estimated runtime. This estimate is only correct for the unit’s condition at the time of the battery capacity test. If the load changes and you would like to display estimated runtime, you must perform this test again. **After a battery capacity test, the unit must charge the batteries for at least eight hours before it has full battery capacity and full runtime.**




To perform a battery capacity test, follow these steps:

1. Press  to display the user parameters.
2. Press  or  to scroll through the parameters until the display shows this:

Battery capacity test: xxx

(“xxx” = the backup time from the last test). If the test has never been performed before or if the test has been aborted, the display will show “???”

3. Press  to abort the test or  to continue. The display shows “Batt. operation time xxx min.”

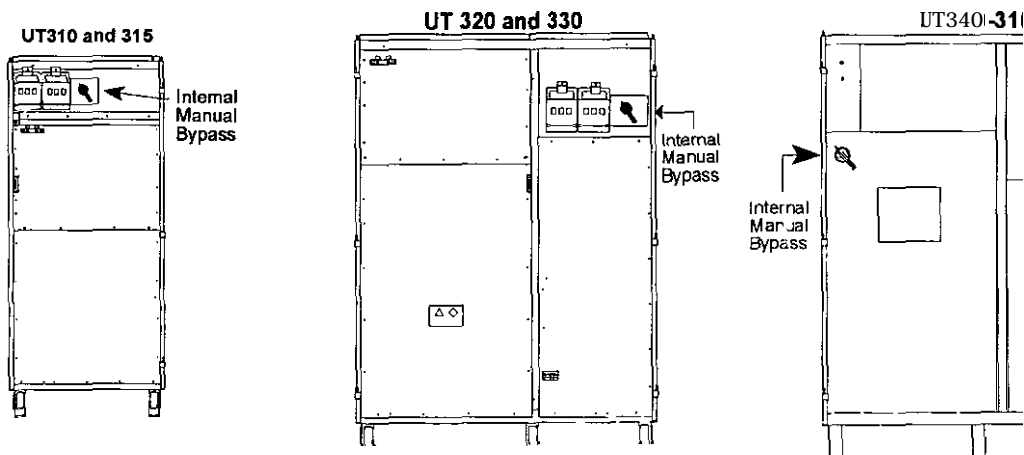
4. If you wish to abort the test while it is underway, follow these steps:
 - a. Display the user parameter list by pressing 
 - b. Use the arrow keys to scroll through the parameters until the display shows “Battery capacity test: xxx.”
 - c. Switch the battery capacity test “OFF” by pressing $\overset{\circ}{*}_c 1$
5. Wait until the display shows “Normal operation load power xx%” and a short alarm sounds.
6. Press  The display will show “Battery capacity test: xxx.” (“XXX” = the estimated backup time in minutes)
7. Press  to exit the user parameter list

304 Internal Bypass Switch (50 Hz Models Only)

50 Hz UT3 10-UT3 100 models include an internal bypass switch inside the front door. This switch is **not the recommended method of bypassing the UPS if the unit is being serviced**. Use an external maintenance bypass switch for 100% isolation of the UPS. If the UPS is not being serviced, you may change the internal bypass switch position to “By-pass” to operate your load equipment directly from mains AC line power. The display will show “Bypass operation,” and the “System in man. bypass” alarm will be active. (See Section 206.) Use the “normal” position when you want your load equipment to receive power from the UPS.

CAUTION

If the unit is being serviced, use an external maintenance bypass switch. Hazardous voltages are present inside the unit even when the internal bypass switch is in the “By-pass” position.



SECTION 400: SPECIFICATIONS

For a complete list of specifications, see the Planning and Installation Manual for your model.

