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# FLEXX 120 Mobile DC Fast Charger



# Operations Manual

9/1/2024

## 1.0 System Overview

Flex Mobile DC Fast Chargers are a product line that serves the electric vehicle industry. It is widely used in application scenarios such as electric vehicle road rescue, emergency power supply, door-to-door charging service, electrified fleet operations, and much more. It is an extension and supplement of electric vehicle charging station operation services, providing fleet managers with more convenient and efficient charging services.

## 2.0 System Features

- Using the latest three-level topology circuitry, full digital control, and high degree of intelligence, it has the characteristics of high efficiency, stability, safety and reliability.
- Energy saving and high efficiency: the charging efficiency is greater than 93%, including the charging conversion efficiency of grid, energy storage and photovoltaic to electric vehicles.
- It has over-temperature, over-voltage, over-current, under-voltage and other protection functions and alarms to ensure safe operations.
- It can carry out constant current charging, constant voltage charging, equalizing charging as well as floating charging.

## 3.0 FLEXX Components

The FLEXX mobile DC fast charger system consists of AC/DC charging modules, batteries, battery management system, charging stations, and an energy management system. The primary system, the energy management unit, is responsible for battery charge and discharge

management, and coordinates the flow between charging stations, batteries, and the AC/DC modules. The battery unit is made up of many battery modules. These modules are made up of individual lithium iron phosphate batteries with stable performance and high energy density.

### **3.1 Energy Storage System**

The energy storage system includes energy storage batteries, (BMS) battery management system, and an (EMS) energy management system. The battery system uses a single cell as the smallest unit to form battery modules and battery clusters, and the energy storage system manages battery capacity. The energy storage system is connected to the charging system on the DC bus so the charging and discharging response is very fast and the efficiency is high.

### **3.2 Charging Station**

Operators interact with FLEXX by swiping cards or scanning codes for charging. The charging system includes advanced system monitoring and metering. The intelligent controller of the charging station has the functions of measuring, controlling and protecting the internal charging system. System protections include running state detection, fault state detection, and linkage control of the charging and discharging process. The DC output is equipped with a DC guide rail smart meter for accurate power dispensed measurement. In addition, the charging station has input and output over-voltage, under-voltage protection short circuit protection, over-current protection, leakage protection, grounding detection, over-temperature and other protection functions, with IP54 protection level.

## 4.0 Operational Guidelines

The FLEXX mobile DC fast charger has several modes of use. Charging Vehicles, Recharging Batteries, and towing. Below is an explanation on each of these modes.

### 4.1 Re-Charging FLEXX

The FLEXX mobile DC fast charger has three ways to recharge its internal battery system. The table below explains each of these ways and how to use each..

#### L3 DC Fast Charger

1. Connect a DC fast Charger to flex CCS1 recharge port.
2. Start DC Fast Charger.
3. FLEXX will recharge @ 120kW until 80%, then lower the charge rate until 100% is reached.
4. Disconnect when complete.



#### L2 AC Charger

1. Connect the J1772 plug into the upper portion of the CCS1 recharge port on FLEXX.
2. Start the L2 Charger.
3. FLEXX will recharge @ up to 16kW.
4. Disconnect when complete

#### NEMA AC Power

1. Open FLEXX lower door to expose NEMA connector.
2. Plug in 220V 14A power to NEMA connector.
3. FLEXX will begin charging.
4. Disconnect when complete.

## 4.2 Charging Electric Vehicles

The FLEXX mobile DC fast charger makes it very easy to charge an electric vehicle.

Follow these steps to start a charging session:

1. Plug vehicle into charging connector #1 or #2
2. Use RDIF card or FOB to place it over the scanner.
3. Watch the info screen and select which charging cable you wish to start.
4. FLEXX will begin charging the vehicle.
5. When charge is finished, simply disconnect.
6. To stop charging process in case of issues, simply tap the Emergency Stop button.



## 4.3 Towing FLEXX

**!** WARNING – TRAILER TOWING can be hazardous. In trailer towing, as in most driving situations, exposure to certain hazards occurs. Trailer towing is safe when precautions are taken. The following safety information is only a summary of the more complete information found in the Safety Standards listed at the end of these precautions. Read and follow all Safety Standards. In addition, the end user must check and comply with all federal, state, and local laws before use.

### 4.3.1 Guidelines:

- Use a towing vehicle prepared and capable of handling the load.

