Firefly®

HYBRID POWER

FLEXIBLE, INTELLIGENT, POWERFUL

CYGNUS®

HYBRID POWER SYSTEM

FIREFLY

Firefly Hybrid Power is an innovative cleantech company headquartered in the UK. We are the leading manufacturer of hybrid power systems.

Contents

CYGNUS® RANGE

In the last few years Cygnus® has become the benchmark for hybrid power systems across the UK and European rental and construction sectors. We are proud of Cygnus® and to be working with many of the leading companies in these sectors. The all new Cygnus® range of hybrid power systems reflects our objective to deliver continuous improvement through a deep understanding of energy storage and most importantly listening to customer feedback.

Our rental partners have extensive experience in using temporary power and like us are passionate about delivering market leading innovation. Contractors are telling us about the importance of CO_2 reporting, reliability and the need for silent power. The result is our most advanced, energy efficient hybrid power system, which meets the challenges for a demanding and changing industry.

Firefly has developed new technology to improve functionality, system performance and in-the-field operation. In addition to our proven AGM energy storage option, the all new Cygnus® range is now available with Lithium Iron Phosphate (LFP).

As the very latest in energy storage technology, LFP delivers storage capacity up to 130 kWh, offering both improved discharge characteristics and fast recharge times. This means that diesel generator runtimes can now be reduced even further.

FIREFLY CYGNUS® 4

The 'All New' Cygnus® 4 is the largest capacity hybrid power system of its kind available on the market today.

Designed for use with diesel generators of up to 250 kVA, Cygnus® 4 can manage load spikes of up to 33.6 kVA without triggering a diesel generator auto start.

Cygnus® 4 boasts the latest in cutting edge OPzV storage technology, with double the life of standard AGM, or the option of LFP storage technology. Either option delivers the fastest return for hire operators and the most savings to end users in fuel, noise, CO_2, NOx and PMs on-site emissions of Firefly's Cygnus® range. Over the product lifetime of Cygnus® 4, potential savings up to 1160 tonnes of CO_2 emissions can be saved.

With up to 130 kWh of energy storage, Cygnus® 4 delivers silent power for higher base loads than ever before.

As with all Firefly hybrid power systems, Cygnus® 4 works seamlessly with GLOW RFM® cloud platform to allow control, diagnostics and reporting from anywhere in the world.

Cygnus® 4 – the most advanced silent hybrid power system available on the market today.

TYPICAL APPLICATIONS

Cygnus® 4 applications are not limited to, but include silent power for:

- Large Site Compounds
- Drying rooms
- Cranes
- Pumping
- Utilities
- Infrastructure

CYGNUS® 4 FEATURES

SAFETY
- Variable RCD Earth Fault Protection
- MCB Overcurrent Protection
- Limit Switch – Cuts power if access door is opened
- Emergency Stop
- Lockable Service Doors
- Lockable Control Panel Door

CONNECTIVITY
- GLOW RFM®
- 125 A CEE Form 3 Phase
- Busbar Wiring Options
- 16 A Maintenance Charge Circuit
- Binding Posts for Remote Generator Start/Stop

CONVENIENCE
- CONTROL CENTRE
- Digital Timer
- SWITCH module
- Reinforced Forklift Pockets
- Lift and Drag Skid
- Rotating Lifting Ring
- Compact Design

QUALITY
- Built to ISO:9001 Quality Management System
- Premium Quality Components
- Rental Specification
- IP55 Rated Toughened 3mm Zintec Steel Canopy

PERFORMANCE
- CARE BMS or ACTIVE BMS
- Climate Master

CYGNUS® FOUR IS A MAJOR STEP FORWARD IN HYBRID POWER CAPACITY

CYGNUS® 4

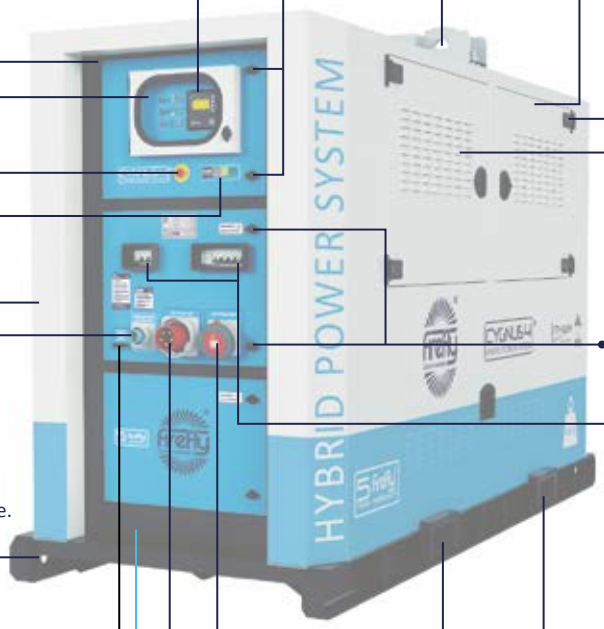
NEW

Energy Storage Options: ▶ LFP ▶ OPzV

LITHIUM ADVANCED TECHNOLOGY

OPzV TUBULAR TECHNOLOGY

CYGNUS 4® HYBRID POWER SYSTEM



S Emergency Stop
Allows user to stop entire operation of unit at push of a button.

S Limit Switch
Cuts power supply if the RCC or distribution panel is opened.

N CONTROL CENTRE
Fully integrate systems control.

N Lockable Access Door
Improved security.

Lifting Ring

S Inverter
Protects against overload, overheating, short circuits and low battery voltage. If the input current exceeds a specified limit, the protective upstream device will trip.

DC Busbar Protection
The positive Busbar is covered by an acrylic protective cover to prevent accidental short circuit or injury.

N SWITCH
Change operating modes at the touch of a button.

S N Restrictor Door Stays
Galvanised arm hook prevents service door slamming shut.

N Glow RFM®
Instant NFC or QR Code secure log-in to machine's Glow RFM® web page.

Air Flow Vents
Improved temperature internal control system

IP55 Rated Toughened Canopy
Reinforced canopy with replaceable panels constructed from 3 mm steel.

N Lockable Distribution Panel

S Variable RCD for Earth Leakage Protection
Detects any current leakage to earth and immediately cuts power.

N 16 A Maintenance Charge
Simple charging when not in use.

Lift and Drag Skid

Auto Start

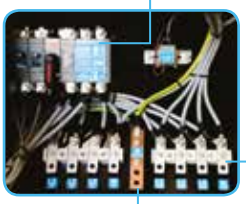
N 125 A 3 Phase Output

N 125 A 3 Phase Input

Breakers for Overcurrent
In the case of over current at any inlet or outlet, the breaker will trip. They can all be manually switched by the user behind the IP55 rated enclosure.

N Reinforced Forklift Pockets
Prevents canopy damage.

Internal View



S Changeover Switch
Disconnects inlet socket when Busbar is used for input. New secure cable clamp function.

S N Busbar Input/ Output
Improved aluminium plate with high grade cable glands - to limit water ingress.

Earth Point

Key: S Safety N New

Cygnus® 4 Technical Specification

			CYG4-II/48/90/OPV	CYG4-II/48/98/LFP	CYG4-II/48/130/LFP
POWER	Stand Alone System Output (No External AC Source)	Prime Rating @ 25°C (kVA)[1]	42		
		Standby Rating @ 25°C - 30 mins (kVA)[1]	48		
	Hybrid System - Autonomous Output Characteristics	Max. Autonomous Load Before Gen. Start Command[1]	37.8 kVA (Immediate Start) 33.6 kVA (1 min) 29.4 kVA (5 mins) 29.3 kVA (1.1 hours)	42 kVA (Immediate Start) 37.9 kVA (1 min) 33.6 kVA (5 mins) 33.5 kVA (2.9 hours)	42 kVA (Immediate Start) 37.9 kVA (5 mins) 33.6 kVA (10 mins) 33.5 kVA (3.9 hours)
		Max. Power For 12 Hour / 6 Hour Runtime (kVA)[1]	6.9 / 11.4	8.2 / 16.3	10.9 / 21.8
	Hybrid System - Output Characteristics (With External AC Source)	Continuous Pass Through (External Source Only)	100 A (per phase) / 69 kVA (All Outputs)		
		Max. Hybrid Output (External AC Source + HPS)[1]	125 A (per phase) / 86.2 kVA (All Outputs)		
		Runtime @ Max. Hybrid Output (External AC Source + HPS)[1]	3 h	5.6 h	7.6 h
		AC Output Voltage - 50 Hz (V)	400 (Adjustable)		
		Input Connections	1 x 125 A 3Ph CEE Form, 1 x 16 A 1Ph CEE Form, AC In Busbar		
		Output Connections	1 x 125 A 3Ph CEE Form, AC Out Busbar		
		Protection	Overload, Overheat, Short Circuit, Earth Fault (Variable RCD)		
STORAGE		Type	OPzV (Sealed Tubular Plate)	LFP (Lithium Iron Phosphate)	
		Capacity @ 25°C, 80% DoD (kWh)	90[2]	98	130
		Charge Time (hours)[3]	7.5	3.5	4.5
		Battery Management System	CARE BMS - Continuous monitoring of state of Charge, voltage and temperature to prevent over charging and discharging	ACTIVE BMS - Multiple µProcessor Battery Monitoring System (BMS) continually monitors and controls state of charge, voltage and temperature along with active balancing of cells to maintain maximum energy availability	
		Expected Cycle Life (80% / 60% Original Capacity)[4]	1500 / 2000	2000 / 4000	
		Maintenance Charge Cycle (weeks)	≤ 2		
CONTROL		CONTROL CENTRE	LCD display allowing access to operating parameters, indication of voltages, power Input/Output, % capacity available and complete operational history		
		SWITCH (Mode Selection)	µProcessor controlled swtching module for system operating mode selection (L1 Support Only, 3Ph Support and Maintenance Charge)		
		CLIMATE MASTER (Temperature Control)	ARM processor based environmental controller monitoring multiple internal temperature sensors, using variable speed forced air cooling and adaptive charging rates to maintain batteries at optimum temperature		
		Remote Generator Start	Binding Posts and Internal Busbar (Two Wire Signal)		
		Transfer Relay Time (ms)	< 15		
		Remote Communication	Integrated GSM-GPS modem to provide access to HPS status, live and historic performance data, fault and event notifications, system control, programming and location data		
ENVIRONMENTAL		Water/Ingress Protection Rating	IP55		
		Operating Temperature Range (°C)[5]	-15 to +45	-20 to +45	
		Sound Level (dBA)	Acoustic Pressure: @ 1 m: Trace, @ 3 m: 0		
		Potential CO_2 Savings Over Product Lifetime (tonnes)[6]	520	1090	1160
MECHANICAL		Dimensions W x D x H (mm)	1280 x 3000 x 2100		
		Weight (kg)	5900	3650	4100
		Lift Points	Lifting Beam, Forklift Pockets, Lift & Drag Skid		

1. Depending on storage SoC
2. kWh is based on C20 rate and will vary depending on rate of discharge (see Fig. 1 & Fig. 2)
3. Charge time dependent on available power of external source
4. See Fig. 3
5. Storage capacity may be affected by charging or discharging at less than 0°C (see Fig. 4)
   Storage total cycle life may be affected by charging or discharging in excess of 25°C (see Fig. 5)
6. Based on 12 hour runtime per cycle savings on a 250 kVA diesel generator

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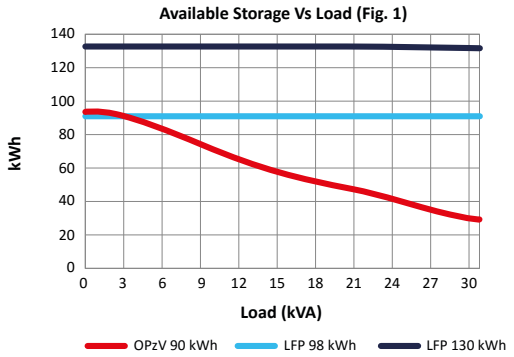
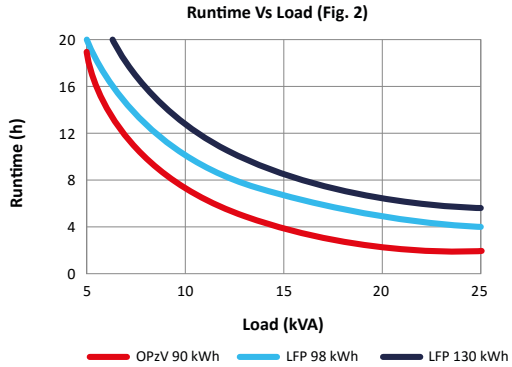
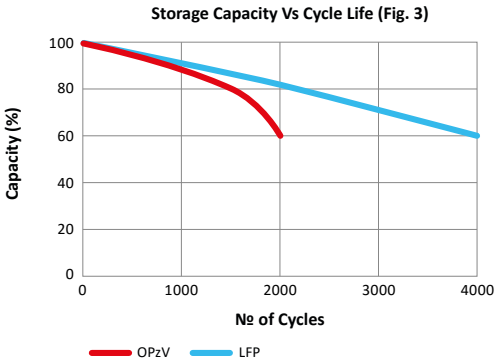
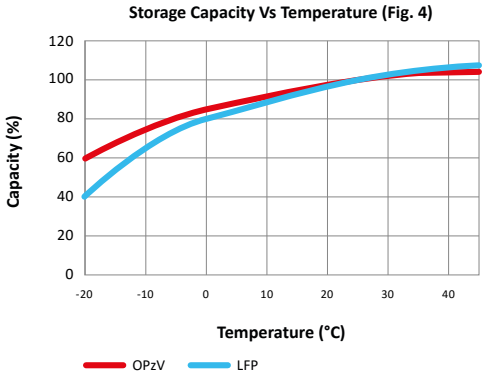
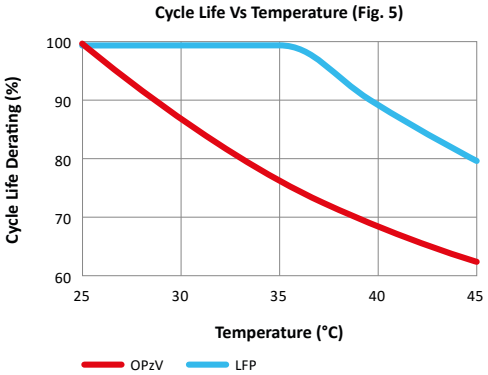
Cygnus® 4 Technical Specification











