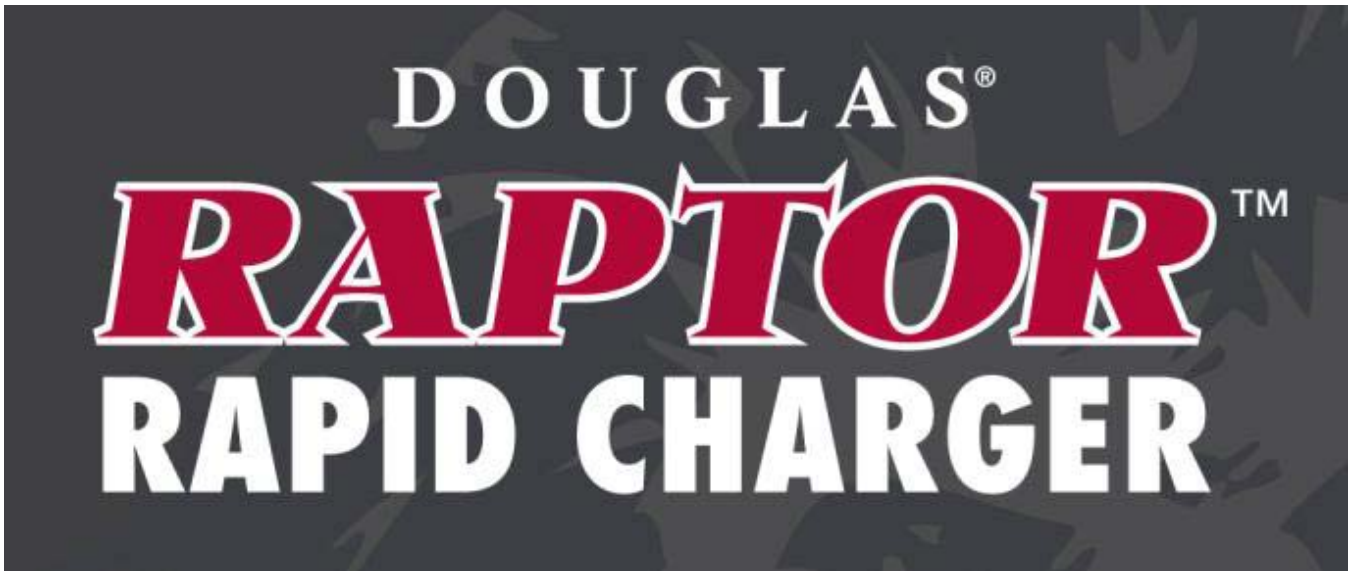


Model: DR3

DOUGLAS® RAPTOR™ HF Rapid Charger
Owner's Manual

To automatically be connected to your closest Service Center, call us toll-free at 1-800-DOUGLAS (1-800-368-4527)
Or, visit us at: http://www.douglasbattery.com/

I.B.1650
Rev A (4/15)

IMPORTANT
Read and understand your user's manual before installing, operating, or servicing this product.
DO NOT DESTROY THIS BOOK

TABLE OF CONTENTS

AC LINE VOLTAGE LETTER CODES

The following table describes the code letters to be used in new charger part numbers to indicate the AC line voltage(s) and AC line frequency at which the charger can be operated.

Code Letters	Voltage(s) (volts rms)	Line Frequency (Hertz)	Comments
Y	480	50/60	480 VAC only
C	600	50/60	600 VAC only

SPECIALTY CHARGER OPTIONS LIST

Suffix	Description
L16	16' of DC cable.
L23	23' of DC cable.
L30	30' of DC cable.
NC	No DC cables (**NOT UL APPROVED)**
PP	Charger shipped on a Plastic Pallet
S	Series DC Cables

IMPORTANT SAFETY INSTRUCTIONS

1. This manual contains important safety and operating instructions. Before using the battery charger, read all instructions, **cautions**, and **warnings** on the battery charger, the battery, and the product using the battery.
2. This charger has been designed to only charge flooded, lead-acid batteries. Read and understand all setup and operating instructions before using the battery charger to prevent damage to the battery and to the charger.
3. **Do not** touch non-insulated parts of the output connector or the battery terminals to prevent electrical shock.
4. During charge, batteries produce hydrogen gas which can explode if ignited. Never smoke, use an open flame, or create sparks in the vicinity of the battery. Ventilate well when the battery is in an enclosed space.
5. **Do not** connect or disconnect the battery plug while the charger is on. Doing so will cause arcing and burning of the connector resulting in charger damage or battery explosion.
6. Lead-acid batteries contain sulfuric acid which causes burns. **Do not** get in eyes, on skin, or on clothing. In cases of contact with eyes, flush immediately with clean water for 15 minutes. Seek medical attention immediately.
7. Only factory qualified personnel can service this equipment. De-energize all AC and DC power connections before servicing the charger.
8. The charger is **not** for outdoor use.
9. Do not expose the charger to moisture. Operating **conditions** should be 0º to 104º F; 0 to 70% relative humidity.
10. Do not operate the charger if it has been dropped, received a sharp hit, or otherwise damaged in any way.
11. For continued protection and to reduce the risk of fire, install chargers on a floor of non-combustible material such as stone, brick, or grounded metal.

WARNING: The shipping pallet must be removed for proper and safe operation.

