Energys

OUR PRODUCTS

SINGLE PHASE UPS

ACE
600-1500 VA

BRIGHT
600-2000 VA

CHALLENGER
1-3 KVA

DYNAMIC
1-3 KVA

DYNAMIC RT
1-3 KVA

DYNAMIC
6,10 KVA

DYNAMIC RT
6,10 KVA

THREE PHASE UPS

ENTERPRISE
10-40 KVA

FORCE
60-300 KVA

GENIUS
3:1 6-40 KVA

GENIUS
10-800 KVA

POWER + SA
10-40 KVA

CENTRIC
50-200 KVA

UPS-SP
3:1 6 - 80 KVA
3:3 10 -200 KVA

BATTERY

- 12V7.2AH
- 12V9AH
- 12V12AH
- 12V17AH
- 12V22AH
- 12V55AH
- 12V75AH
- 12V100AH
- 12V120AH
- 12V150AH
- 12V200AH

UPS PRODUCT LINE

Technology

THREE PHASE UPS

D

SINGLE PHASE UPS

C Challenger

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Power


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GAMATRONIC

Our Power, Your Confidence

STABILIZER

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BATTERY

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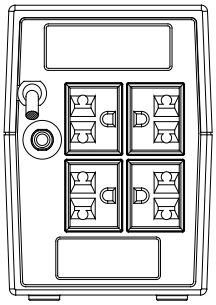
Source

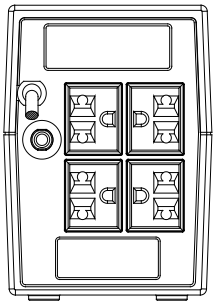
Ace

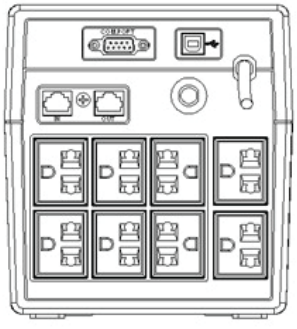
600 - 1500 VA

Features

- Power Saver Function
- Line Interactive Technology
- Cold Start Function
- Intelligent Battery Management
- Built in Boost and Buck AVR







Ace 600-1500VA Specification

	ACE 600	ACE 800	ACE 1000	ACE 1500
Capacity (VA/WATT)	600VA/360W	800VA / 480W	1000VA / 600W	1500VA/900W
Input				
Nominal Input Voltage	220/ 230/ 240V			
Input Voltage range	140 - 300 V			
Input Frequency range	50/60 Hz (auto sensing)			
Bypass				
Bypass Voltage	220/ 230/ 240V			
Transfer time	2-6 ms typical, 10ms max (13ms max for Generator or Step input).			
Output				
Output Voltage	220/ 230/ 240V			
Voltage regulation	±10%			
Output Frequency	50 Hz ±1%			
Waveform	Simulated Sine Wave			
Output Power Factor	0.6			
Battery				
Battery DC Voltage	12V	12V	24V	24V
Battery Type	Sealed Lead Acid			
Battery number	12V/7.2Ah x 1	12V/9Ah x 1	12V/7.2Ah x 2	12V/7.2Ah x 2
Backup time	15-30 min Depend on Load			
Charge current	1.2 A			
LCD indicators				
AC Mode	Solid green led lighting			
Battery Mode	Solid yellow led flash			
Fault	Solid red led lighting			
Protection	short circuit, Overload, Overcharge and overdischarge protection			
Overload capacity	Sounding every 0.5 seconds			
Audible Alarm				
Battery mode	Sounding every 10 seconds			
Low Battery	Sounding every second			
Overload	Sounding every 0.5 seconds			
Fault	Continuously sounding			
Communication interface	DB9/ RS232/ USB port for option (RS232 and USB ports cannot be activated at the same time)			
Physical				
Dimension (DxWxH)mm.	287 x 101 x 142.5	287 x 101 x 142.5	338 x 149 x 162	380 x 158 x 198
Net Weight (KGs)	4.5	5.2	8.5	11.1
Environmental				
Humidity Range	0-90 % RH @ 0-40˚C (non-condensing)			
Noise level	Less than 40dB			
Standards				
Safety	IEC/EN 62040-1;IEC/EN60950-1			
EMC	IEC/EN 62040-2;IEC61000-4-2;IEC61000-4-3;IEC61000-4-4;IEC61000-4-5;IEC61000-4-6;IEC61000-4-8			
Design	IEC/EN 62040-3			

Bright

600 - 2000 VA

LCD or LED panel for option

Two kinds of color LCD display

LED display

Optional socket

Features

- Line interactive Tecnology
- AVR boost and buck
- Cold start function
- Smart RS232/USB interface for power management
- Built-in Self-diagnostic function
- Modem/LAN internet protection
- Compatible with generator set （optional）
- LCD or LED panel for option
- Fastest charging capacity
- Auto charging at off mode
- Auto-restart function

1. AC input
2. Output socket
3. USB & RJ11 communication
4. USB & RS232 communication
5. RJ45

Rear Panel

Bright 600-2000VA Specification

Model	BRIGHT 600	BRIGHT 800	BRIGHT 1000	BRIGHT 1200	BRIGHT 1500	BRIGHT 2000
Capacity (VA/WATT)	600VA/360W	800VA/480W	1000VA/600W	1200VA/720W	1500VA/900W	2000VA/1200W
Input						
Nominal Input Voltage	110/120V or 220/ 230/ 240V					
Input Voltage range	81-145 V or 162-290 V					
Input Frequency range	50/60 Hz (±10%)					
Bypass						
Bypass Voltage	110/120V or 220/ 230/ 240V					
Transfer time	2-6 ms typical, 10ms max.					
Output						
Output Voltage	110/120V or 220/ 230/ 240V					
Voltage regulation	±10%					
Output Frequency	50 /60 Hz ±1%					
Waveform	Simulated Sine Wave					
Output Power Factor	0.6					
Battery						
Battery DC Voltage	12V	12V	24V	24V	24V	24V
Battery Type	Sealed Lead Acid					
Battery number	12V/7.2Ah x 1	12V/9Ah x 1	12V/7.2Ah x 2	12V/7.2Ah x 2	12V/9Ah x 2	12V/9Ah x 2
Backup time	15-30min Depend on Load					
Charge current	1.2 A					
Typical recharge time	6-8 Hours to 90% full capacity					
System Features						
LCD indicators						
AC Mode (Green LED Lighting)	The 5th Green LED lighting (The 1st to 4th Green LED Lighting to indicate load level) LED1(Green) :>100% Load level, LED2(Green) :>75% Load level, LED3(Green) :>50% Load level, LED4(Green) :>25% Load level					
Battery Mode (Amber LED Flashing)	The 5th Green LED Blinking (The 1st to 4th Green LED Lighting to indicate battery capacity) LED1(Green) :Battery Voltage > 25V , LED2(Green) :Battery Voltage > 23V, LED3(Green) :Battery Voltage > 22V, LED4(Green) :Battery Voltage > 21V					
Fault	Solid red led lighting					
Protection	short circuit, Overload, Overcharge and overdischarge protection					
Audible Alarm						
Battery mode	Sounding every 10 seconds					
Low Battery	Sounding every second					
Battery Replacement Alarm	Sounding every 2 seconds					
Overload	Sounding twice every seconds					
Fault	Continuously sounding					
Communication interface	USB/RS232 (Optional),Supports Windows 2000/2003/XP/Vista/2008,Windows7,Linux,Unix and MAC					
Physical						
Dimension (DxWxH)mm.	298 x 101 x 142		338 x 149.3 x 162		380 x 158 x 198	
Net Weight (KGs)	4.25	4.9	7.8	8	11.1	11.5
Environmental						
Operation temperature	0 ~ 40˚C					
Humidity Range	0-90 % RH @ 0-40˚C (non-condensing)					
Noise level	Less than 40dB (1 meter from surface)					
Standards						
Safety	IEC/EN 62040-1;IEC/EN60950-1					
EMC	IEC/EN 62040-2;IEC61000-4-2;IEC61000-4-3;IEC61000-4-4;IEC61000-4-5;IEC61000-4-6;IEC61000-4-8					
Design	IEC/EN 62040-3					

Challenger

1-3 KVA

Features

- High frequency and double conversion on-line technology
- Digitized microprocessor control optimizes reliability
- Wide input voltage range (110V – 300V)
- Input power factor correction
- Output power factor 0.8 - 0.9
- UPS start up without battery
- Cold start function
- Converter mode available
- ECO mode available
- Generator compatible
- Smart SNMP works with either USB or RS-232 together
- EPO function optional
- Input L and N reversed alarm function
- Optional extension battery pack
- Comprehensive display allows easy monitoring and access of UPS status
- OVCD optional
- Can add extra charger for longrun (optional)
- Short circuit Protection

Control Panel
Up to 50 items set by LCD

USB

SNMP

Drycontact card

Rear Panel

Terminal Block

Mini dry
contact card

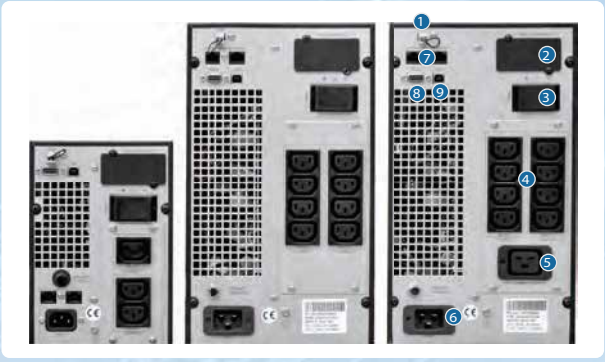
Challenger 1-3KVA Specification

Model	SCC-1K / SCCH-1K	SCC-2K / SCCH-2K	SCC-3K / SCCH-3K
Capacity (VA/WATT)	1000VA/900W	2000VA/1800W	3000VA/2700W
Input			
Nominal Input Voltage	200/ 208/ 220/ 230/ 240Vac		
Input Voltage range	110 ~ 300Vac at 60% load , 160 ~ 300Vac at 100% load		
Input Frequency range	45 ~ 55Hz/55 ~ 65Hz		
Input Power factor	≥ 0.99 @Nominal voltage (100% load)		
Bypass			
Bypass Voltage	200/ 208/ 220/ 230/ 240Vac		
Transfer time	0ms Typical		
Output			
Output Voltage	200/ 208/ 220/ 230/ 240Vac		
Voltage regulation	± 1%		
Output Frequency	45 ~ 55Hz/56 ~ 64Hz		
Waveform	Pure Sine Wave		
Harmonic distortion (THDv)	≤ 3% (Linear load) ≤ 6% (Non-linear load)		
Efficiency	88%	89%	90%
Output Power Factor	0.8		
Battery			
Battery DC Voltage	24V	48V	84V
Battery Type	12V/9Ah	12V/9Ah	12V/9Ah
Battery number	2	4	6
Backup time	15-30 min Depend on Load		
Charge current	1.0 A		
Charging Voltage	27.4Vdc ± 1%	54.7Vdc ± 1%	82.1Vdc ± 1%
Typical recharge time	5 hours recover to 90% capacity		
System Features			
LCD indicators	Load level, Battery level, AC mode, Battery mode, Bypass mode, and Fault indicators		
Alarm			
Battery Mode	Sounding every 4 seconds		
Low Battery	Sounding every second		
Fault	Continously sounding		
Overload capacity	Sounding twice every second		
Communication interface			
Smart RS-232/USB	Supports Windows® 2000/2003/XP/Vista/2008 Windows® 7/8 Linux,FreeBSD and MAC		
Optional SNMP	Power management from SNMP manager and web browser		
Physical			
Dimension (DxWxH)mm.	368 x 144 x 215	468 x 191 x 340	
Net Weight (KGs)	10	21	26
Environmental			
Humidity Range	20 ~ 90% RH @ 0 ~ 40˚C (Non-condensing)		
Noise level	‹ 55dB @ 1 Meter		
Standards			
Safety	IEC/EN 62040-1;IEC/EN60950-1		
EMC	IEC/EN 62040-2;IEC61000-4-2;IEC61000-4-3;IEC61000-4-4;IEC61000-4-5;IEC61000-4-6;IEC61000-4-8		
Design	IEC/EN 62040-3		

Dynamic

1-3 KVA

Control Panel
Up to 50 items set by LCD



Rear Panel

1.EPO port
2.Intelligent slot for SNMP card,drycontact card etc.
3.External battery cabinet connector
4.Output slots including two segments
5.Large current output slot
6.Input slot
7.RJ45 surge suppress port
8.RS232 port
9.USB port

Features

- High frequency and double conversion on-line technology
- High power density.
- Output power factor up to 0.9.
- Three segment charging mode to increase battery life, optimize recharge time.
- Selectable high efficiency mode of operation.
- Cold start.
- Standard communication options: RS-232 communication port, USB communication port, and relay output contacts or SNMP card.
- Power shedding function may turn off uncritical load in battery backup to make longer backup time for critical load.
- Extended runtime with up to four extended battery modules (EBPs) per UPS.
  Emergency shutdown control through the remote emergency power-off (EPO) port.
- Versatile LCD display with setting function.
- Can add extra charger for longrun (optional)
- Generator input support
- Short circuit Protection