TABLE 6 - General specifications for ϵ I models (unless otherwise noted)

Mains tolerance		+10%, 15% (programmable)
Bypass tolerance		$\pm 10\%$ (programmable)
Input frequency $\pm 6\%$ (programmable)		60 Hz or 50 Hz.
Output frequency	mains synchronized: free running:	60 Hz $\pm 6\%$ or 50 Hz $\pm 6\%$. 60 Hz $\pm 0.1\%$ or 50 Hz $\pm 0.1\%$.
Current distortion		0-5%
Tolerance	symmetrical load asymmetrical load load step 0-100	$\pm 1\%$, static. $\pm 3\%$, static. (100% imbalance, provided output current rating is not exceeded.) $\pm 5\%$.
Distortion (linear load)		0-3%
Overload capacity	normal operation, 1 minute normal operation, 10 minutes battery operation, 1 minute battery operation, 10 minutes	250% 150% 150% 125%
Audible noise (dBa)		55 (UT310-UT315) 65 (UT320-UT3100) 73 (UT 3120-UT3220)
Maximum Humidity (noncondensing)		95%
Efficiency	economy mode normal operation	97% (UT360-3220) 96% (UT320-UT340) 95% (UT310-UT315) 93% (UT310-UT315) 94% (UT320-UT330) 95% (UT340-UT360) 96% (UT380-UT3220)

SECTION 500: OPTIONS

BEST offers many options for UNITY//I units. For more information, contact your local BEST office (see the inside front cover) or your dealer. Note that some options only apply to certain models.

Battery Temperature

Compensation: Enables the UPS to adapt the charging voltage to the battery temperature. This is standard in units with internal batteries but optional for units with external batteries. For units with external batteries, this option monitors the temperature in one battery cabinet.

Communication

Interface Board: If you would like to use shutdown software or remote monitoring, your UPS must have this internal circuit board. The board offers three methods of communicating with the UPS:

1. Normally open or normally closed contacts that indicate UPS ON, bypass operation, battery operation, and low battery. (You can choose this method for an AS/400 monitoring system.)
2. RS232 Serial Communications port.
3. Zero to 20 mA current loop.

Fan Monitor: If the unit's fans are not functioning properly, this option starts a "Fan fault" alarm.

LED Panel: *This option is for the UT3120, the UT3160, and the UT3220.* The panel includes LEDs that give you quick information on UPS operating modes and alarms.

Maintenance

Bypass Cabinet: An external bypass switch lets you conveniently transfer your protected load equipment to direct AC input power when it is time to service the UPS. The cabinet includes an AC disconnect.

Parallel Board: This option allows your qualified installer to connect two or more units in parallel. The parallel board ensures proper control of parallel units and proper load sharing between the units. Each unit that will be connected in parallel requires one of these boards. Each board includes 23 feet (7 meters) of interconnection cable. *A BEST Application Engineer should be involved in all parallel unit installations. Phone BEST's Worldwide Service or the nearest BEST office for details.*

Relay Board: This option provides 16 additional relays. In UT320 and UT330 models, this option must be installed at the factory. In UT340-UT3220 models, the relay board can be installed in the field by qualified service personnel. *This option is not available for UT 310 and UT 315 models.*

Warranties:

In addition to the standard warranty on page 27, BEST offers a large array of service plans and extended warranties to fit your needs. Whether you choose a basic level or one that makes power protection virtually effortless, you can be sure Best Power will honor its commitment to provide you with true peace of mind.

Contact your local Best Power representative for availability in your country. By calling us toll-free at 1-800-356-5737 (U.S. and Canada) and referencing this page, you will automatically receive a 10% discount on any plan purchase.

Level 6 — Customized Service Agreement:

Designed by you to match service delivery to your unique needs. Includes any features of Levels 1-5 plus any additional services and terms that you may require.

Level 5 — On-Site Comprehensive Agreement:

A factory-trained technician will perform Preventative Maintenance yearly to reduce the likelihood of unit failure. If failure should occur, you will receive priority scheduling to repair the unit at your location. All labor and parts (including internal batteries) are covered.

Level 4 — On-Site Repair Agreement:

You will receive priority scheduling for a Best Power factory-trained technician to perform the unit repair at your location and ensure that everything is working properly. All labor and parts (including internal batteries) are covered.