INSTRUCTIONS DE SÉCURITÉ IMPORTANTES

1. Ce manuel contient des informations et des consignes importantes pour l'emploi et l'utilisation du chargeur de batteries industrielles. Avant tout emploi, il est fortement conseillé de lire l'ensemble des instructions, recommandations, et avertissements concernant le chargeur et la batterie.
2. Ce chargeur a été conçu pour la charge des batteries industrielles type plomb-acide dite « ouverte ». (Il ne peut pas être adapté pour les batteries étanches.)
3. Lisez toutes les condisnes d'installation et d'utilisation avant d'employer le chargeur de batterie pour empêcher des dommages à la batterie et / ou au chargeur.
4. **Ne pas être en contact avec** les pièces sous-tension non-isolées tels que la prise de charge ou des éléments de connexion de la batterie pour empêcher le choc électrique.
5. Pendant la charge, le dégagement d'hydrogène rend l'emploi de feu strictement interdit «risque d'explosion ». Ne jamais fumer, employer une flamme nue, ou créez les étincelles à proximité de la batterie. Ventiler suffisamment pour éviter toute condensation de gaz dans un espace restreint.
6. **Ne brancher ou débrancher la batterie que si le chargeur est à l'arrêt.** Faire ainsi risque d'endommager la prise de charge pouvant avoir pour conséquence des dommages du chargeur ou l'explosion de la batterie.
7. Les batteries d'acide au plomb contiennent l'acide sulfurique, qui cause des brûlures. Eviter le contact avec les yeux, la peau, ou sur l'habillement. Dans le cas de contact avec les yeux, et faut nettoyer immédiatement avec de l'eau propre pendant 15 minutes et consulter un médecin immédiatement.
8. Seul le personnel qualifié par l'usine peut entretenir cet équipement. Pour le service, veuillez contacter la société Douglas ou l'un de ces représentant (1-800-DOUGLAS) (1-800-368-4527)
9. Avant toute intervention d'entretien ou de réparation il faut s'assurer que le chargeur est hors tension et la batterie est déconnectée.
10. Le chargeur **n'est** pas pour un usage extérieur.
11. Ne pas exposer le chargeur à l'humidité. Les conditions de fonctionnement devraient être – 15° à 40°c; humidité relative de 0 à de 70%.
12. Ne pas mettre en fonctionnement le chargeur s'il a reçu un choc mécanique ou tout autre dommage di quel que façon.
13. Pour une protection permanente et pour réduire le risque du feu, installez les chargeurs sur un plancher ou un matériel non-combustible tel qu'un mur plein en béton, en brique, ou l'acier.

TECHNICAL INFORMATION

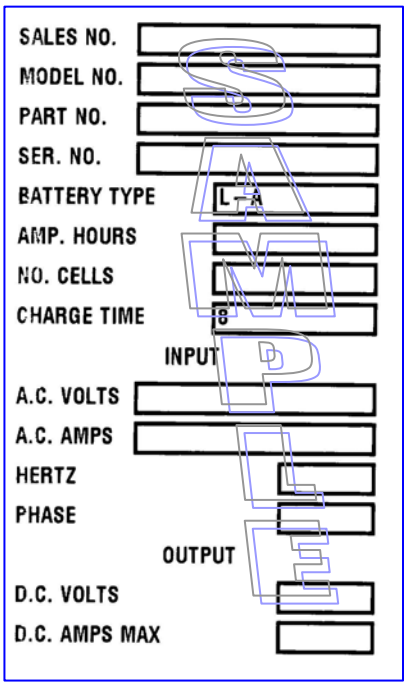
The nameplate, located on the outside of the charger, should be used to check this application before installation.

Part Number
This number specifies in general the characteristics of this particular charger and for this reason it is required in any discussion or correspondence regarding this unit.

DR3-LM-4 Y

- Douglas Raptor
- Phase
- Module Code
- Cabinet Size M=3 P=6
- DC Volt Code
- AC Volt Code

Module Codes: H=1 J=2 L=3 N=4 O=5 P=6
DC Voltage Codes: 4=24/36/48 VDC 5=72/80 VDC
AC Voltage Codes: Y=480 C=600



Serial Number
This number indicates complete information about the specific charger. It must be supplied with the part number on any correspondence or discussion regarding this charger.

Battery Type
The chemical content construction of the battery this unit is designed to charge is given in this part of the nameplate. (L-A = Flooded Lead-Acid)

Ampere-Hours
The information supplied here is the ampere-hour battery capacity which this unit has been factory adjusted to charge. Charging batteries of ampere-hour capacities not specified here might cause the charger to deviate from the specifications.

Cells
This portion of the nameplate gives the number of cells this unit will charge. **This number must match exactly with any battery connected to the charger output.**

Input AC Volts
The nameplate shows the input voltage accommodated by this charger.
IMPORTANT: The charger will operate only on nominal line voltages stamped on the nameplate.
Failure to select the correct voltage will result in damage to the charger and/or the battery.

Input AC Amps
The external fusing and/or the line disconnect circuit breaker should be as specified in the National Electrical Code or other local code agencies. (AC fuse values can be found on the decal inside the charger.)

Hz
This gives the frequency in cycles per second of the AC input voltage. Under no conditions operate charger at a different frequency or from a generator with unstable frequency.

Phase
Number "3" indicates a Three Phase Charger.

DC Volts
This gives the nominal DC output voltage of the system.
Rated DC Amps
This is the nominal DC value of current that this unit will deliver to a battery that is 100% discharged.

INSTALLATION

WARNING: The shipping pallet must be removed for proper and safe operation.

Location
For maximum trouble-free service, choose a location which is free of excess moisture, dust, and corrosive fumes. Also, avoid locations where temperatures are high or where liquids will drip on the charger. Allow six (6) inches of clearance at rear and sides of the charger for air circulation. Do not obstruct the ventilating openings or the space under the charger.

Electrical Connections
To prevent failure of the charger, be sure it is connected to the correct line voltage.

On three phase units
Connect the charger as follows:
Phase A to L1 (terminal block)
Phase B to L2 (terminal block)
Phase C to L3 (terminal block)

Connecting Input Power

WARNING: Make sure the power to the charger is OFF and the battery is disconnected before connecting the input power to the terminals of the charger.

Connect the input power to the appropriate terminals, ***including ground***. Follow your local electrical or National Electric Code in making these connections.

AC Connection
The user must provide suitable branch circuit protection and a disconnect method from the AC power supply to the charger to allow for safe servicing.