Dynamic 1-3KVA Specification

Model	SDC-1K / SDCH-1K	SDC-2K / SDCH-2K	SDC-3K / SDCH-3K
Capacity (VA/WATT)	1000VA/900W	2000VA/1800W	3000VA/2700W
Input			
Nominal Input Voltage	220/230/240 Vac		
Input Voltage range	200~290 Vac (Full load)		
Input frequency range	50/60Hz±10%		
Input Power factor	≥ 0.99		
Bypass			
Bypass Voltage	200/ 208/ 220/ 230/ 240Vac		
Bypass Frequency range	200~290 Vac (Full load)		
Transfer time	0ms (Mains⟷Battery)		
Output			
Output Voltage	200/ 208/ 220/ 230/ 240Vac		
Voltage regulation	± 1%		
Output Frequency	Synchronized with the utility on AC mode; 50/60(±0.1)Hz on battery mode		
Crest Factor	3:1		
Waveform	Pure Sine Wave		
Harmonic distortion (THDv)	<3% (linear load)		
Efficiency	>89%		
	>94% (high efficiency mode)		
Output Power Factor	0.9		
Battery			
Battery DC Voltage	36Vdc	72Vdc	72Vdc
Battery Type	Sealed Lead Acid		
Battery number	12V/7.2Ah/9Ah x 3	12V/7.2Ah/9Ah x 6	12V/9Ah x 6
Backup time	15-30min Depend on Load		
Charge current	1.0 A		
Typical recharge time	5 hours recover to 90% capacity		
System Features			
LCD indicators	Load/Battery/Input/Output/Operating Mode Information		
Overload capacity	30s at 100%-150%;300ms at >150%		
Audible Alarm	1. Sounding every 4 seconds (Battery Mode)		
	2. Sounding every seconds (Low Battery)		
	3. Sounding twice every seconds (Overload)		
	4.Continuously Sounding (Fault)		
Communication interface	RS232,USB,SNMP (optional)		
Physical			
Dimension (DxWxH)mm.	409x144x215	466x199x337	
Net Weight (KGs)	13	24.6	25.5
Environmental			
Operation temperature	0~40 °C		
Humidity Range	0 ~ 90% RH @ 0 ~ 40°C (Non-condensing)		
Noise level	‹ 55dB		
Standards			
Safety	IEC/EN62040-1,IEC/EN60950-1		
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,		
	IEC61000-4-5,IEC61000-4-6,IEC61000-4-8		
Design	IEC/EN 62040-3		

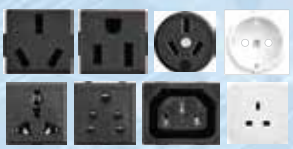
Dynamic RT

1-3 KVA

Features

- Rack/Tower Convertible Design
- Patented Mimic LCD Display May be Rotated by Simply Pushing Front Button
- True Online Double Conversion
- High Output Power Factor at 0.9PF
- Comprehensive display allows easy monitoring and access of UPSstatus
- Smat SNMP works with either USB or RS-232 together
- Hot-Swappable Battery
- Efficiency up to 90%
- Estimated Remaining Time displayed on the LCD
- Support Economic(ECO) Operation Mode
- Matching Battery Pack
- Optional Powerful Charger
- Cold Start
- Power Shedding May Turn Off Uncritical Load in Battery Backup
- Emergency Power Off
- Frequency Converter Mode Is Settable
- **Generator input support**
- Short circuit Protection

Two directions LCD display



Optional socket

Mini dry contact card

Multifunctional bracket

Rack-Tower convertible

Battery Cabinets (Optional)

Easy for maintenance, hot-swappable battery

Dynamic RT 1-3KVA Specification

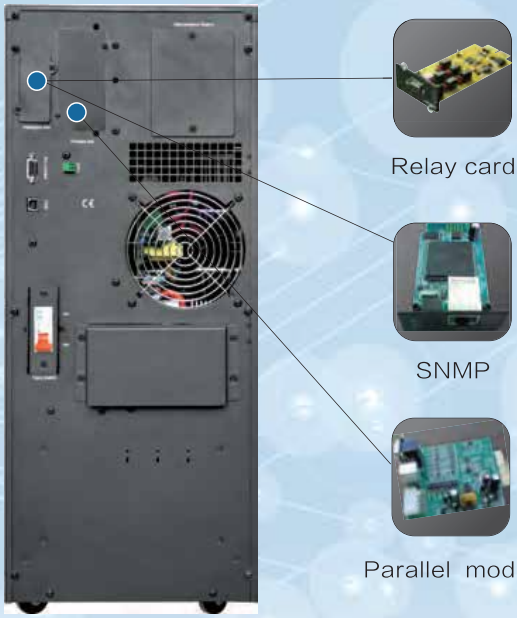
Model		SDCRT-1K/SDCRTH-1K	SDCRT-2K/SDCRTH-2K	SDCRT-3K/SDCRTH-3K
Capacity (VA/WATT)		1000VA/900W	2000VA/1800W	3000VA/2700W
Input				
Nominal Input Voltage		200/ 208/ 220/ 230/ 240Vac		
Input Voltage range		110~290 Vac		
Input Frequency range		45~65Hz(auto-detect)		
Input Power factor		≥0.98		
Generator input		Compatible		
Bypass				
Bypass Voltage		200/208/220/230/240 V Max.voltage: +15%(optional +5% +10% +25%)		
		200/208/220/230/240 V Min.voltage: -45%(optional -15% -20% -30%)		
Bypass Frequency range		±10%		
Transfer time		1. 0ms (Mains⟷Battery) 2. <4ms (Mains ⟷Bypass)		
Output				
Output Voltage		200/ 208/ 220/ 230/ 240Vac		
Voltage regulation		± 1%		
Output Frequency Utility Mode		50Hz or 60Hz (Synchronized to Mains)		
Output Frequency Battery Mode		50/60Hz±0.02Hz		
Waveform		Pure Sine Wave		
Harmonic distortion (THDv)		≤ 3% (Linear load), ≤ 5% (Non-linear load)		
Efficiency	AC Mode(full load)	up to 90%		
	Battery Mode(full load)	>85%		
	ECO Mode(full load)	>94%		
Output Power Factor		0.9		
Battery				
Battery DC Voltage	Standard Model	24Vdc	48Vdc	72Vdc
	Long-run Model			
Battery Type		Sealed Lead Acid		
Battery number	Standard Model	12V/9Ah x 2	12V/9Ah x 4	12V/9Ah x 6
	Long-run Model	Depending on the capacity of external batteries		
Backup time	Standard Model	15-30 Min Depend on Load		
	Long-run Model	Depending on external batteries capacity		
Charge current	Standard Model	1.4A		
	Long-run Model	6A/12A(double board)		
Typical recharge time		4 hours recover to 90% capacity)		
System Features				
LCD indicators		Load/Battery/Input/Output Operating Mode Information		
Overload capacity	AC Mode	Load<100%~150%:30S;Load>150%:300ms then shut down UPS completely		
	Bat. Mode	Load<100%~150%:30S;Load>150%:300ms then shut down UPS completely		
	Bypass. Mode	Load>130%:60S then shut down UPS completely		
Audible Alarm		Line Failure,battery Low,Overload,System Fault		
Communication interface		Smart RS232/USB Port/RJ45/SNMP Card (independent to RS232)		
Physical				
Dimension (WxHxD)mm.		440x86.5x430 (2u)	440x86.5x572 (2u)	440x86.5x696 (2u)
Net Weight (KGs)		15.1	22.2	25.5
Environmental				
Operation temperature		0~40 °C		
Humidity Range		0~90% (non-condensing)		
Noise level		<50dB (at 1 meter)		
Standards				
Safety		IEC/EN62040-1,IEC/EN60950-1		
EMC		IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,		
		IEC61000-4-5,IEC61000-4-6,IEC61000-4-8		
Design		IEC/EN 62040-3		

Dynamic

6-10 KVA

Features

- N+X parallel redundancy
- Online double conversion with DSP control
- Input current harmonic: <3%
- Optimization battery group, the quantity of battery: 16/18/20 pieces (optional)
- High output power factor at 0.9PF
- Wide input voltage range: 120~276Vac
- Wide input frequency range(50Hz: 45~55Hz / 60Hz: 54~66Hz)
- Support generator input
- Support economic(ECO) operation mode
- Self-testing when UPS startup
- Options: SNMP card/Relay card/ Parallel card
- Cold start



Rear Panel

Relay card

SNMP

Parallel module

Dynamic 6-10KVA Specification

Model	SDC-6K /SDCH - 6K	SDC-10K / SDCH-10K
Capacity (VA/WATT)	6K / 5.4k	10K / 9k
Input		
Nominal Input Voltage	220/230/240 Vac	
Input Voltage range	120~276 Vac	
Input Frequency range	50Hz:45~55Hz;60Hz:54~66Hz(auto sensing)	
Input Power factor	≥0.99	
Bypass		
Bypass Voltage	Max.voltage:220V:+25%(optional +10%,+15%,+20%)	
	230V:+20%(optional +10%,+15%)	
	240V:+15%(optional +10%)	
	Min.voltage:-45%(optional -20%,-30%)	
Bypass Frequency range	50Hz/60Hz ±10%	
Transfer time	1. 0ms (Mains ↔ Battery) 2. 0ms (Mains ↔ Bypass)	
Output		
Output Voltage	220/230/240 Vac	
Voltage regulation	±2%	
Output Frequency Utility Mode	±1%/±2%/±4%/±5%/±10% of the rated frequency (optional)	
Output Frequency Battery Mode	50/60(±0.1)Hz	
Crest Factor	3:1	
Waveform	Pure Sine Wave	
Harmonic distortion (THDv)	<2% (with linear load), <5% (with non-linear load)	
Efficiency	>93.5%	
Output Power Factor	0.9	
Battery		
Battery DC Voltage	±96/108/120Vdc (optional)	
Battery Type	Sealed Lead Acid	
Battery number	12V/7.2Ah/9Ah x 20	
Backup time	10-15 Min Depend on Load	
Charge current	1A(Standard unit);Long run unit Max.current 10 A (charge current can be set according to battery capacity installed)	
Typical recharge time	6~8 hours (to 90% of full capacity)	
System Features		
LCD indicators	Input Voltage , Input Frequency,Output Voltage,Output Frequency,Load Percentage,Battery Voltage,	
	Inner Temperature&Remaining Battery Backup Time	
Status LED & LCD display	Line Mode,Back up Mode,ECO Mode,Bypass Mode, Battery Low,Battery Bad,Overload & UPS Fault	
Overload capacity – Line Mode	Load≤110%:last 60min,≤125%:last 10min,≤150%:last 1min,>150% turn to bypass mode immediately	
Overload capacity – Bypass Mode	40A(Breaker)	60A(Breaker)
Short circuit	Hold Whole System	
Overheat	Line Mode: Turn to Bypass;Backup Mode :Shut down UPS immediately	
Audible Alarm	Line Failure, Battery Low,Overload,System fault	
Communication interface	RS232,USB,SNMP card(optional),Parallel card (optional),Relay card (optional)	
Physical		
Dimension (DxWxH)mm.	502x250x616	
Net Weight (KGs)	62	64
Environmental		
Operation temperature	0~40 °C	
Humidity Range	0~95% (non-condensing)	
Noise level	<55dB	
Standards		
Safety	IEC/EN62040-1,IEC/EN60950-1	
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,	
	IEC61000-4-5,IEC61000-4-6,IEC61000-4-8	
Design	IEC/EN 62040-3	

Dynamic RT

6,10 KVA

Features

- Online-Double conversion
- Non Transfer Time of output
- PFC technology
- Full digital control (DSP)
- Output power factor: 0.9
- Input current harmonic: 3%
- ECO function
- Charging/Rectifier/Inverter fully digital control technology
- Optimization battery group, the quantity of battery: 16/18/20 pieces (optional)
- Wide input voltage range: 120~276Vac
- Wide input frequency range: 45~55Hz/54~66Hz ± 0.5Hz
- Self-testing when UPS startup
- Input over/under-voltage protection
- Automatic bypass
- DC start
- Comunication port: RS232 , USB
- Options: SNMP card / Relay card

The LCD panel can be rotated

Battery Cabinets (Optional)

Control Panel

Dynamic RT 6,10 KVA Specification

Model		SDCRT-6K / SDCRTH - 6	SDCRT-10K / SDCRTH-10K
Capacity (VA/WATT)		6K / 5.4k	10K / 9k
Input			
Nominal Input Voltage		220/230/240 Vac	
Input Voltage range		120~276 Vac	
Input Frequency range		45~55Hz/54~66Hz ±0.5Hz	
Input Power factor		≥0.99	
Bypass			
Bypass Voltage		Max.voltage:220V:+25%(optional +10%,+15%,+20%)	
		230V:+20%(optional +10%,+15%)	
		240V:+15%(optional +10%)	
		Min.voltage:-45%(optional -20%,-30%)	
Bypass Frequency range		50Hz/60Hz ±10%	
Transfer time		1. 0ms (Mains ↔ Battery) 2. 0ms (Mains ↔ Bypass)	
Output			
Output Voltage		220/230/240 Vac	
Voltage regulation		±1%	
Output Frequency Utility Mode		±1%/±2%/±4%/±5%/±10% of the rated frequency (optional)	
Output Frequency Battery Mode		50/60(±0.1)Hz	
Crest Factor		3:1	
Waveform		Pure Sine Wave	
Harmonic distortion (THDv)		<2% (with linear load), <5% (with non-linear load)	
Efficiency		>93.5%	
Output Power Factor		0.9	
Battery			
Battery DC Voltage		±96/108/120Vdc (optional)	
Battery Type		Sealed Lead Acid	
Battery number		12V/7.2Ah/9Ah x 20	
Backup time		10-15 Min Depend on Load	
Charge current		Maximum current 6 A ;charge current can be set according to battery capacity installed.	
Typical recharge time		6~8 hours (to 90% of full capacity)	
System Features			
LCD indicators		Input Voltage , Input Frequency,Output Voltage,Output Frequency,Load Percentage,Battery Voltage,	
		Inner Temperature&Remaining Battery Backup Time	
Overload capacity	Line Mode	Load≤110%:last 60min,≤125%:last 10min,≤150%:last 1min,>150% turn to bypass mode immediately	
	Bypass Mode	40A(Breaker)	60A(Breaker)
Short circuit		Hold Whole System	
Overheat		Line Mode: Turn to Bypass;Backup Mode :Shut down UPS immediately	
Audible Alarm		Line Failure, Battery Low,Overload,System fault	
Communication interface		RS232,USB,SNMP card(optional),Parallel card (optional),Relay card (optional)	
Physical			
Dimension (WxHxD)mm.		443x131x580 (3U)	
Net Weight (KGs)		62	64
Environmental			
Operation temperature		0~40 °C	
Humidity Range		0~95% (non-condensing)	
Noise level		<55dB	
Standards			
Safety		IEC/EN62040-1,IEC/EN60950-1	
EMC		IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,	
		IEC61000-4-5,IEC61000-4-6,IEC61000-4-8	
Design		IEC/EN 62040-3	