Level 3 — External Battery Preventative Maintenance:

Two types of battery preventative maintenance service are available: *Standard* and Premium. The *Standard* Preventative Maintenance Agreement can be performed during normal working hours and is designed to prevent minor problems from becoming major battery integrity issues. The *Premium* Preventative Maintenance Agreement is designed to meet the manufacturer's requirements to maintain battery warranty; it will generally be performed outside normal working hours because it requires a full DC power-down.

Level 2 — Standard Warranty Extension:

This plan extends the Best Power Standard Warranty for an additional year.

Level 1 — Standard Warranty Protection (2 Years Free):

See page 27. Best Power warrants the product to be free from defect in material and workmanship. Best Power will factory repair the product upon failure at no charge to you. You will be responsible for the freight in and out. On-site repair is available — parts are covered at no charge, labor and shipping are extra. See page 27 for details.

SECTION 600: WARRANTY

LIMITED TWO YEAR WARRANTY

Standard Warranty For All Purchases

BEST POWER a division of General Signal Power Systems, Inc. (hereinafter called BEST POWER) warrants that each product sold by BEST POWER is compatible with existing commercially available computer equipment with enclosed power supplies and is free from defects in materials and workmanship under normal use and service. This warranty is applicable only to the initial retail purchaser (PURCHASER), and is not transferable. The duration of this warranty is two (2) years from the date of the first retail sale or the date of delivery to the PURCHASER, whichever occurs first, subject to the following conditions.

If the PURCHASER discovers within the duration of this warranty a failure of the product to perform compatibly with presently existing computer equipment or a defect in material or workmanship, the PURCHASER must promptly notify BEST POWER in writing within the duration of the warranty or not later than one month after expiration of the warranty. BEST POWER's obligation under this warranty is limited to the replacement or repair, subject to the conditions specified below, of such product returned intact to BEST POWER which shall appear to BEST POWER, upon inspection, to have been either incompatible or defective. Replacement or repair will be made at BEST POWER's Worldwide Service, Highway 80, Necedah, Wisconsin 54646, U.S.A. Such repair or replacement shall be at BEST POWER's expense. This warranty does not cover any taxes which may be due in connection with replacement or repair, nor any installation, removal, transportation or postage costs. These expenses will be paid by PURCHASER. If BEST POWER is unable to repair or replace the product to conform to this warranty after a reasonable number of attempts, BEST POWER will refund the purchase price. Remedies under this warranty are expressly limited to those specified above.

TO THE EXTENT ALLOWED BY LAW, BEST POWER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. TO THE EXTENT ALLOWED BY LAW, BEST POWER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, INJURIES TO PROPERTY, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT.

Some states do not allow limitations on how long an implied warranty lasts, so that the above limitation on duration of implied warranties may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. You are advised to consult applicable state laws.

No warranty is made with respect to other products sold by BEST POWER which do not bear the name BEST POWER and no recommendation of such other product shall imply or constitute any warranty with respect to them. This warranty does not cover repair or replacement because of damage from unreasonable use (for example only, damage from road hazard, accident, fire or other casualty, misuse, negligence, or incorrect wiring) and any use or installation not in conformance with instructions furnished by BEST POWER, or repairs or replacements needed because of modifications or parts not authorized or supplied by BEST POWER.

SECTION 700: GLOSSARY

Ampere (Amp): A unit of electric current One amp = a steady current produced by one volt applied across a resistance of one ohm.

British thermal unit (BTU): A unit of heat energy. One BTU = the heat needed to raise the temperature of one pound of air-free water from 60° F (15.5° C) to 61° F (16.1° C) at a constant pressure of one standard atmosphere.

Decibel adjusted (dBa): A unit used to show the relationship between an acoustic noise source and a reference sound power level of -85 dBm.

Ground (Earth): A conducting connection, whether intentional or accidental, by which an electric circuit or electric equipment is connected to earth, or to some conducting body that serves in place of earth.

Load tolerance - symmetrical: Equally balanced loads on a three-phase system

Load tolerance - asymmetrical: Unbalanced loads on a three-phase system.