Plug Polarity
The charging cable is connected to the DC output of the charger with the positive lead marked RED. The output polarity of the charger must be strictly observed when connecting to the battery (read warning above). Improper connection will open the DC fuse.

Grounding the Charger

DANGER: FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electric Code for ground wire sizing.

Connect a grounding conductor to the lug provided on the horizontal support panel. This lug is marked as shown:

Install Thermistor

Insert the thermistor (the large Gray wire with the metallic rod on the end) at a cell intersection close to the center of the battery. The probe should be inserted all the way to the strain relief. Do not install at a partition.

Connect the two thermistor wires to the auxiliary contacts on the SBX connector on the battery cable. Either wire can be connected to either terminal. Using an ohmmeter on the 1K scale the resistance between the contacts should be approximately 10K ohms.

DESCRIPTION OF OPERATION

General

The Raptor range of chargers is designed to recharge 24 V, 36 V, 48 V, 72V or 80 V batteries with 3-phase supply. The microprocessor controlled unit automatically recognizes the battery (voltage, capacity, charge level, etc.) and very effectively analyses its condition for optimum handling. A fast charging profile is standard (vented lead/acid batteries, gel batteries or waterless batteries) depending on the configuration selected by the user. The capability for desulphation, equalization and refresh charging is also included. Battery temperature is measured with a thermistor installed in the center of the battery.

Starting the charge

If Autostart is OFF the charge will start only if the central button is pressed. To stop the charge, press the central button.

The display shows information relative to the connected battery and counts down the time remaining until the effective charge begins.

This battery charger is designed to charge flooded lead-acid storage batteries within the range of the cell and ampere-hour rating as marked on the nameplate.

Charging

Charging current is determined by the battery voltage and interaction of the charger. Charging current declines automatically as battery voltage rises during the charge. As the battery charges, the display will output various charge parameters including the percentage of battery capacity.

AC Power Fail

If the AC power fails with a battery connected to the charger during a charge cycle, the charger will reset and start a new charge cycle when power is restored.

Series Charging

In series charging, the voltages of both batteries add up and must match charger's nameplate rating. Charger's Ampere-Hour rating must be equal to each of the batteries Ampere-Hour rating. Charge cycle will not start unless both batteries are connected.

GLOSSARY

Charging Coefficient
The ratio of the number of ampere-hours restored during charging to the number of ampere-hours consumed during discharge.

Charging Profile
The charging profile defines the rate of current charge over time. The charger adapts to the battery's age and level of discharge. Controlling the overcharge coefficient, whatever the battery's discharge level, reduces the amount of electricity consumed.

Equalization Charging
Equalization charging, performed after normal charging, balances the electrolyte densities in the battery's cells.

Fast Profile
The Fast Profile has a start rate of 50% of the batteries rated amp hour capacity, requires one opportunity recharge in every 24 hours of service and must have an equalize charge done once a week which is programmed to run automatically.

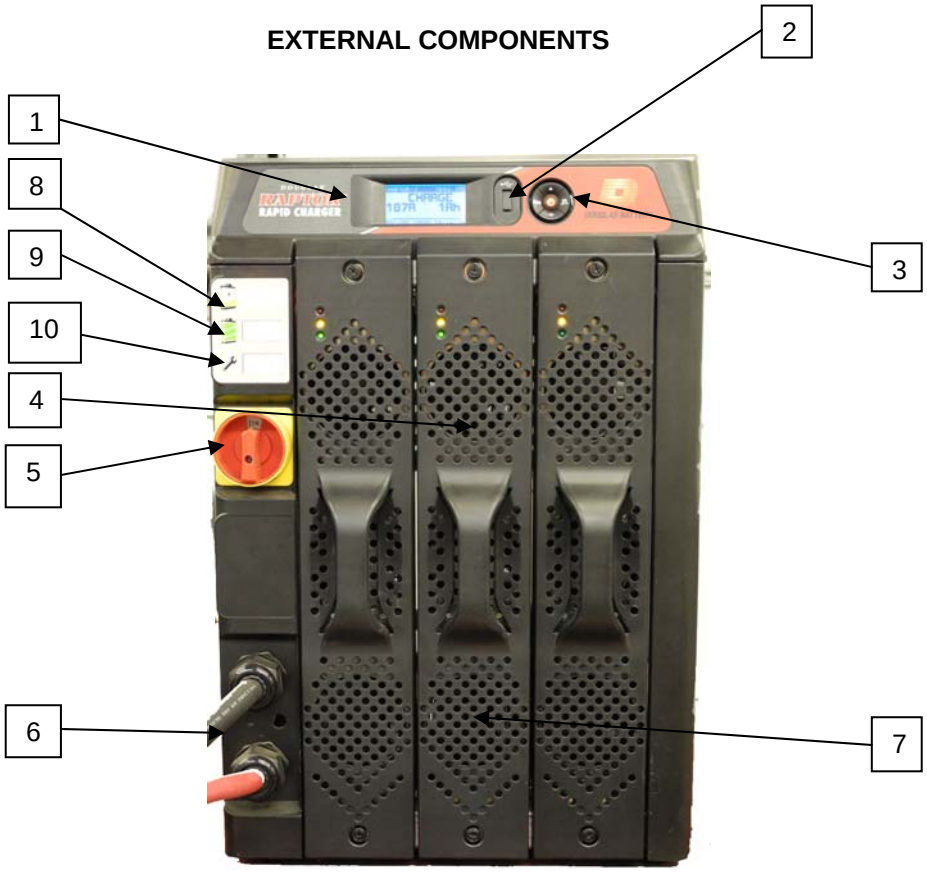
Operation:
During Fast charging the user can plug the battery in and charge it during breaks, lunch or any work stoppage time. Sufficient time should be scheduled after the full charge to allow the battery to completely cool to ambient temperatures before use.

