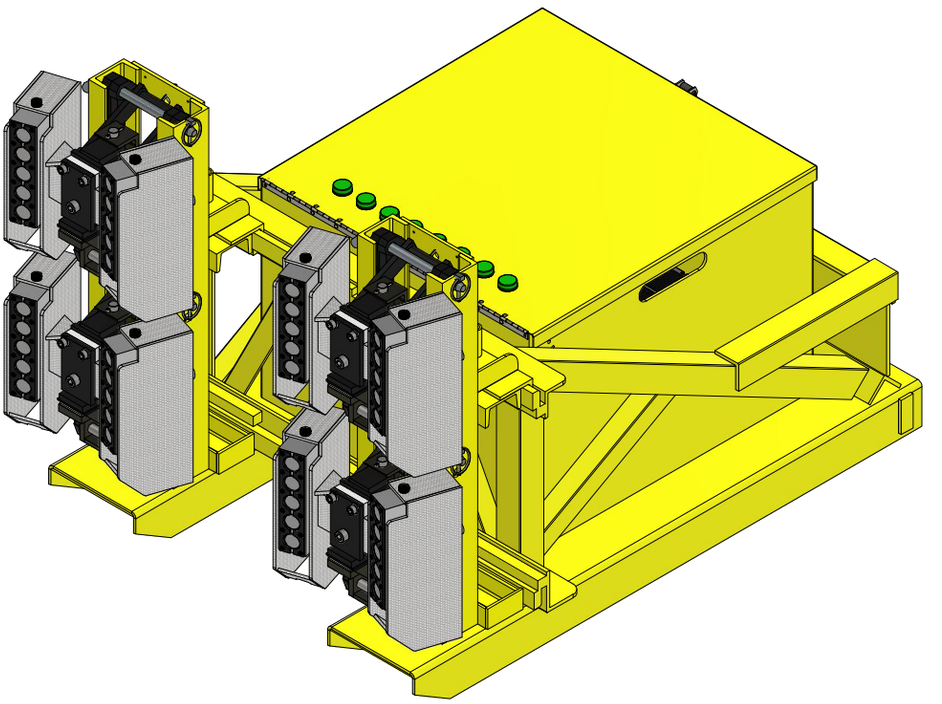
Easy Lift Equipment Co., Inc.
2 Mill Park Court, Newark, Delaware 19713 - Phone: 800-233-1800 / 302-737-7000

OPERATING/MAINTENANCE MANUAL

FOR

MODEL EG4M8DC2-F EMPTY DRUM HANDLING ATTACHMENT



Model #: EG4M8DC2-F
S/N:

EASY LIFT EQUIPMENT
EMPTY DRUM HANDLING ATTACHMENTS
EAGLE GRIP® MODEL EG4M8DC2-F

INTRODUCTION

The Model EG4M8DC2-F empty drum handling attachments utilize a heavy duty quadruple magnetic clamping mechanism for handling (2) empty 55-gallon steel drums at a time. The attachment fork pockets and safety chain provide a quick and easy connection to any lift truck. The specification plate affixed to each attachment provides the following information: model number, serial number, attachment weight, and lifting capacity. **Please verify with your local forklift dealer that your lift truck, counter-balanced walkie stacker, or walkie straddle stacker is certified and tagged properly for this attachment**.

This manual contains information to instruct you on the proper use and maintenance of your empty drum handling attachment. This manual should be available to all personnel working with the machine. Follow the maintenance procedures carefully to ensure a safe and reliable service life. Do not operate your equipment until you have read and understood these instructions.

COMMISSIONING YOUR EAGLE-GRIP EG4M8DC2-F ATTACHMENT

1. Remove all packing materials, protective strapping, and wood shipping blocks, then, using an appropriate lift truck, remove the attachment from the shipping pallet or crate.

2. Perform a visual inspection of the entire attachment for damage.

3. Position the lift truck forks inside the attachment fork pockets, and remove the attachment from the pallet.

4. Secure the attachment to the lift truck by connecting the safety chain to the forklift carriage. The end of the chain is equipped with a snap hook, so generally the chain is looped around the carriage and the snap hook is connected to the chain to form a loop. (Unless the Attachment has Quick-Claw).

5. **Open the DC cabinet. Look at all the components inside the cabinet to ensure nothing appears to have come loose when the equipment was in transit.**

6. **Locate the Remote Controls which are stored in a plastic storage bag within the cabinet. Remove one of the four Remote Controls and close the cabinet. The Remote Controls have been programmed prior to shipping.**

7. **Locate the battery master disconnect switch on the outside of the cabinet and turn it to the "ON" position.**

   Note: There are (8) total magnets on this attachment. Every magnet is identified with a number (M1, M2, M3, M4, etc.). Each magnet has (1) green LED light on top of the battery cabinet lid, as well as on the underside of the attachment frame. There is also a small led blue light on the bottom of each magnet. The blue light only illuminates when the master disconnect switch is in the "ON" position.

8. **Press the "ON" button on the Remote Control to energize the magnets. All (16) green lights on the magnet (8 on the cabinet lid, and 8 on the underside of the attachment) should illuminate when the magnets are energized, thus magnetic. Should they all not illuminate, press the same Remote-Control button "ON" again until all are illuminated. Then, press the button on the key fob "OFF" to de-energize the magnets. All (16) LED lights should then off. If any lights remain lit, press the Remote-Control button "OFF" once again. Continue this on and off procedure until all light consistently turn on and off at the same time. Should there be a consistent issue with any of the lights going on or off, see the REMOTE CONTROL REPROGRAMMING INSTRUCTIONS within this manual or try a different Remote-Control.**

DAILY SAFETY INSPECTION

Do not operate your Eagle-Grip empty drum handling attachment if you notice any unsafe condition(s) that may have been caused by an accident or malfunction. Immediately report this condition to your supervisor.

1. Perform a visual inspection, checking for loose or damaged parts from previous use.

2. Ensure that safety chain is properly attached to carriage.

3. Check the battery discharge indicator to be sure the attachment has sufficient charge for required usage.

Do not operate your empty drum handling attachment if you notice any unsafe condition(s) that may have been caused by an accident or malfunction from previous use. Immediately report any unsafe conditions or issues with the equipment to your supervisor. Lock out/tag out the machine properly to keep others from using it until the issue has been corrected.

SAFETY PRACTICES

1. Do not grip or lift drums that have any contents in them.

2. During transportation, the drum(s) should **only** be lifted to a minimum height required for proper floor clearance.

3. Keep hands and feet clear of empty drums once they are lifted. Steel-toe safety shoes should be worn when manually handling empty steel drums.

4. Be certain the magnetic head(s) have made a secure connection with the side of the drum below the chime of the drum before attempting to move or transport the empty drums.

WARNINGS

WARNING: **NEVER lift the attachment or suspend loads over people. Stay clear of suspended loads.**

WARNING: **Do not attempt to handle a drum or drums that have any contents in them.**

WARNING: **Never transport the attachment with drums being elevated more than a few inches above floor level.**

WARNING: **Do not leave attachment outside in rain, snow, etc., for extended periods.**

WARNING: **Never leave the attachment unattended with a suspended load.**

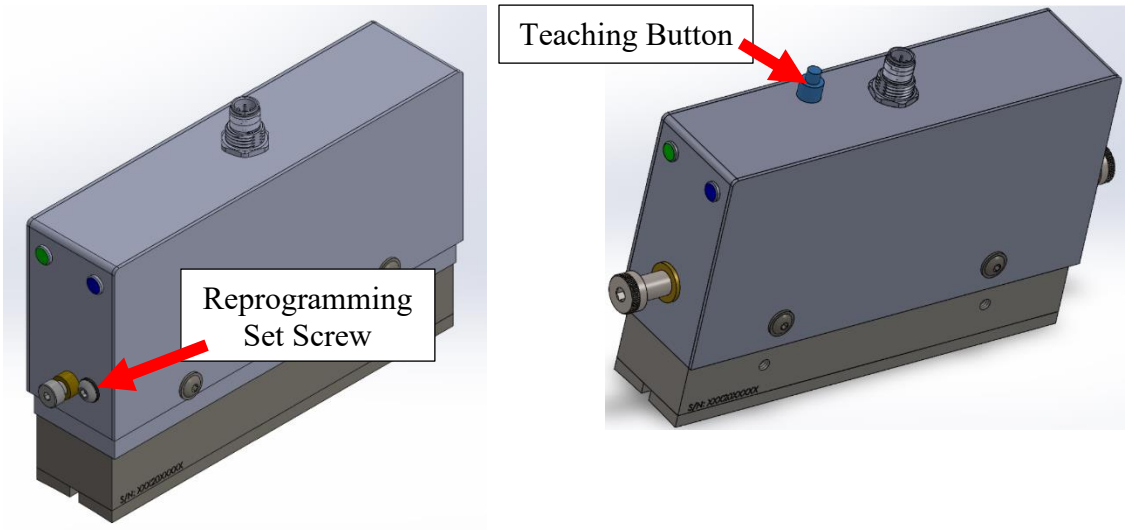
WARNING: **Never wash down the attachment. The attachment is designed to be wiped down by hand.**