- Be sure load is properly secured. Load includes FLEXX, cables, tools, and approved accessories.
- Towing any trailer requires special awareness because of the changed driving situation.
- When towing, it takes longer to start, stop, and pass – use training and practice to avoid accidents.
- Turning and backing up present new problems, plan ahead.
- Require each driver to be fully trained and experienced in trailer towing before going out on the road.
- Be sure the trailer is fully prepared and connected to towing vehicle.
- Observe maximum speed of 65 mph when towing.
- Do not modify or change the trailer in any way – changes void the warranty.

## **4.4 Safety**

### **4.4.1 LIGHTS that are not working can cause accidents**

The following State and Federal regulations require trailers used on highways to have tail, stop, turn, and side marker lights.

- Lights are not required for trailers designed for off-road use only.
- Check all lights and connectors for proper installation and operation before using the trailer.
- Check the condition of wiring harness leads, plugs, and connections regularly.
- Repair or replace damaged parts or wires.
- Replace any broken lenses, reflectors, or bulbs.

### **4.4.2 INCORRECT TORQUE on lug nuts or INCORRECT TIRE**

**PRESSURE or BEARING MAINTENANCE can cause loss of control resulting in serious injury and equipment damage.**

- Recheck lug nut torque after first 50 miles (80 km) and once each year or every 12,000 miles (19,500 km) thereafter, whichever comes first.
- When checking lug nuts, keep them clean, dry, and unlubricated.
- Check and repack wheel bearings once each year or every 12,000 miles (19,500 km), whichever comes first.
- Maintain correct tire pressure according to sidewall data on tire – underinflation is the most common cause of tire trouble.
- Check tires for wear every six months.
- Use only replacement tires of the same size, rating, and capacity

#### **4.4.3 Principal Safety Standards**

- Towing a Trailer – Being Equipped for Safety, Publication from U.S. Department of Transportation, National Highway Traffic Safety Administration, 1200 New Jersey Ave., SE, Washington D.C. 20590 (phone:1-800-424-9071), website: [www.fhwa.dot.gov](http://www.fhwa.dot.gov)).
- Safety and Health Standards, Title 49 CFR 200 to 999, from Superintendent of Documents, U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone:1-866-512-1800)
- Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30329-4027 (phone: 1-800-232-4636, website: [www.cdc.gov/NIOSH](http://www.cdc.gov/NIOSH)).

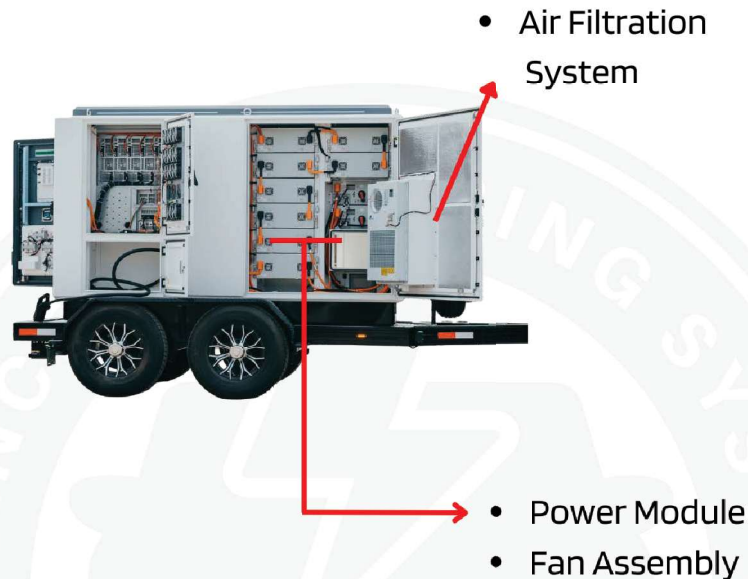
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## 5.0 Maintenance Procedures

Performing the following preventative maintenance steps will keep the FLEXX unit running longer with minimal maintenance issues.



### Air Filtration System

Changing out the system filter when dirty.

1. Using the info screen, place FLEXX into "Maintenance" mode.
2. Open doors of FLEXX to expose power modules.
3. Remove the cover by unscrewing the 6 screws holding the filter cover in place
4. Change out the filter using the supplied filter. (Call Charge Rigs if you need more filters.)
5. Place filter cover back on and screw into place.
6. Close door
7. Return to Normal Mode.