Complete Charge Time:
The Value programmed will be the time of day for a "Complete Charge".

Note: The user must configure the charger for the delay value that the complete charge is to take place, they must also configure the delay value that the equalize charge will take place.

Refresh Charging
Refresh or maintenance charging enables the battery to be maintained at maximum charge all the time that it is connected to the charger.

EXTERNAL COMPONENTS



Ref	Function
1.	Control Panel with LCD display
2.	USB port
3.	Navigation button
4.	Modules
5.	ON/OFF Switch
6.	Output cables
7.	Ventilation panels
8.	Charging LED
9.	Charge Complete LED
10.	Fault LED

CHARGER CONTROL PANEL

LCD DISPLAY COLORS

Color	Function
Dark Blue	Wait for Battery Connect
Light Blue	Battery on Charge
Light Blue/Orange	Alternating - On Charge Warning. Pump Fault, Overdischarge,Thermal Fault. or Module failure.
Green	Charge Complete
Red	Charger Fault DF1, DF2,DF3,Thermal, Wrong Module
Green/Orange	Alternating – Battery charged but with pump defect, over discharge or module failure

KEY FUNCTIONS

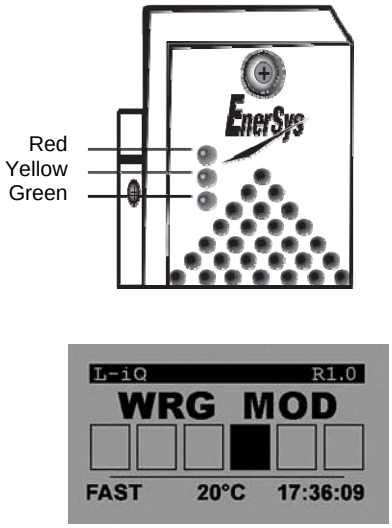
Key	Function
	Navigation in the menu. Start/End of list (Press 2 seconds)
 GREEN/RED	The central button is equipped with a two-colored LED Green/Red (Green: charger is waiting, Red: charger operating) Stop or Start of charge Selection of active menu or validation of value stored Cancel the value stored (Press 2 seconds)
	Start an equalization charge. Access to a sub-menu.
	Access to the menus (press 3 seconds) Close the window.

MODULE MANAGEMENT

- There are two types of the modules: 24/36/48V and 72/80V.
- Do not mix both types in a single charger.
- The modules are plug and play: if the module needs to be replaced a module, plug the new module into the cabinet and the system will operate.
-

DISCONNECT THE AC SUPPLY AND THE BATTERY BEFORE CHANGING MODULES

- The module management system ensures optimization of the electrical efficiency and performance of the product.
- If one module fails then the system keeps on charging in reduced power mode. It allows the battery to be charged even in the case of module failure.
- There are 3 status LED's on the modules:
  - Red: OFF - normal status / ON - internal module fault
  - Yellow: OFF - absence of AC supply / ON - normal status when AC supply present
  - Green: OFF - module OFF / ON - module ON (in function - charging)



Location of the wrong module in the system
(here 3rd module from the right side on a 6-slot cabinet)

Menu Access

When the charger is idle, press and hold <ESC>, the Main Menu is then displayed. The current menu is automatically exited after six minutes of inactivity or can be exited voluntarily by pressing the <ESC> button.

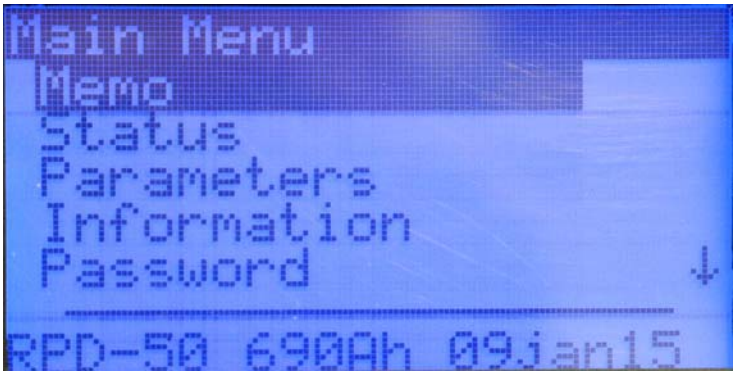
The menus provide access to the following functions:

- Last 896 charging cycles (MEMORIZATIONS menu).
- Viewing of faults, alarms, etc. (STATUS menu).
- Download of data stored in the charger via the USB storage memory.
- Charger configuration (CONFIGURATION menu).
- Setting of date, language and others (PARAMETERS menu).
- Management of password (PASSWORD menu)
- Viewing basic charger information (INFORMATION menu)

Main Menu

All menus are accessed from Main Menu; a detailed description of each menu is included in the next sections of this manual. The menus that require a password are not displayed until the correct password has been entered.

Memo
Status
Parameters
Information
Password



Memorizations

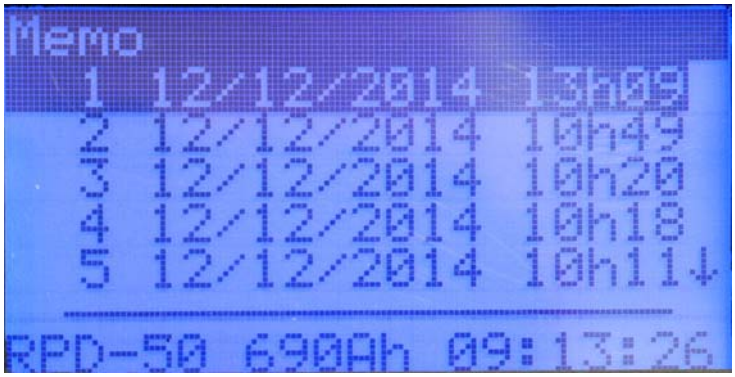
The charger can display the details of the last 896 charge cycles.