Enterprise

10-40 KVA

Control Panel

Features

- Online-Double conversion
- Output transfer time is 0ms
- PFC technology
- Full digital control (DSP)
- Output power factor: 0.9
- Input current harmonic: 3%
- ECO function
- Charging/Rectifier/Inverter fully digital control technology
- LCD/LED double display
- Intelligent charging management
- EPO function
- Optimization battery group, the quantity of battery: 16/18/20 pieces (optional)
- Wide input voltage range: 208~478Vac
- Wide input frequency range: 45~66Hz
- DC start
- Comunication port: USB/RS232/RS485/ Parallel port/ dry contact
- Options: SNMP card/Relay card
- Common battery group
- The output can be meet 100% unbalanced load

Enterprise 10-40 KVA Specification

Model	3EC-10K	EC-15K	3EC-20K	3EC-30K	3EC-40K	3EC-60K	3EC-80K
Capacity (VA/WATT)	10KVA/9KW	15KVA/13.5KW	20KVA/18KW	30KVA/27KW	40KVA/36KW	60KVA/54KW	80KVA/72KW
Input							
Nominal Input Voltage	380/400/415Vac, (3Ph+N+PE)						
Input Voltage range	208 ~ 478Vac						
Input Frequency range	50Hz:45 ~ 55Hz;60Hz:54 ~ 66Hz(auto sensing)						
Input Power factor	≥0.99						
Bypass							
Bypass Voltage	Max.voltage: 380V: +25%(optional +10%, +15%, +20%)						
	400V: +20%(optional +10%, +15%)						
	415V: +15%(optional +10%)						
	Min. voltage: -45% (optional -20%, -30%)						
Bypass Frequency range	Frequency protection range: ± 10%						
Transfer time	Mains to Battery:0ms; Mains to Bypass:0ms						
Output							
Output Voltage	380/400/415Vac, (3Ph+N+PE)						
Voltage regulation	± 1%						
Output Frequency	1.Line Mode: ±1%, ±2%, ±4%, ±5%, ±10% of the rated frequency(optional) 2.Battery Mode: 50/60(±0.1)Hz						
Crest Factor	3:1						
Harmonic distortion (THDv)	≤2% with linear load, ≤5% with non-linear load						
Efficiency	93.5%	94.5%					
Output Power Factor	0.9						
Battery							
Battery DC Voltage	Standard unit: ±120Vdc	Standard unit: ±120Vdc		Standard unit: ±120Vdc			
Battery Type	sealed lead acid						
Battery number	Standard unit: 20 pcs	Standard unit: 20 pcs x 2group		Standard unit: 20 pcs x 3group			
Backup time	Long run unit depends on the capacity of external batteries.						
Charge current	1.35/2.7/4.05A(10/15/20/30/40KVA);Long run unit Max.10-15A					Max current 30A	
System Features							
Overload capacity	Load≤ 110%:60min; ≤ 125%:last 10min; ≤ 150%:last 1min; > 150% turn to bypass mode						
Short circuit	Hold Whole System						
Communication interface	USB,RS232,RS485,Parallel port, Dry contact, Intelligent slot, SNMP card(optional), Relay card(optional)						
Physical							
Dimension (DxWxH)mm.	828 x 250 x 868				828 x 330 x 920	828 x 360 x 868	
Net Weight (KGs)	115	170	171	223	225	118	122
Environmental							
Operation temperature	0 ˚C ~ 40 ˚C						
Humidity Range	0 ~ 95% (non-condensing)						
Noise level	<55dB	<58dB				<60dB	
Altitude	<1500m.						
Standards							
Safety	IEC/EN62040-1,IEC/EN60950-1						
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8						
Design	IEC/EN 62040-3						
IP Rating	IP20						

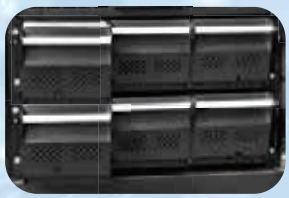
Force (Modular UPS)

60-300 KVA

UPS Cabinet Control Panel

Module Control Panel

Battery Cabinets(Optional)



3 U Battery Box Optional

6kVA /10kVA 1:1 phase
6kVA /10kVA 3:1 phase

10kVA /15kVA / 20kVA / 25kVA / 30kVA 3:3 phase

40kVA 3:3 phase

Features

- High frequency and double conversion on-line technology
- Advanced PFC technology
- 3U frame, rack-mounted and tower convertible
- EPO function
- Wide input voltage range
- Fully digitized microprocessor control
- Parallel redundancy
- Advanced battery management
- Lightning and surge protection, short circuit and overload protection
- Multilingual LCD and LED display
- EMI/RFI noise filter
- Smart RS232 communication with monitoring software
- Optional SNMP card slot

Force 60-300 KVA Specification

Model		3FCM-60K	3FCM-100K	3FCM-200K	3FCM-250K	3FCM-90K	3FCM-150K	3FCM-300K
Capacity (VA/WATT)	UPS cabinet	10~ 60KVA/9 ~ 54KW	10~100KVA/9~90KW	10~200KVA/9~180KW	250KVA/225KW	90KVA/81KW	150KVA/135KW	300KVA/270KW
	HPM module	10KVA/9KW, 15KVA/13.5KW, 20KVA/18KW			25KVA/22.5KW	25KVA/22.5KW, 30KVA/27KW		
Input								
Nominal Input Voltage		380/400/415Vac, (3Ph+N+PE)						
Input Voltage range		208~478Vac						
Input Frequency range		40 ~70Hz						
Input Power factor		≥0.99						
Bypass								
Bypass Voltage		Max.voltage: 380V: +25%(optional +10%, +15%, +20%)						
		400V: +20%(optional +10%, +15%)						
		415V: +15%(optional +10%)						
		Min. voltage: -45% (optional -20%, -30%)						
Bypass Frequency range		Frequency protection range: ± 10%						
Transfer time		Mains to Battery:0ms; Mains to Bypass:0ms						
Generator Input (Soft start)		Support						
Output								
Output Voltage		380/400/415Vac, (3Ph+N+PE)						
Voltage regulation		± 1%						
Output Frequency		1.Line Mode: ±1%, ±2%, ±4%, ±5%, ±10% of the rated frequency(optional) 2.Battery Mode: 50/60(±0.1)Hz						
Crest Factor		3:1						
Harmonic distortion (THDv)		≤2% with linear load, ≤5% with non-linear load						
Efficiency		95.5%			95%			
Output Power Factor		0.9/1(Optional)						
Battery								
Battery DC Voltage		±192Vdc/±204Vdc/±216Vdc/±228Vdc/±240Vdc; battery quantity(optional)						
Battery Type		sealed lead acid						
Backup time		Depends on the capacity of external batteries.						
Charge current	UPS cabinet	18A (Max.)	30A (Max.)	60A (Max.)	60A (Max.)	30A (Max.)	50A (Max.)	100A (Max.)
	module	6A (Max.) (charge current can be set according to battery capacity installed)						
System Features								
Overload capacity	Line Mode	Load≤ 110%:60min; ≤ 125%:last 10min; ≤ 150%:last 1min; ≥ 150% turn to bypass mode immediately						
	Bat. Mode	Load≤ 110%:last 10min, ≤ 125%:last 1min, ≤ 150%:last 1s, ≥ 150% shut down UPS immediately						
	Bypass Mode	Breaker(10KVA: 20A/15KVA: 32A/20KVA:40A)			Breaker(25KVA:40A)	Breaker(25KVA:40A/ 30KVA:60A)		
Short circuit		Hold Whole System						
Communication interface		1. UPS cabinet : RS232, RS485, Dry contact, Intelligent slot x 2(SNMP card, Relay card optional) UPS module: RS232						
Physical								
Dimension (DxWxH)mm.	UPS cabinet	840 x 600 x 1400		1100 x 600 x 2000	600 x1100 x 2000	600 x 840 x 1400		1100 x 600 x 2000
	module	443 x 580 x 131 (3U)						
Net Weight (KGs)	UPS cabinet	149	152	290	290	158	170	307
	module	10KVA/26; 15KVA/30; 20KVA/31			32	25KVA/32; 30KVA/33.5		
Environmental								
Operation temperature		0˚C ~40˚C						
Storage Temperature		-25˚C ~55˚C						
Humidity Range		0 ~95% (non-condensing)						
Noise level		<65dB			<70dB			
Altitude		< 1500m						
Standards								
Safety		IEC/EN62040-1,IEC/EN60950-1						
EMC		IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8						
Design		IEC/EN 62040-3						
IP Rating		IP20						

Genius

6-40 KVA
3/1 Phase
PF : 0.8

Control Panel

1.RS232 port
2.Parallel port
3.Input breaker
4.FAN
5.Connection box
6.Entrance hole
7.Active wheel

Rear Panel

Features

High reliability design

· Double Conversion on-line design, which makes the output a pure sine wave source with tracking frequency, phase-lock and voltage regulation, noise suppression, and without power fluctuation interference, providing the load with more comprehensive protection.

· Zero transfer time of output, satisfies high standard power requirements of precision equipment.

· Modular design and dual-CPU control, high reliability and stability ensure the safe operation and high efficiency.

High reliability during operation

Pure online static bypass technology, provides a strong protection against overload and fault.

· Built-in manual maintenance bypass, further improves the reliability of continuous operation.

Wide input range

· The range of AC input voltage is 380V ± 20 % , thereby it reduces the battery using frequency and greatly extending the battery life.

· Wide input frequency range, ensure all types of fuel generators connected work stable.

Optimization of high-performance battery

· Adapt intelligent battery management(ABM) technology, thus it extends battery life and reduces battery maintenance times.

· Advanced CC(constant current) / CV(constant voltage) auto-conversion charging technology maximizes the activation of cells, thus it saves the charging time and extending the battery life.

Comprehensive and reliable protection

· Self-diagnosis function before start-up, avoid the risks that the failure may lead to.

· The multi-protections such as overload, short-circuit, over-temperature, battery under voltage, battery over-charge and so on greatly ensure the system stability and reliability.

Strong Redundancy/parallel ability

· Some units can be directly connected in parallel, increasing the scalability of the system.

Genius 3/1 6-40 KVA Specification

Model	3GCT1-6K	3GCT1-8K	3GCT1-10K	3GCT1-15K	3GCT1-20K	3GCT1-30K	3GCT1-40K
Capacity (VA/WATT)	6KVA/4.8KW	8KVA/6.4KW	10KVA/8KW	15KVA/12KW	20KVA/16KW	30KVA/24KW	40KVA/32KW
Input							
Nominal Input Voltage	380Vac, (3Ph+N+PE)						
Input Voltage range	± 20%						
Input Frequency range	50/60Hz (±5Hz)						
Input Power factor	>0.97(with filter)						
Max.Input current (A)	14	18	23	34	45	68	90
Bypass							
Transfer time	Mains to Battery:0ms; Mains to Bypass:0ms						
Output							
Output Voltage	220 Vac						
Voltage regulation	± 1%						
Output Frequency	50/60(±1)Hz						
Crest Factor	3:1 (Max.)						
Harmonic distortion (THDv)	<1.5% with linear load						
Efficiency	85% online		90% online				
Output Power Factor	0.8						
Battery							
Battery DC Voltage	192Vdc						240Vdc
Battery Type	sealed lead acid						
Battery number	16 Pcs						20 Pcs
Backup time	Depends on the capacity of external batteries.						
System Features							
Overload capacity	Load > 125%:last 1min; >150%:last 200ms						
Communication interface	RS232, Dry contact(optional), SNMP card(optional)						
Physical							
Dimension (DxWxH)mm.	585 x 305 x 864		798 x 409 x 1044			741 x 555 x 1200	600 x 800 x 1200
Net Weight (KGs)	105	115	125	200	235	336	380
Environmental							
Operation temperature	0˚C ~40˚C						
Storage Temperature	-25˚C ~55˚C						
Humidity Range	0 ~95% (non-condensing)						
Noise level	<55dB						
Altitude	< 1500m						
Standards							
Safety	IEC/EN62040-1,IEC/EN60950-1						
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8						
Design	IEC/EN 62040-3						
IP Rating	IP20						

Genius

10-800 KVA

Features

Online double conversion

· Online Double Conversion design helps to output a pure sine wave ,which is immune from the UPS input, so that the load can run steadily.

