

# CYBERWAVEUPS

## Data Sheet



CyberWave UPS, the world's first digitally controlled UPS for custom industrial applications, combines Cyberex's hallmark rugged electrical design with the versatility of digital signal processors, field-programmable gate arrays and EPROM's to set a new standard in UPS performance and reliability.

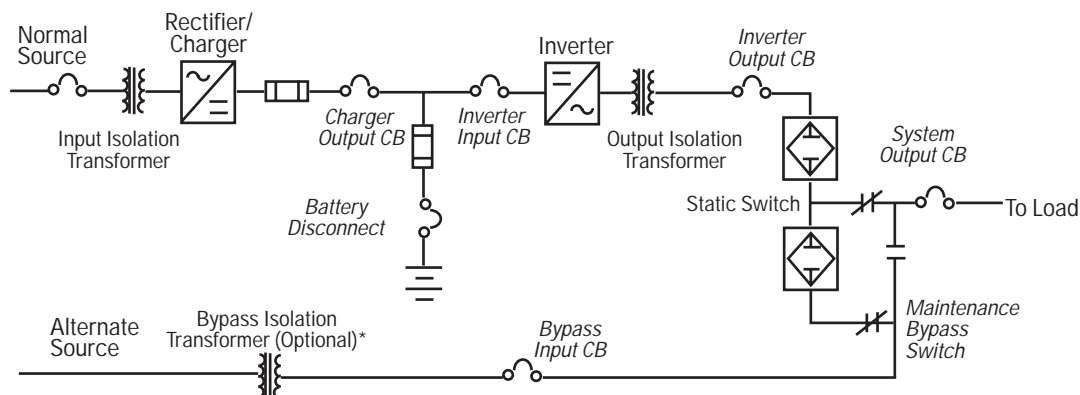
CyberWave UPS has standard features no other UPS manufacturer can match, including modbus Communications and advanced battery management capabilities and the world's first VGA, full-color touch-screen 8" x 11" control panel (PowerPad). In addition, every CyberWave UPS incorporates Cyberex's patented Digital Static Transfer Switch design for increased system redundancy and reliability.



### Hardware Configuration Summary

	INPUT			RECTIFIER				BATTERY				INVERTER			BYPASS			SYSTEM		
	System Input Breaker (auto)	Input Isolation Transformer	10% Input Filter	6-pulse Rectifier/Charger	Charger Output Fuse	Charger Output CB (non-auto)	Battery Disconnect Switch	240V DC Bus Voltage	120V DC Bus Voltage	Battery Fuse	Inverter Input CB (non-auto)	IGBT PWM Inverter (< 5% VTHD for CF-3)	Internal IGBT Fuses	Inverter Output Isolation Transformer	Inverter Output CB (non-auto)	Bypass CB	Bypass Isolation Transformer	Bypass Voltage Regulator	Maintenance Bypass Switch	Static Switch: Fully rated Bi-directional System Output CB (non-auto)
M1	x	x	o	x	x		x	x	o	x		x	x			o	o	x	x	
M2	x	x	o	x	x		x	x	o	x		x	x		x	o	o	x	x	x
M3	x	x	o	x	x	x	x	x	o	x	x	x	x	x	x	o	o	x	x	x

x = Standard Feature    o = Optional Feature    Shaded Blocks = Not Available



M3 Configuration

\*When alternate line transformer is needed, Cyberex recommends an M2 or M3 configuration.

# User Interface Configuration Summary

The fully-digital architecture of the CyberWave UPS system allows the user to monitor key system parameters and to digitally control system setpoints through the Power Pad – an 8"x11" VGA full-color, touch screen front panel. Three pre-configured information and control platforms are available: Basic (PowerPad 1), Advanced (PowerPad 2) and Comprehensive (PowerPad 3).

X - Standard Feature      PowerPad 1 (P1) – Basic  
 O - Optional Feature      PowerPad 2 (P2) – Advanced  
    PowerPad 3 (P3) – Comprehensive

## Standard System Setpoints & Controls

### General

- UPS Start
- UPS Stop
- Modbus Communications
- Transfer to Bypass
- Preferred/Alternate Control
- Date, Time & Time Zone Set
- Audible Alarm Enable/Disable
- Audible Keys Enable/Disable
- Default Screen Options
- Password Protection
  - User Level
  - Service Level
  - Factory Level

### Rectifier

- Rectifier Output DC Voltage Window
- Rectifier Output DC Voltage: High Alarm Setpoint
- Rectifier Output DC Voltage: Low Alarm Setpoint
- Rectifier Start-up Only