Memorization Access

On the Main Menu, select Memo and press <Enter>.

Memorizations Display Screen

The display shows here that 17 charges have been stored in memory (title line). MEMO 1 is the latest charge memorized. After memorizing the 896th charge, the oldest record is deleted and replaced by the next oldest.



Displaying a charge cycle

Proceed as follows:

1. Select a record (MEMO x) using the ▲/▼ buttons.
2. Display the first History screen by pressing Enter.
3. Display the second History screen by pressing▼.
4. Return to the Main Menu by pressing Esc.

The charge history is displayed; use the ▲/▼ to scroll through the parameters.

The Memorizations can be cleared via the Reset command in the Configuration Menu (Password required).

Status

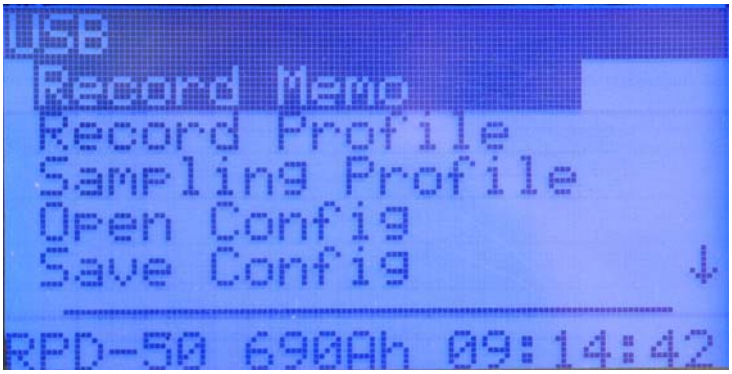
This menu displays the status of the charger's internal counters (number of normal and equalize charges, faults by type, etc.).

Access

On the Main Menu, select Status and then press <Enter>.

Status	Information
Charge	Total number of charges. Corresponds to the total of normally terminated charges and charges terminated with or by faults.
	Number of charges terminated abnormally.
	Number of charges normally terminated.
EGAL	Number of equalization charges completed by the charger.
TH	Number of charger temperature faults*.
DF1 etc.	Number of faults recorded by the charger (see Fault Codes).

The Memorizations can be cleared via the Reset command in the Configuration Menu (Password required).



Parameters

Date/Time

Sets date and time of the charger. The clock has a battery backup which will preserve the time when power to the charger is off.

Serial Number

Language

Selects the language displayed in the menus.

Region

Select the format for date, metric (EU) or imperial (US) units for temperature, length, and cable gauge.

Contrast

Set the display contrast level (0 to 49).

Backlight On/OFF

Information

Vers/SN

Display charger version information.

Measures

Display charger internal information.

Memory

Display processor memory information.

Password

Enter the charger password. Reserved for techs only.

Modular

Info Gen : General information about the system

Info 1: Details about Module #1

Info 2: Details about Module #2

Info 3: Details about Module #3

Info 4: Details about Module #4

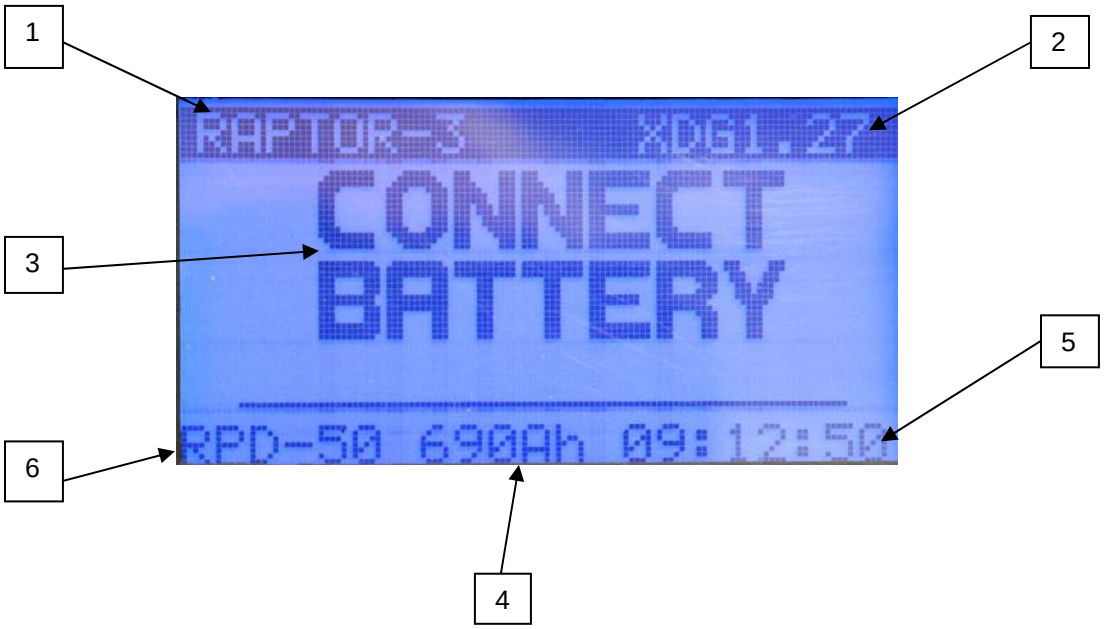
Info 5: Details about Module #5

Info 6: Details about Module #6

CHARGING

At this point, the charger should have been set up by a qualified service person. Charging can only begin with a battery of the proper type, capacity and voltage connected to the charger.