Cygnus® 4 II 90 kWh OPzV				
Runtime (h)	Available Storage (kWh)	A (1Ph)	Current (A)	Power (kVA)
20	91.3	19.9	6.6	4.6
16	87.8	23.9	8.0	5.5
14	85.5	26.5	8.8	6.1
12	82.6	29.9	10.0	6.9
10	79.1	34.4	11.5	7.9
8	73.7	40.0	13.3	9.2
6	68.5	49.6	16.5	11.4
4	60.7	66.0	22.0	15.2
2	46.6	101.4	33.8	23.3
1	30.8	133.7	44.6	30.8

Cygnus® 4 II 98 kWh LFP				
Runtime (h)	Available Storage (kWh)	A (1Ph)	Current (A)	Power (kVA)
20	98.3	21.4	7.1	4.9
16	98.2	26.7	8.9	6.1
14	98.1	30.5	10.2	7.0
12	98.0	35.5	11.8	8.2
10	97.9	42.6	14.2	9.8
8	97.8	53.2	17.7	12.2
6	97.7	70.8	23.6	16.3
4	97.6	106.1	35.4	24.4
3	97.5	141.3	47.1	32.5
2.35	97.4	180.2	60.1	41.4

Cygnus® 4 II 130 kWh LFP				
Runtime (h)	Available Storage (kWh)	A (1Ph)	Current (A)	Power (kVA)
20	131.1	28.5	9.5	6.6
16	131.0	35.6	11.9	8.2
14	130.9	40.7	13.6	9.4
12	130.8	47.4	15.8	10.9
10	130.7	56.8	18.9	13.1
8	130.6	71.0	23.7	16.3
6	130.5	94.6	31.5	21.8
4	130.4	141.7	47.2	32.6
3.1	130.3	182.7	60.9	42.0

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FIREFLY CYGNUS® 3

The 'All New' Cygnus® 3 is the industry's most popular silent hybrid power system, reinvented.

Featuring a host of additional upgrades and to enable seamless process automation, Cygnus® 3 uniquely features SWITCH technology between Three Phase Support and L1 Support Only modes. Cygnus® 3 is the most versatile, dependable hybrid system of its kind obtainable on the market.

With up to 65 kWh of energy capacity, Cygnus® 3 is available with LFP or AGM storage technologies. Ideally suited for use with diesel generators of up to 100 kVA, Cygnus® 3 manages load spikes of up to 16.8 kVA without triggering auto start of the diesel generator.

Used by many of Europe's leading plant hire companies, Cygnus® 3 sets the standard in hybrid power for temporary applications, providing completely silent power and can save up to 720 tonnes of CO_2 emissions over its lifetime.

Cygnus® 3 is a cost effective and eco-friendly addition to any fleet, delivering fast returns for hire operators and significant savings in both fuel and on-site emissions for end users.

As with all Firefly hybrid power systems, Cygnus® 3 works seamlessly with GLOW RFM® cloud platform to allow control, diagnostics and reporting from anywhere in the world.

TYPICAL APPLICATIONS

Cygnus® 3 applications are not limited to, but include silent power for:

- Site Compounds
- Perimeter Lighting
- Drying Rooms
- Welfare facilities
- Utilities
- Infrastructure
- Telecoms

CYGNUS® 3 FEATURES

SAFETY
- Variable RCD Earth Fault Protection
- MCB Overcurrent Protection
- Limit Switch – Cuts power if access door is opened
- Emergency Stop
- Lockable Service Doors
- Lockable Control Panel Door

CONNECTIVITY
- GLOW RFM®
- 63 A CEE Form 3 Phase
- 125 A CEE Form 3 Phase
- Busbar Wiring Options
- 16 A Maintenance Charge Circuit
- Binding Posts for Remote Generator Start/Stop

CONVENIENCE
- CONTROL CENTRE
- Digital Timer
- SWITCH module
- Reinforced Forklift Pockets
- Lift and Drag Skid
- Rotating Lifting Ring
- Compact Design

QUALITY
- Built to ISO:9001 Quality Management System
- Premium Quality Components
- Rental Specification
- IP55 Rated Toughened 2.5mm Zintec Steel Modular Canopy

PERFORMANCE
- CARE BMS or ACTIVE BMS
- CLIMATE MASTER

CYGNUS® THREE HAS A PROVEN TRACK RECORD AND CONTINUES TO BE THE MAINSTAY OF RENTAL FLEETS

Firefly HYBRID POWER

NEW

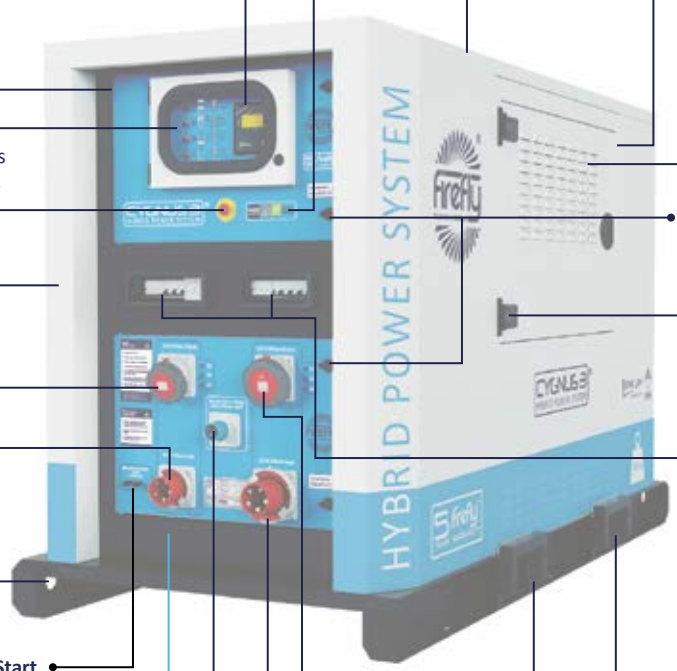
CYGNUS® 3

Energy Storage Options: ▶ LFP ▶ AGM

LITHIUM ADVANCED TECHNOLOGY

AGM DEEP CYCLE

CYGNUS 3® HYBRID POWER SYSTEM



N Glow RFM®
Instant NFC or QR Code log-in to machine's Glow RFM® web page.

S Inverter
Protects against overload, overheating, short circuits and low battery voltage. If the input current exceeds a specified limit, the protective upstream device will trip.

DC Busbar Protection
The positive Busbar is covered by an acrylic protective cover to prevent accidental short circuit or injury.

S Limit Switch
Cuts power supply if the RCC or distribution panel is opened by user.

N CONTROL CENTRE
Fully integrate systems control.

Rotating Lifting Ring

S Emergency Stop
Allows user to stop entire operation of unit at one push of a button.

N SWITCH
Change operating modes at the touch of a button.

N Air Flow Vents
Part of improved airflow managed by CLIMATE CONTROL.

N Lockable Distribution Panel

IP55 Rated Toughened Modular Canopy
Reinforced canopy with replaceable panels constructed from 2.5mm steel.

S N Restrictor Door Stays
Galvanised arm hook prevents service door slamming shut.

63 A 3 Phase Output

63 A 3 Phase Input

S Variable RCD for Earth Leakage Protection
Detects any current leakage to earth and immediately cuts power.

Lift and Drag Skid

Auto Start

Breakers for Overcurrent
In the case of overcurrent at any inlet or outlet, the breaker will trip. They can all be manually switched by the user behind the IP55 rated enclosure.

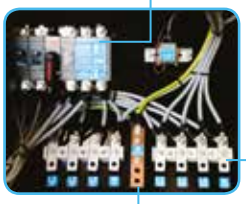
N 125 A 3 Phase Output

N 125 A 3 Phase Input

N 16 A Maintenance Charge
Simple charging when not in use.

N Reinforced Forklift Pockets
Prevents canopy damage.

Internal View



S Changeover Switch
Disconnects inlet socket when Busbar is used for input. New secure cable clamp function.

S N Busbar Input/ Output
Improved aluminium plate with high grade cable glands - to limit water ingress.

Earth Point

Key: S Safety N New

CYGNUS 3® HYBRID POWER SYSTEM | 5 Firefly® YEAR WARRANTY | LITHIUM ADVANCED TECHNOLOGY | AGM DEEP CYCLE | Firefly® HYBRID POWER

Cygnus® 3 Technical Specification

				CYG3-II/24/50/AGM	CYG3-II/24/50/LFP	CYG3-II/24/65/LFP
POWER	Stand Alone System Output Power (No External AC Source)		Prime Rating @ 25°C (kVA)[1]	21		
			Standby Rating @ 25°C - 30 mins (kVA)[1]	24		
	Hybrid System - Autonomous Output Power Characteristics		Max. Autonomous Load Before Gen. Start Command[1]	18.9 kVA (Immediate Start) 16.8 kVA (1 min) 14.7 kVA (5 mins) 14.6 kVA (2.3 hours)	21 kVA (Immediate Start) 18.9 kVA (1 min) 16.8 kVA (5 mins) 16.7 kVA (2.9 hours)	21 kVA (Immediate Start) 18.9 kVA (5 mins) 16.8 kVA (10 mins) 16.7 kVA (3.9 hours)
			Max. Power For 12 Hour / 6 Hour Runtime (kVA)[1]	4 / 7.4	4.1 / 8.1	5.4 / 10.8
	Hybrid System - Output Power Characteristics (With External AC Source)	(3Ph Support) - 63/3 CEE Form Socket	Continuous Pass Through (External Source Only)	50 A (per phase) / 34.5 kVA		
			Max. Hybrid Output (External Source + HPS)[1]	63 A (per phase) / 43.5 kVA		
			Runtime @ Max. Hybrid Output (External Source + HPS)[1]	2.8 h	3.7 h	5 h
		(3Ph Support) - Busbar or 125/3 CEE Form	Continuous Pass Through (External Source Only)	50 A (per phase) / 34.5 kVA		
			Max. Hybrid Output (External Source + HPS)[1]	80 A (per phase) / 55.2 kVA		
			Runtime @ Max. Hybrid Output (External Source + HPS)[1]	1.4 h	2.3 h	3.1 h
		(L1 Support Only) - 125/3 CEE Form or Busbar	Continuous Pass Through (External Source Only)	125 A (per phase) / 86.2 kVA		
			Max. Hybrid Output (External Source + HPS)[1]	125 A (per phase) / 86.2 kVA		
			Runtime @ Max. Hybrid Output (External Source + HPS)[1]	N/A		
			AC Output Voltage - 50 Hz (V)	230 1Ph, 400 3Ph (Both Adjustable)		
			Input Connections	1 x 63 A 3Ph CEE Form, 1 x 125 A 3Ph CEE Form, 1 x 16 A 1Ph CEE Form, AC In Busbar		
			Output Connections	1 x 63 A 3Ph, 1 x 125 A 3Ph CEE Form, AC Out Busbar		
			Protection	Overload, Overheat, Short Circuit, Earth Fault (Variable RCD)		
STORAGE			Type	AGM (Absorbent Glass Mat)	LFP (Lithium Iron Phosphate)	
			Capacity @ 25°C (kWh)	50 (70% DoD)[2]	50 (80% DoD)	65 (80% DoD)
			Charge Time (hours)	6	3.5	4.5
			Battery Management System	CARE BMS - Continuous monitoring of state of Charge, voltage and temperature to prevent over charging and discharging	ACTIVE BMS - Multiple µProcessor Battery Monitoring System (BMS) continually monitors and controls state of charge, voltage and temperature along with active balancing of cells to maintain maximum energy availability	
			Expected Cycle Life (80% / 60% Original Capacity)[4]	600 / 800	2000 / 4000	
			Maintenance Charge Cycle (weeks)	≤ 2		
CONTROL			CONTROL CENTRE	LCD display allowing access to operating parameters, indication of voltages, power Input/Output, % capacity available and complete operational history		
			SWITCH (Mode Selection)	µProcessor controlled swtching module for system operating mode selection (L1 Support Only, 3Ph Support and Maintenance Charge)		
			CLIMATE MASTER (Temperature Control)	ARM processor based environmental controller monitoring multiple internal temperature sensors, using variable speed forced air cooling and adaptive charging rates to maintain batteries at optimum temperature		
			Remote Generator Start	Binding Posts and Internal Busbar (Two Wire Signal)		
			Transfer Relay Time (ms)	< 15		
			Remote Communication	Integrated GSM-GPS modem to provide access to HPS status, live and historic performance data, fault and event notifications, system control, programming and location data		
ENVIRONMENTAL			Water/Ingress Protection Rating	IP55		
			Operating Temperature Range (°C)[5]	-20 to +45		
			Sound Level (dBA)	Acoustic Pressure: @ 1 m: Trace, @ 3 m: 0		
			Typical CO_2 Savings Over Product Lifetime (tonnes)[6]	140	690	720
MECHANICAL			Dimensions W x D x H (mm)	1180 x 2380 x 1565		
			Weight (kg)	2700	1640	1900
			Lift Points	Rotatable Lifting Ring, Forklift Pockets, Lift & Drag Skid		