· UPS transfers among different working mode without output interruption, thereby powering the load uninterruptedly.

Full DSP control

· Full DSP Control avoids the risks caused by analog devices failure and makes the control system more stable and reliable.

High power factor

· The output power factor up to 0.9 better matches the load.

· The input power factor 0.98 with filter helps to improve the efficiency, reduce the harmonic pollution to the Grid and lower the UPS running cost.

Wide input adaptability

· The range of AC input voltage is (380Va/400Vac/415Vac) (−25%/+20%), minimizing transfer to battery mode, thereby greatly prolonging the battery life.

· Wide input frequency ranging from 45Hz to 65Hz, ensures stability of UPS while generator connected.

Optimized battery management

· Intelligent battery management system and advanced battery auto float/boost charge technology, reduces the frequency of battery maintenance, greatly improves the battery efficiency and extends battery life.

· Battery discharge time prediction: the system will display the backup time of battery calculated by discharge current and voltage.

· Battery self-test: battery is automatically tested at regular intervals

· Flexible battery configuration ranging from 360-480VDC.

N+X parallel redundancy

· N+X parallel redundant design, up to 6 units available, makes the configuration more flexible.

Any unit in parallel system fails, the faulty one will automatically cut off the output, and the load will be powered by the remained units.

· It is easy to configure the parallel system just by connecting the parallel cables and doing proper settings.

· Non-fixed Master-Slave relationship: Among several UPS in parallel, the unit startup first is Master UPS, the others are Slave. The master and slave may be exchanged.

Strong overload capability

· 110%/125%/150% overload for 60min/10min/1min.

Power walk in

· Specially designed power walk in function, in which rectifier of each unit in parallel system will be turned on in sequence at intervals to avoid the sudden load on the generator, thereby reducing the cost of the generator required.

Generator mode

· Set the maximum output power of the generator when a smaller one than needed is employed to extend the battery duration time. In this case, the load is supplied by both the generator and battery.

LBS synchronization

· Synchronize the output of the two independent UPS systems (single unit or parallel) even when the two systems are operating on different modes (bypass/inverter) or on battery.

Multi-protection

· Self-diagnosis function will take place before start-up for safety.

· Multi-protection: AC input under/over voltage, overload, short-circuit, over-current, over bus voltage, over-temperature, fan failure, auxiliary power failure, battery under voltage, battery over-charge and so on.

· **Output isolation transformer**

EPO function

· A concave red EPO button with transparent cover is embodied in the LCD control panel for emergency power off.

User-friendly network management

· Chinese/English LCD and LED mimic diagram: real time operation parameters and status

· Log history event up tp 516 events

· RS232 & RS485 communication ports: for local monitor with corresponding software, and MODBUS protocol is optional.

· SNMP adapter (optional): for remote monitor through network

· Dry contacts for additional monitoring:

a) UPS on Inverter
b) Mains input failure
c) remote EPO
d) Battery low voltage alarm
e) UPS fault
f) UPS alarm
g)UPS on battery
h) UPS on bypass

Note: d)--h) optional

Genius 3/3 10-80 KVA Specification

Model	3GCT3-10K	3GCT3-20K	3GCT3-30K	3GCT3-40K	3GCT3-60K	3GCT3-80K
Capacity (VA/WATT)	10KVA/9KW	20KVA/18KW	30KVA/27KW	40KVA/36KW	60KVA/54KW	80KVA/72KW
Input						
Nominal Input Voltage	380/400/415Vac, (3Ph+N+PE)					
Input Voltage range	(380-25%, 415+20%)Vac					
Input Frequency range	50/60Hz (±5Hz)					
Input Power factor	≥0.98(with filter)					
Bypass						
Bypass Voltage	380/400/415Vac					
	Upper limit: +20% (+10%, +15%, +20% adjustable)					
	Lower limit: -40% (-10%, -20%, -30%, -40% adjustable)					
Bypass Frequency range	50/60Hz ± 10% (±2.5%, ±5%, ±10%, ±20% adjustable)					
Transfer time	Mains to Battery:0ms; Mains to Bypass:0ms					
Output						
Output Voltage	380/400/415Vac					
Voltage regulation	± 1%					
Output Frequency	50/60Hz(±0.05)					
Crest Factor	3:1 (Max.)					
Harmonic distortion (THDv)	<3% with linear load					
Efficiency	>89%	>90%	>91%		>92%	
Output Power Factor	0.9					
Battery						
Battery DC Voltage	384Vdc					
Battery Type	sealed lead acid					
Battery number	32 Pcs					
Backup time	Depends on the capacity of external batteries.					
System Features						
Overload capacity	Load≤ 110%:60min; ≤ 125%:last 10min; ≤ 150%:last 1min; > 150% turn to bypass mode					
Communication interface	RS232,RS485, Dry contact, SNMP card(optional)					
Physical						
Dimension (DxWxH)mm.	570 x 800 x 1195				760 x 880 x 1600	
Net Weight (KGs)	217	273	316	330	483	525
Shipping weight (KGs)	272	328	371	385	553	595
Environmental						
Operation temperature	0˚C ~40˚C					
Storage Temperature	-25˚C ~55˚C					
Humidity Range	0 ~95% (non-condensing)					
Noise level	<60dB			<65dB		
Altitude	< 1500m					
Standards						
Safety	IEC/EN62040-1,IEC/EN60950-1					
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8					
Design	IEC/EN 62040-3					
IP Rating	IP20					

Genius 3/3 100-800 KVA Specification

Model	3GCT3-100K	3GCT3-120K	3GCT3-160K	3GCT3-200K	3GCT3-300K	3GCT3-400K	3GCT3-500K	3GCT3-600K	3GCT3-800K
Capacity (VA/WATT)	100KVA/90KW	120KVA/108KW	160KVA/144KW	200KVA/180KW	300KVA/270KW	400KVA/360KW	500KVA/450KW	600KVA/540KW	800KVA/720KW
Input									
Nominal Input Voltage	380/400/415Vac, (3Ph+N+PE)								
Input Voltage range	(380-25%, 415+20%)Vac								
Input Frequency range	50/60Hz (±5Hz)								
Input Power factor	≥0.98(with filter)						≥0.85		
Bypass									
Bypass Voltage	380/400/415Vac								
	Upper limit: +20% (+10%, +15%, +20% adjustable)								
	Lower limit: -40% (-10%, -20%, -30%, -40% adjustable)								
Bypass Frequency range	50/60Hz(auto-sensing) ± 10% (±2.5%, ±5%, ±10%, ±20% adjustable)								
Transfer time	Mains to Battery:0ms; Mains to Bypass:0ms								
Output									
Output Voltage	380/400/415Vac								
Voltage regulation	± 1%								
Output Frequency	50/60Hz(±0.05)								
Crest Factor	3:1 (Max.)								
Harmonic distortion (THDv)	<2% with linear load								
Efficiency	>92%			>92.5%	>93%	>94%	>95%		>96%
Output Power Factor	0.9								
Battery									
Battery DC Voltage	384Vdc						480Vdc		
Battery Type	sealed lead acid								
Battery number	32 Pcs						40 Pcs		
Backup time	Depends on the capacity of external batteries.								
System Features									
Overload capacity	Load≤ 110%:60min; ≤ 125%:last 10min; ≤ 150%:last 1min; > 150% turn to bypass mode								
Communication interface	RS232,RS485, Dry contact, SNMP card(optional)								
Physical									
Dimension (DxWxH)mm.	805 x 1160 x 1600		945 x 1400 x 1900		1040 x 1640 x 1900		1040 x 2800 x 1900		1100 x 3900 x 1950
Net Weight (KGs)	800	903	1219	1425	1780	2050	3700	4500	6400
Shipping weight (KGs)	890	993	1349	1555	1950	2200	3950	4750	6700
Environmental									
Operation temperature	0˚C ~40˚C								
Storage Temperature	-25˚C ~55˚C								
Humidity Range	0 ~95% (non-condensing)								
Noise level	<65dB				<70dB				
Altitude	< 1500m								
Standards									
Safety	IEC/EN62040-1,IEC/EN60950-1								
EMC	IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8								
Design	IEC/EN 62040-3								
IP Rating	IP20								

Stabilizer

Energys

Energy Management Solutions

Energys
Energy Management Solutions

Main technical paramter

Input voltage	Single-phase 176 - 264V	Three phase line voltage 304 - 456V, Phasevoltage176 - 264V
Output voltage	Single-phase 220V	Three phase line voltage 304 ~ 456V, Phase voltage
Regulated voltage precision	± 2.5%	
Efficiency	>95%	
Straining time	0.2 - 0.5S	
Waveform distortion	≤ 2%	
Frequency	50Hz-60Hz	
Load power factor	>0.7	
Instantaneous overload capability	Rated current 1.5-2 times	
Ambient temperature	-15 - 40℃	
Function characteristic: Noncontact, no noise, no machinery and carbon brush wearing, equipped with over-voltage, under-voltage, phaselacking, breakdown diagnosis, signal dispaly, alarm and protection function.		

Specification, size, weight

Type and specification	Product size (cm)	Net weight (kg)
SJW-WB 10kVA	60 × 40 × 145	170
SJW-WB 15kVA	60 × 40 × 145	180
SJW-WB 20kVA	70 × 50 × 155	190
SJW-WB 30kVA	70 × 50 × 155	200
SJW-WB 50kVA	70 × 60 × 165	230
SJW-WB 80kVA	80 × 60 × 175	270
SJW-WB 100kVA	80 × 60 × 175	310
SJW-WB 120kVA	100 × 80 × 180	330
SJW-WB 150kVA	100 × 80 × 180	340
SJW-WB 180kVA	100 × 80 × 195	365
SJW-WB 200kVA	100 × 80 × 205	390
SJW-WB 225kVA	110 × 90 × 210	425
SJW-WB 250kVA	110 × 90 × 210	475
SJW-WB 300kVA	120 × 90 × 220	520
SJW-WB 320kVA	120 × 90 × 220	570
SJW-WB 350kVA	120 × 90 × 220	610
DJW-WB 10kVA	60 × 40 × 135	67
DJW-WB 15kVA	60 × 40 × 135	77
DJW-WB 20kVA	65 × 45 × 145	105
DJW-WB 30kVA	65 × 45 × 145	115
DJW-WB 50kVA	70 × 50 × 155	130
DJW-WB 60kVA	70 × 50 × 155	180
DJW-WB 80kVA	80 × 60 × 165	220
DJW-WB 100kVA	80 × 60 × 165	260

Energys Battery

Energys

Energy Management Solutions

PRODUCT APPLICATIONS

A partial list of common applications includes:

- Communications Equipment.
- Emergency Alarms And Security Systems.
- Emergency Lighting Systems.
- Electric Wheelchairs.
- Electronic Equipment.
- Geophysical Equipment.
- Medical Equipment.
- Power Tools.
- Solar Powered Systems.
- Telecommunications Systems.
- Toys.
- Uninterruptible Power Supplies.

Value Regulated (Sealed) Construction

The valve regulated AGM rechargeable lead acid battery allows safe, troublefree operation in any position. There is never any requirement to refill electrolyte in normal operation. The battery is leak-proof.

Ease of Shipment

Sealed construction, the batteries can be shipped by sea, road or air without special handling and packaging precautions.

Maintenance Free Operation

During the float service life, the batteries not to be needed to check the specific gravity of the electrolyte or add water

Cycle or Float Service

Batteries are suitable for either cycling or floating service

Heavy Duty Grids

batteries utilize heavy duty calcium-tin alloy grids to extend service life.

Compact Design

Utilizing the best possible raw materials to build a high power-to-weight ratio battery.

Low Self Discharge

lead calcium grids minimize capacity loss during storage periods. So the batteries can be stored for long periods of time without recharge at room temperature.

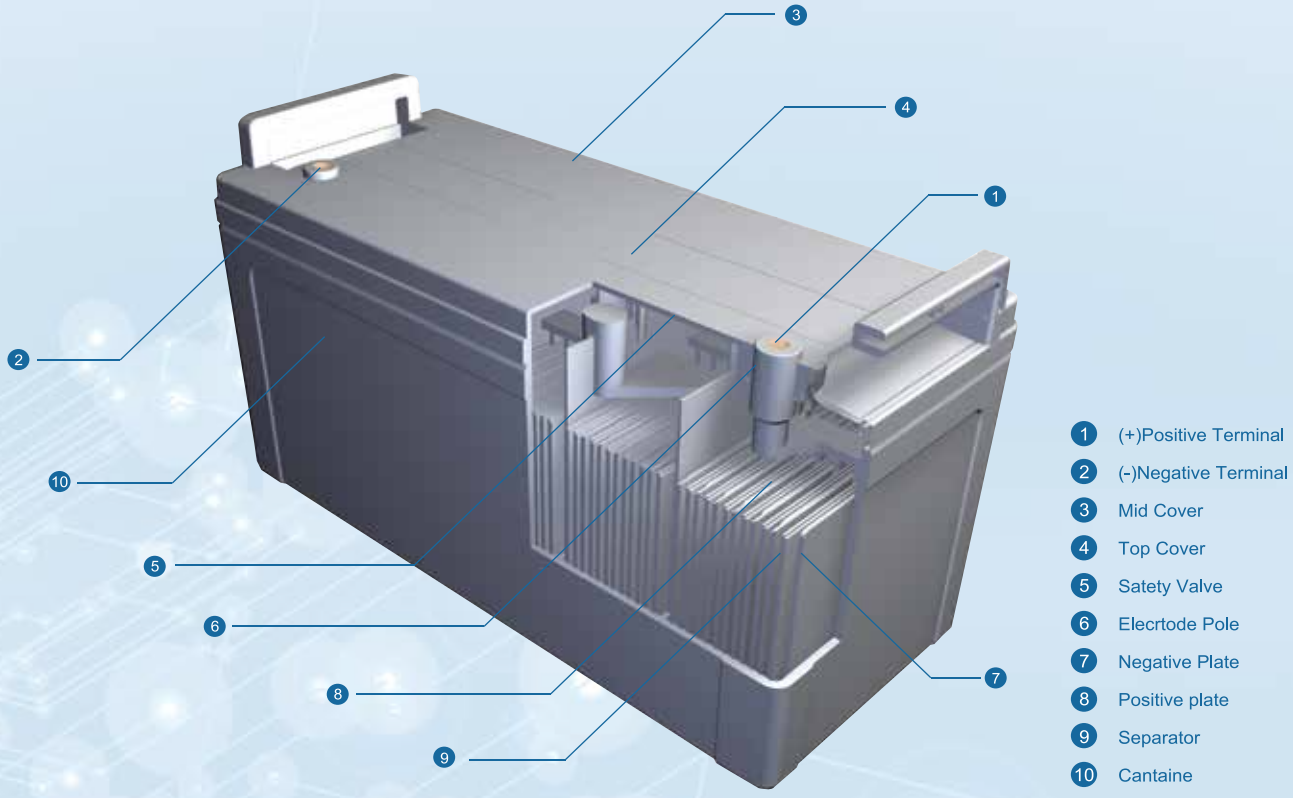
Wide Operating Temperature

Batteries may be operated over a broad range of ambient temperatures.