With the charger in wait mode (No battery connected) and without pressing the Stop/Start button, the display will show the following information (the display background will be dark blue):



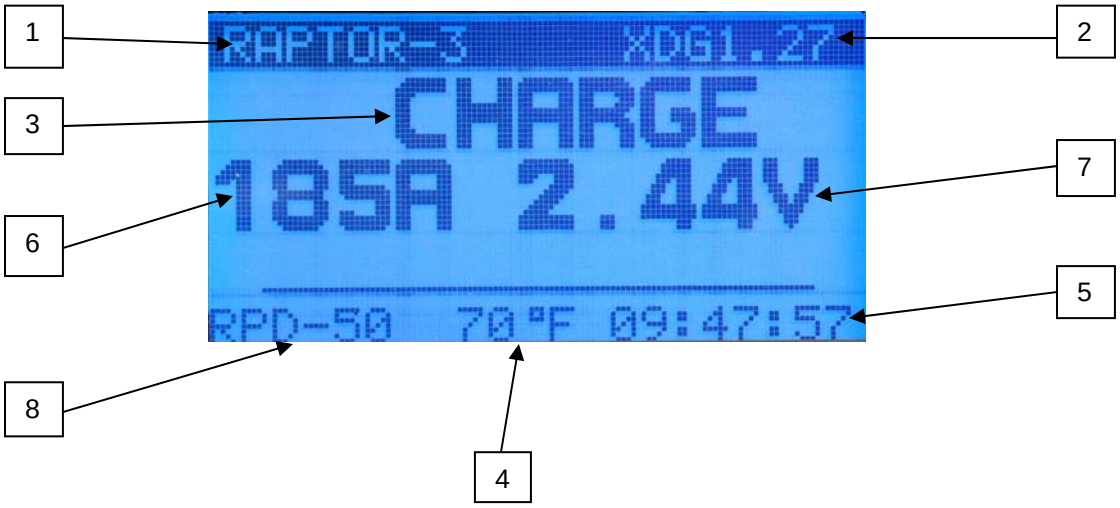
Ref	Description
1	Charger type
2	Firmware version
3	Charger status
4	Programmed battery parameters (Cap, temp)
5	System time and date (if set)
6	Charge Profile

Delayed Start

If the charger was programmed for delayed start (Configuration->Charge->Delay), charging will begin following that delay. When the battery is plugged in to the charger, the display shows the time remaining before the programmed charging starts (the display background will be light blue).

Effective charging starts after a 20 second countdown. The charger uses Profile, Capacity, and Temperature settings programmed in the Configuration menu.

Effective charge
A few moments into the effective charge, the display will begin alternating between the following charging information:



Ref	Description
1	Charger type
2	Firmware version
3	Charger status (CHARGE, AVAIL, EQUAL, FAULT)
4	Programmed battery parameters (Cap, temp)
5	System time and date (if set)
6	Charger output current
7	Alternating battery charge statistics (Batt V, Vpc, Ah returned, time on charge, estimated time remaining, % State of Charge)
8	Charge Profile

End of charge without equalization

The display background turns green after proper end of charge. The display shows AVAIL. The display alternates between:

- Total charging time.
- Amp/hrs restored to the battery.

Any other background color indicates a problem during charging. Please refer to paragraph *Control Panel* for more information.

The battery is now ready for use. Push the ON/OFF button before unplugging the battery.

CAUTION: To prevent arcing and burning at the connector and possible battery explosion, press the **START/STOP** push button first to stop the charge cycle before disconnecting a battery that is currently on charge.

End of charge with equalization

An Equalize charge can be started manually or automatically.

Manual Start
1. At the end of charge (green background), press on the <EQUALIZE> button. The equalize button can also be pressed any time during the charge and an equalize charge will be started after charging is complete.

NOTE: When an equalize is manually started, the output current will be set to the value saved in Configuration->Equalize->Manu Current.

2. The start of the equalization charge is indicated by the message **EQUAL**. During the equalization charge, the charger displays the output current and alternating, the battery voltage, voltage per cell, remaining time.
L2010 24-36-48V US11

3. The battery will be available when the green LED comes back on and the display shows AVAIL.

4. The battery is now ready for use. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge. Push the ON/OFF button before unplugging the battery.

Automatic start
If an equalization day has been programmed (Configuration->Equalization->Frequency) the equalization charge will start automatically on the programmed day of the week after charging is complete.

The battery will be available when the green LED comes back on and the display shows AVAIL. The battery is now ready for use. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge. Push the ON/OFF button before unplugging the battery.

Fault Codes

In case of a fault, one of the corresponding fault codes listed below will appear on the display. If it is a critical fault, charging will stop and the red Fault LED will be illuminated.

Fault	Critical	Cause	Solution
DF1	Yes	Low output current	Check input voltage and fuses. Call for service.
DF2	Yes	Output fault	Check for proper battery connection (reversed polarity). Check output fuse. Call for service
DF3	Yes	Improper battery	Battery voltage too high (>2.3 Vpc) or too low (<1.6 Vpc). Use proper charger for battery.
DF4	No	The battery has been discharged more than 80% of its capacity	Prevent future over discharging of battery. Battery charge gauges and lift interrupts may need calibration.
DF5	No	Battery requires inspection	Non critical fault. Check battery cables for condition and size, check for loose connections, check for defective cells.
TH	Yes	Charger overheating	Check that fans are working. Verify that ambient temperature is not too high. Inspect to see if charger ventilation is obstructed or impaired.
BAT TEMP	Yes	Battery temperature reached maximum	Allow battery to cool. Check max temperature setting in Configuration->Battery->Max Temp
DF MOD	No	Alternating with charge parameters – one or more module in DF1 fault – the charge process continues – the fault module(s) is (are) displayed + red led flashing.	Check power modules. If all modules in DF1 fault a DF1 error will follow.
WRG MOD	Yes	Blocking fault – one or more modules are not compatible with the charger configuration (for example 24V charger with one 48V module). This can happen if the user replaces one module with another one with a different voltage setting.	Use correct module(s).

MAINTENANCE & SERVICE

The charger requires a minimum of maintenance. Connections and terminals should be kept clean and tight. The unit (especially the module heatsink) should be periodically cleaned with an air hose to prevent any excessive dirt build up on components. Care should be taken not to bump or move any adjustments during cleaning. Make sure that both the AC lines and the battery are disconnected before cleaning. The frequency of this type of maintenance depends on the environment in which this unit is installed.