### Power Module Fan Assembly

Cleaning out the power module fan assemblies

1. Using the info screen, place FLEXX into "Maintenance" mode.
2. Open doors of FLEXX to expose power modules.
3. Using a can of spray air, clean the fan blades removing any dirt or dust that has collected.
4. Ensure connectors are secure / snug.
5. Close door
6. Return to Normal Mode.

## 6.0 FLEXX120 Specifications

Battery Specifications	
Battery charging power	16kW (AC) / 120kW (DC) / NEMA 10kW
Battery output	12VDC 10A / 220VAC 15A / 110VAC 18A
Charging voltage	240V(AC) / 700V (DC)
Charging standard	CCS1   NACS Optional
Nominal capacity	120kWh
Battery voltage range	537~700V
Depth of discharge	≤90% DOD
Cycles	> 4000
Cell type	3.2V/120Ah (LFP)
Rated voltage	614V
Rated frequency	50/60Hz
Cooling method	air cooled
IP level	IP54
Safety Certification	UL

Charger Specifications	
Rated power	120kW
Output voltage range	150-1000Vdc
Output current range	0-250A
Human Interface	12.1-inch touch screen
Charging mode	Automatic full, fixed power, fixed amount, fixed time
Payment method	Swipe card payment, scan code payment
Networking method	4G / Wi-Fi
Networking protocol	OCPP 1.6J
Charging standard	CCS1   NACS
Safety Certification	ETL
Unit Specifications	
Dimension L * W * H	16' x 7' x 8' (ft)
Weight	5,000 Lbs.
Operating temperature/°C	14°F-131°F
Cooling method	air cooled
Altitude/m	6500 Ft.
Noise/dB	≤65dB
Relative humidity/RH	5%~95%RH, non-condensing



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# FLEXX 200 Mobile DC Fast Charger



# Operations Manual

9/1/2024

## 1.0 System Overview

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- It has over-temperature, over-voltage, over-current, under-voltage and other protection functions and alarms to ensure safe operations.
- It can carry out constant current charging, constant voltage charging, equalizing charging as well as floating charging.

## 3.0 FLEXX Components

The FLEXX mobile DC fast charger system consists of AC/DC charging modules, batteries, battery management system, charging stations, and an energy management system. The primary system, the energy management unit, is responsible for battery charge and discharge

management, and coordinates the flow between charging stations, batteries, and the AC/DC modules. The battery unit is made up of many battery modules. These modules are made up of individual lithium iron phosphate batteries with stable performance and high energy density.

### **3.1 Energy Storage System**

The energy storage system includes energy storage batteries, (BMS) battery management system, and an (EMS) energy management system. The battery system uses a single cell as the smallest unit to form battery modules and battery clusters, and the energy storage system manages battery capacity. The energy storage system is connected to the charging system on the DC bus so the charging and discharging response is very fast and the efficiency is high.

### **3.2 Charging Station**

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The FLEXX mobile DC fast charger has three ways to recharge its internal battery system. The table below explains each of these ways and how to use each..

#### L3 DC Fast Charger

1. Connect a DC fast Charger to flex CCS1 recharge port.
2. Start DC Fast Charger.
3. FLEXX will recharge @ 120kW until 80%, then lower the charge rate until 100% is reached.
4. Disconnect when complete.



#### L2 AC Charger

1. Connect the J1772 plug into the upper portion of the CCS1 recharge port on FLEXX.
2. Start the L2 Charger.
3. FLEXX will recharge @ up to 16kW.
4. Disconnect when complete

#### NEMA AC Power

1. Open FLEXX lower door to expose NEMA connector.
2. Plug in 220V 14A power to NEMA connector.
3. FLEXX will begin charging.
4. Disconnect when complete.

## 4.2 Charging Electric Vehicles

The FLEXX mobile DC fast charger makes it very easy to charge an electric vehicle.

Follow these steps to start a charging session:

1. Plug vehicle into charging connector #1 or #2
2. Use RDIF card or FOB to place it over the scanner.
3. Watch the info screen and select which charging cable you wish to start.
4. FLEXX will begin charging the vehicle.
5. When charge is finished, simply disconnect.
6. To stop charging process in case of issues, simply tap the Emergency Stop button.



## 4.3 Towing FLEXX

**⚠️ WARNING – TRAILER TOWING** can be hazardous. In trailer towing, as in most driving situations, exposure to certain hazards occurs. Trailer towing is safe when precautions are taken. The following safety information is only a summary of the more complete information found in the Safety Standards listed at the end of these precautions. Read and follow all Safety Standards. In addition, the end user must check and comply with all federal, state, and local laws before use.