High Impact Case

Batteries utilize high impact resistant and non-conductive plastic cast .(ABS) Flame retardant (UL94)

CONSTRUCTION



PRINCIPLE OPERATION OF VALVE REGULATED LEAD ACID BATTERY

Positive Plate. $PbO_2+SO_4^-+4H^++2e^-=PbSO_4+H_2O$

Negative Plate. $Pb+SO_4^-+4H^++2e^-=PbSO_4+H_2O$

Net. $PbO_2+2SO_4^-+4H^++Pb=2PbSO_4+2H_2O$

The gassing and water loss reactions are as follows:

Positive Plate. $H_2O=2H^++1/2O_2+2e^-$

Negative Plate. $2H^++2e^-=H_2$

Net. $H_2O=H_2+1/2O_2$

It is noted that the gassing reaction only generally occurs to any extent when the battery is almost totally charged.
In the valve regulated battery it is obvious that water loss must be avoided. This is done by limiting the escape of hydrogen and oxygen from the battery. The design therefore accomplishes the recombination of the oxygen formed at the positive plate with the hydrogen formed at the negative plate. The reaction is as follows.

Negative a. $Pb+1/2O_2+H_2SO_4=PbSO_4+H_2O$

Negative b. $PbSO_4+2H^++2e^-=Pb+H_2SO_4$

Net Negative. $1/2O_2+2H^++2e^-=H_2O$

This virtually eliminates the production of free hydrogen at the negative plate to the action of recombination
However it is necessary to ensure that correct charging voltages are used.
Because the construction provides a means of recombining the internally generated hydrogen and oxygen and the suppression of the evolution of hydrogen gas to limit the consumption of water from the electrolyte. Therefore the battery requires no addition of water during its normal life time.

Valve regulated batteries are sealed with the exception of a valve that opens when excess pressure builds up inside the battery. The valve automatically reseals itself. The recombination of charge gases is accomplished by allowing oxygen produced at the positive plate to pass through the separator material to the negative plates where the recombination reaction occurs. The valve controls the internal of the battery to optimize this efficiency of the recombination reaction and minimise the possible expense of electrolyte.

NOMINAL CAPACITY

The capacity of a battery is the available amount of electrical energy which can be obtained from a fully charged cell.
The capacity of a cell is expressed in ampere hours (AH).Which is a current-time product.
The capacity value is dependent upon the discharge current, the temperature during discharge, the final cut-off voltage and the general history.
The nominal capacity of a battery is measured at the 10 hour or 20 hour rate according to types at 25 ℃ to a cut-off voltage of 1.75 volts per cell. (Design lifetime 10 Years at 25°C)

STORAGE

During storage, batteries gradually lose their capacity due to their self-discharge, their self-discharge rate is low and is typically less than3% per month at 25 ℃, Althougtthe self-discharge rate is low, specific precautions must be taken against the battery over discharging itself by self-discharge when in storage or not operating.

Precautions Against Over Self-discharge

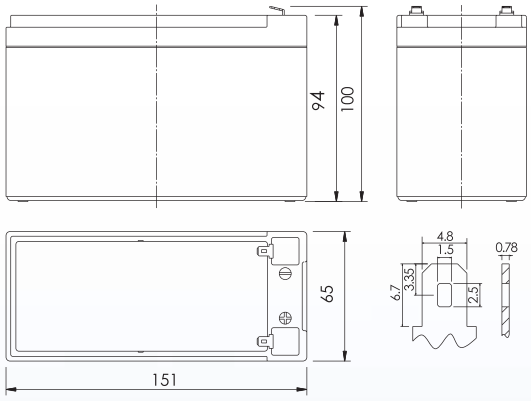
a. The batteries should be stored in a clean , cool and dry place.
b. Storage place should not be affected by sources of radiant heat such as sunshine, heating units, radiators or steam pipes.
c. The recommendable storage temperature: 10~20 ℃.
d. The recommendable storage humidity: as low as possible.

Charge Advice

Storage Temperature	Charging Interval
20 ℃ or less	9 months
20~30 ℃	6 months
30~40 ℃	3 months

12V 7.2AH

FM Series
Battery For General Use



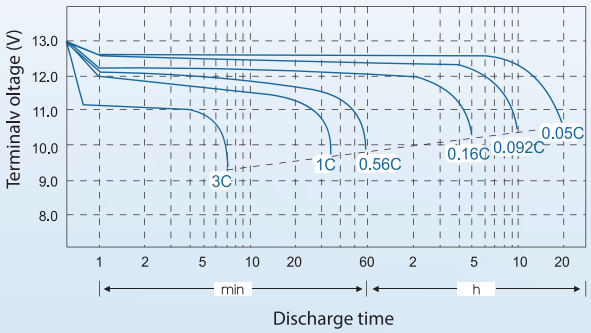
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		7.0Ah
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	2.56 inches(65mm)
Weight		Approx.4.84 Pound(2.20kg)

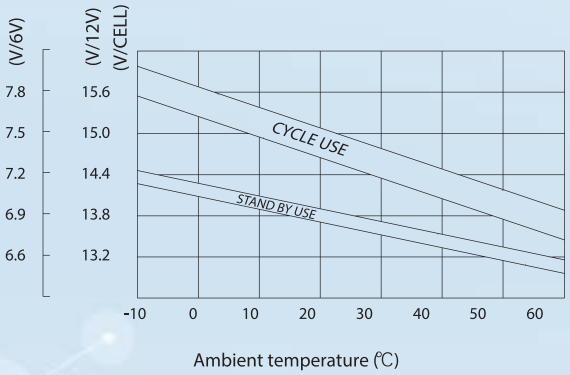
Characteristics

Capacity 77°F (25 ℃)	20 hour rate (0.35A)	7.0 Ah
	10 hour rate (0.65A)	6.5 Ah
	5 hour rate (1.12A)	5.6 Ah
	1hour rate (4.20 A)	4.2 Ah
	15Minute Rate (12.3 A)	3.1 Ah
Internal Resistance	Full charged Battery 77°F (25 ℃)	26 mΩ
Capacity affected by Temperature (20hour rate)	104 °F (40 ℃)	102%
	77°F (25 ℃)	100%
	32°F (0 ℃)	85%
	5°F (-15 ℃)	65%
Self-Discharge 77°F (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F (25 ℃)	105A(5S)	
Terminal	F1 \ F2	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 2.1A	
	Voltage 14.4~14.7 V / 77°F (25 ℃)	
Float	Voltage 13.5~13.8V / 77°F (25 ℃)	

Discharge Curves 77°F (25 ℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25 ℃)

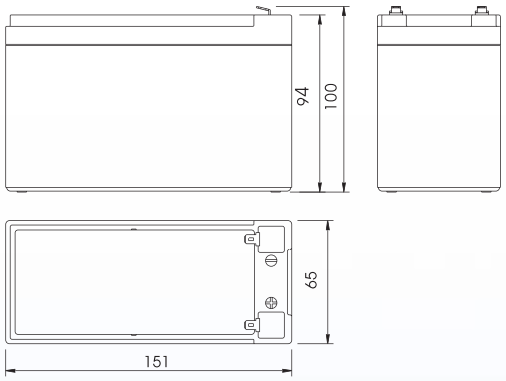
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	26.7	16.9	13.6	7.56	4.62	2.61	1.80	1.44	1.22	0.67	0.35
9.9	26.0	16.5	13.1	7.35	4.50	2.52	1.78	1.43	1.21	0.66	0.35
10.2	24.9	15.8	12.7	7.21	4.38	2.49	1.76	1.41	1.20	0.65	0.35
10.5	23.8	15.1	12.2	7.14	4.27	2.45	1.75	1.40	1.19	0.65	0.35
10.82	22.4	15.0	11.6	6.93	4.13	2.38	1.72	1.37	1.18	0.64	0.34

Constant Power Discharge (WATTS PER CELL@25 ℃)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	297	190	154	86.2	53.3	30.5	21.4	17.2	14.5	7.95	4.26
9.9	290	185	149	84.2	52.0	29.5	21.2	17.0	14.5	7.89	4.24
10.2	277	177	144	82.6	50.6	29.1	21.0	16.9	14.4	7.83	4.23
10.5	266	171	139	81.9	49.5	28.8	20.9	16.7	14.2	7.83	4.21
10.82	250	169	132	79.6	47.9	28.0	20.6	16.3	14.1	7.66	4.14

12V 9AH

FM Series
Battery For General Use



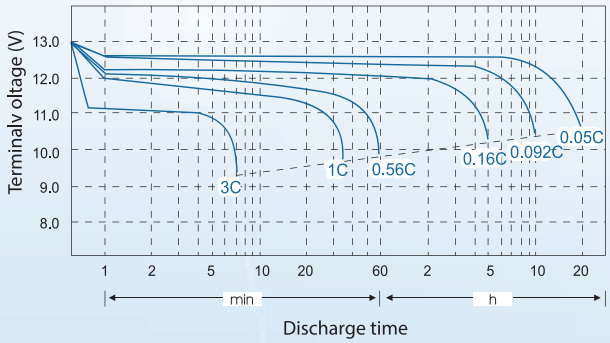
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		9Ah
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	2.56 inches(65mm)
Weight		Approx.5.52 Pound(2.51kg)

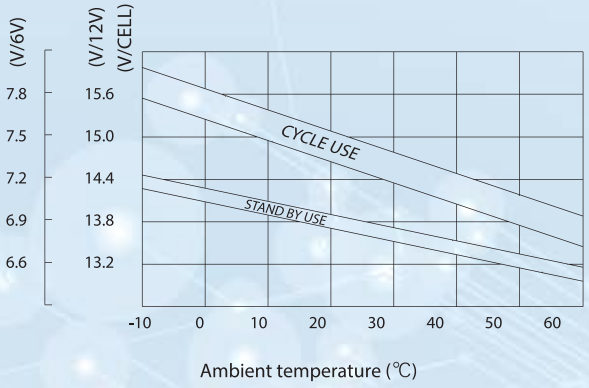
Characteristics

Capacity 77˚F (25 ℃)	20 hour rate (0.45A)	9.0 Ah
	10 hour rate (0.83A)	8.3 Ah
	5 hour rate (1.44A)	7.2 Ah
	1hour rate (5.40 A)	5.4 Ah
	15Minute Rate (15.6 A)	3.9 Ah
Internal Resistance	Full charged Battery 77 ˚F (25 ℃)	13 mΩ
Capacity affected by Temperature (20hour rate)	104 ˚F (40 ℃)	102%
	77 ˚F (25 ℃)	100%
	32 ˚F (0 ℃)	85%
	5 ˚F (-15 ℃)	65%
Self-Discharge 77 ˚F (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77 ˚F (25 ℃)	135A(5S)	
Terminal	F1 \ F2	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 27A	
	Voltage 14.4~14.7 V / 77 ˚F (25 ℃)	
Float	Voltage 13.5~13.8V / 77 ˚F (25 ℃)	

Discharge Curves 77˚F (25 ℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

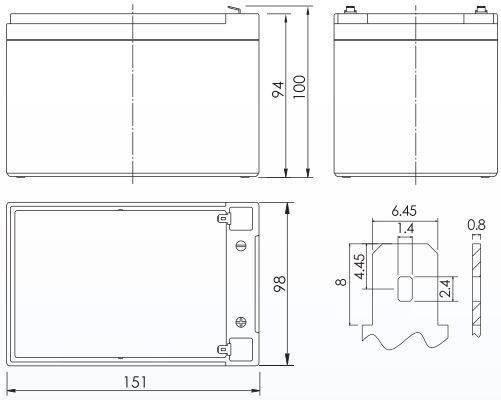
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	34.3	21.8	17.5	9.72	5.94	3.36	2.31	1.85	1.57	0.86	0.46
9.9	22.5	21.2	16.8	9.45	5.79	3.24	2.29	1.84	1.56	0.85	0.45
10.2	32.0	20.3	16.3	9.27	5.63	3.20	2.26	1.82	1.56	0.84	0.45
10.5	30.6	19.4	15.7	9.18	5.49	3.15	2.25	1.80	1.53	0.84	0.45
10.8	28.8	19.3	14.9	8.91	5.31	3.06	2.21	1.76	1.51	0.82	0.44