WARNING: **Do not make alterations or modifications to the attachment without Easy Lift Equipment authorization.**

WARNING: **Prior to handling drums stacked three high in a trailer it is necessary to check the free lift of the lift truck mast. Be sure the lift truck mast and load backrest will not contact the ceiling of the trailer.**

WARNING: **Exercise care when lifting drums stacked three high in trailers. The upright portions on the attachment are about the same height as the empty drums when lifted. Be sure not to lift the attachment too high and cause any damage to the roof of the trailer or the attachment.**

MAGNET (GEN 1) **MAGNET (GEN 2)**



EG4M8DC2-F Attachments sold before December 2023 included "GEN 1" magnets.
"GEN 1" magnets are reprogrammed via the "Reprogramming Set Screw"
"GEN 2" magnets are reprogrammed via a "Teaching Button" on the back side of the magnet.

EAGLE GRIP® 4 EMPTY DRUM HANDLING ATTACHEMENT OPERATING INSTRUCTIONS

NOTE: The holding strength of the magnets are dependent upon many factors. The heavier the gauge of the drum sidewall, the better magnetic attraction to the metal. Operator care in eliminating shock from traveling over dock plates and sharp turns should be exercised. Operators should strive to grip empty drums once when unloading to help reduce cosmetic abrasions where the magnets contact the drums. Magnets are equipped with replaceable wear shoes to protect the magnets themselves from wear. Wear shoes contact the drums and are powder coated to reduce cosmetic abrasions. The entire face of the magnets should be in full contact against the flat surface of the drum sidewall so that magnets are flush against the drum without any gaps at the top or bottom of the magnets.

TO ENGAGE AND TRANSPORT CLOSED HEAD EMPTY STEEL DRUMS

1. With the attachment properly secured to the lift truck and the master disconnect switch in the "ON" position, press the Remote Control button "ON" to illuminate all (16) green lights which (8) are located on top of the battery cabinet lid, and (8) on the underside of the attachment. In the event that all (16) lights do not illuminate when the magnets are energized, continue to press the remote-control button "ON" until all (16) lights are illuminated. Do not attempt to grip empty drums unless all (16) green lights are illuminated.

REMOTE CONTROL

TO ENGAGE AND TRANSPORT CLOSED HEAD EMPTY STEEL DRUMS (CONT.)

2. When all (16) green lights are illuminated, the magnets are now energized to grip the drums. Level the forks on the lift truck. Center the attachment clamping mechanisms with center of drum(s). Drive the lift truck forward with the clamping mechanisms in a position to contact the empty drum(s). The upper clamping mechanisms should make contact against both the upper third of the drum, above the second rolled hoop or "W" hoop, and the lower clamping mechanisms should make contact below the second rolled hoop of the empty drum. The magnets will now engage the metal on the side on the empty drums. In situations where the trailer is not on the same plane as the warehouse floor it would be necessary for the lift truck operator to tilt the mast of lift truck forward or back to z.

3. Raise the lift truck forks slightly to elevate the drums and back away. When removing drums from trailers it is necessary to cross dock boards and ramps softly as shock from bouncing from trailer to warehouse areas can cause the empty drums to release from the magnets.

4. **To release the drums onto the floor, pallet, or conveyor the operator must <u>not</u> have the lift truck carriage tilted forward or back. Doing so will only increase the chance of abrasions to the drums' painted surface.** Lower the drums just enough to contact the floor, pallet or conveyor, then press the Remote-Control button "OFF" to disengage the drums.

   Do not back away until all (16) lights are no longer illuminated. Once released, the operator can back away from the released drums, then press the Remote-Control button "ON" again to energize the magnets before entering the trailer to grip additional empty drum(s).

Note: Drums with a third rolling hoop near the drums' chime, such as a 17H drum, will <u>not</u> work with this attachment. There is not enough space between the second rolled hoop and the drums lid for the magnets to engage the drum.

Note: All Remote Controls are provided with Hook & Loop tape attached to the back of the Remote-Control Holder. This enables the Remote Control to be attached in a convenient location in the lift truck for the operator without the need to be handheld.

CHARGING THE BATTERIES:

All EG4M8DC2-F empty drum attachments are equipped with a DC cabinet which houses two 12-volt AGM deep cycle batteries to provide the power supply for activating the magnets. The DC Cabinet also includes an internal charger, master disconnect switch, and a 'gauge-type' battery discharge indicator. The internal charger uses a standard 120-volt outlet. To charge the unit a polarized heavy gauge extension cord rated 12-3 15amp / 125 volt may be required but not provided.

CHARGING THE BATTERIES (CONT.):

To remove the attachment for charging:

1. Disconnect the safety chain securing the attachment to the lift truck, the remove the attachment from the lift truck. Turn off the disconnect switch on the side of the cabinet to the "OFF" position.

2. Open the cabinet lid, use a grounded medium heavy gauge extension cord and plug the power cord from the charger into the extension cord.

3. The charger will shut off when the batteries are fully charged. A battery discharge indicator located by the disconnect switch displays the state of charger for the batteries.

CHECKING MAGNET BOLT TIGHTNESS (WEEKLY):

All EG4M8DC2-F magnets have a bolt on the top and bottom, as seen here:

It is recommended to check for proper tightness of these two bolts WEEKLY to ensure they don't become too loose or fall out. For the magnets to work properly, it's imperative that these four bolts stay properly tightened.

Using a 5mm Allen Key ensure WEEKLY that these bolts are properly tightened. It's important NOT to overtighten the bolts. Ensure that the magnets still float freely within the outer housings after the bolts have been tightened. If they do not float freely, the bolts have been overtightened.

FAILURE TO TIGHTEN THESE BOLTS PROPERLY COULD ALLOW THE MAGNETS NOT TO FUNCTION CORRECTLY OR COMPLETELY FALL OUT OF THE OUTER HOUSINGS ALTOGETHER.

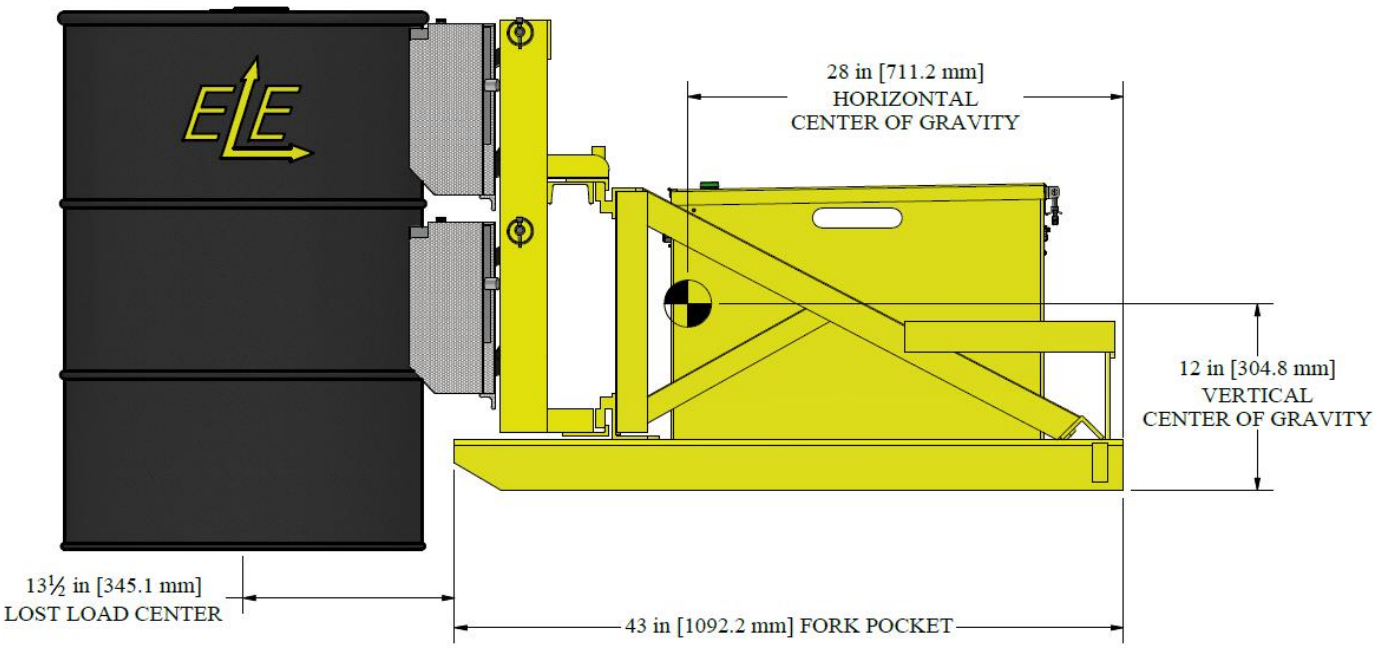
MODEL EG4M8DC2-F EMPTY DRUM HANDLING ATTACHMENT SPECIFICATIONS:

Model	Capacity (lbs./kg.)	Weight (lbs./kg.)	Height x Length x Width (inches)	(mm)	Drums Handled	Description
EG4M8DC2-F	200/90.7	700/317.5	31x48x36	787x1219x914	1 or 2	Empty Drum Attachment

LOST LOAD CENTER - The distance from the tip of the attachment's 43" fork pockets to the center of the drum(s): 13-1/2" (345.1 mm)

VERTICAL CENTER OF GRAVITY - The distance from the bottom of the attachment to the point on which the attachment balances: 12" (304.8 mm)

HORIZONTAL CENTER OF GRAVITY - The distance from the beginning of the 43" fork pockets to the point on which the attachment balances: 28" (711.2 mm)



FOR PARTS, SERVICE, OR TECHNICAL QUESTIONS CALL:
(800) 233-1800 or **(302) 737-7000, ext. 4**. Or email us at **sales@easylifteqpt.com**

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Operator's Daily Checklist

Eagle-Grip® Magnetic Empty Drum Handling Attachment (EG4M8DC2-F)

Inspections Performed by: _____

Note: This inspection must be made by the equipment operator **daily** at the start of the shift. Check (✓) the appropriate "OK" or "Needs Repair" field.
This Daily Checklist is intended to help verify that the equipment is in proper working order each day.
More thorough Weekly, Monthly and Yearly Maintenance schedules should still be followed.

	DATE:	/		/		/		/		/		/		/	
	VISUAL CHECK	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair
VISUAL CHECK: FRAME, MASTS & BATTERY BOX	**DATA PLATES & WARNING DECALS**- Data Plates & Warning Decals are affixed to the unit and in good condition														
	DAMAGE - Look for bent, dented or broken parts. This includes frame welds, bolted connections, battery box components, (16) LED indicator lights, and fork pockets														
	LEAKS - Check for any leaking battery acid from the battery Box														
	SAFETY CHAIN - Verify that all the components of the Safety Chain are free of damage or missing components														
	CARRIAGE MOUNTS - Verify that the Carriage Mounts are free of damage and properly secured on to the Attachment Frame														
	BATTERY COMPARTMENT - Verify that the gas struts on the battery compartment lid are intact and in proper working order														
VISUAL CHECK: MAGNETS	**MAGNET DAMAGE** - Ensure the magnet outer and inner housings, retaining pins, cotter pins, springs, LED lights and hardware are free of damage or missing components. Ensure the magnet assemblies "float freely" and articulate. This will help ensure solid contact when engaging empty drums														
	MAGNETIC SHOES - Check the magnet shoes for excessive wear														
	MAGNETIC HARDWARE - Verify the bolts located on the top and bottom of each magnet are fully tightened														
	MAGNETIC WIRING - Confirm that all magnetic wires are properly connected and show no signs of damage														

Checklist Continued on Next Page

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Operator's Daily Checklist (cont.)

Eagle-Grip® Magnetic Empty Drum Handling Attachment (EG4M8DC2-F)

	DATE:	/		/		/		/		/		/		/	
	OPERATIONAL CHECK	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair	OK	Needs Repair
OPERATIONAL CHECK: FRAME, MASTS & BATTERY BOX	**FORK POCKETS** - Verify that the forks of your lift truck fit accordingly into the fork pockets of your Eagle-Grip Attachment														
	SAFETY CHAIN - Confirm that the Safety Chain is properly connected to the carriage of your lift truck using either the Cam Lock or Snap Hook systems														
	POWER UP - Turn the Master Disconnect Switch to the 'ON' position and ensure that the Battery Discharge Indicator properly displays														
	REMOTE CONTROL - Verify that the Magnet Remote Control is in proper working order by pressing the 'ON' button of the remote control; this should cause all (16) LED indicator lights to turn ON. Then press the 'OFF' button of the remote control, this should cause all (16) LED indicator lights to turn OFF. (In the instance where the remote control doesn't work, see the Manual for 'Reprogramming Instructions')														
MAGNETIC CLAMPS	**MAGNETIC CLAMPING HEADS** - Verify that the Eagle-Grip Magnetic Clamping Heads engage and distengage empty steel drums properly. Only lift the empty drums to the minimum height required to ensure all the magnets are in proper working order.														

List the details of all required repairs in the comments section below. Then, **tag and decommission the equipment for safety.**

Comments (items needing repair or adjustment): _____

_____

_____

_____

_____

_____

Caution – If the equipment is found to be in need of repair or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the designated supervisor, and the attachment shall not be operated until it has been restored to a safe operating condition. If during operation, the attachment becomes unsafe in any way, the matter shall be reported immediately to the designated supervisor, and the attachment shall not be operated until it has been restored to safe operating condition. Do not make repairs or adjustments unless specifically authorized to do so.

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EAGLE-GRIP® MAGNETIC EMPTY DRUM HANDLING ATTACHMENT (EG4MDC2-F) MAINTENANCE SCHEDULES

Easy Lift Equipment recommends the following maintenance intervals.
Failure to do so could cause the equipment not to work as intended.

WEEKLY INTERVALS

EG4MDC2-F Magnet Hardware	Verify the bolts located on the top and bottom of each magnet are fully tightened.

MONTHY INTERVALS

EG4MDC2-F Safety Chain	Thoroughly verify that all the components of the Safety Chain are free of damage or missing components.
EG4MDC2-F Battery Compartment	Thoroughly inspect the Battery Compartment and ensure that the gas struts on the battery compartment lid are intact and in proper working order.
EG4MDC2-F Magnet Components	Ensure the magnet outer and inner housings, retaining pins, cotter pins, springs, LED lights and hardware are free of damage or missing components. Ensure the magnet assemblies "float freely" and articulate. This will help ensure solid contact when engaging empty drums. **Again, verify the bolts located on the top and bottom of each magnet are fully tightened.**
EG4MDC2-F Magnet Shoes and excessive wear	Check the magnet shoes for excessive wear.

SIX-MONTH INTERVALS

EG4MDC2-F Battery Components	Check battery discharge indicator to ensure it is functioning properly. Verify that the batteries are holding a proper charge.
EG4MDC2-F Charger Components	Check that battery cables and battery hold-downs are tight. Verify that the wiring on all LED lights are intact and properly connected.

YEARLY INTERVALS

EG4MDC2-F Frame & DC Box Cracked Inspection	Elevate the attachment and thoroughly inspect the equipment, including underneath the frame, fork pockets, and DC Box, for cracked welds or structural damage.