1. Depending on storage SoC
2. kWh is based on C20 rate and will vary depending on rate of discharge (see Fig. 1 & Fig. 2)
3. Charge time dependent on available power of external source
4. See Fig. 3
5. Storage capacity may be affected by charging or discharging at less than 0°C (see Fig. 4)
   Storage total cycle life may be affected by charging or discharging in excess of 25°C (see Fig. 5)
6. Based on 12 hour runtime per cycle savings on a 100 kVA diesel generator

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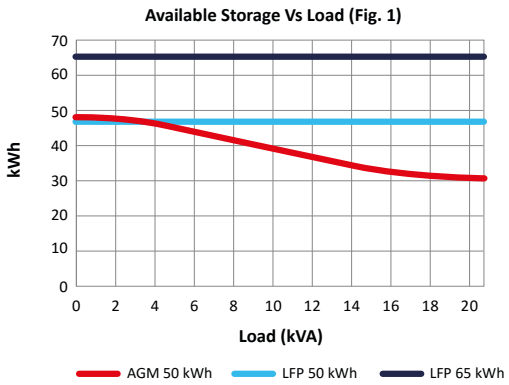
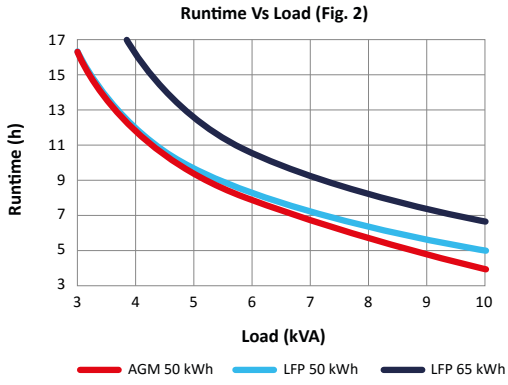
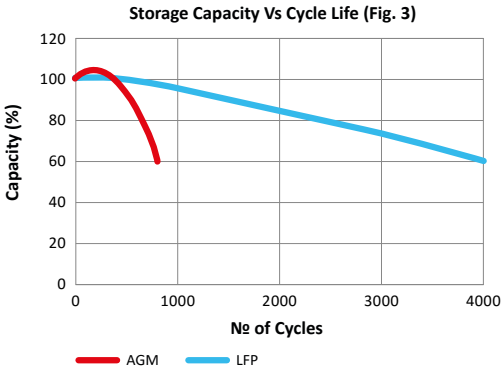
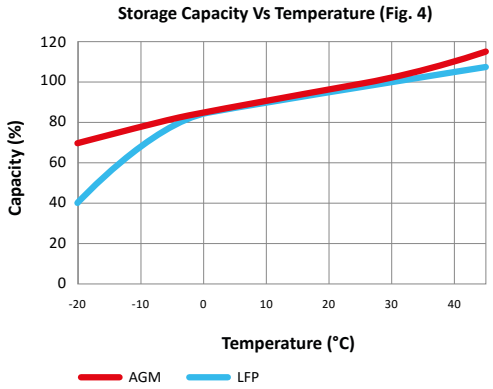
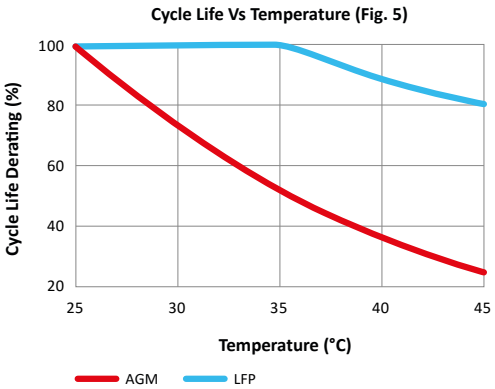
Cygnus® 3 Technical Specification











Cygnus® 3 65 kWh LFP				
Runtime (h)	Available Storage (kWh)	Current in 1Ph (A)	Current in 3Ph (A)	Power (kVA)
20	65.5	14.2	4.7	3.3
16	65.4	17.8	5.9	4.1
14	65.3	20.3	6.8	4.7
12	65.2	23.6	7.9	5.4
10	65.1	28.3	9.4	6.5
8	65.0	35.3	11.8	8.1
6	64.9	47.0	15.7	10.8
4	64.8	70.4	23.5	16.2
3.1	64.6	90.6	30.2	20.8

Cygnus® 3 50 kWh AGM				
Runtime (h)	Available Storage (kWh)	Current in 1Ph (A)	Current in 3Ph (A)	Power (kVA)
20	50.2	10.9	3.6	2.5
16	48.9	13.3	4.4	3.1
14	48.2	15.0	5.0	3.4
12	47.6	17.2	5.7	4.0
10	47.0	20.4	6.8	4.7
8	45.7	24.8	8.3	5.7
6	44.7	32.4	10.8	7.4
4	40.1	43.6	14.5	10.0
2	32.6	70.8	23.6	16.3
1.4	29.3	91.0	30.3	20.9

Cygnus® 3 50 kWh LFP				
Runtime (h)	Available Storage (kWh)	Current in 1Ph (A)	Current in 3Ph (A)	Power (kVA)
20	49.2	10.7	3.6	2.5
16	49.1	13.3	4.4	3.1
14	49.0	15.2	5.1	3.5
12	48.9	17.7	5.9	4.1
10	48.8	21.2	7.1	4.9
8	48.7	26.5	8.8	6.1
6	48.6	35.2	11.7	8.1
4	48.5	52.7	17.6	12.1
3	48.4	70.1	23.4	16.1
2.3	48.3	91.3	30.4	21.0

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FIREFLY CYGNUS® 2

Cygnus® 2 is a powerful single phase hybrid power system from Firefly's rental specification range.

Ideally suited for use with diesel generators of up to 45 kVA, Cygnus® 2 manages load spikes of up to 5.6 kVA without triggering auto start of the diesel generator.

Cygnus® 2 incorporates all the features that you expect of a premium product from Firefly and is available with up to 37 kWh energy storage with LFP technology or 25 kWh with AGM technology.

Modest in footprint, Cygnus® 2 provides versatility, reliability and completely silent power. Delivering ease of operation as a primary or back-up, straightforward noise-free power solution.

The integration of Cygnus® 2 as part of standard diesel generator power installations, delivers significant noise, CO_2, NOx and PMs reductions. Over the product lifetime of Cygnus® 2, up to 375 tonnes of CO_2 emissions potentially can be saved.

As with all Firefly hybrid power systems, Cygnus® 2 works seamlessly with GLOW RFM® cloud platform to allow control, diagnostics and reporting from anywhere in the world.

TYPICAL APPLICATIONS

Cygnus® 2 applications are not limited to, but include silent power for:

- Single Cabin Compounds
- Security Lighting and CCTV Systems
- Aviation Lighting
- Telecoms
- General Construction
- Restricted Access Sites

CYGNUS® 2 FEATURES

SAFETY
- Variable RCD Earth Fault Protection
- MCB Overcurrent Protection
- Limit Switch – Cuts power if access door is opened
- Emergency Stop
- Lockable Service Doors
- Lockable Control Panel Door

CONNECTIVITY
- GLOW RFM®
- 63 A CEE Form and Busbar Wiring Options
- 16 A Maintenance Charge Circuit
- Binding Posts for Remote Generator Start/Stop

CONVENIENCE
- CONTROL CENTRE
- Digital Timer
- SWITCH module
- Reinforced Forklift Pockets
- Lift and Drag Skid
- Rotating Lifting Ring
- Compact Design

QUALITY
- Built to ISO:9001 Quality Management System
- Premium Quality Components
- Rental Specification
- IP55 Rated Toughened 2mm Zintec Steel Modular Canopy

PERFORMANCE
- CARE BMS or ACTIVE BMS
- CLIMATE MASTER

CYGNUS® 2 IS A COST EFFECTIVE HYBRID SOLUTION FOR A RANGE OF APPLICATIONS

Firefly HYBRID POWER

NEW

CYGNUS® 2

Energy Storage Options: ▶ LFP ▶ AGM

LITHIUM ADVANCED TECHNOLOGY

AGM DEEP CYCLE

CYGNUS 2® HYBRID POWER SYSTEM

N SWITCH
Change operating modes at the touch of a button.

N CONTROL CENTRE
Fully integrate systems control.

S Emergency Stop
Allows user to stop entire operation of unit at push of a button.

N Lockable Access Door.

S Limit Switch
Cuts power supply if the RCC or distribution panel is opened by user.

IP55 Rated Toughened Modular Canopy
Reinforced canopy with replaceable panels constructed from 2mm steel.

Rotating Lifting Ring

Inverter
Protects against overload, overheating, short circuits and low battery voltage. If the input current exceeds a specified limit, the protective upstream device will trip.

N Glow RFM®
Instant NFC or QR Code secure log-in to machine's Glow RFM® web page.

S DC Busbar Protection
The positive Busbar is covered by an acrylic protective cover to prevent accidental short circuit or injury.

N Lockable Distribution Panel

S Variable RCD for Earth Leakage Protection
Detects any current leakage to earth and immediately cuts power.

N Reinforced Forklift Pockets
Prevents canopy damage.

Lift and Drag Skid

63 A Single Phase Output

63 A Single Phase Input

16 A Maintenance Charge

S Breakers for Overcurrent
In the case of overcurrent at any inlet or outlet, the breaker will trip. They can all be manually switched by the user behind the IP55 rated enclosure.

Auto Start

S Changeover Switch
Disconnects inlet socket when Busbar is used for input. New secure cable clamp function.

S N Busbar Input/ Output
Improved aluminium plate with high grade cable glands - to limit water ingress.

Key: S Safety N New

CYGNUS 2® HYBRID POWER SYSTEM | 5 Firefly® YEAR WARRANTY | LITHIUM ADVANCED TECHNOLOGY | AGM DEEP CYCLE | Firefly® HYBRID POWER

Cygnus® 2 Technical Specification

			CYG2-II/8/25/AGM	CYG2-II/8/25/LFP	CYG2-II/8/37/LFP
POWER	Stand Alone System Output (No External AC Source)	Prime Rating @ 25°C (kVA)[1]	7		
		Standby Rating @ 25°C - 30 mins (kVA)[1]	8		
	Hybrid System - Autonomous Output Characteristics	Max. Autonomous Load Before Gen. Start Command[1]	6.3 kVA (Immediate Start) 5.6 kVA (1 min) 4.9 kVA (5 mins) 4.8 kVA (4.2 hours)	7 kVA (Immediate Start) 6.3 kVA (1 min) 5.6 kVA (5 mins) 5.5 kVA (4.4 hours)	7 kVA (Immediate Start) 6.3 kVA (5 mins) 5.6 kVA (10 mins) 5.5 kVA (6.7 hours)
		Max. Power For 12 Hour / 6 Hour Runtime (kVA)[1]	2 / 3.7	2 / 4.1	3.1 / 6.1
	Hybrid System - Output Characteristics (With External AC Source)	Continuous Pass Through (External Source Only)	50 A / 11.5 kVA (All Outputs)		
		Max. Hybrid Output (External Source + HPS)[1]	63 A / 14.5 kVA (All Outputs)		
		Runtime @ Max. Hybrid Output (External Source + HPS)[1]	8	8	12
		AC Output Voltage - 50 Hz (V)	230 (Adjustable)		
		Input Connections	1 x 63 A 1Ph CEE Form, 1 x 16 A 1Ph CEE Form, AC In Busbar		
		Output Connections	1 x 63 A 1Ph CEE Form, AC Out Busbar		
		Protection	Overload, Overheat, Short Circuit, Earth Fault (Variable RCD)		
STORAGE		Type	AGM (Absorbent Glass Mat)	LFP (Lithium Iron Phosphate)	
		Capacity @ 25°C (kWh)	25 (70% DoD)[2]	25 (80% DoD)	37 (80% DoD)
		Charge Time (hours)[3]	6	5	7.5
		Battery Management System	CARE BMS - Continuous monitoring of state of Charge, voltage and temperature to prevent over charging and discharging	ACTIVE BMS - Multiple µProcessor Battery Monitoring System (BMS) continually monitors and controls state of charge, voltage and temperature along with active balancing of cells to maintain maximum energy availability	
		Expected Cycle Life (80% / 60% Original Capacity)[4]	600 / 800	2000 / 4000	
		Maintenance Charge Cycle (weeks)	≤ 2		
CONTROL		CONTROL CENTRE	LCD display allowing access to operating parameters, indication of voltages, power Input/Output, % capacity available and complete operational history		
		SWITCH (Mode Selection)	µProcessor controlled swtching module for system operating mode selection (L1 Support Only, 3Ph Support and Maintenance Charge)		
		CLIMATE MASTER (Temperature Control)	ARM processor based environmental controller monitoring multiple internal temperature sensors, using variable speed forced air cooling and adaptive charging rates to maintain batteries at optimum temperature		
		Remote Generator Start	Binding Posts and Internal Busbar (Two Wire Signal)		
		Transfer Relay Time (ms)	< 15		
		Remote Communication	Integrated GSM-GPS modem to provide access to HPS status, live and historic performance data, fault and event notifications, system control, programming and location data		
ENVIRONMENTAL		Water/Ingress Protection Rating	IP55		
		Operating Temperature Range (°C)[5]	-20 to +45		
		Sound Level (dBA)	Acoustic Pressure: @ 1 m: Trace, @ 3 m: 0		
		Potential CO2 Savings Over Product Lifetime (tonnes)[6]	75	345	375
MECHANICAL		Dimensions W x D x H (mm)	1050 x 1480 x 1310		
		Weight (kg)	1300	750	920
		Lift Points	Rotatable Lifting Ring, Forklift Pockets, Lift & Drag Skid		