### Battery

- Battery Voltage Low Alarm Setpoint
- Battery Test: Programmable/Manual (120VDC Only w/P3 software)
- Battery Test: Interval Setpoint (120VDC Only w/P3 software)
- Battery Test: Current Setpoint (120VDC Only w/P3 software)
- Battery Test: Duration Setpoint (120VDC Only w/P3 software)
- Battery Test: Start/Stop Control (Manual) (120VDC Only w/P3 software)
- Battery Equalization Mode: Auto/Manual
- Battery Equalization Start/Stop Control (Manual)
- Battery Equalization Duration Setpoint

### Inverter

- Inverter Output Voltage Window
- Inverter Output Voltage: High Alarm Setpoint
- Inverter Output Voltage: Low Alarm Setpoint
- Inverter Saturation Trip Restart: Enable/Disable
- Return to Inverter: Enable/Disable
- Auto Start: Enable/Disable
- Transfer to Bypass on Inverter Fail: Enable/Disable
- Synchronization Fail Transfer: Enable/Disable
- STS Test Control

Metering	Metering Value (1% Accuracy)	P1	P2	P3
<b>Rectifier</b>	Input Voltage (A, B, C)	x	x	x
	Input Current (A, B, C)	x	x	x
	Input Frequency		x	x
	Output Voltage DC		x	x
	Output Current DC		x	x
<b>Battery</b>	Voltage DC	x	x	x
	Current DC	x	x	x
	Temperature	o	o	o
	Runtime		x	x
	Time Remaining		x	x
	Power		x	x
	Cycles			x
	Total Cycles			x
	Test Cycles			x
	<b>Inverter</b>	Voltage RMS		x
Current RMS			x	x
Frequency			x	x
Inverter Input DC Bus Volts		o	o	o
<b>Output</b>	Output Voltage RMS	x	x	x
	Output Current RMS	x	x	x
	Output Frequency	x	x	x
	Output Real Power (Watts)		x	x
	Output Apparent Power (VA)		x	x
	% Loading		x	x
	Crest Factor			x
	UPS Peak Current			x
	Power Factor			x
	<b>Alt Line</b>	Input Voltage	x	x
Input Frequency		x	x	x
<b>Number of Meters</b>		<b>11</b>	<b>23</b>	<b>29</b>

## CyberWave System Options

- Cascaded Redundant Configuration
- Split Redundant Configuration
- Temperature Compensated Battery Charging
- All Alarms latched
- Special Paint Specifications
- Conformal Coated PC Boards
- Redundant Cooling for Cabinet Fans
- Separate Maintenance Bypass Cabinet
- DC Blocking Diode\*
- Breaker Position Indicator Package
- Blown Fuse Indicator Package
- Remote Alarm Panel
- Additional Remote Alarm Contacts (4 Standard)
- 10% Input Filter
- Seismic Bracing
- Drip Shield
- Vermin Shield
- Bottom Cable Entry
- SIS Wire
- Wire Markers

\*Battery Test Not Available with this Option

# User Interface Configuration Summary

Events/Alarms Parameter	P1	P2	P3
<b>Rectifier</b>			
Rectifier Input Available	x	x	x
Rectifier Input Failure	x	x	x
On Rectifier	x	x	x
Rectifier OK	x	x	x
Rectifier Fail	x	x	x
RCB Communications Failure	x	x	x
Rectifier Equalize Mode	x	x	x
Rectifier Output Voltage High		x	x
Rectifier Output Voltage Low		x	x
Rectifier Output Current High		x	x
Rectifier Input Voltage High			x
Rectifier Input Voltage Low			x
Rectifier Input Frequency Low			x
Rectifier Input Frequency High			x
Rectifier Input CB Open	o	o	o
Rectifier Output Fuse Blown	o	o	o
Rectifier Output CB Open	o	o	o
<b>DC Bus</b>			
DC Bus OK	x	x	x
DC Ground Fault		x	x
DC Bus High Voltage	o	o	x
DC Ground Fault Positive		x	x
DC Ground Fault Negative		x	x
DC Caps Due for Maintenance			x
DC Bus CB Open	o	o	o
DC Bus Fuse Blown	o	o	o
<b>Battery</b>			
On Battery	x	x	x
Low Battery	x	x	x
Battery Equalize Initiated	x	x	x
Battery Equalize Aborted	x	x	x
Battery Equalize Complete	x	x	x
Battery Available ( <i>Disk Closed</i> )	x	x	x
Battery Not Available ( <i>Disk Open</i> )	x	x	x
Battery End Voltage	x	x	x
Battery Test			x
Battery Test Initiated			x
Battery Test Failed			x
Battery Test Terminated by User			x
Battery Test Incomplete			x
Battery Due for Maintenance			x
Battery Equalize in 30 minutes			x
Battery Equalize Terminated by User			x
Battery CB Shunt Trip	o	o	o
Battery Blown Fuse	o	o	o
Temp. Compensated Battery Charging	o	o	o
Battery CB Open	o	o	o
<b>Inverter</b>			
Inverter OK	x	x	x
Inverter Failure	x	x	x
Inverter Overload	x	x	x
Inverter Current Limit	x	x	x
Inverter Sat Trip	x	x	x
Inverter Temperature OK	x	x	x
Inverter Overtemp	x	x	x
Inverter Output Voltage High			x
Inverter Output Voltage Low			x
Inverter Output Frequency High			x
Inverter Output Frequency Low			x
Inverter Input CB Open	o	o	o
Inverter Output CB Open	o	o	o
Inverter Input Fuse Blown	o	o	o