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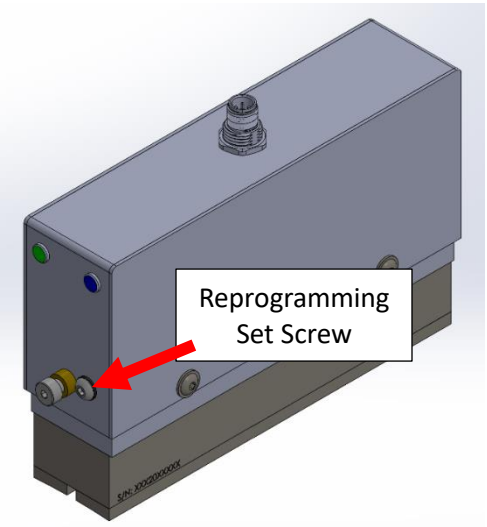
REMOTE CONTROL REPROGRAMMING INSTRUCTIONS ("GEN 1" STYLE)

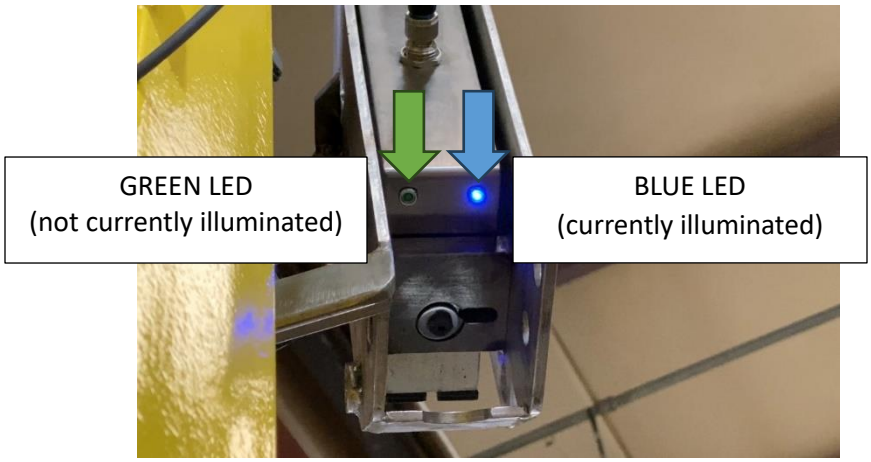
EG4MDC2-F Attachments sold before December 2023 included "GEN 1" magnets (below, left). "GEN 1" magnets are reprogrammed via the "Reprogramming Set Screw".

All EG4MDC2-F Attachments are provided with four Remote Controls (below, right).

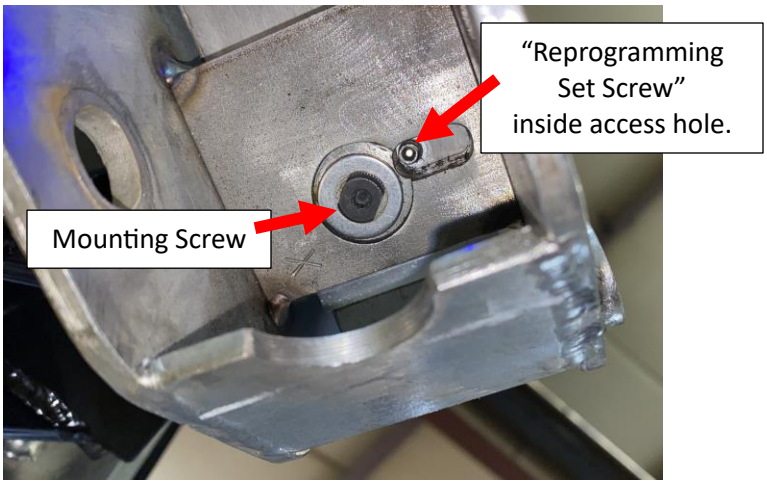


To Begin: With the attachment attached to the lift truck, elevate the attachment so the bottom of the magnets are at or above eye level. This makes the programming process more ergonomic for the operator, rather than attempting to access the bottom of the magnets from floor level.

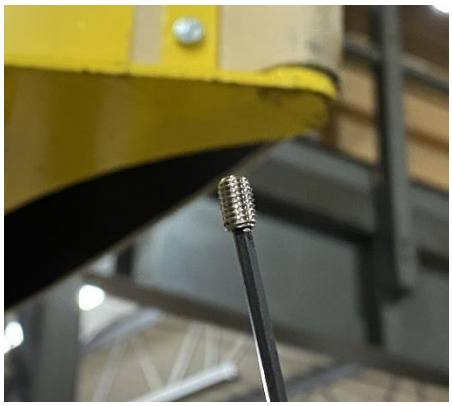
To Access the wireless teaching button: On the bottom side of every magnet there are two small LED lights, one green and one blue. These small lights are helpful when reprogramming the remote controls.



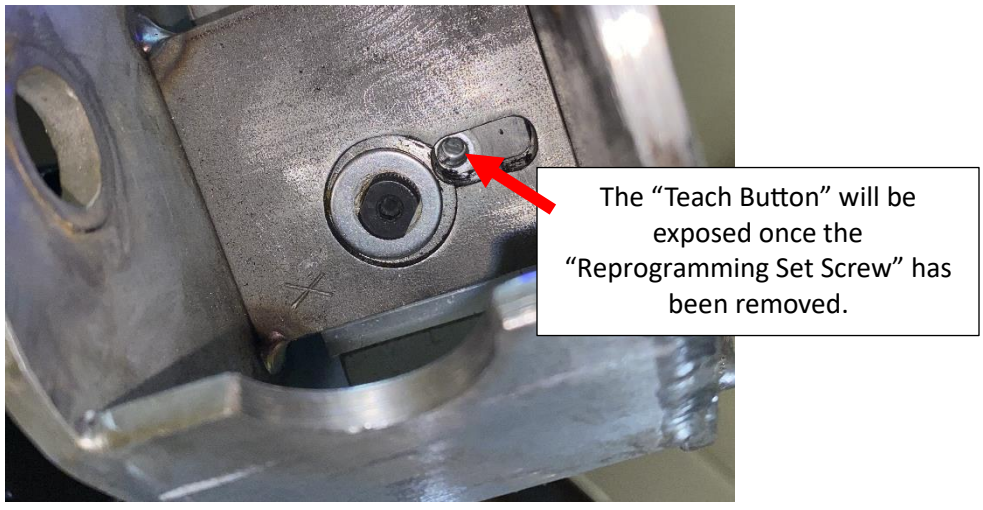
On the bottom of each magnet is a mounting screw (left) as well a 3mm “Reprogramming Set Screw” (right) within an access hole.



Use a 3mm Allen key to unthread and remove the “Reprogramming Set Screw” on the bottom of each magnet.



To Pair a Remote with a Magnet: With the “Reprogramming Set Screw” removed, inset the 3mm Allen key into the hole where the set screw was removed until it touches the **teach button** inside the hole. Hold the button in for 2 seconds to put the receiver in **pairing mode**.



Within a few seconds of releasing the teach button, press the “ON” button of the Remote Control**. You must be within close proximity of the magnet while pairing.** Then wait a few seconds for the Remote Control and magnet receiver to pair.

Once the magnet has properly paired, the green LED will illuminate.

Next, test the pairing by pushing the Remote Control “ON” and “OFF” buttons again. The green light on the magnet, the battery cabinet lid and underside of the attachment will illuminate green when the magnets are charged. And, the green LEDs will turn off, when the magnets are not charged.

Repeat this procedure until all four magnets have been paired with the same Remote Control.

Test the system by turning on and off all four magnets/green lights consistently.

If all four lights (on the magnet, the battery cabinet lid and underside of the attachment) do not illuminate, continue to press the key fob button “ON” until all four lights are illuminated. If one or more magnets do not pair, repeat the pairing process with the magnet having the problem until all four magnets/green lights consistently turn on and off.

You will have to repeat this process for every individual remote control.

Re-closing the Magnet: When all programming is complete, insert “Reprogramming Set Screw” back into the bottom screw hole of each of the magnets that have been reprogrammed, and tighten the set screws until they’re snug.

NOTE: All Eagle-Grip® Attachments conform to OSHA standards. A metal plate, affixed to each attachment, provides model number, serial number, rated capacity and attachment weight. OSHA requires contacting the lift truck manufacturer for written approval of any attachment to be used on a lift truck.

Contact Easy Lift Equipment if your Easy Lift Attachment is missing the metal specification plate.