Mains (AC Line): The input power source. It includes the conductors extending from the service switch, the generator bus, or the converter bus to the main distribution center in interior wiring.

Maintenance bypass cabinet (MBC): Contains the external bypass switch and the AC disconnect switch.

Noise attenuation - differential mode: The ability to attenuate (reduce) noise, line to line.

Noise attenuation - common mode: The ability to attenuate (reduce) noise, line to ground and neutral to ground.

Nominal voltage: The voltage at which a device operates under ideal conditions,

Out of Tolerance: Outside of the unit's programmed limits. If you would like these limits reprogrammed, call BEST's Worldwide Service.

Power factor (PF): The ratio of the true (real) power to the apparent power of an alternating current (AC) circuit.

Protective earth (PE): Same as the equipment grounding conductor. See Ground (Earth).

Static bypass: An internal bypass mode inside the unit The unit must be programmed into static bypass operation before an external bypass switch is used.

Static switch: An electronic switch that has no moving parts.



Best Power Standard Warranty

LIMITED TWO-YEAR WARRANTY

Standard Warranty For All Purchases

BEST POWER warrants that each product sold by BEST POWER is compatible with existing commercially available computer equipment with enclosed power supplies and is free from defects in materials and workmanship under normal use and service. This warranty is applicable only to the initial retail purchaser ("PURCHASER"), and is not transferable. The duration of this warranty is two (2) years from the date of the first retail sale or the date of delivery to the PURCHASER, whichever occurs first, subject to the following conditions:

If the PURCHASER discovers within the duration of this warranty a failure of the product to perform compatibly with presently existing computer equipment or a defect in material or workmanship, the PURCHASER must promptly notify BEST POWER in writing within the duration of the warranty or not later than one month after expiration of the warranty. BEST POWER's obligation under this warranty is limited to the replacement or repair, subject to the conditions specified below, of such product returned intact to BEST POWER which shall appear to BEST POWER upon inspection, to have been either incompatible or defective. Replacement or repair will be made at BEST POWER's Worldwide Service, Highway 80, Necedah, Wisconsin 54646, U.S.A. Such repair or replacement shall be at BEST POWER's expense. This warranty does not cover any taxes which may be due in connection with replacement or repair, or any installation, removal, transportation or postage costs. These expenses will be paid by PURCHASER. If BEST POWER is unable to repair or replace the product to conform to this warranty after a reasonable number of attempts, BEST POWER will refund the purchase price. Remedies under this warranty are expressly limited to those specified above.

TO THE EXTENT ALLOWED BY LAW, BEST POWER DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. TO THE EXTENT ALLOWED BY LAW, BEST POWER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, INJURIES TO PROPERTY, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT.

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No warranty is made with respect to other products sold by BEST POWER which do not bear the name BEST POWER, and no recommendation of such other product shall imply or constitute any warranty with respect to them. This warranty does not cover repair or replacement because of damage from unreasonable use (for example only, damage from road hazard, accident, fire or other casualty, misuse, negligence, or incorrect wiring) and any use or installation not in conformance with instructions furnished by BEST POWER, or repairs or replacements needed because of modifications or parts not authorized or supplied by BEST POWER.

Best Power Limited "Double Lifetime" Warranty

LIMITED WARRANTY

Transient Voltage Surge Suppression Circuitry (For U.S. and Canadian Purchasers Only)

Best Power hereby warrants the transient voltage surge suppression circuitry in each TRIAXXUM™ THREE-PHASE, FERRUPS™, AXIUM™, BEST 610 FERRUPS™, PATRIOT™, UNITY™ Single-Phase, or SPIKEFREE™ product (hereinafter called "Product"), sold by it for installation in the United States of America and Canada to be free from defects in material and workmanship under normal use and service for the Lifetime of the Product, beginning with the date of the sale to the initial retail purchaser, subject to the following conditions. This warranty is applicable only to the initial retail purchaser (hereinafter called "PURCHASER"), is not transferable, and is limited to the following remedies:

1. The replacement or repair of the transient voltage surge suppression circuitry in each Product that is returned intact to BEST POWER and which shall appear to BEST POWER upon inspection to have been defective in material or workmanship or to have been damaged through normal use;
2. The reimbursement to the PURCHASER of up to \$25,000 per occurrence of documented physical damage to specified computer equipment connected to a Product where such damage could have been prevented by transient voltage surge suppression circuitry as detailed in BEST POWER's specification for the Product sold.