1. Depending on storage SoC
2. kWh is based on C20 rate and will vary depending on rate of discharge (see Fig. 1 & Fig. 2)
3. Charge time dependent on available power of external source
4. See Fig. 3
5. Storage capacity may be affected by charging or discharging at less than 0°C (see Fig. 4)
   Storage total cycle life may be affected by charging or discharging in excess of 25°C (see Fig. 5)
6. Based on 12 hour runtime per cycle savings on a 45 kVA diesel generator

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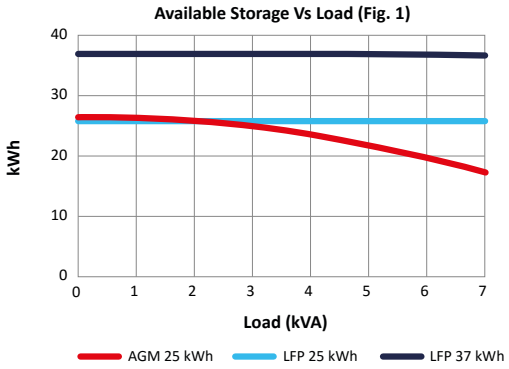
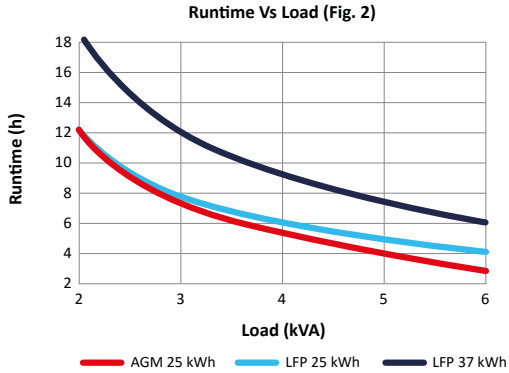
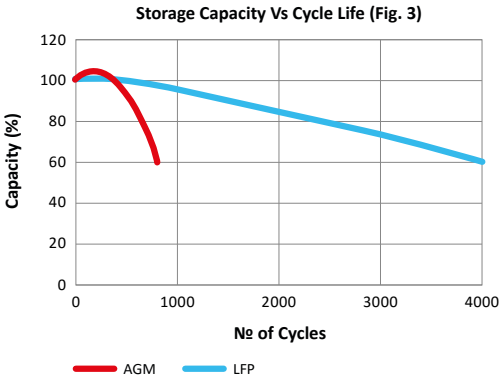
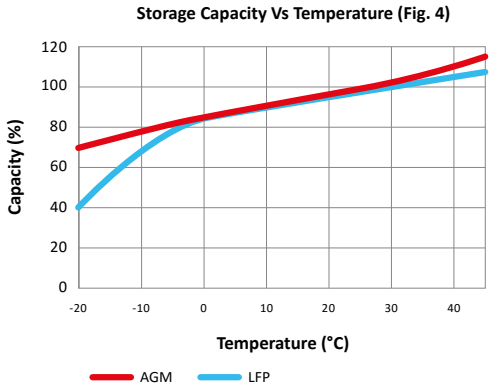
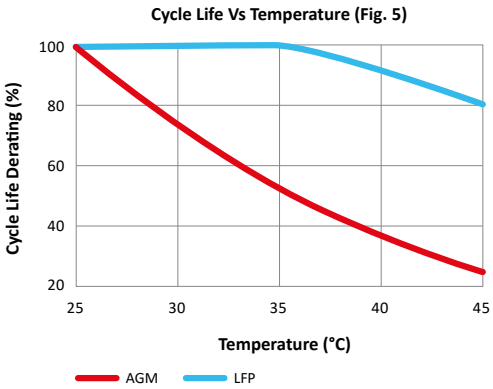
Cygnus® 2 Technical Specification











Cygnus® 2 25 kWh AGM			
Runtime (h)	Available Storage (kWh)	Current (A)	Power (kVA)
20	25.1	5.5	1.3
16	24.4	6.6	1.5
14	24.1	7.5	1.7
12	23.8	8.6	2.0
10	23.5	10.2	2.3
8	22.8	12.4	2.9
6	22.3	16.2	3.7
4	20.1	21.8	5.0
3	18.4	26.7	6.1
2.5	17.4	30.2	6.9

Cygnus® 2 25 kWh LFP			
Runtime (h)	Available Storage (kWh)	Current (A)	Power (kVA)
20	24.6	5.3	1.2
16	24.6	6.7	1.5
14	24.5	7.6	1.8
12	24.5	8.9	2.0
10	24.4	10.6	2.4
8	24.4	13.2	3.0
6	24.3	17.6	4.1
4	24.3	26.4	6.1
3.5	24.2	30.1	6.9

Cygnus® 2 37 kWh LFP			
Runtime (h)	Available Storage (kWh)	Current (A)	Power (kVA)
20	36.9	8.0	1.8
16	36.9	10.0	2.3
14	36.8	11.4	2.6
12	36.8	13.3	3.1
10	36.7	16.0	3.7
8	36.7	19.9	4.6
6	36.6	26.5	6.1
5.5	36.6	28.9	6.6
5.25	36.5	30.2	7.0

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FHP Range Brochure V1 - 22 May 2017 4:38 PM

FIREFLY CYGNUS® 1

The 'All New' Cygnus® 1 is the most compact model in the Cygnus® range, manufactured to a robust rental specification.

Available with LFP or AGM storage technologies providing up to 8 kWh of energy storage. Cygnus® 1 is ideally suited for use with diesel generators of up to 15 kVA, managing load spikes of up to 2.8 kVA without triggering auto start of the diesel generator.

Cygnus® 1 delivers truly silent power, without interruption to the surrounding environment; mitigating noise disturbance to local wildlife and neighbouring building occupants.

Providing silent emission-free power, up to 250 tonnes of CO_2 emissions potentially can be saved over the product lifetime of Cygnus® 1.

As with all Firefly hybrid power systems, Cygnus® 1 works seamlessly with GLOW RFM® cloud platform to allow control, diagnostics and reporting of from anywhere in the world.

TYPICAL APPLICATIONS

Cygnus® 1 applications are not limited to, but include silent power for:

- Security Lighting
- CCTV
- IT Equipment
- Monitoring Equipment

CYGNUS® 1 FEATURES

SAFETY
- Variable RCD earth fault protection
- MCB overcurrent protection
- Limit Switch cuts power if access door is opened
- Emergency Stop
- Lockable Service Door

CONNECTIVITY
- GLOW RFM®
- 32 A CEE Form and Busbar Wiring Options
- Binding Posts for Remote Generator Start/Stop

CONVENIENCE
- CONTROL CENTRE
- Digital Timer
- Forklift Pockets and Lift & Drag Skid
- Compact Design

QUALITY
- Built to ISO:9001 Quality Management System
- Premium Quality Components
- Rental Specification
- IP55 Rated Toughened 2mm Zintec Steel Canopy

PERFORMANCE
- CARE BMS or ACTIVE BMS
- CLIMATE MASTER

COMPACT AND FLEXIBLE, CYGNUS® 1 IS IDEAL FOR SMALL SITE APPLICATIONS

CYGNUS® 1

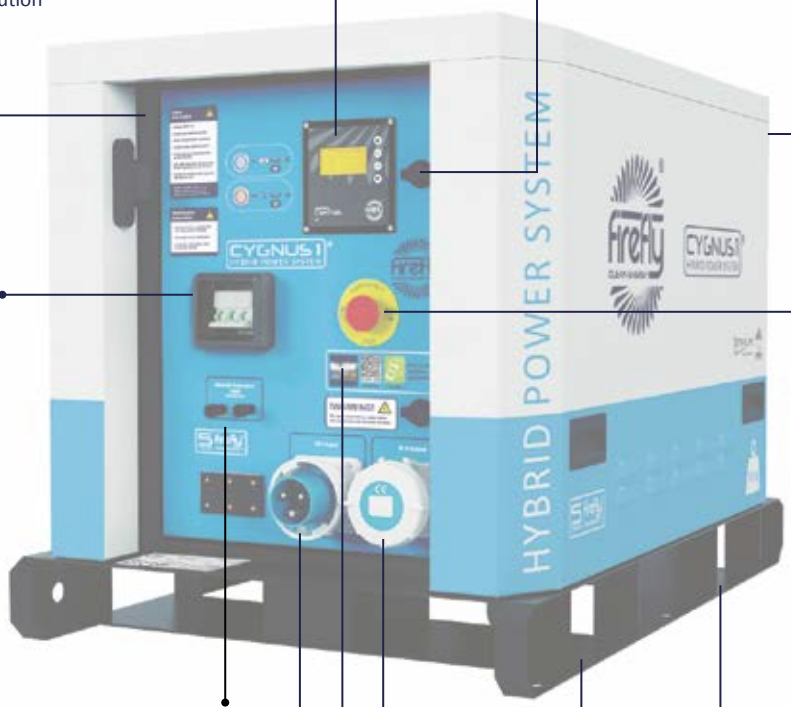
NEW

Energy Storage Options: ▶ LFP ▶ AGM

LITHIUM ADVANCED TECHNOLOGY

AGM DEEP CYCLE

CYGNUS 1® HYBRID POWER SYSTEM



N CONTROL CENTRE
Fully integrate systems control.

N Lockable Access Door

S Limit Switch
Cuts power supply if distribution panel is opened by user.

N IP55 Rated Toughened Canopy
Reinforced canopy constructed from 2mm steel.

S Variable RCD for Earth Leakage Protection
Detects any current leakage to earth and immediately cuts power.

Breakers for Overcurrent
In the case of overcurrent at any inlet or outlet, the breaker will trip. They can all be manually switched by the user behind the IP55 rated enclosure.

S Emergency Stop
Allows user to stop entire operation of unit at one push of a button.

N Reinforced Forklift Pockets

Auto Start

32 A Single Phase Input

32 A Single Phase Output

N Glow RFM®
Instant NFC or QR Code secure log-in to machine's Glow RFM® web page.

Key: S Safety N New

CYGNUS 1® HYBRID POWER SYSTEM | 5 YEAR Firefly® WARRANTY | LITHIUM ADVANCED TECHNOLOGY | AGM DEEP CYCLE | Firefly® HYBRID POWER

Cygnus 1 Technical Specification

			CYG1-II/3.5/6/AGM	CYG1-II/4/8/LFP
POWER	Stand Alone System Output (No External AC Source)	Prime Rating @ 25°C (kVA)[1]	3	3.5
		Standby Rating @ 25°C - 30 mins (kVA)[1]	3.5	4
	Hybrid System- Autonomous Output Characteristics	Max. Autonomous Load Before Gen. Start Command[1]	2.7 kVA (Immediate Start) 2.4 kVA (1 min) 2.1 kVA (5 mins) 2 kVA (2 hours)	3.15 kVA (Immediate Start) 2.8 kVA (1 min) 2.45 kVA (5 mins) 2. 4 kVA (3.3 hours)
		Max. Power For 12 Hour / 6 Hour Runtime (kVA)[1]	0.5 / 0.9	0.7 / 1.3
	Hybrid System- Output Characteristics (With External AC Source)	Continuous Pass Through (External Source Only)	32 A / 7.4 kVA (Busbar / CEE Form)	
		Max. Hybrid Output (External Source + HPS)[1]	32 A / 7.4 kVA (Busbar / CEE Form)	
		Runtime @ Max. Hybrid Output (External Source + HPS)[1]	N/A	
		AC Output Voltage - 50 Hz (V)	230 (Adjustable)	
		Input Connections	1 x 32 A 1Ph CEE Form, AC in Busbar	
		Output Connections	1 x 32 A 1Ph CEE Form, AC Out Busbar, Powercon True 16 A	
		Protection	Overload, Overheat, Short Circuit, Earth Fault (32 A 30 mA RCBO)	
STORAGE		Type	AGM (Absorbent Glass Mat)	LFP (Lithium Iron Phosphate)
		Capacity @ 25°C (kWh)	6 (70% DoD)[2]	8 (80% DoD)
		Charge Time (hours)[3]	6	4
		Battery Management System	CARE BMS - Continuous monitoring of state of Charge, voltage and temperature to prevent over charging and discharging	ACTIVE BMS - Multiple µProcessor Battery Monitoring System (BMS) continually monitors and controls state of charge, voltage and temperature along with active balancing of cells to maintain maximum energy availability
		Expected Cycle Life (80% / 60% Original Capacity)[4]	600 / 800	2000 / 4000
		Maintenance Charge Cycle (weeks)	≤ 1	
CONTROL		CONTROL CENTRE	LCD display allowing access to operating parameters, indication of voltages, power Input/Output, % capacity available and complete operational history	
		SWITCH (Mode Selection)	On / Off	
		CLIMATE MASTER (Temperature Control)	ARM processor based environmental controller monitoring multiple internal temperature sensors, using variable speed forced air cooling and adaptive charging rates to maintain batteries at optimum temperature	
		Remote Generator Start	Binding Posts and Internal Busbar (Two Wire Signal)	
		Transfer Relay Time (ms)	< 15	
		Remote Communication	Integrated GSM-GPS modem to provide access to HPS status, live and historic performance data, fault and event notifications, system control, programming and location data	
ENVIRONMENTAL		Water/Ingress Protection Rating	IP55	
		Operating Temperature Range (°C)[5]	-20 to +45	
		Sound Level (dBA)	Acoustic Pressure: @ 1 m: Trace, @ 3 m: 0	
		Potential CO_2 Savings Over Product Lifetime (tonnes)[6]	50	250
MECHANICAL		Dimensions W x D x H (mm)	675 x 1020 x 717	
		Weight (kg)	350	240
		Lift Points	Forklift Pockets, Lift and Drag Skid	