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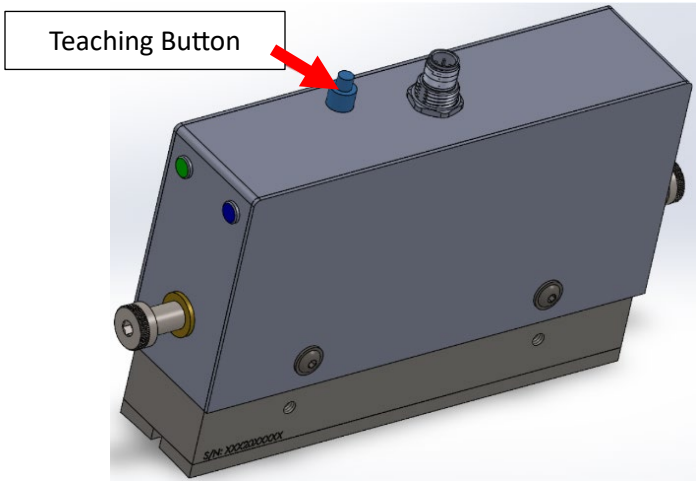
REMOTE CONTROL REPROGRAMMING INSTRUCTIONS ("GEN 2" STYLE)

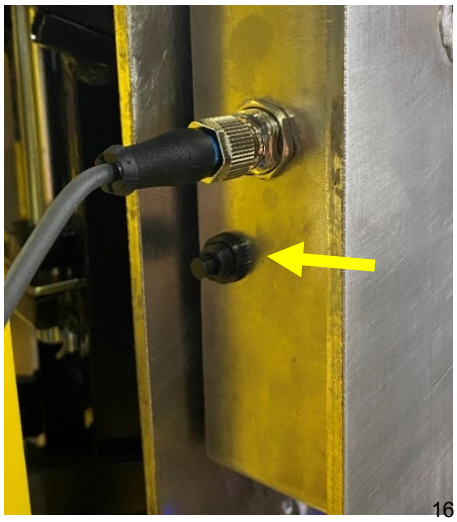
Beginning in December 2023 EG4MDC2-F & EG4M8DC2-F Attachments Include "GEN 2" magnets (below, left). "GEN 2" magnets are reprogrammed via the "Teaching Button" on the back side of the magnet.

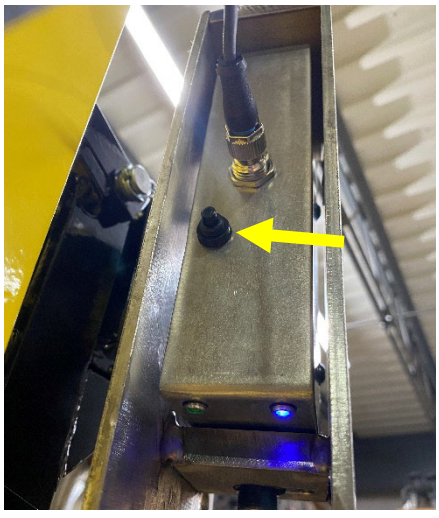
All EG4MDC2-F & EG4M8DC2-F Attachments are provided with four Remote Controls (below, right).



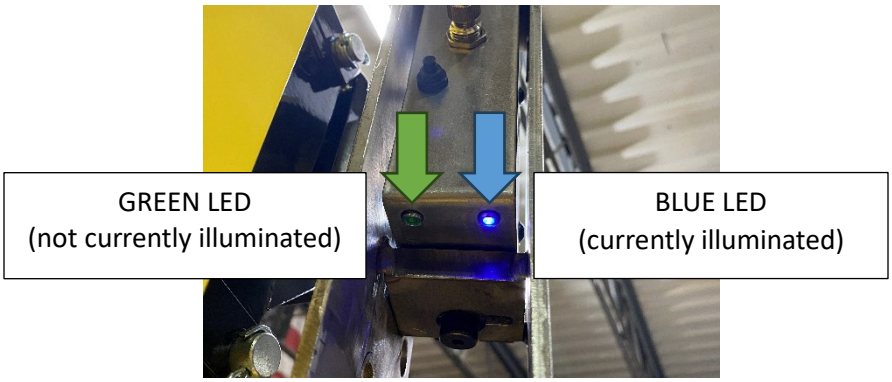
To Begin: With the attachment attached to the lift truck, elevate the attachment so the back side of the of magnets are at eye level. This makes the programming process more ergonomic for the operator.

To Pair a Remote with a Magnet: The "Teaching Button" is located on the back side of each magnet, as seen below:

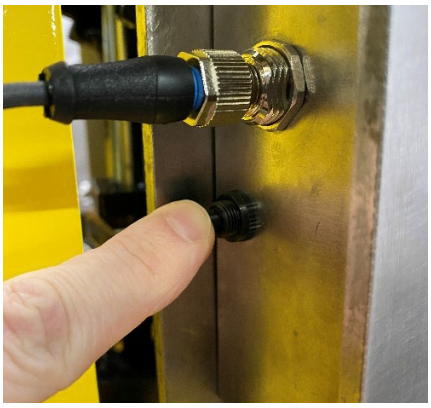




On the bottom side of every magnet there are two small LED lights, one green and one blue. These small lights are helpful when reprogramming the remote controls

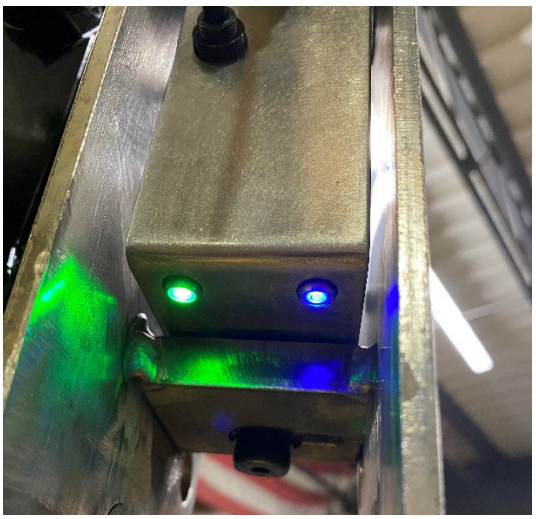


Hold the Teach Button in for 2 seconds to put the receiver in **pairing mode**.



Within a few seconds of releasing the Teach Button, press the "ON" button of the Remote Control**. You must be within close proximity of the magnet while pairing.** Then wait a few seconds for the Remote Control and magnet receiver to pair.

Once the magnet has properly paired, the green LED will illuminate.



Next, test the pairing by pushing the Remote Control “ON” and “OFF” buttons again. The green light on the magnet, the battery cabinet lid and underside of the attachment will illuminate green when the magnets are charged. And, the green LEDs will turn off, when the magnets are not charged. You should also be able to audibly hear the magnets engaging and disengaging as you press the “ON” and “OFF” buttons of the remote control.

Repeat this procedure until all magnets (4 magnets for EG4MDC2-F models, and 8 magnets for EG4M8DC2-F models) have been paired with the same Remote Control.

Test the system by turning on and off all magnets/green lights (4 magnets & 8 LED lights for EG4MDC2-F models, and 8 magnets & 16 LED lights for EG4M8DC2-F models) consistently.

If all LED lights (on the magnet, the battery cabinet lid and underside of the attachment) do not illuminate, continue to press the remote-control button “ON” until all LED lights are illuminated. If one or more magnets do not pair, repeat the pairing process with the magnet having the problem until all magnets/green lights consistently turn on and off.

You will have to repeat this process for every individual remote control.

To Reset a Magnet and Remote: Press and hold the Teach Button on the back side of each magnet for at least 5 seconds. When the Teach Button is released, the magnet will then forget all paired remotes. Repeat the steps above to re-pair the magnets and remotes.

NOTE: All Eagle-Grip® Attachments conform to OSHA standards. A metal plate, affixed to each attachment, provides model number, serial number, rated capacity and attachment weight. OSHA requires contacting the lift truck manufacturer for written approval of any attachment to be used on a lift truck.
Contact Easy Lift Equipment if your Easy Lift Attachment is missing the metal specification plate.

Easy Lift Equipment Co., Inc.
2 Mill Park Court, Newark, Delaware 19713 - Phone: 800-233-1800 / 302-737-7000

EASY LIFT EQUIPMENT WARRANTY POLICY
FOR MODELS WITH PREFIXES: ED/ER/EL/ELDR/EG & RCR

Easy Lift Equipment ("ELE") warrants each new product to be free from factory material and workmanship defects, under normal use with proper maintenance, for a period of 12 months. Warranty coverage for this warranty period is provided by authorized dealers and includes parts. Labor is covered for the same periods of 12 months as outlined above. Please call ELE for the authorized repair dealer in your area.