Events/Alarms Parameter	P1	P2	P3
<b>Bypass</b>			
Alt Line Available	x	x	x
Alt Line Fail	x	x	x
Sync Loss	x	x	x
STS on Inverter	x	x	x
Manual Transfer Enable	x	x	x
Alt Line CB Open	o	o	o
<b>Output</b>			
Load on Inverter	x	x	x
Load on Bypass	x	x	x
MBS in Normal Position	x	x	x
MBS in Bypass	x	x	x
MBS in Bypass Isolate	x	x	x
STS Active Short	x	x	x
STS Inactive Short	x	x	x
STS Open SCR	x	x	x
STS Receive Error	x	x	x
STS Timeout Error	x	x	x
STS on Alternate	x	x	x
Output Failure			x
Output to Ground Fault	o	o	o
STS Output CB Open	o	o	o
Emergency Power OFF	o	o	o
<b>General</b>			
UPS Normal	x	x	x
System Reset	x	x	x
Overload Timer Started	x	x	x
Overload Timer Ended	x	x	x
EPROM Write Error	x	x	x
Lost Communication to Master	x	x	x
Summary Alarm	x	x	x
Summary Overtemp	x	x	x
Cabinet Overtemperature	x	x	x
Fan Failure			x
STS Power Supply Failure			x
System Logic Power Supply			x
Air Filter Needs Cleaning			x
Fans Due for Maintenance			x
Cascaded Redundent Configuration	o	o	o
Split Redundent Configuration	o	o	o
UPS Trouble	o	o	o
UPS Shutdown	o	o	o
<b>Other</b>			
Event Log	x	x	x
STS Test			x
Mimic Panel			x

X - Standard Feature

O - Optional Feature

PowerPad 1 (P1) - Basic

PowerPad 2 (P2) - Advanced

PowerPad 3 (P3) - Comprehensive

# CyberWave UPS Selection Guide

UPS Model	CW-10	CW-15	CW-20	CW-25	CW-30	CW-40	CW-50	CW-60	CW-75	CW-112
kVA	10	15	20	25	30	40	50	60	75	112

## Input

Input Voltage	208, 480, or 600 Volts for 60 Hz Systems and 220/240, 380, or 415/440 Volts for 50 Hz Systems									
Number of Phases	3 Phases									
Number of Wires	Standard: 3 wire + Ground, Optional: 4 Wire + Ground									
Input Frequency	Standard: 60 Hz, Optional: 50Hz									
Input Power Factor	0.75 pf at rated output and load									
Maximum Input Current @ 480V, 100% Load, 240 VDC	21A	31A	41A	51A	62A	82A	103A	124A	154A	231A
Input Breaker @ 480V	35A	50A	60A	80A	90A	125A	150A	175A	200A	300A

## Bypass

Input Voltage	Same as Output of the UPS									
Nominal Bypass Current @ 120V	83A	125A	167A	208A	250A	333A	417A	500A	625A	933A
Maintenance Bypass Switch	Rotary 3 Position Switch									
Bypass Switch	Standard for M2 & M3; Bypass Line Input Disconnect Switch,					Optional for M2 & M3; Automatic Battery Disconnect Breaker				

## DC Bus

Voltage	Standard: 240 VDC, Optional: 120 VDC							240 VDC Only		
Battery Switch	Standard: Battery Disconnect Switch,							Optional: Automatic Battery Disconnect Breaker		
Maximum Battery Current @ 240VDC , 100% Load	51A	76A	102A	127A	152A	203A	254A	263A	381A	569A
Maximum Rectifier/Charger Current @ 240VDC , 100% Load	44A	61A	78A	95A	112A	146A	180A	214A	265A	391A

## Output

Output Voltage	Standard: 120VAC for 60 Hz Output,					Optional: 110/120VDC for 50 Hz Output				
Output Frequency	Standard: 60 Hz, Optional: 50 Hz									
Number of Phases	Single Phase									
Number of Wires	Standard: 2 Wire, Optional: 3 Wire									
Output Isolation Switch/Breaker	Standard in M2 & M3 Configurations									
UPS Output Current @ 120VAC, 100% Load	83A	125A	167A	208A	250A	333A	417A	500A	625A	933A
15 Minute Overload Current @ 120VAC Unity PF, 150% KW Rating	100A	150A	200A	250A	300A	400A	500A	600A	750A	1120A
Overload: Static Bypass (One Loop)	1400%	950%	700%	700%	600%	1600%	1300%	1050%	850%	
<i>Inverter Efficiency</i>										
100% Load					88%					
75% Load					89%					
50% Load					88%					
25% Land					85%					
Full Load Heat Rejection (BTU/Hr)	4200	5600	7460	12050	14460	19320	24196	28918	38000	56000