This warranty is made in addition to BEST POWER's Limited Two Year Warranty.

This warranty does not include any taxes which may be due in connection with replacement or repair nor any installation, transportation or postage costs. These expenses will be paid by PURCHASER. Replacement or repair will be made at BEST POWER's Worldwide Service, Highway 80, Necedah, Wisconsin 54646, U.S.A.

This warranty does not cover repair or replacement because of damage from unreasonable use (damage from road hazards, accident, fire or other casualty, misuse, negligence, incorrect wiring) and any use or installation not in conformance with instructions furnished by BEST POWER, or repairs or replacements needed because of modifications or parts not authorized or supplied by BEST POWER.

This warranty is operable only upon the written acceptance by BEST POWER of an application by the PURCHASER on BEST POWER's standard form for the above warranty coverage for the Product sold. In such application, the PURCHASER shall represent that the Product sold has been properly installed and grounded in accordance with instructions received from BEST POWER, and the PURCHASER shall also specify the computer equipment to which the Product sold has been connected and the location of the computer equipment. This warranty will not apply to any equipment not specified in the application by the PURCHASER as protected equipment.

EXCEPT AS EXPRESSLY SET FORTH IN THIS WARRANTY AND BEST POWER'S LIMITED TWO-YEAR WARRANTY, BEST POWER MAKES NO OTHER WARRANTIES, AND TO THE EXTENT ALLOWED BY LAW, BEST POWER DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

REMEDIES UNDER THIS WARRANTY ARE EXPRESSLY LIMITED TO THE REPAIR OR REPLACEMENT OF PRODUCTS AND THE REIMBURSEMENT SPECIFIED ABOVE, AND TO THE EXTENT ALLOWED BY LAW ANY CLAIMS FOR LOSS ARISING OUT OF THE FAILURE OF PRODUCTS TO PERFORM FOR ANY PERIOD OF TIME OR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR OTHER ECONOMIC LOSS ARE EXPRESSLY EXCLUDED.

Some states do not allow limitations on how long an implied warranty lasts, so that the above limitation on duration of implied warranties may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so that the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. You are advised to consult applicable state laws.

Additional Information

The Best Power device purchased and all connected equipment must be specified in writing on the registration form. Any changes to the connected equipment must be sent in writing to Best Power or the agreement is void.

All connected equipment must pass through a Best Power product and conform with installation instructions furnished by Best Power. Also, the installation must comply with all applicable electrical and safety codes set forth by the National Electrical Code (NEC). Power protection products must be plugged into or directly connected to properly wired and grounded outlets of panels. Only Best Power bypass switches may be used. No extension cords, adapters, other ground wires, or other electrical connections may be used. The warranty does not cover damage from improperly installed equipment.

Users who suspect surge-related damage should call Best Power's Worldwide Service at 1-800-356-5737 for specific instructions. A report explaining the nature of the damage must be compiled by a qualified technician and sent to Best Power in a timely fashion. Best Power reserves the right to have its technicians evaluate the damage, evaluate any parts, circuitry and examine the customer's facility. Damaged parts must remain available for inspection until the claim is settled. If the surge circuitry has failed to protect the connected equipment, Best Power will repair or reimburse as specified in the warranty document.

The warranty does not include taxes that may be due as a result of replacing or repairing equipment. The customer is also responsible for any installation, transportation, or postage costs.

For Users in the United States Only

This 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. This 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 the interference at his/her own **expense**.

For Users in Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.