1. Depending on storage SoC
2. kWh is based on C20 rate and will vary depending on rate of discharge (see Fig. 1 & Fig. 2)
3. Charge time dependent on available power of external source
4. See Fig. 3
5. Storage capacity may be affected by charging or discharging at less than 0°C (see Fig. 4)
   Storage total cycle life may be affected by charging or discharging in excess of 25°C (see Fig. 5)
6. Based on 12 hour runtime per cycle savings on a 20 kVA diesel generator

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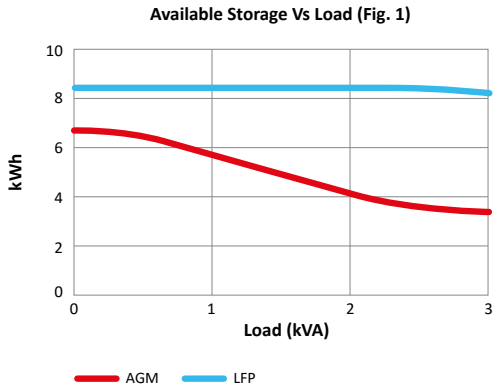
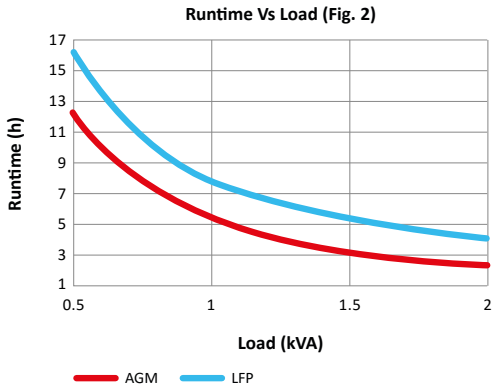
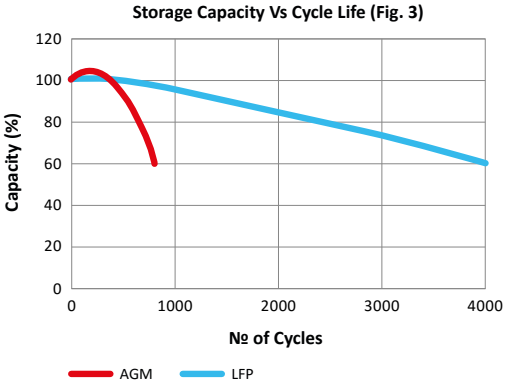
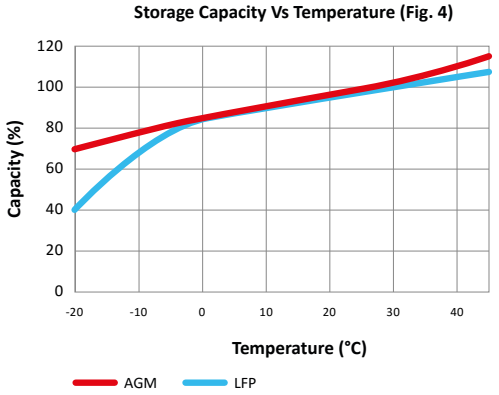
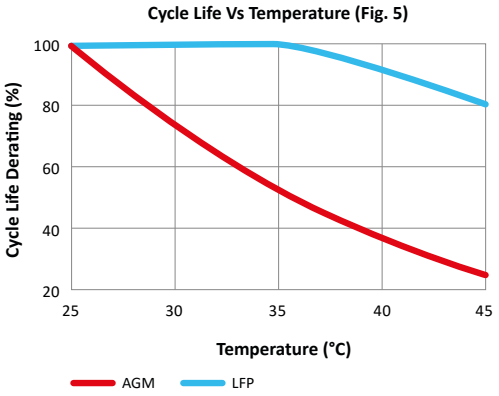
Cygnus® 1 Technical Specification











Cygnus® 1 6 kWh AGM			
Runtime (h)	Available Storage (kWh)	Current (A)	Power (kVA)
20	6.3	1.4	0.3
16	6.1	1.7	0.4
14	6.0	1.9	0.4
12	5.9	2.2	0.5
10	5.9	2.6	0.6
8	5.7	3.1	0.7
6	5.6	4.0	0.9
4	5.0	5.5	1.3
3	4.6	6.7	1.5
2	4.1	8.9	2.0
1.2	3.5	12.8	2.9

Cygnus® 1 8 kWh LFP			
Runtime (h)	Available Storage (kWh)	Current (A)	Power (kVA)
20	8.2	1.8	0.4
16	8.2	2.2	0.5
14	8.2	2.5	0.6
12	8.1	2.9	0.7
10	8.1	3.5	0.8
8	8.1	4.4	1.0
6	8.1	5.8	1.3
4	8.0	8.7	2.0
3	8.0	11.6	2.7
2.5	8.0	13.8	3.2
2.3	7.9	14.9	3.4

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CYGNUS® 1 eTOWERLIGHT

4 x 80W or 4 x 160W LED lamps

Up to 100 hours autonomy

7 metre mast

Light intensity selector/PIR/ dawn-dusk/ digital timer

Firefly's all new Cygnus® 1 eTowerlight delivers a compact, silent and sustainable lighting solution for a range of demanding applications. Brighter, more efficient LEDs are combined with improved functionality to put ease of use at the heart of this design. Functions include variable beam strength, dawn/dusk and PIR sensors, which are controlled with simple push button control via the Light Control Module (LCM). Generator start and advanced timer functions are managed via the Cygnus® 1 CONTROL CENTRE. Operational performance and system integrity can be monitored remotely via Firefly's GLOW RFM® cloud platform.

The eTowerlight delivers up to 25 hours of autonomous run time at full power, or in PIR mode the unit can remain operational for up to 100 hours without the need for recharge. The PIR mode is particularly useful over long holiday weekends when staff are away from site, but where security and adjacent public access must be maintained. For unmanned or remote deployments eTowerlight autonomy can be extended with Firefly's SolarPack upgrade.

The eTowerlight can be connected to mains grid for emergency lighting requirements or when linked to a diesel generator, Cygnus® 1 can deliver a fully automated power and lighting solution. The system can be programmed to ensure that the diesel generator does not run at night, eliminating noise whilst meeting essential lighting requirements. eTowerlight includes 32A in/out CEE form connectors as well as busbar where additional equipment is required.

Transportation and deployment capability has been enhanced with fork pockets; positioning handles and trailer hitch for on-site relocation (single or 4 point lifting option also available). Fully adjustable stabilisers are integral to the new design to ensure safe deployment and continuous use.

The eTowerlight is based on Firefly's market leading Cygnus® range technology. Available with AGM or LFP energy storage options and 4 x 80W or 4 x 160W super efficient LEDs, eTowerlight provides unparalleled silent, emission free performance characteristics.

TYPICAL APPLICATIONS

- Site compounds
- Trackside lighting
- Road works
- Car parks
- Events
- Building refurbishment
- Demolition

Truly silent power & light

Provides 100 hours of light before recharge *PIR mode

CONFIGURATION
- AGM or LFP energy storage
- 4 x 80W or 4 x 160W super efficient LED lamps

SAFETY
- Stabilisers
- Automatic mast brake
- System overload, overheat, short circuit and earth fault
- Emergency stop

CONNECTIVITY
- GLOW RFM®
- Binding posts for generator start
- In/ Out external 32 A CEE form sockets and busbar

CONVENIENCE
- CONTROL CENTRE
- LIGHT CONTROL MODULE (LCM)
- Light intensity selector
- PIR Sensor
- Dawn / dusk sensor
- Digital timer
- **360° rotatable mast head**

QUALITY
- Built to ISO:9001 Quality Management System
- Premium Quality Components
- Rental Specification
- IP55 Rated Toughened 2mm Zintec Steel Canopy

PERFORMANCE
- CARE BMS or ACTIVE BMS
- Up to 25 hours in continuous full power mode
- Up to 100 hours in PIR mode