### 4.3.1 Guidelines:

- Use a towing vehicle prepared and capable of handling the load.
- Be sure load is properly secured. Load includes FLEXX, cables, tools, and approved accessories.



- Towing any trailer requires special awareness because of the changed driving situation.
- When towing, it takes longer to start, stop, and pass – use training and practice to avoid accidents.
- Turning and backing up present new problems, plan ahead.
- Require each driver to be fully trained and experienced in trailer towing before going out on the road.
- Be sure the trailer is fully prepared and connected to towing vehicle.
- Observe maximum speed of 65 mph when towing.
- Do not modify or change the trailer in any way – changes void the warranty.

## **4.4 Safety**

### **4.4.1 LIGHTS that are not working can cause accidents**

The following State and Federal regulations require trailers used on highways to have tail, stop, turn, and side marker lights.

- Lights are not required for trailers designed for off-road use only.
- Check all lights and connectors for proper installation and operation before using the trailer.
- Check the condition of wiring harness leads, plugs, and connections regularly.
- Repair or replace damaged parts or wires.
- Replace any broken lenses, reflectors, or bulbs.

### **4.4.2 INCORRECT TORQUE on lug nuts or INCORRECT TIRE PRESSURE or BEARING MAINTENANCE can cause loss of control resulting in serious injury and equipment damage.**

- Recheck lug nut torque after first 50 miles (80 km) and once each year or every 12,000 miles (19,500 km) thereafter, whichever comes first.
- When checking lug nuts, keep them clean, dry, and unlubricated.
- Check and repack wheel bearings once each year or every 12,000 miles (19,500 km), whichever comes first.
- Maintain correct tire pressure according to sidewall data on tire – underinflation is the most common cause of tire trouble.
- Check tires for wear every six months.
- Use only replacement tires of the same size, rating, and capacity

#### **4.4.3 Principal Safety Standards**

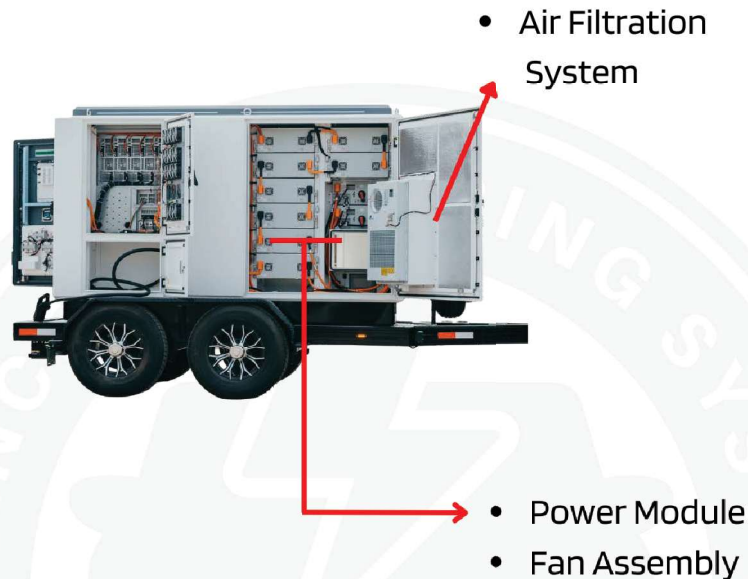
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## 5.0 Maintenance Procedures

Performing the following preventative maintenance steps will keep the FLEXX unit running longer with minimal maintenance issues.



### Air Filtration System

Changing out the system filter when dirty.

1. Using the info screen, place FLEXX into "Maintenance" mode.
2. Open doors of FLEXX to expose power modules.
3. Remove the cover by unscrewing the 6 screws holding the filter cover in place
4. Change out the filter using the supplied filter. (Call Charge Rigs if you need more filters.)
5. Place filter cover back on and screw into place.
6. Close door
7. Return to Normal Mode.

### Power Module Fan Assembly

Cleaning out the power module fan assemblies

1. Using the info screen, place FLEXX into "Maintenance" mode.
2. Open doors of FLEXX to expose power modules.
3. Using a can of spray air, clean the fan blades removing any dirt or dust that has collected.
4. Ensure connectors are secure / snug.
5. Close door
6. Return to Normal Mode.