Constant Power Discharge (WATTS PER CELL@25 ℃)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	382	245	198	111	68.6	39.2	27.5	22.1	18.7	10.2	5.48
9.9	373	238	191	108	66.9	37.9	22.2	21.9	18.6	10.2	5.46
10.2	357	228	185	106	65.1	37.5	26.9	21.7	18.5	10.1	5.44
10.5	342	219	178	105	63.6	37.0	26.8	21.5	18.3	10.1	5.42
10.8	322	218	169	102	61.6	36.0	26.5	21.0	18.1	9.85	5.33

12V 12AH

FM Series
Battery For General Use



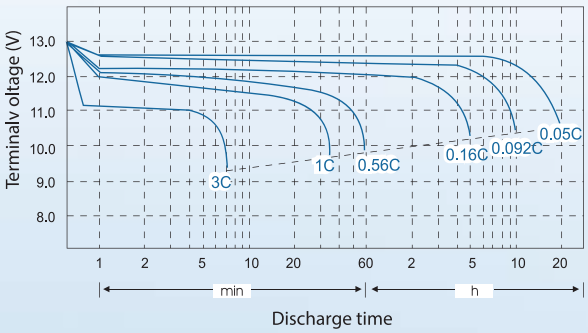
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		12Ah
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	3.86 inches(98mm)
Weight		Approx.7.92 Pound(3.60kg)

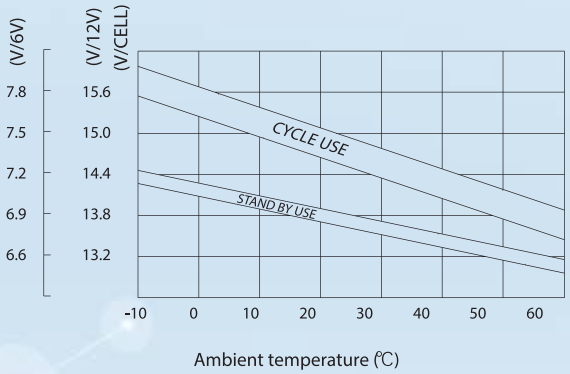
Characteristics

Capacity 77˚F (25 ℃)	20 hour rate (600mA)	12.0 Ah
	10 hour rate (1.12A)	11.2 Ah
	5 hour rate (1.92A)	9.6 Ah
	1hour rate (7.20A)	7.2 Ah
	15Minute Rate (21.1A)	5.3 Ah
Internal Resistance	Full charged Battery 77˚F (25 ℃)	17 mΩ
Capacity affected by Temperature (20hour rate)	104˚F (40 ℃)	102%
	77˚F (25 ℃)	100%
	32˚F (0 ℃)	85%
	5˚F (-15 ℃)	65%
Self-Discharge 77˚F (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77˚F (25 ℃)		180A(5S)
Terminal		F2
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 3.6A
		Voltage 14.4~14.7 V / 77 ˚F (25 ℃)
	Float	Voltage 13.5~13.8V / 77 ˚F (25 ℃)

Discharge Curves 77 ˚F (25 ℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25 ℃)

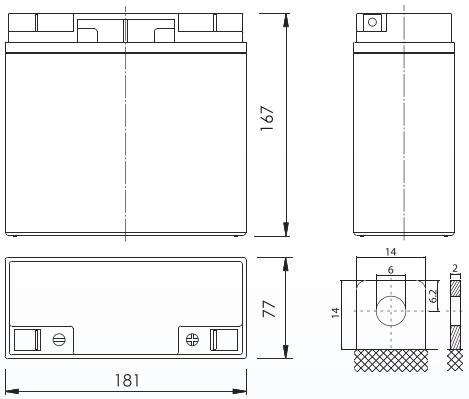
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	45.7	29.0	23.3	13.0	7.92	4.48	3.08	2.47	2.09	1.14	0.61
9.9	44.6	28.2	22.4	12.6	7.72	4.32	3.05	2.45	2.08	1.13	0.61
10.2	42.6	27.0	21.7	12.4	7.50	4.26	3.01	2.42	2.06	1.12	0.60
10.5	40.8	25.9	20.9	12.2	7.32	4.20	3.00	2.40	2.04	1.12	0.60
10.8	38.4	25.7	19.8	11.9	7.08	4.08	2.95	2.34	2.02	1.09	0.59

Constant Power Discharge (WATTS PER CELL@25 ℃)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.6	509	326	264	148	91.4	52.3	36.7	29.4	24.9	13.6	7.30
9.9	498	317	255	144	89.2	50.5	36.3	29.2	24.8	13.5	7.28
10.2	475	304	247	142	86.8	49.9	35.9	28.9	24.7	13.4	7.25
10.5	456	292	238	140	84.8	49.3	35.8	28.7	24.4	13.4	7.22
10.8	429	290	229	136	82.1	47.9	35.3	28.0	24.1	13.1	7.10

12V 17AH

FM Series
Battery For General Use



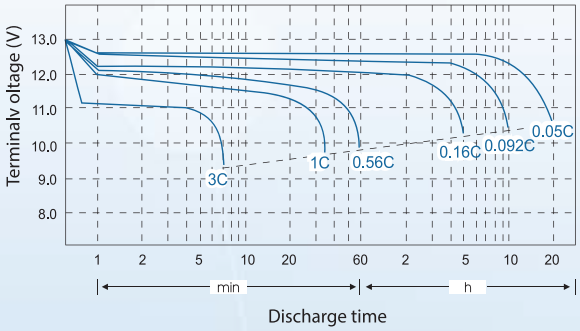
Specifications

Nominal Voltage		12V
Rated Capacity(20 hour rate)		17Ah
Dimensions	Total Height (with terminals)	6.57inches (167mm)
	Height	6.57inches (167mm)
	Length	7.13inches (181mm)
	Width	3.03inches (77mm)
Weight		Approx. 11.22pound (5.10kg)

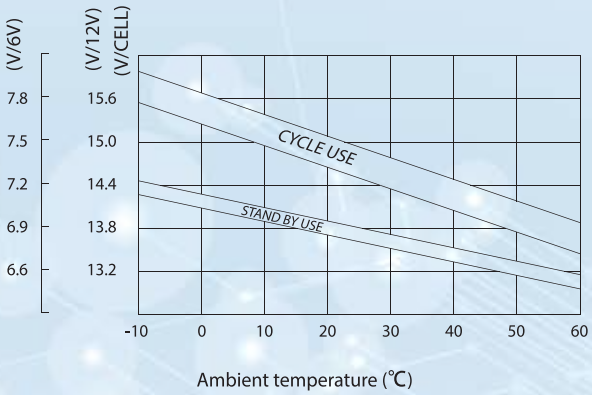
Characteristics

Capacity 77℉(25℃)	20 hour rate (0.85A)	17Ah
	10 hour rate (1.58A)	15.8Ah
	5 hour rate (2.72A)	13.6Ah
	1 hour rate (10.2A)	10.2Ah
	15 minute Rate (29.92A)	7.5Ah
Internal Resistance	Full charged Battery 77℉(25℃)	14mΩ
Capacity affected by Temperature (20 hour rate)	104℉(40℃)	102%
	77℉(25℃)	100%
	32℉(0℃)	85%
	5℉(-15℃)	65%
Self-Discharge 77℉(20℃)	Capacityafter 3 month storage	91%
	Capacityafter 6 month storage	81%
	Capacityafter 12 month storage	60%
Max. Discharge Current 77℉(25℃)	255A(5S)	
Terminal	B1/M4	
Charge (ConstantVoltage) Cycle	Initial Charging Current less than 5.1A	
	Voltage 14.4~14.7V/77℉(25℃)	
Float	Voltage 13.5~13.8V/77℉(25℃)	

Discharge Curves 77℉(25℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

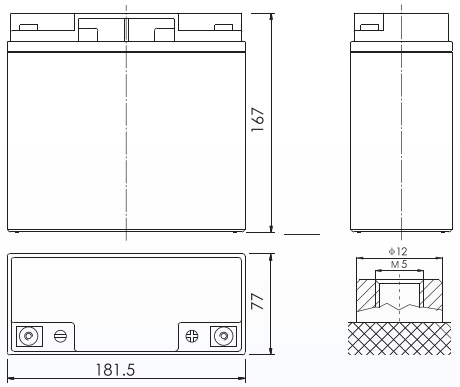
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.60	64.77	41.14	32.98	18.36	11.22	6.34	4.37	3.50	2.96	1.62	0.86
9.90	63.24	39.95	31.79	17.85	10.93	6.12	4.32	3.47	2.95	1.60	0.86
10.20	60.35	38.25	30.77	17.51	10.63	6.04	4.27	3.43	2.92	1.59	0.85
10.50	57.80	36.72	29.58	17.34	10.37	5.95	4.25	3.40	2.89	1.59	0.85
10.80	54.40	36.38	28.05	16.83	10.03	5.78	4.18	3.32	2.86	1.55	0.83

Constant Power Discharge (WATTS PER CELL@25℃)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.60	721.54	462.41	374.65	209.30	129.48	74.11	51.95	41.71	35.26	19.32	10.34
9.90	705.13	449.44	361.45	204.38	126.36	71.59	51.43	41.37	35.18	19.17	10.31
10.20	673.51	430.70	350.16	200.66	122.93	70.73	50.89	41.00	34.94	19.02	10.27
10.50	645.63	414.20	336.92	198.89	120.08	69.85	50.70	40.63	34.56	19.02	10.23
10.80	608.19	411.09	319.81	193.21	116.35	67.92	49.97	39.65	34.19	18.60	10.06

12V 22AH

FM Series
Battery For General Use



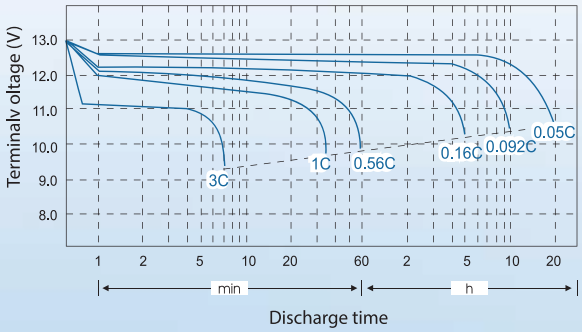
Specifications

Nominal Voltage		12V
Rated Capacity(20 hour rate)		22Ah
Dimensions	Total Height (with terminals)	6.57inches (167mm)
	Height	6.57inches (167mm)
	Length	7.15inches (181.5mm)
	Width	3.03inches (77mm)
Weight		Approx. 13.86pound (6.3kg)

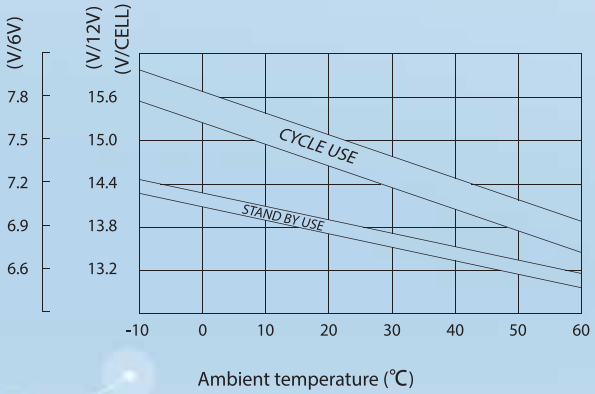
Characteristics

Capacity 77℉(25℃)	20 hour rate (1.1A)	22Ah
	10 hour rate (2.05A)	20.5Ah
		17.6Ah
		13.2Ah
	15 minute Rate (38.7A)	9.7Ah
Internal Resistance	Full charged Battery 77℉(25℃)	12mΩ
Capacity affected by Temperature (20 hour rate)	104℉(40℃)	102%
	77℉(25℃)	100%
	32℉(0℃)	85%
	5℉(-15℃)	65%
Self-Discharge 77℉(20℃)	Capacityafter 3 month storage	91%
	Capacityafter 6 month storage	81%
	Capacityafter 12 month storage	60%
Max. Discharge Current 77℉(25℃)	330A(5S)	
Terminal	M4	
Charge (ConstantVoltage) Cycle	Initial Charging Current less than6.6A	
	Voltage 14.4~14.7V/77℉(25℃)	
Float	Voltage 13.5~13.8V/77℉(25℃)	

Discharge Curves 77℉ (25℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

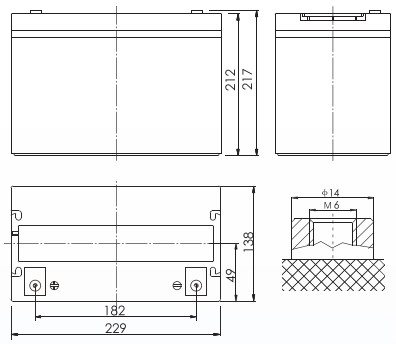
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.60	83.82	53.24	42.68	23.76	14.52	8.21	5.65	4.53	3.83	2.09	1.11
9.90	81.84	51.70	41.14	23.10	14.15	7.92	5.59	4.49	3.81	2.07	1.11
10.20	78.10	49.50	39.82	22.66	13.75	7.81	5.52	4.44	3.78	2.05	1.10
10.50	74.80	47.52	38.28	22.44	13.42	7.70	5.50	4.40	3.74	2.05	1.10
10.80	70.40	47.08	36.30	21.78	12.98	7.48	5.41	4.29	3.70	2.00	1.08