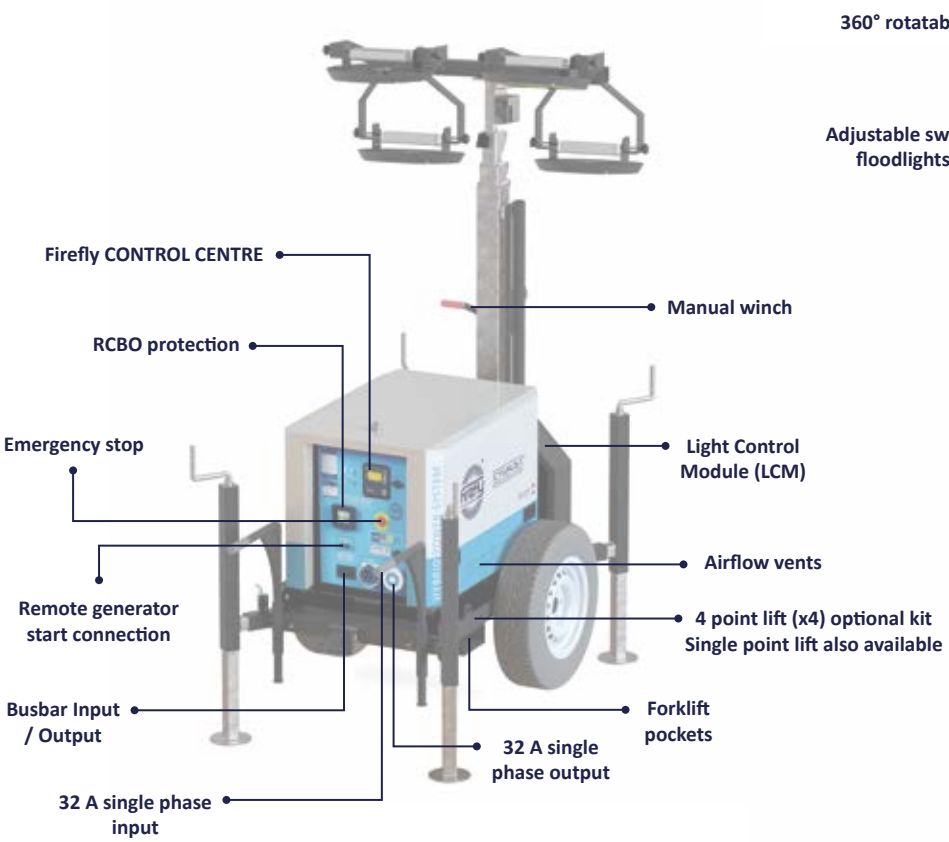
CYGNUS® 1 eTOWERLIGHT

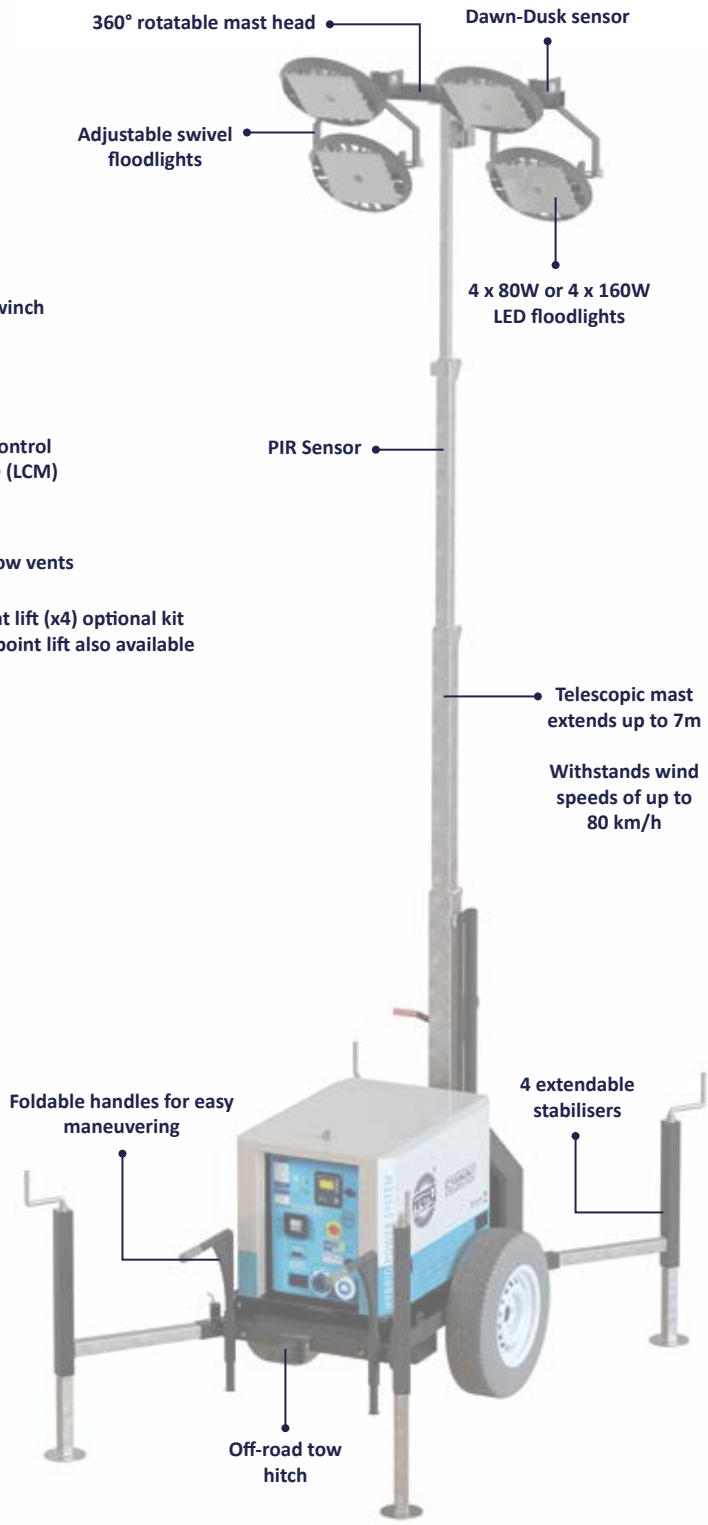
Energy Storage Options: ▶ LFP ▶ AGM

LITHIUM ADVANCED TECHNOLOGY

AGM DEEP CYCLE

CYGNUS 1® eTOWERLIGHT





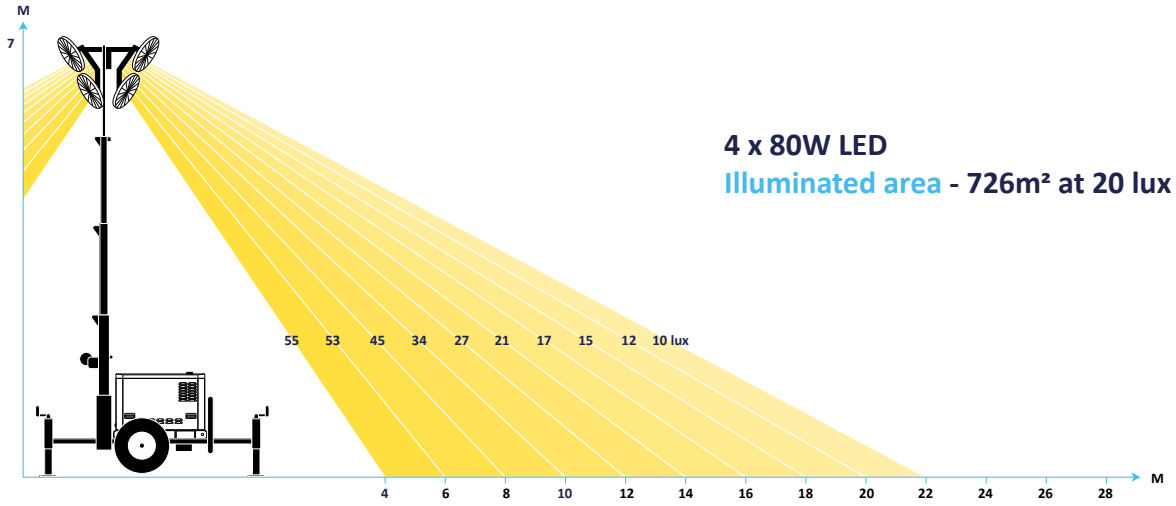
Light Control Module

Simple mode switching using the LCM. Select the PIR, dawn/dusk and light intensity levels.

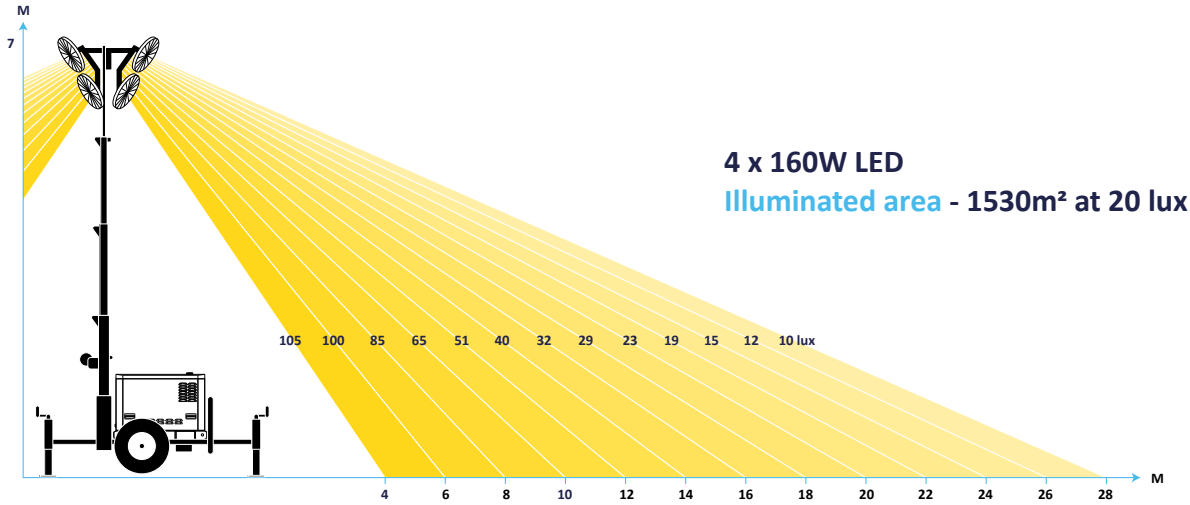
Cygnus® 1 eTowerlight Lighting Characteristics

Autonomous Runtimes in Hours					
	Dimmer Level	Cygnus® 1 eTowerlight 320W AGM	Cygnus® 1 eTowerlight 640W AGM	Cygnus® 1 eTowerlight 320W LFP	Cygnus® 1 eTowerlight 640W LFP
Continuous Mode	100%	19.4	9.1	25.6	12.7
	75%	26.3	12.3	34.2	17.1
	50%	39.4	19.7	51.3	25.6
	25%	78.8	39.4	102.5	51.3
PIR Mode[1]	75%	24.2	11.3	31.5	15.8
	50%	31.5	15.8	41	20.5
	25%	45	22.5	58.6	29.3
	0%	77.5	36.3	102.5	50.9

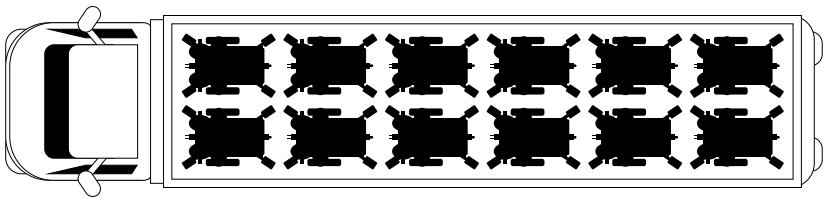
[1] Based on standard PIR settings of 15 minutes from specified base level to 100% beam strength, operating once per hour

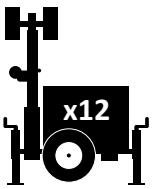


4 x 80W LED
Illuminated area - 726m² at 20 lux



4 x 160W LED
Illuminated area - 1530m² at 20 lux





Transport up to 12 eTowerlights on a 40ft trailer

Cygnus® 1 eTowerlight Technical Specification

Variant		Cygnus® 1 eTowerlight 320W AGM	Cygnus® 1 eTowerlight 640W AGM	Cygnus® 1 eTowerlight 320W LFP	Cygnus® 1 eTowerlight 640W LFP
Product Code		CYG1-II/ETL/320/AGM	CYG1-II/ETL/640/AGM	CYG1-II/ETL/320/LFP	CYG1-II/ETL/640/LFP
LIGHTING PERFORMANCE	Lamps	4 x 80 W LED/ 35840 Lumen/ 50000 hours	4 x 160W LED/ 71680 Lumen/ 50000 hours	4 x 80 W LED/ 35840 Lumen/ 50000 hours	4 x 160W LED/ 71680 Lumen/ 50000 hours
	Illuminated Area	726 m^2 @ Lux 20	1530 m^2 @ Lux 20	726 m^2 @ Lux 20	1530 m^2 @ Lux 20
	Lamp Colour Temperature	5500 Kelvin/ Day light white			
	Lamp warm up/ re-strike time	N/A - immediate to 100% of rating			
MAST OPERATION	Mast Height	7 metres			
	Mast Head Rotation	360º			
	Mast Deployment	Manual winch			
	Mast Deployment Time	20 sec			
EXTERNAL POWER	External Output	230V AC 32A CEE Form/ Internal busbar			
	External Input	230V AC 32A CEE Form/ Internal busbar			
	Maximum solar PV array (optional)	2.5 kWp		4 kWp	
ENERGY STORAGE	Type	AGM (Absorbent Glass Mat)		LFP (Lithium Iron Phospate)	
	Usable Storage Capacity	6 kWh (70% DoD)[1]		8 kWh (80% DoD)	
	Charge Time (hours)[2]	6		4	
OPERATION	System Installation Time	15 minutes			
	Sensors & Programme Function	LIGHT CONTROL MODULE (LCM): variable light intensity (dimmer), PIR motion sensor, dawn/ dusk control. CONTROL CENTRE: LCD display to manage auxiliary generator start, monitor voltage, current, power and operational history. Advanced control of timer function for lights.			
	Generator Auto Start	External mounted twin binding posts, programmed via Firefly CONTROL CENTRE			
	Remote Communication	Integrated GSM-GPS modem to access HPS status, performance data, notifications, system configuration and location data			
SAFETY	Wind Loading	80 km/h @ 7 metres / 100km/h @ 5m		50 km/h @ 7 metres / 80 km/h @ 5m	
	Stability	4 x corner mounted manually adjusted stabiliser leg			
	Mast	Manual winch with integrated bi-directional automatic brake			
	System protection	Overload, Overheat, Short Circuit, Earth Fault (variable RCBO)			
	Emergency Stop	AC isolation of all input/ output connections, inverter shut down			
ENVIRONMENTAL	Water/ Ingress Protection Rating	IP55			
	Operating Temperature[3]	-20°C to +45°C			
	Sound Level	Acoustic Pressure @ 1m: Trace/ @ 3m: 0			
	Potential Lifetime CO_2 Savings[4]	50 tonnes CO_2		250 tonnes CO_2	
GENERAL CHARACTERISTICS	Closed/ Transport Position W x D x H (mm)	1175 x 1650 x 2500			
	Open/ Deployed Position W x D x H (mm)	2400 x 2400 x 7000			
	Weight (kg)	665		555	
	Lift Points	Forklift pockets, manual positioning handles, off-road tow hitch and optional single or 4 point lifting rings			
	Maintenance Regime	Leave in standby mode. Charge via external connection whilst not in use. Annual service inspection to comply with warranty conditions.			

1. 1. kWh is based on C20 rate and will vary depending on rate of discharge (further information available on website)
2. Charge time dependent on available power from external power source
3. Storage capacity may be affected by charging or discharging at less than 0°C
4. Based on 12 hours run time per cycle savings and 20kVA diesel generator

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TIMED DISTRIBUTION UNIT

Firefly's Timed Distribution Unit or TDU is a must have addition to temporary power installations, for rental operators and end users alike. Hybrid Power Systems are a well established tool to save fuel, CO2, localised pollution and noise. However, power supply is only part of the equation. The key to maximising the benefit of using Firefly's Cygnus® Hybrid Power System is improving energy efficiency on site. This is not always easy to do. Lights and Heaters are left on overnight, windows and doors are propped open whilst the heating is running. Switching to energy efficient consumers such as LED lights; retro-fitting timers, PIRs and thermostats; improving cabin insulation and encouraging staff to be more aware can help. But its not always possible to do this, and even if it is – there is always more to be done.

Firefly's TDU provides the operator with the confidence that energy efficiency and CO2 reduction objectives can be achieved. The TDU takes the guess work out of saving energy and helps service providers and users predict power requirements more accurately. In a typical set up, that uses a diesel generator and Cygnus® Hybrid Power System, the TDU increases the overall savings on site by eliminating the supply of energy to unused consumers. Overnight loads are kept to an absolute minimum by using the user defined timer function in the TDU. Each of the 6 32A single phase outputs can be individually controlled to create a finely tuned power distribution set up.

In the event that work patterns change, the TDU is easily re-programmed via an in-built TFT touch screen. Alternatively the manual over-ride function means that temporary extensions to work hours can be met, without requiring any re-programming. Critically the time limit on the manual over-ride ensures that power supply is automatically controlled, ensuring energy efficiencies are still achieved.

The TDU has been designed to meet the same robust rental specification standards that customers of the Cygnus® range already expect. Fork pockets keep logistics simple and a seam welded 2mm powder coated steel canopy is combined with a galvanised steel stand to keep the TDU well clear of adverse ground conditions.

TDU is the smart way to improve energy savings.