## 6.0 FLEXX200 Specifications

Battery Specifications	
Battery charging power	16kW (AC) / 120kW (DC) / NEMA 10kW
Battery output	12VDC 10A / 220VAC 15A / 110VAC 18A
Charging voltage	240V(AC) / 700V (DC)
Charging standard	CCS1   NACS
Nominal capacity	200kWh
Battery voltage range	537~700V
Depth of discharge	≤90% DOD
Cycles	> 4000
Cell type	3.2V/120Ah (LFP)
Rated voltage	614V
Rated frequency	50/60Hz
Cooling method	air cooled
IP level	IP54
Safety Certification	UL

Charger Specifications	
Rated power	120kW
Output voltage range	150-1000Vdc
Output current range	0-250A
Human Interface	12.1-inch touch screen
Charging mode	Automatic full, fixed power, fixed amount, fixed time
Payment method	Swipe card payment, scan code payment
Networking method	4G / Wi-Fi
Networking protocol	OCPP 1.6J
Charging standard	CCS1
Safety Certification	ETL
Unit Specifications	
Dimension L * W * H	17' x 8' x 8.5' (ft)
Weight	7,000 Lbs.
Operating temperature/°C	14°F-131°F
Cooling method	air cooled
Altitude/m	6500 Ft.
Noise/dB	≤65dB
Relative humidity/RH	5%~95%RH, non-condensing



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# FLEXX 300 Mobile DC Fast Charger



# Operations Manual

9/1/2024

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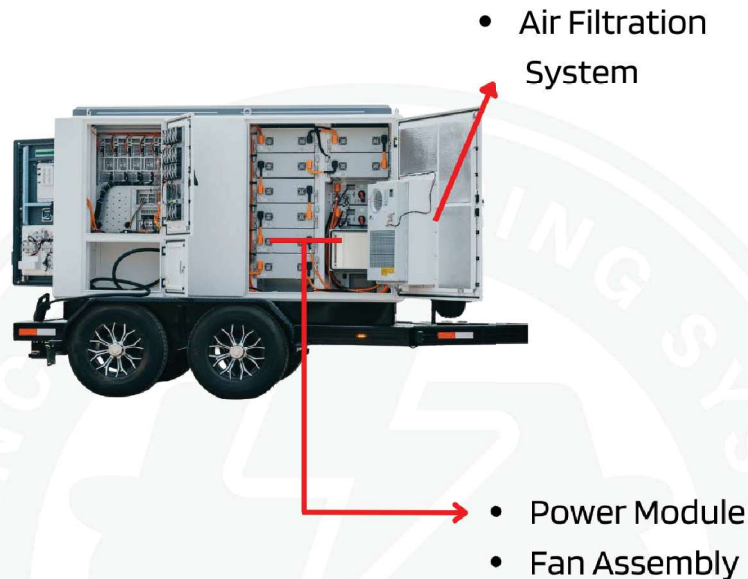
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4. Ensure connectors are secure / snug.
5. Close door
6. Return to Normal Mode.

## 6.0 FLEXX300 Specifications

Battery Specifications	
Battery charging power	16kW (AC) / 120kW (DC) / NEMA 10kW
Battery output	12VDC 10A / 220VAC 15A / 110VAC 18A
Charging voltage	240V(AC) / 700V (DC)
Charging standard	CCS1   NACS Optional
Nominal capacity	300kWh
Battery voltage range	537~700V
Depth of discharge	≤90% DOD
Cycles	> 4000
Cell type	3.2V/120Ah (LFP)
Rated voltage	614V
Rated frequency	50/60Hz
Cooling method	air cooled
IP level	IP54
Safety Certification	UL



Charger Specifications	
Rated power	120kW
Output voltage range	150-1000Vdc
Output current range	0-250A
Human Interface	12.1-inch touch screen
Charging mode	Automatic full, fixed power, fixed amount, fixed time
Payment method	Swipe card payment, scan code payment
Networking method	4G / Wi-Fi
Networking protocol	OCPP
Charging standard	CCS1
Safety Certification	ETL
Unit Specifications	
Dimension L * W * H	17' x 8' x 8.5' (ft)
Weight	9,000 Lbs.
Operating temperature/°C	14°F-131°F
Cooling method	air cooled
Altitude/m	6500 Ft.
Noise/dB	≤65dB
Relative humidity/RH	5%~95%RH, non-condensing