Constant Power Discharge (WATTS PER CELL@25℃)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
9.60	933.75	598.42	484.84	270.86	167.56	95.91	67.23	53.98	45.63	25.00	13.39
9.90	912.52	581.63	467.76	264.50	163.53	92.65	66.55	53.54	45.53	24.81	13.34
10.20	871.60	557.37	453.15	259.68	159.09	91.53	65.85	53.06	45.21	24.62	13.29
10.50	835.52	536.03	436.01	257.39	155.40	90.40	65.62	52.58	44.73	24.62	13.24
10.80	787.07	532.00	413.87	250.03	150.57	87.89	64.67	51.31	44.25	24.07	13.02

12V 55AH

FM Series
For General Use



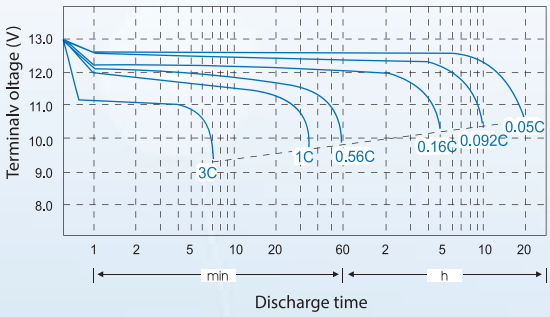
Specifications

Nominal Voltage		12V
Rated Capacity(20 hour rate)		55Ah
Dimensions	Total Height (with terminals)	8.54inches (217mm)
	Height	8.35inches (212mm)
	Length	9.02inches (229mm)
	Width	5.43inches (138mm)
Weight		Approx. 41.6pound(18.9kg)

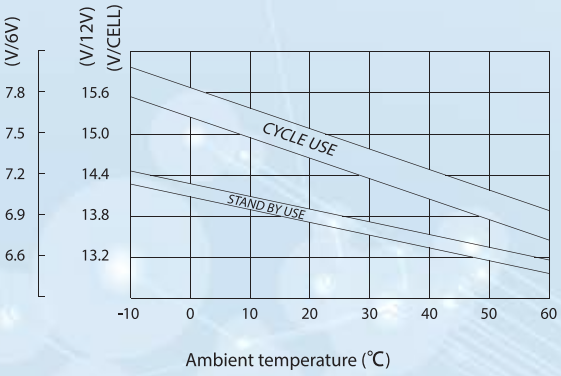
Characteristics

Capacity 77℉(25℃)	20 hour rate (2.75A)	55Ah
	10 hour rate (5.06A)	50.6Ah
	5 hour rate (8.8A)	44Ah
	1 hour rate (33A)	33Ah
	15 minute Rate (96.0A)	24.0Ah
Internal Resistance	Full charged Battery 77℉(25℃)	7mΩ
Capacity affected by Temperature (20 hour rate)	104℉(40℃)	102%
	77℉(25℃)	100%
	32℉(0℃)	85%
	5℉(-15℃)	65%
Self-Discharge 77℉(20℃)	Capacityafter 3 month storage	91%
	Capacityafter 6 month storage	81%
	Capacityafter 12 month storage	60%
Max. Discharge Current 77℉(25℃)	550A(5S)	
Terminal	M1	
Charge (ConstantVoltage) Cycle	Initial Charging Current less than 16.5A	
	Voltage 14.4~14.7V/77℉(25℃)	
Float	Voltage 13.5~13.8V/77℉(25℃)	

Discharge Curves 77℉ (25℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

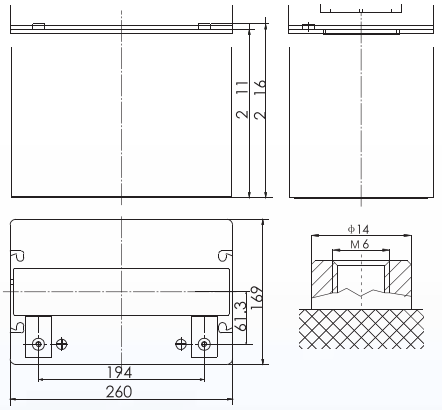
F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.65	119.4	92.4	56.1	44.1	29.8	20.79	14.36	9.63	6.82	5.39	4.63	2.38
1.70	112.8	86.4	47.7	41.6	28.5	20.30	13.75	9.30	6.55	5.27	4.49	2.34
1.80	95.2	75.4	43.1	39.3	27.2	19.42	12.98	8.80	6.16	5.06	4.36	2.30

Constant Power Discharge (WATTS PER CELL@25℃)

F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.60	245	190	113	87.8	71.0	42.2	29.9	19.4	12.0	10.0	8.71	4.57
1.65	231	182	111	86.5	69.3	41.4	29.3	19.0	12.0	10.0	8.71	4.57
1·67	224	176	111	85.7	68.4	40.9	29.0	18.8	12.0	10.0	8.71	4.57
1·70	219	173	110	84.7	67.7	40.6	28.7	18.7	12.0	10.0	8.71	4.57
1·75	206	166	108	82.8	66.2	39.4	28.1	18.5	11.9	10.0	8.64	4.57
1·80	191	158	107	80.6	64.5	38.3	27.4	18.3	11.8	9.79	8.37	4.48
1·85	158	133	86	73.6	62.0	37.1	26.6	17.1	11.7	9.24	8.02	4.22

12V 75AH

FM Series
For General Use



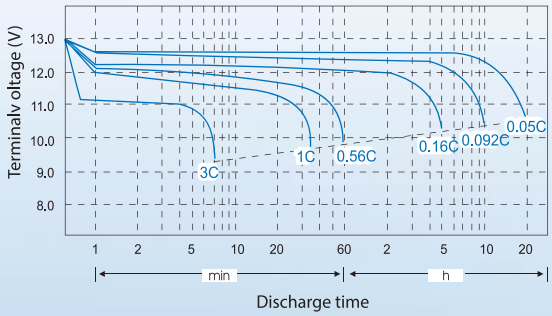
Specifications

Nominal Voltage		12V
Rated Capacity(20 hour rate)		75Ah
Dimensions	Total Height (with terminals)	8.51inches (216mm)
	Height	8.31inches (211mm)
	Length	10.24inches(260mm)
	Width	6.65inches (169mm)
Weight		Approx. 48.4pound(22kg)

Characteristics

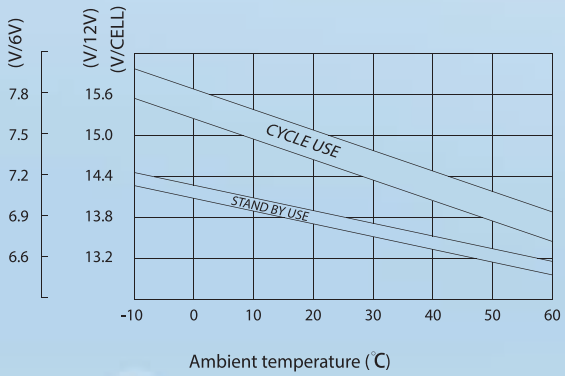
Capacity 77℉(25℃)	20 hour rate (3.75A)	75Ah
	10 hour rate (6.8A)	68Ah
	5 hour rate (12A)	60Ah
	1 hour rate (45A)	45Ah
	15 minute Rate (122A)	30.5Ah
Internal Resistance	Full charged Battery 77℉(25℃)	7mΩ
Capacity affected by Temperature (20 hour rate)	104℉(40℃)	102%
	77℉(25℃)	100%
	32℉(0℃)	85%
	5℉(-15℃)	65%
Self-Discharge 77℉(20℃)	Capacityafter 3 month storage	91%
	Capacityafter 6 month storage	81%
	Capacityafter 12 month storage	60%
Max. Discharge Current 77℉(25℃)	675A(5S)	
Terminal	M1	
Charge (ConstantVoltage) Cycle	Initial Charging Current less than 22.5A	
	Voltage 14.4~14.7V/77℉(25℃)	
Charge (ConstantVoltage) Float	Voltage 13.5~13.8V/77℉(25℃)	

Discharge Curves 77℉(25℃)



Mercury12V100AH/1046-0333

Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

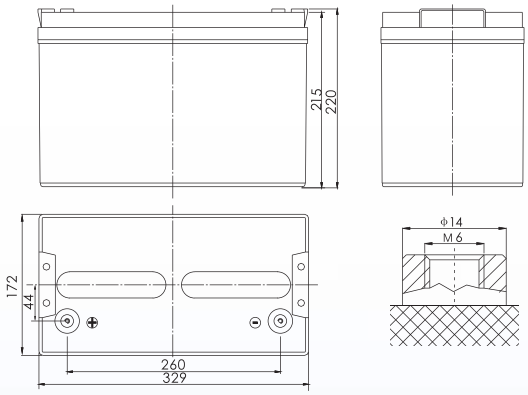
F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.65	162.8	126.0	76.5	60.1	40.7	28.35	19.58	13.13	9.30	7.35	6.31	3.25
1.70	153.8	117.8	65.1	56.8	38.9	27.68	18.75	12.68	8.93	7.19	6.12	3.19
1.80	129.8	102.8	58.8	53.6	37.1	26.48	17.70	12.00	8.40	6.90	5.95	3.14

Constant Power Discharge (WATTS PER CELL@25℃)

F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.60	293	224	147	110	89.1	52.3	36.7	24.1	16.4	13.6	11.8	6.17
1.65	290	222	143	109	88.2	51.6	36.3	23.9	16.3	13.4	11.7	6.15
1.67	288	219	142	107	87.0	51.0	36.2	23.8	16.2	13.3	11.5	6.13
1.70	284	216	140	106	86.5	50.3	36.0	23.4	16.0	13.0	11.5	6.10
1.75	265	210	128	104	86.3	49.7	35.5	23.2	15.9	12.9	11.5	6.08
1.80	247	196	120	103	85.8	48.9	34.7	23.1	15.6	12.7	11.1	6.06
1.85	204	172	111	94.7	79.8	47.8	34.3	22.0	15.0	12.6	10.9	5.71

12V 100AH

FM Series
For General Use



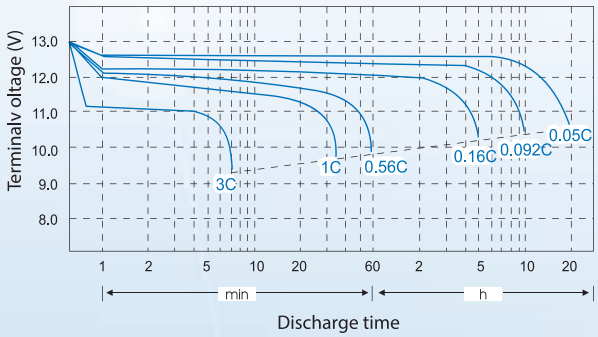
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		100Ah
Dimensions	Total Height (with terminals)	8.66 inches(220mm)
	Height	8.46 inches(215mm)
	length	12.95 inches(329mm)
	width	6.77 inches(172mm)
Weight		Approx.60.94 Pound(27.7kg)

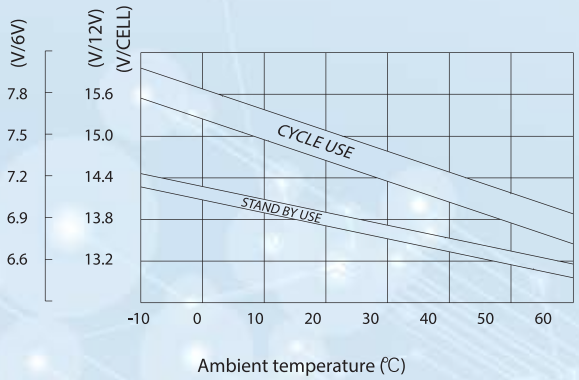
Characteristics

Capacity 77℉ (25 ℃)	20 hour rate (5.0A)	100 Ah
	10 hour rate (9.2A)	92 Ah
	5 hour rate (16.0A)	80 Ah
	1hour rate (60.0A)	60 Ah
	15Minute Rate (164A)	41 Ah
Internal Resistance	Full charged Battery 77 ℉ (25 ℃)	5 mΩ
Capacity affected by Temperature (20hour rate)	104℉ (40 ℃)	102%
	77 ℉ (25 ℃)	100%
	32 ℉ (0 ℃)	85%
	5 ℉ (-15 ℃)	65%
Self-Discharge 77℉ (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77℉ (25 ℃)	800A(5S)	
Terminal	M2	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 30A	
	Voltage 14.4~14.7 V / 77 ☒ (25 ℃)	
Float	Voltage 13.5~13.8V / 77 ☒ (25 ℃)	

Discharge Curves 77℉(25 ℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25 ℃)

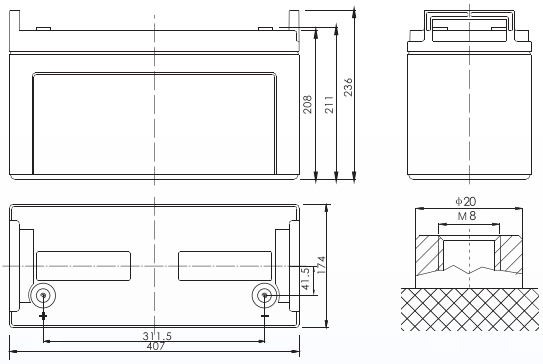
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.65	311	217	168	102	80.1	54.2	37.8	26.1	17.5	9.80	4.33
1.70	285	205	157	86.8	75.7	51.9	36.9	25.0	16.9	9.59	4.25
1.80	227	173	137	78.4	71.5	49.4	35.3	23.6	16.0	9.20	4.18