TYPICAL PERFORMANCE*

- Improves Energy Storage Runtime of Hybrid Power System by up to 50%
- Saves up to an additional 168 liters of fuel per week

*When connected to a Cygnus® 3 Hybrid Power System

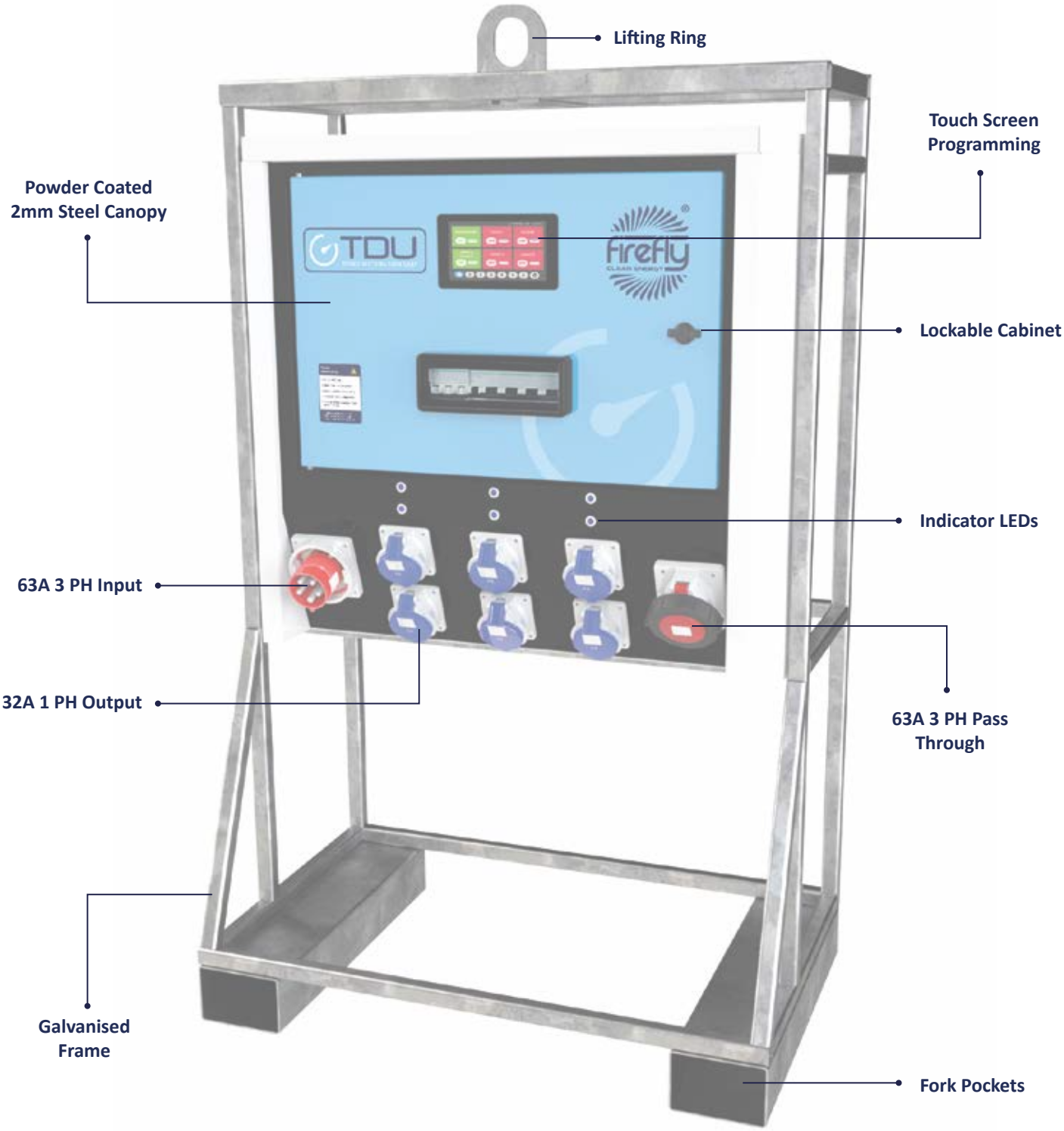
FEATURES

- Fully compatible with Cygnus® range, mains grid and diesel generators
- Programmable digital three Stage 7 day timer for all 6 32A sockets
- Robust canopy and frame
- Manual over-ride
- Fork pockets and Lifting ring

BENEFITS

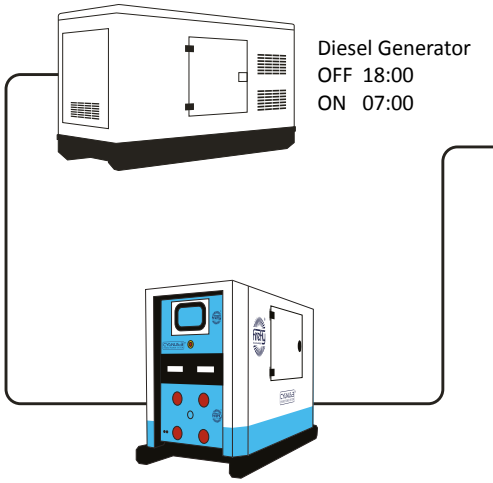
- Guarantee energy savings
- Simple programming and set up
- Ensure no generator start overnight
- Longer hybrid power system run times
- Lower CO2, NOx and PM emissions
- Eliminate noise for fewer complaints

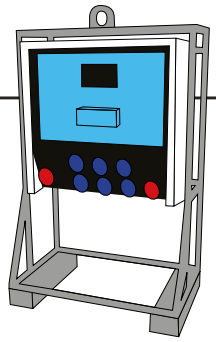
TIMED DISTRIBUTION UNIT



TIMED DISTRIBUTION UNIT

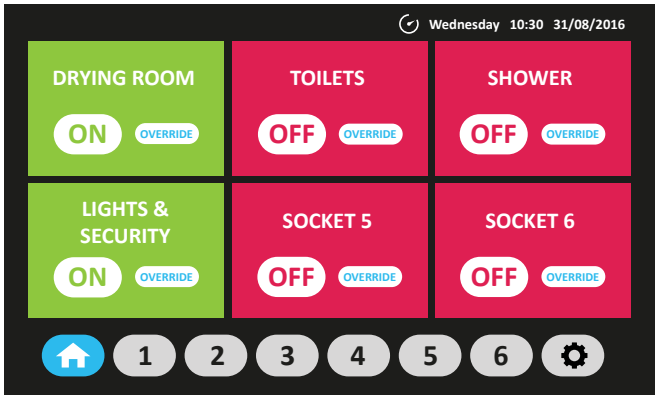
TYPICAL SITE SET UP SCENARIO



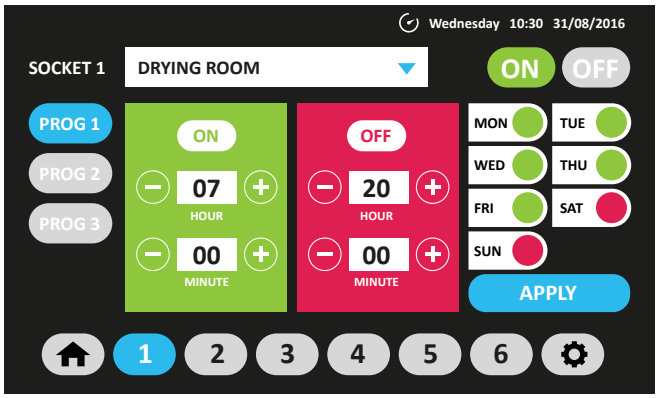


SECURITY LIGHT AND ALARMS	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
OFFICE WITH SERVER	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
DRYING ROOM	ON 20:00	OFF 21:59
	ON 00:00	OFF 02:00
	ON 04:00	OFF 06:00
TOILET	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
OFFICE	ON 05:00	OFF 19:00
	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set
STORE	ON 07:00	OFF 18:00
	ON Not Set	OFF Not Set
	ON Not Set	OFF Not Set

SCREEN NAVIGATION / SET-UP



Home Screen



Socket Set-up Screen

Firefly Timed Distribution Unit Technical Specification

		TDU/6/32/V1
POWER	AC Input Voltage (50Hz)	400V
	AC Output Voltage (50Hz)	230 1Ph / 400 3Ph
	Input Connection	63A/3 Ph CEE Form Connector
	Output Connections (Sockets)	6 x Timer Switched 32A/1Ph CEE Form Connectors 1 x Pass Through 63A/3 Ph CEE Form Connector
	Overcurrent and Earth Fault Protection	6 x RCBO 32A 30mA; 2x 63A 3 poles MCB
MONITORING & CONTROL	Control Centre	7" Capacitive TFT touchscreen for output programming and status display. Up to 3 times per day/ 7 day week independent socket programme capability. Automatic daylight savings time adjustment. Timer override option. Selection of pre-programmed load names.
	Distribution Status	Surface mounted LED indicators indicate socket status.
ENVIRONMENT	Water/ Ingress Protection	IP44
	Operating Temperature	-10 to +40 °C
GENERAL	Dimensions	960 x 500 x 1500 mm
	Socket Height	630mm
	Security	Lockable Cabinet
	Weight	100 kg
	Frame	Galvanised steel
	Lift Points	Forklift pockets, single point lifting ring

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GLOW RFM®

Firefly's Remote Fleet Management Cloud Platform

GLOW RFM® cloud platform delivers a unique fleet management and reporting tool for operators and end users. The GLOW RFM® cloud integrates fleet operation tools, environmental performance reports and remote service support. The platform operates across the Firefly Hybrid Power System range to deliver simple, timely performance data for single and multi-site installations.

GLOW will continue to evolve with new functionality added on a regular basis. New features will be developed with user feedback in mind and reflecting Firefly's ongoing commitment to innovation.

Environmental Performance Reporting

Aggregated data that delivers strategic insight

Unlike other RFM systems, GLOW RFM® is specifically designed to support installation based environmental savings reports. Fleet operators can provide access to clients with their own dashboard, allowing them to see their rentals on a single screen, via a secure allocated login. This reporting also aggregates individual sites for a companywide performance summary. The end user home page includes lifetime performance, highlighting best performing sites; as well as the ability to select current and historical sites on a geographical or specific time frame basis.

Users can choose preferred metrics including:

- ✓ Tonnes of CO_2 or NOx Emissions Saved
- ✓ Litres of Diesel Fuel Saved
- ✓ Number of Silent Hours
- ✓ Hybrid Power Vs Diesel Generator Usage %

GLOW RFM® removes the headache of calculating site energy use from multiple data sources such as fuel and energy invoices. Sustainability Managers can share best practice, identify further on-site efficiencies and track performance over time, from one platform.

Fleet Management

Operational efficiency as standard

GLOW RFM® delivers a holistic approach to managing fleet operations, and is based around an intuitive dashboard that puts key metrics in easy reach. Operators are able to check location, status, installation details and performance in a few mouse clicks. Clear layout using icons, menus and graphs enhance functionality at a glance but also facilitates more detailed analysis if needed.

Once a Hybrid System is deployed on site, the details are recorded as a new installation. This ensures that in the event of service issues engineers are able to easily identify site location, contact details, set-up and in most cases, resolve these remotely. GLOW RFM also records the due date for the next service of each Hybrid Power System, which is updated by Firefly's customer service team.

- ✓ Fleet dashboard and location map
- ✓ Filter by installation, customer, serial number or by hire contract
- ✓ Record installation contacts and site address
- ✓ Track service dates
- ✓ Presentation-ready site reports for clients
- ✓ Create long term reports for key clients

Over time installation records build to provide a unique resource that tracks machine lifetime performance, service history and key client use. Fleet managers are able to prepare reports for clients for single sites or use the aggregated data tools to provide a summary of generator run-time, fuel, NOx and carbon savings over a chosen time frame or geography.

Remote Servce and Support

Ensure system uptime

- ✓ Set-up and configure installations remotely
- ✓ Message alerts by fleet or individual machine
- ✓ Peak, average and low power demand history
- ✓ Energy discharge and recharge characteristics
- ✓ Diesel generator on/off times

GLOW RFM® is built on a combination of instant live and historical data regularly updated through 3G Cellular Networks. Smart roaming ensures that signal strength is optimised by linking to the best available 3G signal, whoever the network operator and wherever the installation. Key metrics for AC power, voltage and frequency in and out, battery performance, generator run time and auxiliary relay status (generator start).

Whilst most issues can be resolved remotely, in the event that a site visit is required, managers are able to identify potential issues ahead of a field visit, improving effectiveness and reducing costly fault finding on site. The Firefly customer services team provide end to end support by interrogating GLOW RFM® data to support operators and their engineering teams, should this be required.

Experienced fleet managers will know that client requirements often change over the course of a project, for example periods of night working may be required. GLOW RFM® enables the operator to change timer and operating mode configurations remotely – removing the need for site call out. Furthermore, operators can monitor installations to determine any changes in energy use, ensuring that any potential problems can be averted and system uptime is not compromised.

Connectivity

Smart access on site

Engineers can directly connect to GLOW RFM® to view performance with NFC or QR Code technology using their secure login.

CONTROL TECHNOLOGY

System design from the ground up by the market's leading hybrid company.

Firefly is more than just a systems integrator, we develop electronics and software that works seamlessly with every component of our hybrid power systems. We create solutions that deliver measurable environmental benefit through products that are light years ahead of the crowd. Our attention to detail demonstrates our intimate understanding of hybrid technology and more importantly the needs of our customers.

We have automated dozens of key functions that others still struggle to comprehend. Below is just a small selection of the technology we build into every Firefly product to make the transition to a more sustainable future simple.

CONTROL CENTRE

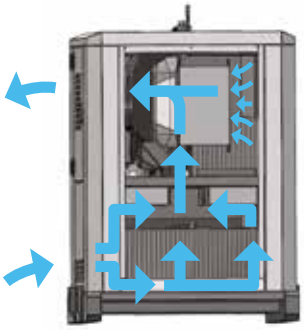
CONTROL CENTRE is at the core of every Firefly hybrid power system, bringing all the functionality within each machine together in a simple user interface that delivers data to Glow RFM®. The LCD display enables installers to quickly gain access to status and performance information and configure the machine for each unique installation. With built in memory, every minute of data is stored for a lifetime.

CONTROL CENTRE is connected to the internet via 3G cellular networks enabling daily backups of system data to Firefly's Glow RFM® platform. Accurate location data using the internal GPS module is also viewed through Glow RFM®.