ELE shall be the sole judge of the validity of any claim or defect and may elect to make any replacement or repair of any part thereof that it has agreed to be defective. Wearable Items such as: hoses, bearings, belts, brushes, seals, lift motors, clamp motors, relays, fuses, springs and wheels are wear items not covered under the warranty policy. ELE assumes no responsibility whatsoever to work done, parts replaced, or expenses incurred not specifically authorized by ELE. Normal maintenance or replacement of service items is not covered by this warranty. No warranty claims will be considered for customers with any delinquent outstanding balance. When batteries, battery chargers, scale printers or scale indicators are purchased from ELE with the equipment, the original manufacturer's warranty applies.

WARRANTY LIMITATION/DISCLAIMERS:

Easy Lift Equipment reserves the right to void warranty coverage if the unit has been overloaded beyond rated capacity; damaged due to: abuse, misuse, neglect, accidents, freight damage, improper usage, improper repair, and/or improper storage; or any modification or repair conducted in a manner not approved by Easy Lift Equipment. Equipment used in freezers, abrasive, corrosive, and/or excessively moist conditions must be properly equipped for the environment to ensure the warranty is not voided. Warranty questions and claims should be directed to our customer service department. ELE customer service representatives will help you assess and resolve the claim or assist you in contacting the local authorized dealer or representative. The warranty described here shall constitute the sole remedy of the authorized dealer and/or the initial purchaser. ELE neither assumes nor authorizes any person to assume for it any other obligation or responsibility in connection with this product warranty. In no event shall ELE be responsible for direct, indirect, special or consequential damages or any other delay or any economic or commercial loss resulting from Easy Lift Equipment's performance or non-performance under this warranty. This warranty is expressly in lieu of all warranties, obligations or responsibilities of ELE dealers or other authorized source, expressed, implied or statutory.

SUBMITTING CLAIMS:

To make a claim under this policy, please contact Easy Lift Equipment for assistance. We can be reached by calling 800-233-1800 ext. 4 for customer service or by writing to sales@easyliftequipment.com. Do not return defective parts unless a return authorization (RA) has been provided requesting the return. If requested, we will provide shipping information on how the part should be returned and bear the expense for the return shipping, if the part is proven to be defective. A copy of the work order made at the time of the repair and parts claimed under warranty may be requested for ELE's inspection.

ORDERING PARTS:

Easy Lift Equipment's parts are distributed through our customer service department and ship the same day as ordered whenever possible. You will be well taken care of whenever parts, adjustments or repairs are needed. **When contacting ELE, please be sure to state the model and serial number for the equipment.** There is no cost for electronic copies of replacement manuals, parts lists and other general information containing part numbers and nomenclature. Most manuals contain parts pricing, but it is not guaranteed to be valid as parts pricing can change at any time without notice. Any customer service representative can provide timely parts quotations upon request. Adherence to above procedure will save time and provide prompt assistance when it counts. You are of course always welcome to bring to us any questions, comments or recommendations pertaining to your Easy Lift Equipment products.

MANUFACTURER CONTACT INFORMATION:

Easy Lift Equipment Co., Inc.
2 Mill Park Ct.
Newark, DE 19713
Email: sales@easyliftequipment.com

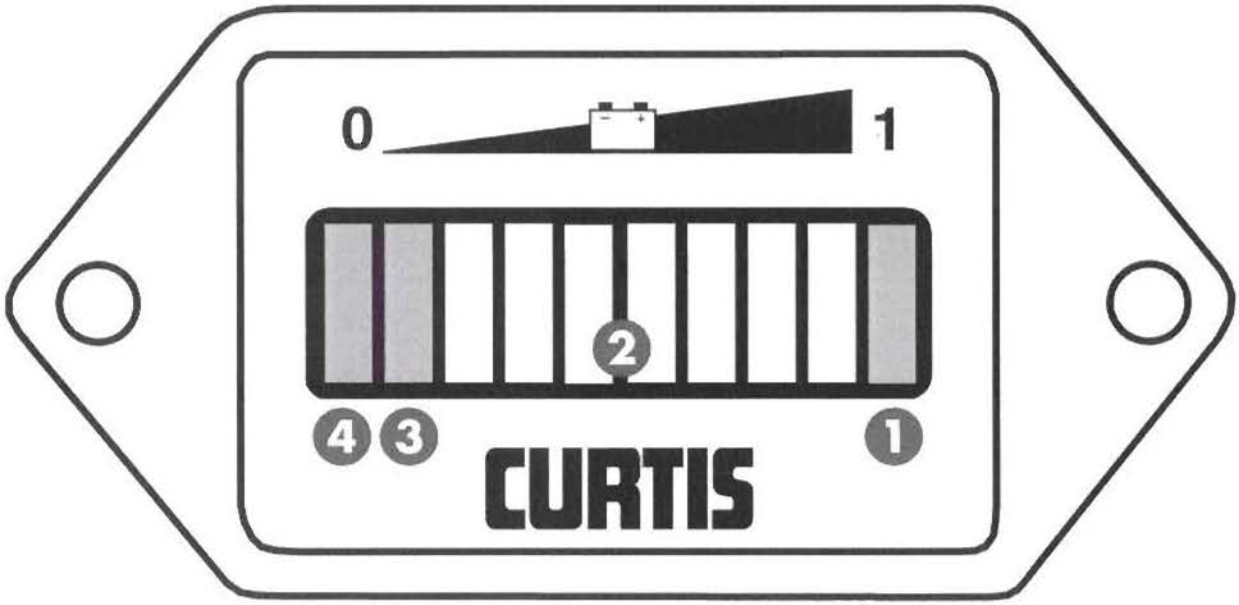
Phone: 800-233-1800: 302-737-7000
Fax: 302-737-7333
Website: www.easyliftequipment.com

Updated: 7/26/18

OPERATION

Display

1. Only when the battery is properly charged is the right-most LED lit.
2. As the battery's state-of-charge decreases, successive LEDs light up, only one on at a time.
3. The 2nd-from-left LED flashes, indicating "energy reserve" (70% depth of discharge).
4. The 2 left-most LEDs alternately flash, indicating "empty" (80% depth of discharge).



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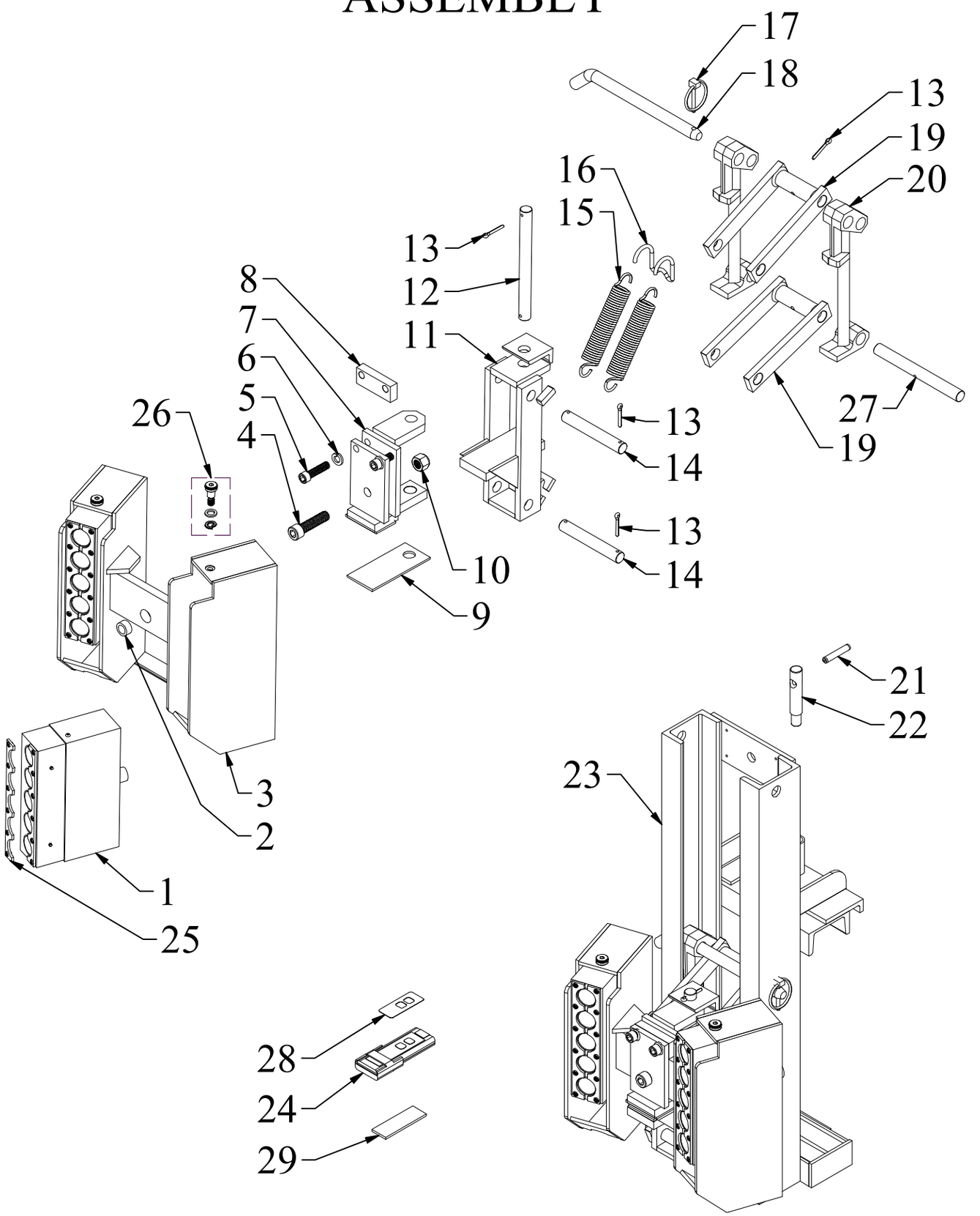
EAGLE-GRIP EMPTY DRUM HANDLING CLAMPING MECHANISM (EG4M8DC2-F STARTING 2026) ASSEMBLY