Constant Power Discharge (WATTS PER CELL@25 ℃)

Cut off voltage V/cell	5min	10min	15min	30min	45min	1h	2h	3h	5h	10h	24h
1.60	571	394	307	191	148	119	70.0	49.1	32.4	18.3	8.11
1.65	542	389	304	185	146	115	69.1	49.0	32.2	18.2	8.10
1.67	540	386	302	173	144	114	68.8	48.6	31.9	18.2	8.09
1.70	506	379	291	162	142	111	68.4	47.7	31.6	18.1	8.07
1.75	461	346	274	156	141	108	67.9	46.4	31.0	18.0	8.06
1.80	423	330	264	151	138	107	66.6	46.1	30.5	17.7	8.04
1.85	339	273	231	141	127	104	64.2	45.0	29.5	16.9	7.62

12V 120AH

FM Series
Battery For General Use



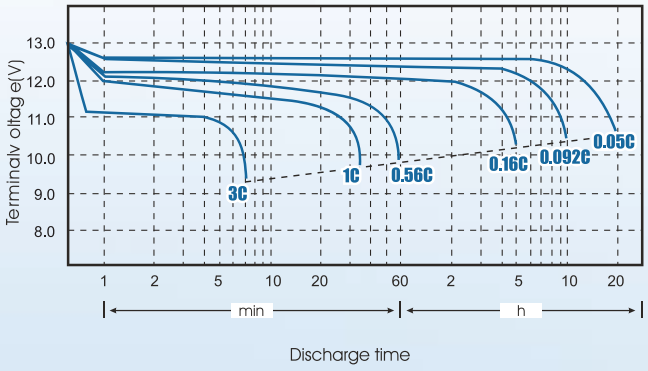
Specifications

Nominal Voltage		12V
Rated Capacity(20 hour rate)		120Ah
Dimensions	Total Height (with terminals) Height Length Width	9.29inches (236mm) 8.19inches (208mm) 16.02inches (407mm) 6.85inches (174mm)
Weight		Approx. 76.56pound(34.8kg)

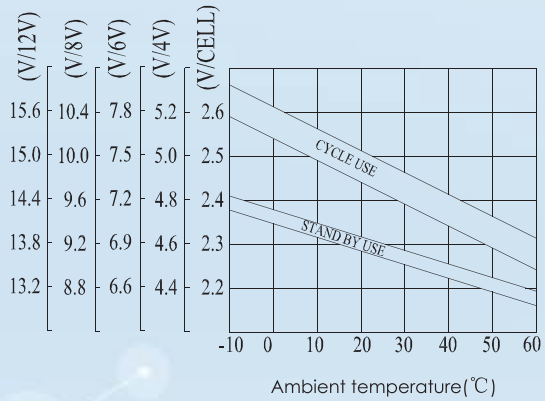
Characteristics

Capacity 77°F(25°C)	20 hour rate (6.0A) 10 hour rate (11A) 5 hour rate (19.2A) 1 hour rate (72A)	120Ah 110Ah 96Ah 72Ah
	15 minute Rate(196.8A)	49.2Ah
Internal Resistance	Full charged Battery 77°F(25°C)	4.0mΩ
Capacity affected by Temperature (20 hour rate)	104°F(40°C) 77°F(25°C) 32°F(0°C) 5°F(-15°C)	102% 100% 85% 65%
Self-Discharge 77°F(20°C)	Capacityafter 3 month storage Capacityafter 6 month storage Capacityafter12 month storage	91% 81% 60%
Max. Discharge Current 77°F(25°C)	960A(5S)	
Terminal	M3	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 36A Voltage 14.4~14.7V/77°F(25°C)	
Charge (Constant Voltage) Float	Voltage 13.5~13.8V/77°F(25°C)	

Discharge Curves 77°F(25°C)



Relationship between charge voltage and temperature



■ Constant Current Discharge (AMPERES @25 ℃)

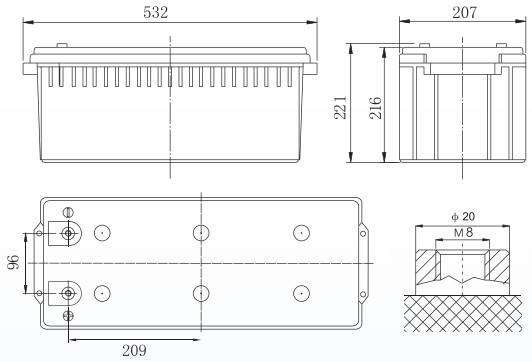
F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.65	261	202	122	96.1	65.2	45.3	31.2	21.0	14.8	11.7	10.1	5.20
1.70	246	189	104	90.9	62.4	44.2	30.0	20.3	14.3	11.5	9.80	5.09
1.80	207	165	94.1	85.8	59.3	42.4	28.3	19.2	13.4	11.0	9.50	5.02

■ Constant Power Discharge (WATTS PER CELL@25℃)

F.V/Time	10Min	15Min	30Min	45Min	1Hour	2Hour	3Hour	5Hour	8Hour	10Hour	12Hour	24Hour
1.60	473	368	229	178	143	84.0	58.9	38.9	27.5	22.0	18.8	9.73
1.65	467	365	222	175	138	82.9	58.8	38.6	27.4	21.8	18.7	9.72
1.67	463	362	208	173	137	82.6	58.3	38.3	27.2	21.8	18.6	9.71
1.70	455	349	194	170	133	82.1	57.2	37.9	26.8	21.7	18.5	9.68
1.75	415	329	187	169	130	81.5	55.7	37.2	26.0	21.6	18.4	9.67
1.80	396	317	181	166	128	79.9	55.3	36.6	25.7	21.2	18.3	9.65
1.85	328	277	169	152	125	77.0	54.0	35.4	24.1	20.3	17.3	9.14

12V 150AH

FM Series
For General Use



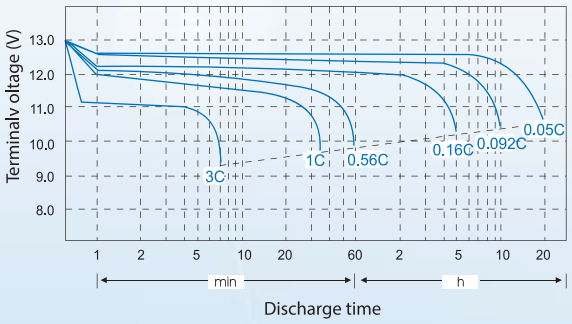
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		150Ah
Dimensions	Total Height (with terminals)	8.70 inches(221mm)
	Height	8.50 inches(216mm)
	length	20.94 inches(532mm)
	width	8.15 inches(207mm)
Weight		Approx.105.2 Pound(47.8kg)

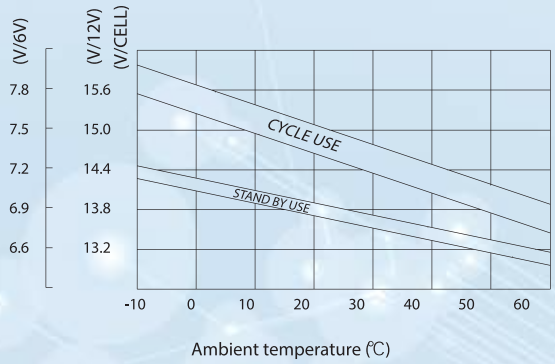
Characteristics

Capacity 77°F (25 ℃)	20 hour rate (7.5A)	150 Ah
	10 hour rate (13.8A)	138 Ah
	5 hour rate (24.0A)	120 Ah
	1hour rate (90.0A)	90 Ah
	15Minute Rate (246A)	61.5 Ah
Internal Resistance	Full charged Battery 77°F (25 C)	3 mΩ
Capacity affected by Temperature (20hour rate)	104°F (40 ℃)	102%
	77°F (25 ℃)	100%
	32°F (0 ℃)	85%
	5°F (-15 ℃)	65%
Self-Discharge 77°F (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F (25 ℃)	1000A(5S)	
Terminal	M5	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 30A	
	Voltage 14.4~14.7 V / 77°F (25 ℃)	
Float	Voltage 13.5~13.8V / 77°F (25 ℃)	

Discharge Curves 77℉ (25℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25 ℃)

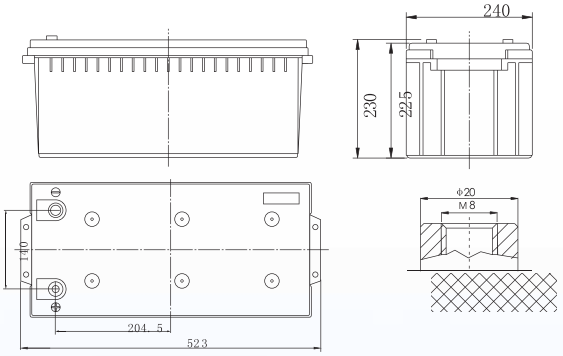
F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.65	461	322	249	155	119	81.7	56.8	38.9	26.1	14.9	6.74
1.70	426	303	239	132	112	77.7	55.0	37.5	25.2	14.5	6.52
1.80	336	255	203	111	106	72.6	53.0	35.8	23.7	13.8	6.28

Constant Power Discharge (WATTS PER CELL@25℃)

Cut off voltage V/cell	5min	10min	15min	30min	45min	1h	2h	3h	5h	10h	24h
1.60	821	583	454	286	219	178	106	73.7	48.6	27.8	12.2
1.65	804	576	451	282	217	175	104	72.0	48.1	27.6	12.1
1.67	801	571	450	276	213	172	103	71.3	47.8	27.5	12.0
1.70	757	560	441	247	210	168	102	70.4	47.1	27.2	11.9
1.75	691	519	411	234	208	162	101	69.6	46.5	27.0	11.8
1.80	626	487	391	214	205	159	100	68.7	45.2	26.5	11.6
1.85	501	404	342	208	188	148	95.5	67.8	44.0	25.2	11.4

12V 200AH

FM Series
For General Use



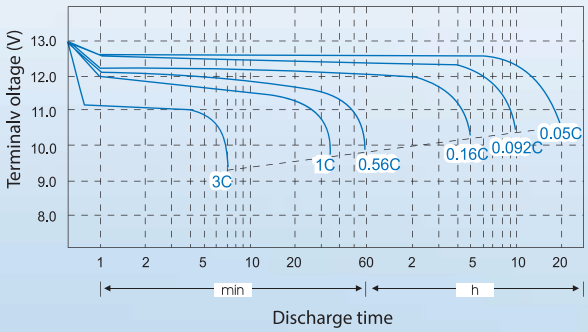
Specifications

Nominal Voltage		12V
Rated Capacity (20 hour rate)		200Ah
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight		Approx.132.66 Pound(60.3kg)

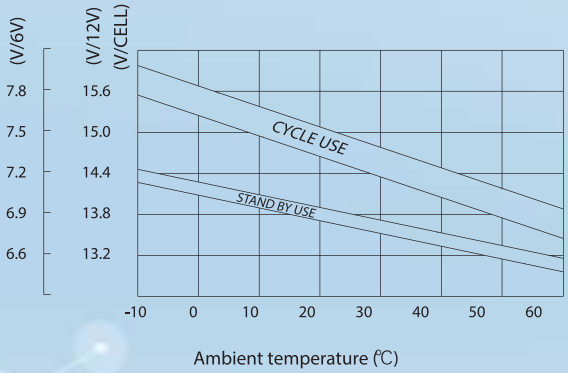
Characteristics

Capacity 77°F (25 ℃)	20 hour rate (10.0A)	200 Ah
	10 hour rate (18.4A)	184 Ah
	5 hour rate (32.0A)	160 Ah
	1hour rate (120.0A)	120 Ah
	15Minute Ra te (328A)	82.0 Ah
Internal Resistance	Full charged Battery 77°F (25 ℃)	3 mΩ
Capacity affected by Temperature (20hour rate)	104°F (40 ℃)	102%
	77°F (25 ℃)	100%
	32°F (0 ℃)	85%
	5°F (-15 ℃)	65%
Self-Discharge 77°F (25 ℃)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F (25 ℃)	1333A(5S)	
Terminal	M3	
Charge (Constant Voltage) Cycle	Initial Charging Current less than 60A	
	Voltage 14.4~14.7 V / 77°F (25 ℃)	
Float	Voltage 13.5~13.8V / 77°F (25 ℃)	

Discharge Curves 77°F (25 ℃)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25℃)

F. V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.65	553	386	299	189	143	109	74.3	51.5	34.2	20.3	8.90
1.70	511	364	286	177	134	103	72.2	50.0	33.5	19.5	8.64
1.80	403	305	244	146	128	98	68.9	48.3	32.1	18.4	8.35

Constant Power Discharge (WATTS PER CELL@25 ℃)

Cut off voltage V/cell	5min	10min	15min	30min	45min	1h	2h	3h	5h	10h	24h
1.60	985	697	545	349	263	231	138	95.8	63.2	37.3	15.8
1.65	965	691	541	343	260	228	136	94.6	63.0	36.8	15.6
1.67	961	685	540	338	256	223	135	94.0	62.8	36.2	15.5
1.70	908	672	529	331	252	219	134	93.2	62.6	36.0	15.4
1.75	836	629	499	296	250	216	133	92.8	62.0	35.1	15.3
1.80	751	584	469	281	246	211	130	92.1	61.4	34.4	15.1
1.85	601	485	410	257	226	207	124	89.3	57.2	32.8	14.8