For service, contact the closest Service Center at:

1-800-DOUGLAS (1-800-368-4527)
Or, visit us at: http://www.douglasbattery.com/

REPLACEMENT PARTS AND QUANTITY - 24/36/48 VDC

Part Number	Description	DR3-HM-4YR	DR3-JM-4YR	DR3-LM-4YR	DR3-NP-4YR	DR3-OP-4YR	DR3-PP-4YR	DR3-HM-4CR	DR3-JM-4CR	DR3-LM-4CR	DR3-NP-4CR	DR3-OP-4CR	DR3-PP-4CR		
X1100-6LA58004	24/36/48V Module 480V	1	2	3	4	5	6								
	24/36/48V Module 600V	0	0	0	0	0	0								
124-7KW-3-0L10	Cable Assembly 3/0	1	1	1	2	2	2								
X1100-6LA58001	Blank Module	2	1	0	2	1	0								
I.B.1650	Instruction Manual	1	1	1	1	1	1								
X1060-6LA11825	Main Control Board	1	1	1	1	1	1								
X1060-14-7TS-1	Temperature Sense Board	1	1	1	1	1	1								

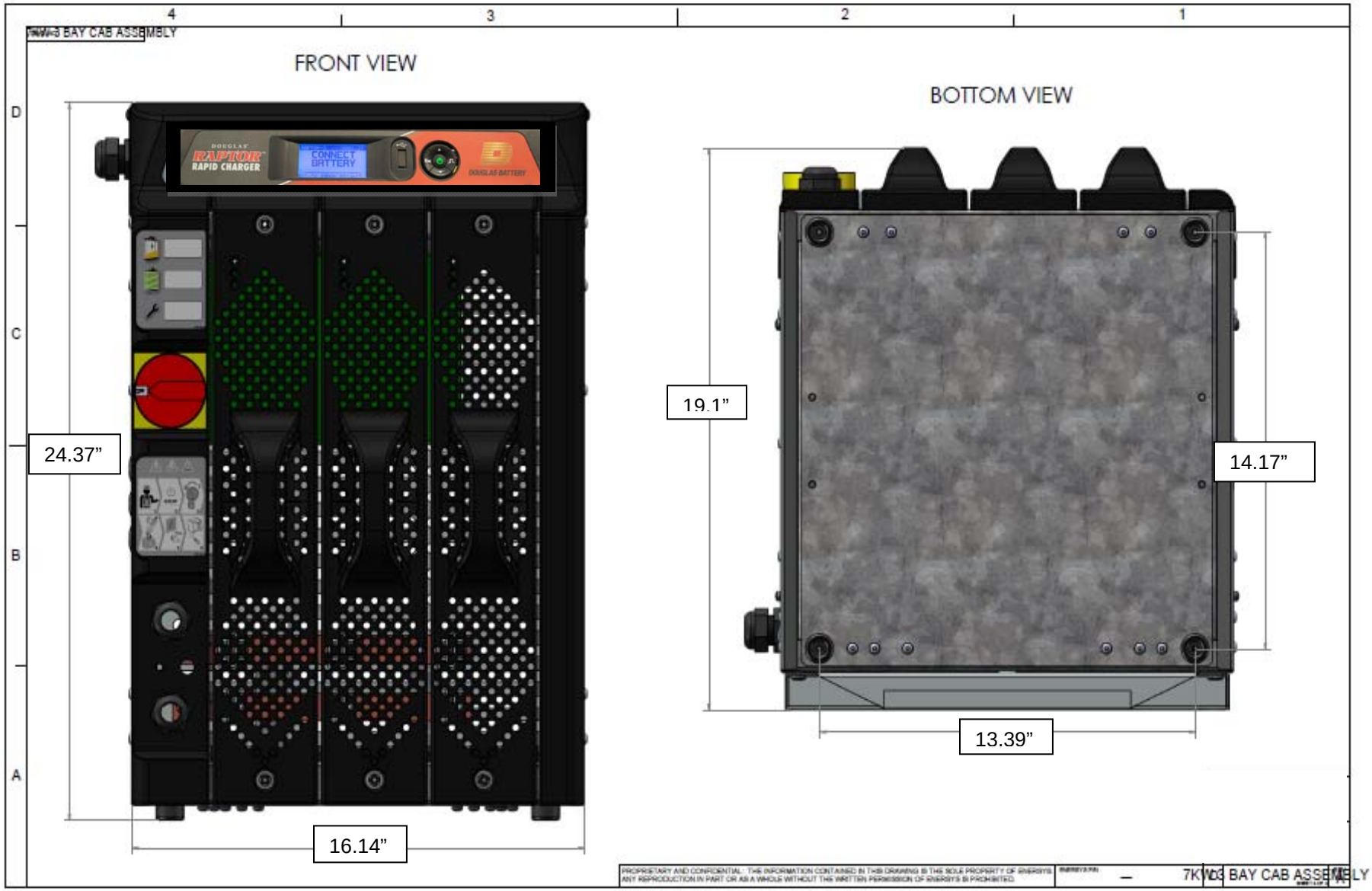
REPLACEMENT PARTS AND QUANTITY – 72/80 VDC

Part Number	Description	DR3-HM-5YR	DR3-JM-5YR	DR3-LM-5YR	DR3-NP-5YR	DR3-OP-5YR	DR3-PP-5YR	DR3-HM-5CR	DR3-JM-5CR	DR3-LM-5CR	DR3-NP-5CR	DR3-OP-5CR	DR3-PP-5CR		
X1100-6LA58005	72/80V Module 480V	1	2	3	4	5	6								
	72/80V Module 600V	0	0	0	0	0	0								
124-7KW-3-0L10	Cable Assembly 3/0	1	1	1	2	2	2								
X1100-6LA58001	Blank Module	2	1	0	2	1	0								
I.B.1650	Instruction Manual	1	1	1	1	1	1								
X1060-6LA11825	Main Control Board	1	1	1	1	1	1								
X1060-14-7TS-1	Temperature Sense Board	1	1	1	1	1	1								