EAGLE-GRIP® EMPTY DRUM HANDLING
CLAMPING MECHANISM (EG4M8DC2-F STARTING 2026)
PARTS LIST

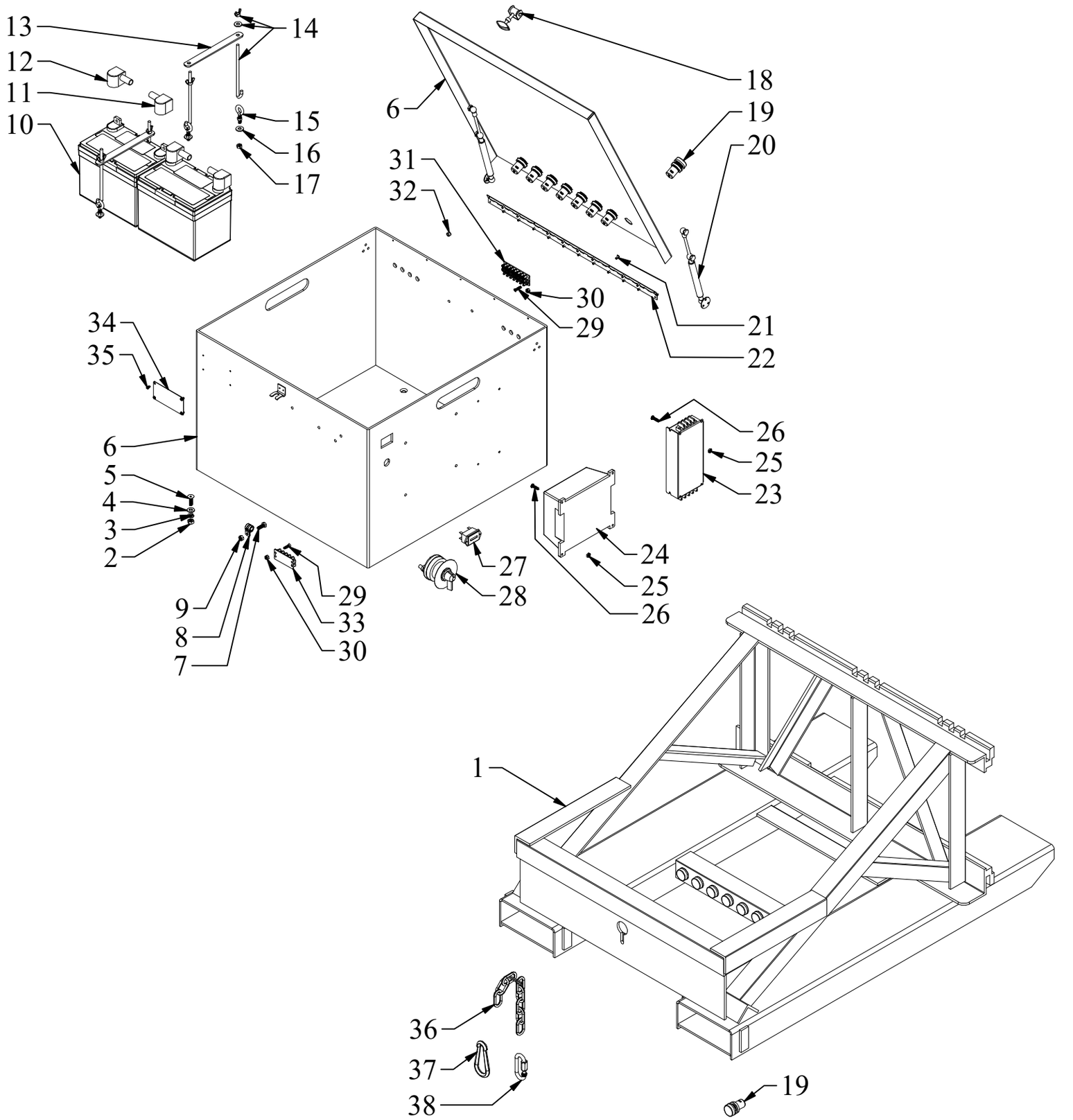
ITEM	PART NO.	DESCRIPTION	QTY
1	81401335	ELAY30x5 Magnet	8
2	10001	Bushing, Housing Yolk Trunion (zinc)	4
3	3536202	Outer Housing (Stainless Steel - EG4 Magnet)	4
4	1/2-13 x 2 SHCS	1/2-13 x 2 Socket Head Cap Screw (zinc)	4
5	3/8-16 x 1 1/2 SHCS	3/8-16 x 1 1/2 Socket Head Cap Screw Alloy Plated	8
6	3/8 LW	3/8 Lock Washer (zinc)	8
7	9202	Universal Body (Black Powder Coating)	4
8	3530529	1/2" x 1" x 2-1/2" Magnet Body Spacer	4
9	16009-1	Wear Plate, Universal Carrier	4
10	1/2-13 NLN	1/2-13 Nylon Locking Nut (zinc)	4
11	7202	Universal Carrier (Black Powder Coating)	4
12	15106-1	Pin, Universal Body to Carrier (zinc)	4
13	6006-CP	Cotter Pin, 5/32" x 1" (zinc)	32
14	17006-1	Pin, Clevis to Housing (HP10-370-E)	8
15	4206	Spring, Clevis (zinc)	8
16	8996	Clevis Spring Hook (Stainless Steel)	4
17	HANG-2	3/16 x 1-3/4 Circle Cotter "Hang 2" (7016)	4
18	19106-1	Adjustment Pin (zinc)	4
19	3202	EG3 & EG4 Upper Clevis (With 3202P Pin) - 6-1/8" Length	8
20	1700-7	Adjustment Slide (Black Powder Coating)	8
21	70063	Spring Roll Pins 1/4 X 1-3/4 (zinc) (xref 70643)	2
22	36006-1	Pin, Lock to Carriage	2
23	4902-3NC	Magnet Carriage Mount - 3 hole (No Cradle)	2
24	88001245	Magnet Remote Control Kit	4
25	88001101	Pole Shoe Kit, Easy Lift 30x5	8
26	3530587	Magnet Mounting Hardware Kit, ELAY30x5 (2026)	8
27	3202P	Clevis Replacement Pin with Cotter Pin	8
28	ADART054	Magnet Remote Decal	1
29	S-15759-3	Hook & Loop Tape 3"	1
	FULL ASSEMBLY		
30	* 6004MAG	EG4 Double Clamping Mechanism (Stainless Steel - EG4 Magnet)	4

* EG4 Magnetic Head Assembly Only

HARDWARE KIT COMPONENTS (Contents per each Kit)