CONTROL CENTRE receives information from SWITCH, CLIMATE MASTER and the ACTIVE BMS or CARE BMS modules and automatically adjusts parameters to optimise system performance and safety, reducing manual user intervention.

CLIMATE MASTER

CLIMATE MASTER uses system vitals from CONTROL CENTRE and its own temperature sensors to fine tune its variable speed forced air cooling system, as well as adjusting charge rate to regulate the machine's internal and energy storage temperature for efficient operation and maximum performance.



SWITCH

SWITCH reconfigures the machine's settings at the push of a button, taking all the work out of configuring different modes. For example, charge rates are automatically adjusted when switching from maintenance mode to an operational mode, removing the need for cumbersome distribution or changing settings manually when maintenance charging is required.

Furthermore SWITCH activates the required input and disables all other inputs for complete installer safety. In selected machines SWITCH configures inputs, outputs and charge rates for use in either Three Phase Support or L1 Support Only modes.

ACTIVE BMS

LFP based machines benefit from Firefly's ACTIVE BMS, which delivers cutting edge energy storage management. Some BMS operate a binary on/off method, leading to sub-optimal performance. With Firefly, individual cell monitoring ensures that every cell is constantly checked for performance. In the unlikely event of a cell failure, the cell string will be automatically deactivated and a message sent to Glow RFM® advising of the fault. Our leading ACTIVE BMS inter-cell balancing ensures maximum energy is always available.

CARE BMS

CARE BMS manages the storage of OPzV and AGM based machines, monitoring temperature, rate of discharge, and voltage. CARE BMS provides accurate state of charge information and ensures that the energy storage is kept in good health, preventing over charging or discharging.

STORAGE TECHNOLOGY

Energy storage is at the heart of all of our hybrid power system and Firefly offers a range of options, carefully researched to perform across a wide range of applications.

Every Firefly hybrid model is equipped with a smart energy storage management system to ensure safe, optimal performance and longevity. OPzV and AGM based systems are fitted with Firefly's CARE BMS technology whilst LFP based systems are underpinned by our ACTIVE BMS technology. Our storage technologies are stringently tested and backed by our extensive warranty ensuring market leading reliability. Read more about these options to choose which suits your applications.

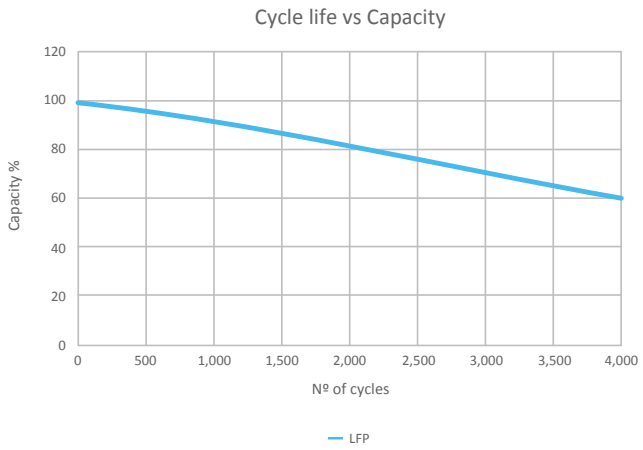
LFP
(Lithium Iron Phosphate)

LITHIUM ADVANCED TECHNOLOGY

Lithium Iron Phosphate (LFP) offers significantly extended life expectancy compared to other technologies; and is used in a wide variety of appliances from electric cars to mobile phones. LFP based hybrid power systems offer the greatest storage capacity option and is lightweight, long lasting and reliable. The chemistry of LFP storage allows for a very fast recharge, reducing diesel generator runtime further. Firefly's LFP storage provides consistent discharge characteristics whatever the load requirements, which means that total energy per cycle is unaffected even at high discharge rates. In addition, LFP has an extended operating temperature range compared to other storage technologies offering no reduction in cycle life when operated at higher temperatures.

The total cost of ownership of a LFP based hybrid power system is similar to AGM or OPzV technology, but with the benefit of no storage replacement expected during the lifetime of the hybrid power system. However LFP offers significant weight reduction, which improves transport and handling efficiency and the overall environmental benefit of the hybrid system.

Choose LFP technology if you anticipate higher base loads, want to maximise logistics efficiency or want a storage technology that will last the lifetime of the hybrid power system. LFP is the most versatile storage technology for a broad range of demanding applications.



All Firefly LFP based systems are supported by our ACTIVE BMS management system.

LIFE EXPECTANCY:
- 2000 cycles to 80% of original capacity
- 4000 cycles to 60% of original capacity

- Available in Cygnus® 1,2,3,4

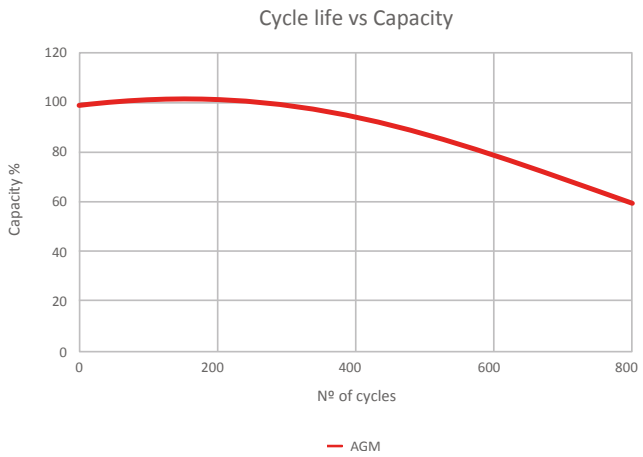
AGM
(Absorbent Glass Mat)

AGM DEEP CYCLE

AGM is a cost effective storage technology which is sealed and requires little maintenance. The electrolyte is absorbed into a fibre glass mat material held firmly between the plates. This makes the internal resistance relatively low, making this storage technology suitable for deep cycle applications, typical of hybrid power systems. AGM technology has proven very reliable and robust, and can stand low temperature environments.

All Firefly AGM based systems are supported by our CARE BMS management system.

LIFE EXPECTANCY
- 600 cycles to 80% of original capacity
- 800 cycles to 60% of original capacity



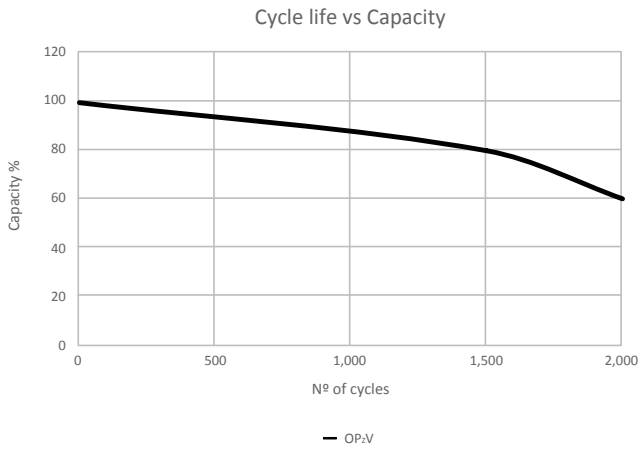
- Available in Cygnus® 1, 2,3;
- Arcturus 1, 2; Vega 2, 3

OPzV
(Sealed Tubular Plate)

OPzV storage technology combines gel electrolyte and tubular plates to deliver excellent cycle life performance and is ideal for demanding applications requiring a high number of discharge /recharges. OPzV uses a sealed enclosure which means that it can be used in poorly ventilated areas. Like AGM, OPzV is a robust and stable storage technology. Higher internal resistance means that OPzV is better suited to longer, low rates of discharge. This technology is used in the Cygnus® 4 model to give a larger storage capacity of 90 kWh.

The Cygnus® 4 OPzV model is supported by our CARE BMS management system.

LIFE EXPECTANCY:
- 1500 cycles to 80% of original capacity
- 2000 cycles to 60% of original capacity



- Available in Cygnus® 4

Energy Storage Technology Comparison

The choice of LFP, OPzV or AGM based hybrid power system is determined by the usage profile. Whether this is for low loads, with long runtime, or for high power discharging many times a day, we can offer a suitable storage option.

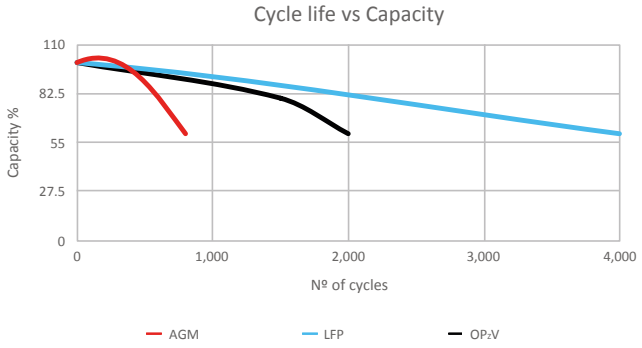
You should consider the following factors:
- Discharge rate
- Runtime
- Cycle time (charge to discharge)

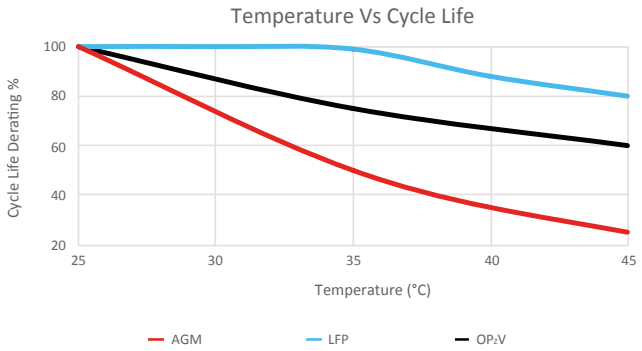
Our account managers and technical team are happy to discuss your requirements in more detail, contact us now.

Summary of Key Benefits of using LFP over Standard AGM/ OPzV Storage Technology:

- Increased cyclic life of up to 4000 cycles
- Very fast recharge to 100% at full recharge rate
- The storage technology will deliver its full stored capacity, regardless of the size of load
- LFP based hybrid power systems offer the greatest storage capacity option
- Higher energy density and a more efficient energy store than AGM or OPzV

COMPARISON GRAPHS





FIREFLY ENGINEERING

Innovation - Engineering and Software

Firefly is an innovative cleantech company headquartered in the UK. As the leading manufacturer of hybrid power systems, ongoing product development is in our DNA. Since 2007 Firefly has designed and built Hybrid Power Systems that seamlessly connect to solar PV, mains grid and diesel generators to optimise performance and efficiency. Today Firefly continues to drive new thinking with data analytics, diagnostic tools and power distribution products.

This innovation is a result of the experience and technical expertise of our engineers who specialise in mechanical design and fabrication; electrical systems; electronic hardware and software development. Our team research the latest technologies to embed them in cutting edge solutions that meet our customer's high standards.

Customer feedback is a critical part of our design process. Not only does this help us understand the ways we can improve existing products but shapes our design solutions for new products and services.

WARRANTY

In addition to developing innovative products Firefly has invested in an experienced Field Service team to provide technical advice to our direct customers. We can support you through training, telephone advice and in-field support. Our after sales service is underpinned by a Five Year "Return to Base" warranty. Our overall aim is to help your teams to gain the knowledge and skills they need to operate your hybrid fleet.

Five Year Warranty Commitment

Firefly offers a market leading five year return to base limited warranty FREE with every Cygnus® Hybrid Power System. Since 2007 we have developed a comprehensive and detailed knowledge of hybrid technology and this warranty underlines our confidence in the quality and reliability of our products.

In the unlikely event that your hybrid develops a fault in the first five years from date of purchase all you need to do is return the unit to our factory and we will repair it free of charge. We normally undertake to complete repairs within three working days in order to minimise interruption.

As you would expect our warranty won't cover misuse, improper installation and normal wear and tear. Your warranty will be invalid if you make any unauthorised modifications or use non-approved parts. Storage technology performance will vary with site usage and storage practices and isn't warranted.

In order to keep your warranty validated you should contact our operations team to arrange regular annual services. If you have any questions about your Cygnus® Hybrid Power System don't hesitate to call us.

Return to Base

Once our Field Service Engineer has established that your hybrid needs to be returned to our factory for further diagnostics or repair, you will need to arrange transportation. All parts and labour are completely free of charge in the event of a warranty claim. We will also provide you with a written report explaining the work undertaken, and where relevant likely causes of the problem and any recommendations. Repairs at our facilities normally take about three days. We will let you know when these are complete, and you can then arrange collection.

Premium Warranty

For extra peace of mind why not take advantage of our premium warranty. Upgrade your existing fleet or take out the premium warranty with your new purchases. Your account manager will be able to tailor a package to suit your individual needs.

Our premium warranty includes:

- Free annual servicing
- Free 24-hour telephone support
- Annual refresher technical training courses
- Same day on-site response where possible (location dependent)
- Replacement Cygnus® (subject to availability)

If you do not have a spare unit in your fleet to cover your installation, whilst the unit is undergoing repair, we can arrange for a replacement unit from our Rental Partner Network. This service is subject to availability. Terms and conditions apply.

For more information on our warranty options, please contact your account manager or our service department.

Getting the Best from Your Hybrid Fleet

We are also able to work with you to develop appropriate procedures and policies for your teams to follow. For example, implementing suitable pre-dispatch and off hire checks can help to minimise on site issues. Don't forget to book an annual service to ensure that your warranty continues to be valid.

It is crucial that suitable depot storage and charging facilities are available to ensure storage system life is optimised. Keeping hybrids on trickle charge is essential when not in use.

CYGNUS® HYBRID POWER SYSTEM

RENTAL SPECIFICATION RANGE

Flexible, intelligent, powerful.

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