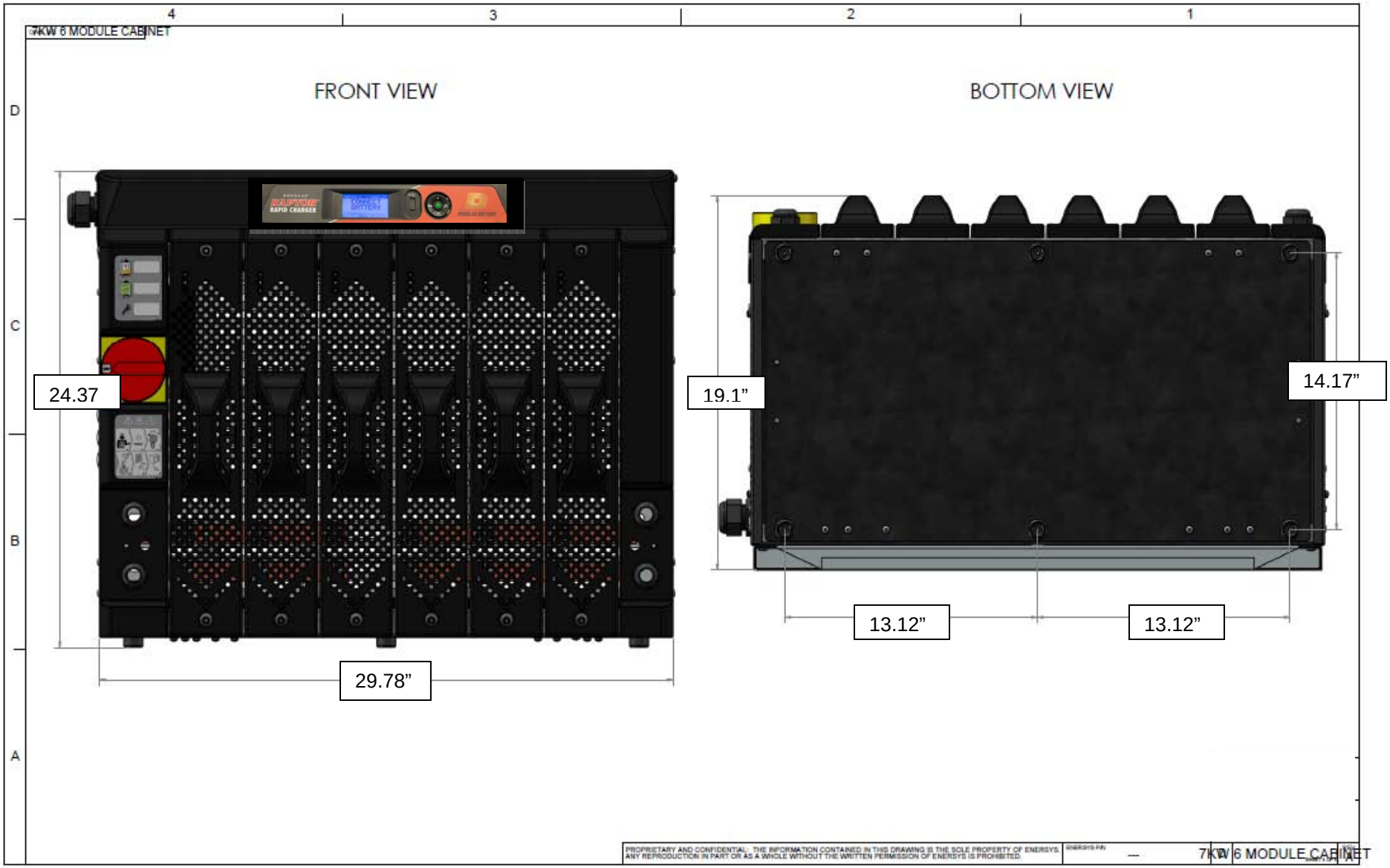
7 kW STANDARD TECHNICAL SPECIFICATIONS

	AC Input			DC Output				
Part Number	**Voltage**	**Max Amps**	**Phase**	**Cells**	**kW**	**Max Current (A)**	**Fast Capacity (Ah)**	**Charger Cable AWG**
DR3-HM-4YR	480	9	3	12/18/24	7	115	230	3/0
DR3-JM-4YR	480	18.0	3	12/18/24	14	230	460	3/0
DR3-LM-4YR	480	27.0	3	12/18/24	21	320	640	3/0
DR3-NP-4YR	480	36.0	3	12/18/24	28	460	920	2 Sets, 3/0
DR3-OP-4YR	480	45.0	3	12/18/24	35	550	1100	2 Sets, 3/0
DR3-PP-4YR	480	54.0	3	12/18/24	42	640	1280	2 Sets, 3/0
DR3-HM-5YR	480	9.0	3	36/40	7	70	140	2/0
DR3-JM-5YR	480	18.0	3	36/40	14	140	280	2/0
DR3-LM-5YR	480	27.0	3	36/40	21	210	420	2/0
DR3-NP-5YR	480	36.0	3	36/40	28	280	560	3/0
DR3-OP-5YR	480	45.0	3	36/40	35	320	640	3/0
DR3-PP-5YR	480	54.0	3	36/40	42	420	840	2 Sets, 2/0

3 BAY CABINET DIMENSIONS



6 BAY CABINET DIMENSIONS



MAINTENANCE LOG

1. Modifications to Factory Settings

Date	Variable	Change	Service Technician

2. Service

Date	Description	Service Technician

DOUGLAS BATTERY

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