MITSUBISHI UPS SYSTEMS

MITSUBISHI UPS

7011A SERIES
6, 8, 10 & 12KVA

SPECIFICATIONS

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1. SCOPE

This specification describes the requirements for a true on-line, double conversion single phase, solid-state, uninterruptible power system, hereafter known as the UPS. The UPS shall provide a quality sinewave output waveform that will supply uninterruptible power to critical AC loads. The system shall consist of a converter, system battery, inverter and automatic static bypass transfer switch.

2. SYSTEM DESCRIPTION

2.1. Configuration:

The utility commercial line supplies alternating current (AC Power) to the UPS's input IGBT (Insulated Gate Bipolar Transistor) rectifier charger circuit and converts it into direct current (DC Power) required to maintain the system's battery in a constant fully charged state while simultaneously supplying the high frequency PWM (Pulse Width Modulation) inverter. The inverter, which uses IGBT's, then converts the DC power to AC power using a 16kHz switching frequency and produces a sinewave output via a conductor capacitor filter resulting in clean conditioned output power for critical AC loads.

2.2. Components:

The UPS is comprised of the following major components:

a. Solid-state static converter using IGBT's
b. Solid-state static inverter using IGBT's
c. CPU control circuit
d. Static bypass transfer switch
e. Sealed lead-acid battery system

2.3. Features:

a. Microprocessor based fault memory and diagnostics
b. Microprocessor based menu controlled operation

c. LED status mimic diagram
d. Active mitigation of reflected input harmonics (no passive filters).
e. Active control of output voltage distortion (no passive filters).
f. Automatic input current walk-in
g. Automatic UPS restart and load pick-up (after system battery depleted; AC restored)
h. External customer contacts (A-type) dry contacts
i. Remote Emergency Power Off (EPO)
j. Internal Maintenance Bypass Switch (MBS)
k. Battery system self-test
l. System battery input fuses

2.4. Modes of Operation:

The UPS shall be designed to operate continuously at rated capacity as an on-line, double conversion, automatic system in the following modes:

2.4.1. Normal:
The inverter continuously supplies AC power to the critical load. The converter/rectifier converts commercial AC power to regulated DC power which then serves as the inverter input and, simultaneously, as a float charge to the battery system.

2.4.2. Emergency:
In the event of a commercial AC power failure, the inverter shall derive its input from the system battery, thus providing uninterrupted power to the critical load. This transition shall be accomplished without any switching or coupling, and with no interruption of power to the critical load from either a failure or restoration of the commercial AC power.

2.4.3. Recharge:
Subsequent to restoration of commercial AC power, the converter shall automatically reactivate and provide DC power to the inverter, simultaneously recharging the system battery. This occurs automatically and without interruption to the critical load.

2.4.4. Bypass:
In the event that the UPS must be taken off-line due to an overload condition or UPS failure, the critical load shall be transferred to the bypass source via the static switch without interruption of power to the critical load. Re-transfer from the bypass source back to normal mode (inverter supplying load) is done automatically once the overload or UPS failure condition has been cleared.

2.4.5. Remote:

The UPS logic shall be capable of remote operation allowing activation of the following functions from a remote location:

a. Inverter stop.
b. Inverter start.
c. Emergency power off.

2.4.6. Maintenance Bypass

The UPS system shall be equipped with an internal MBS to allow safe and reliable maintenance of the UPS. The MBS shall be of the Make-Before-Break, “Zero Energy” type to ensure maximum load reliability and personnel safety.

2.5. Applicable Standards

The UPS has been designed in accordance with, and complies to, the following standards:

a. Underwriters Laboratories (UL 1778 standard), cUL Listing
b. IEC, Semiconductor Converter Standards.
c. ISO 9001 Quality Assurance program.
d. EMI compatibility: FCC Title 47, Part 15, Subpart B
e. IEEE C62. 41-1991
f. National Electric Code (NFPA-70).

3. PERFORMANCE CHARACTERISTICS

3.1. System Ratings:

The UPS capacity shall be sized to supply a load with a .7 pf lagging.
Sizes of 6, 8,10 and 12kVA.

3.2. Input (Converter / Rectifier):

a. Nominal input voltage: 208/120VAC or 240/120VAC
Single phase, 3 wire

b. Input voltage range: 84-145VAC

c. Input frequency range: 50/60Hz auto-selectable +/-7%

d. Total power factor: .98 lagging (at full load)

e. Reflected current harmonic distortion: 5% (at full load)

3.3. Input (Bypass):

a. Input bypass voltage range: +/- 10% of nominal

b. Input bypass frequency range: 50/60Hz +/- 5%

3.4. Battery System:

a. Nominal bus voltage: 216VDC

b. Battery type: Sealed lead-acid

c. Back-up time:

kVA	100% load	50% load
6	10 minutes	22 minutes
8	18 minutes	35 minutes
10	18 minutes	25 minutes
12	10 minutes	25 minutes

d. Recharge time: 8hrs to 90%, 24hrs to 100%

3.5. Output:

a. Output capacity:

6kVA:	4.2kW
8kVA:	5.6kW
10kVA:	7.0kW
12kVA:	8.4kW

b. Nominal output voltage: 208/120VAC or 240/120VAC

c. Output voltage regulation: +/- 2%

d.	Output frequency regulation:	back-up mode: +/- 0.01Hz
e.	Rated load power factor:	.7 lagging
f.	Crest factor:	3:1
g.	Transient characteristics:	+/- 3% for 100% load step change
h.	Overload capacity:	105-150% for 1 minute
i.	Total voltage harmonic distortion:	2% maximum under linear load
j.	Efficiency (typical):	6KVA: >88% 8KVA: >88% 10KVA: >89% 12kVA: >90%
k.	Bypass:	Static switch < 1 ms transfer time; auto retransfer