## General

<i>Module Dimensions W"xD"xH"</i>										
Base Unit (M1)	77x38x34	77x38x34	77x38x34	77x38x34	77x56x34	77x56x34	77x56x34	77x56x34	77x92x34	77x92x34
<i>Module Weights (lbs)</i>										
(M1)	1600	1600	1600	1900	2590	2590	3200	3700	5400	5400

## Standard Specifications

IGBT-Based PWM Inverter  
Modbus Communications  
Full Digital Controls with DSP's  
Full Isolation Input/Output Transformers  
Full Color Touch Screen Monitor Panel  
RS 232 Communications Port  
Bidirectional Fully Rated Static Switch  
Maintenance Bypass Switch  
Fiber Optic Datapaths  
Advanced Battery Monitoring & Management

## AC Input Rating

Input Voltage	Nominal Voltage +10% and -20%
Frequency	Nominal Frequency $\pm$ 5%
Input Power Factor	0.75@ Full Load and Nominal Input
Input Inrush Current	400% of Nominal Input Current
Current Walk-In Ramp	Up To Full Load in 15 Seconds
Surge Withstand	Meets IEEE 587/ANSI C62.41
Transient Energy	160 Joules (Max Ratings at 85° C, 10/1000msec & Combination Wave Tests)
Current Limit	125% of Rated 0.8pf Current
Input Current THD	30% Typical, 10% with Optional Filters

## DC Bus Rating

DC Voltage	Standard 240V <sub>DC</sub> , 120V <sub>DC</sub> Optional
DC Regulation	$\pm$ .25% from No Load to Full Load
DC Voltage Ripple	<2% RMS Ripple @ Full Load, without Battery Connected

## AC Output Rating

Inverter Power	Rated at 0.8 Power Factor
Voltage	120V, 240V Optional (International Voltages Available)
Voltage Adjustability	$\pm$ 5% of Nominal
Voltage Regulation	< $\pm$ .5% Steady State for 0-100% Load Change
Transient Response	< $\pm$ 5% for a 100% Load Step < $\pm$ 1% for Loss or Return of AC Input Power < $\pm$ 5% for Manual Transfer to Bypass and Back @100% Load
Voltage Recovery	Return to Within $\pm$ 2.5% of Nominal Value Within 16 Milliseconds (One Cycle)
Voltage Distortion	Linear Loads: <3.5% at Full Load Non Linear Loads (Crest Factor = 3:1): Max 5% at Full Load
Overload: Inverter	Up to 150% of Rated Output Power for 15 Minutes at Min DC Bus and Input Voltage at 40°C Up to 150% of Rated Output Power for 5 Minutes at 50°C
Overload: Static Bypass	10 to 20kVA: 1193A RMS Symmetrical with X <sub>L</sub> /R=15 for One Loop 25 to 30kVA: 1491A RMS Symmetrical with X <sub>L</sub> /R=15 for One Loop 40 to 75kVA: 5321A RMS Symmetrical with X <sub>L</sub> /R=15 for One Loop
Frequency	60Hz Nominal, 50Hz Optional
Frequency Stability	$\pm$ .1% Free Running
Frequency Slew Rate	1.0 Hz/Sec Maximum

## Product Standards

In Accordance with NEMA and UL 1778/ETL Field Labeling Option  
Year 2000 Compliant  
CSA Compliant

## Environmental Specifications

Accoustical Noise Level	Less Than 60dBA at 3 Feet
Operating Temperature	0-40°C
Relative Humidity	0-95% Non-Condensing
Access	No Rear or Side Access Required for Operations or Maintenance
Cooling	Forced Air; Optional Redundant Fan Assemblies for Cabinet
Operating Altitude	Up to 1000 m at 40°C; Derate by 9% for Every 1000m Altitude Increase

## SuperSource™ Short-Circuit Protection

Cyberex SuperSource™ Short-Circuit Protection (optional) provides an additional internal power source to the UPS controls which allows the inverter to deliver 110% of its rated current into a downstream bolted AC fault for up to two minutes.

This optional module is recommended in those cases when AC faults must be cleared even if the alternate AC line has been lost. SuperSource allows the inverter itself to clear very large fault protection devices in the AC distribution system. The module is powered directly from the DC battery bus.

Dimensions (W"xH")

- One Control Module, 16x6.25



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