3.6. Environment:

The UPS shall be capable of withstanding any combination of the following external environment conditions without mechanical damage, electrical failure or degradation of operating characteristics.

a.	Ambient operating temperature range:	32°F to 104°F (0°C to 40°C)
b.	Recommended operating temperature:	77°F (25°C)
c.	Storage temperature:	5°F to 104°F (-15°C to 40°C)
d.	Relative humidity:	30-90% (non-condensing)
e.	Audible noise:	< 55db at 3.3 feet (1 meter)

3.7. Battery Self Test (DiamondSense)

For a short duration of time, a small power discharge from the battery is automatically carried out. From this small power discharge, the Mitsubishi UPS evaluates the degradation of the battery. The following advantages are therefore achieved:

- The DiamondSense Battery Self-Test Function can be performed even when the load is on the inverter
- Due to the short duration small power discharge there is no effect to the battery life expectancy
- The small power discharge has negligible effect on the overall battery back up time. The small power that is discharged by the battery will quickly be replenished

3.8. Reliability:

The UPS equipment reliability shall be represented in terms of theoretical Mean-Time-Between-Failures. The UPS manufacturer shall, as a minimum, provide the following capability:

a. Total UPS system output (includes reliability of bypass circuit):

   4,000,000 MTBF hours

b. UPS operation only:
   200,000 MTBF hours.

3.9. Maintainability

MTTR of the UPS shall not exceed 1 hour including time to replace components.

3.10. Installation

All units are hardwired as standard. Plug & Play option is available for the 6 and 8kVA units.

4. OPERATOR CONTROLS & STATUS DISPLAY

The UPS system shall be equipped with control switches, status indicator LED's and associated accessories which will allow the operator to perform functional commands, monitor the system status and allow for ease of installation.

4.1. Indicators:

a. Battery LED indicator (monitors when in back-up mode; battery supplying load)
b. Inverter LED indicator (monitors inverter on/off)
c. UPS LED indicator (monitors when output is present from inverter)
d. Bypass LED indicator (monitors when load is on bypass)
e. UPS failure LED indicator
f. Backlit LCD display (monitors UPS operating parameters & diagnostics)
    -Self test status
    -Normal and loading status
    -Battery and back-up status
    -Overloading status
    -Shutdown status
    -Remote auto-shutdown
    -Failure status

4.2. Control switches:

a. Start/Stop button (controls the inverter on/off)
b. Menu button (controls different power readings on LCD display)

4.3. Accessories:

a. Input/output terminal blocks
b. External battery input terminal blocks
c. Battery fuse
d. External input/output communication connector port
e. External RS232C communication connector port for Diamondlink

5. COMMUNICATIONS

The UPS shall be equipped with an external input/output signal port connector and an RS232C communication interface to enable the operator to receive and send remote communication signals.

5.1. External input/output signal

5.1.1. AS400 connector:

The UPS shall have an external input/output signal port connector compatible with all AS400. A-type dry (male or female) contacts for input and output signals shall be made available through a D-sub 25 pin connector.

Output signals shall include:

a. Fault
b. On battery
c. Battery low
d. On bypass
e. On inverter

Input signal shall include:

a. Remote stop

5.1.2. Terminal blocks

The UPS shall have an external input/output signal terminal.

Output signals shall include:

a. Fault

Input signal shall include:

a. Battery temperature high
b. Emergency Power Off (EPO)
c. Remote start
d. Remote stop

5.2. External RS232C connector:

An RS232C external communication port shall be provided for Diamondlink management and shutdown software. Refer to optional equipment listed below.

6. OPTIONAL EQUIPMENT

6.1. Plug & Play: (6 & 8KVA)

6.1.1. AC line cords:

AC input line cords shall be made available for the 6 and 8KVA units. The line cords shall be utilized in lieu of the provided terminal blocks for hardwiring which will allow for ease of installation.

6.1.2. Output load receptacles:

Multiple receptacle configurations shall be made available for the AC load connections other than the provided (4) 120V 5-15R on the units.

6.2. Extended battery cabinets:

Extended battery runtimes shall be made available in external matching cabinets for applications requiring reserve times beyond the battery provided inside or externally of the respective UPS cabinet.

6.3. Diamondlink monitoring/shutdown software:

The UPS shall be compatible with the Diamondlink monitoring software. Diamondlink is an advanced user-customizable power monitoring management and shutdown software providing UPS status information thus allowing to perform unattended system shutdown when critical conditions occur. Diamondlink is designed to run on network servers or workstations in any office environment.

Features of Diamondlink shall include:

a. Monitoring of all intelligent Mitsubishi UPS's.
b. On-screen power history graphing
c. Multilingual capabilities
d. Customizable power event actions
e. Customizable flex events
f. Easy, menu driven installation
g. Multiple server shutdown

7. PHYSICAL CHARACTERISTICS

a. Dimensions & Weights:

Unit	Dimensions	Packed Weight	Net Weight
6KVA	13.8”W x 29.9”D x 27.5”H	350 lbs	307 lbs
8KVA	13.8”W x 29.9”D x 40.5”H	550 lbs	504 lbs
10KVA	13.8”W x 29.9”D x 40.5”H	550 lbs	504 lbs
12KVA	13.8”W x 29.9”D x 40.5”H	550 lbs	504 lbs

b. Casters with locking points and leveling feet shall be included as a standard feature.

c. Minimum required clearance: 1.2” sides , 3.9” back , 23.6” top