24	88001245	Magnet Remote Control Kit	1
	270395	Remote Control, RF 433Mhz, 2 Button	1
	270398	Battery, Alkaline 23A 12V	1
	S-15759-3	Hook & Loop Tape 3"	1
25	88001101	Pole Shoe Kit, Easy Lift 30x5	1
	3202533	Solid Pole Shoe, Easy Lift 30x5	2
	180752	SHCS, M4x6	12
26	3530587	Magnet Mounting Hardware Kit, ELAY30x5 (2026)	1
	M10 x 16MM with M8-1.25 SSS	M10 x 16MM with M8-1.25 Threaded Socket Shoulder Bolt (alloy)	2
	M10 LW-SS	M10 Lock Washer (stainless steel)	2
	98689A117	Thin M10 18-8 SST Washer, 10.50 ID x 18MM OD	3

EAGLE-GRIP EMPTY DRUM HANDLING ATTACHMENT DC BOX (EG4M8DC2-F STARTING 2026) ASSEMBLY



EAGLE-GRIP® EMPTY DRUM HANDLING ATTACHMENT DC BOX (EG4M8DC2-F STARTING 2026) PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	3530549	Magnetic Drum Handling Frame (2026 Update with 8 Magnets)	1
2	5/16-18 HN	5/16-18 Finished Hex Nut (zinc)	4
3	5/16 LW	5/16 Lock Washer (zinc)	4
4	5/16 FW	5/16 Flat Washer (zinc)	4
5	5/16-18 x 1 FSHCS-SS	5/16-18 x 1 Flat Socket Head Cap Screw (stainless steel)	4
6	3530548	DC Cabinet & Lid for Magnetic Drum Handling Attachment (Starting 2026)	1
7	1/4-20 x 1/2 HHCS-SS	1/4-20 x 1/2 Hex Head Cap Screw (stainless steel)	2
8	8863T14	Loop Clamp with Vinyl Coated 1/2" OD, 1-7/16" Long	2
9	1/4-20 NLN	1/4-20 Nylon Locking Nut (zinc)	3
10	DCM0035L	12v DC 35Ah Deep Cycle Battery (List Price $ 140.00, Limited time promo price)	2
11	DEK06119	Right Elbow Boot 4-8 GA Red	2
12	DEK06120	Left Elbow Boot 4-8 GA Black	2
13	3530573	Magnetic Drum Handling Attch. Battery Hold-Down Bracket (Starting 2026)	2
14	IM1420-8-HH	Adjustable Battery Hold Down (Set of 2), 8" length, 18-8 (304) SS J bolts	2
15	22065	1/4-20 x 2 Threaded Eye Bolt (zinc)	4
16	1/4 FW-SS	1/4 Flat Washer (stainless steel)	4
17	1/4-20 HN	1/4-20 Finished Hex Nut (zinc)	4
18	WJ202	Hood Latch (730-1750)	1
19	A18033000UX0419	Green Indicator Light AC/DC 24V, 22mm Panel Mount	16
20	FT0831-50N	50N Hydraulic Gas Strut Lift Support Door Cabinet Hinge	2
21	97447A025	Aluminum Blind Rivet 1/8" for material .188-.25"	10
22	CS24010628H	Cabinet Hinge	1
23	RSD-200B-24	DC /DC Converter 1 Output 24V 8.4 A	1
24	IS2	12 amp 2 bank 110/220/50-60/1ph CE Charger	1
25	10-24 HN-SS	10-24 Finished Hex Nut 18/8 (stainless steel)	8
26	10-24 x 1 PMS-SS	10-24 x 1 Phillips Machine Screw (stainless steel)	8
27	T101772	24 Volt Battery Discharge Indicator (906T24JWDGN)	1
28	PA16529	Master Disconnect Switch	1
29	8-32 x 3/4 PTHS	8-32 x 3/4 Phillips Truss Head Screw (zinc)	4
30	8-32 NLN	8-32 Nylon Locking Nut (zinc)	4
31	7527K66	Terminal Block (Strip) 7/16", 6 circuits	1
32	ZZHEY3208	Cable Fitting	8
33	7527K64	Terminal Block (Strip) 7/16", 4 circuits	1
34	MCL007031	Specification Plate	1
35	6 x 1/4 RUDS-SS	6 x 1/4 Round Head U Drive Screw (stainless steel)	4
36	12E312-0003	36" 5/16" Chain Zinc Plated Proof Coil Chain	1
37	SNAP2450-375NE	3/8" Snap Hook	1
38	QL312/DP	5/16" Quick Link (Zinc Plated)	1

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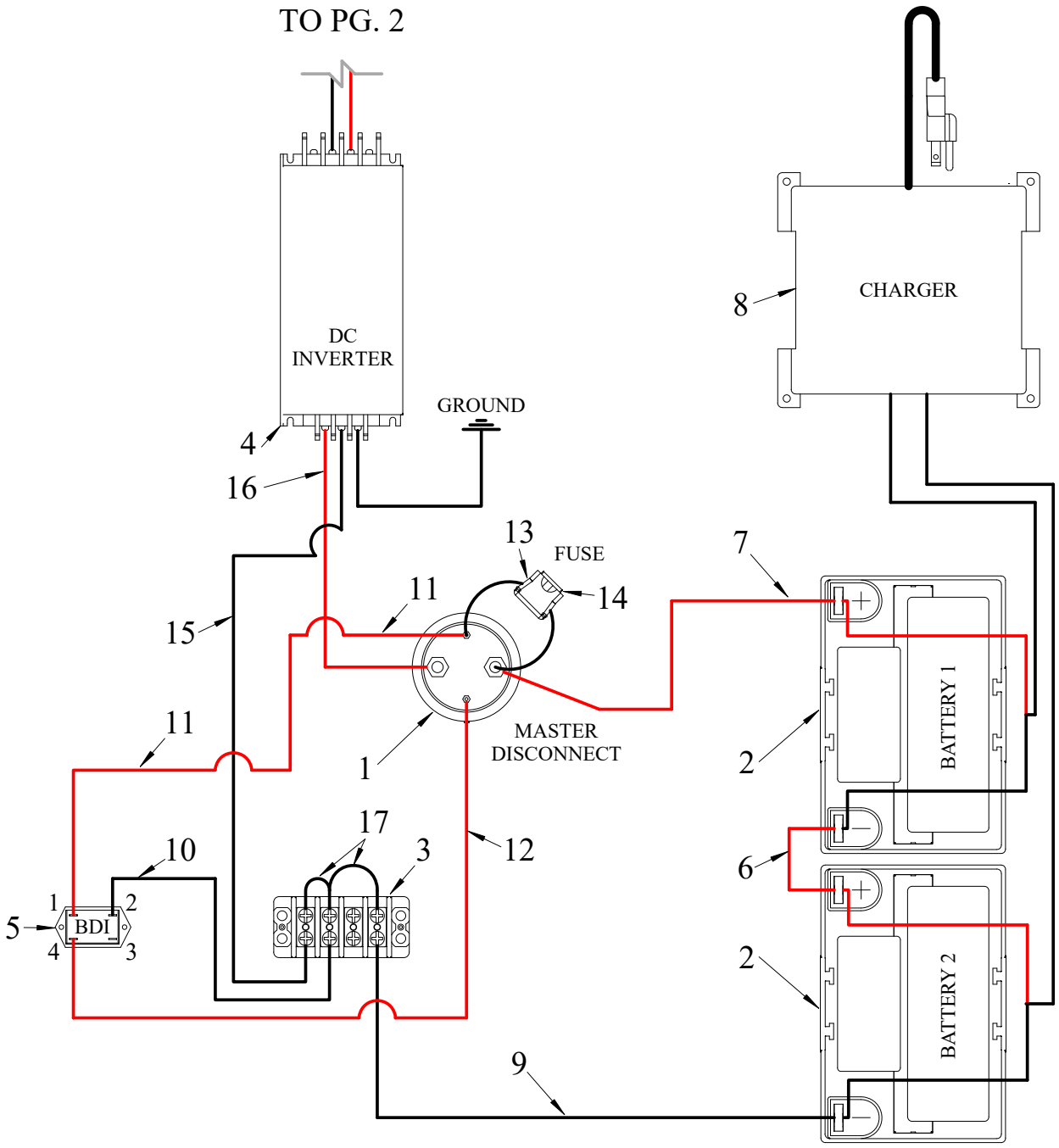
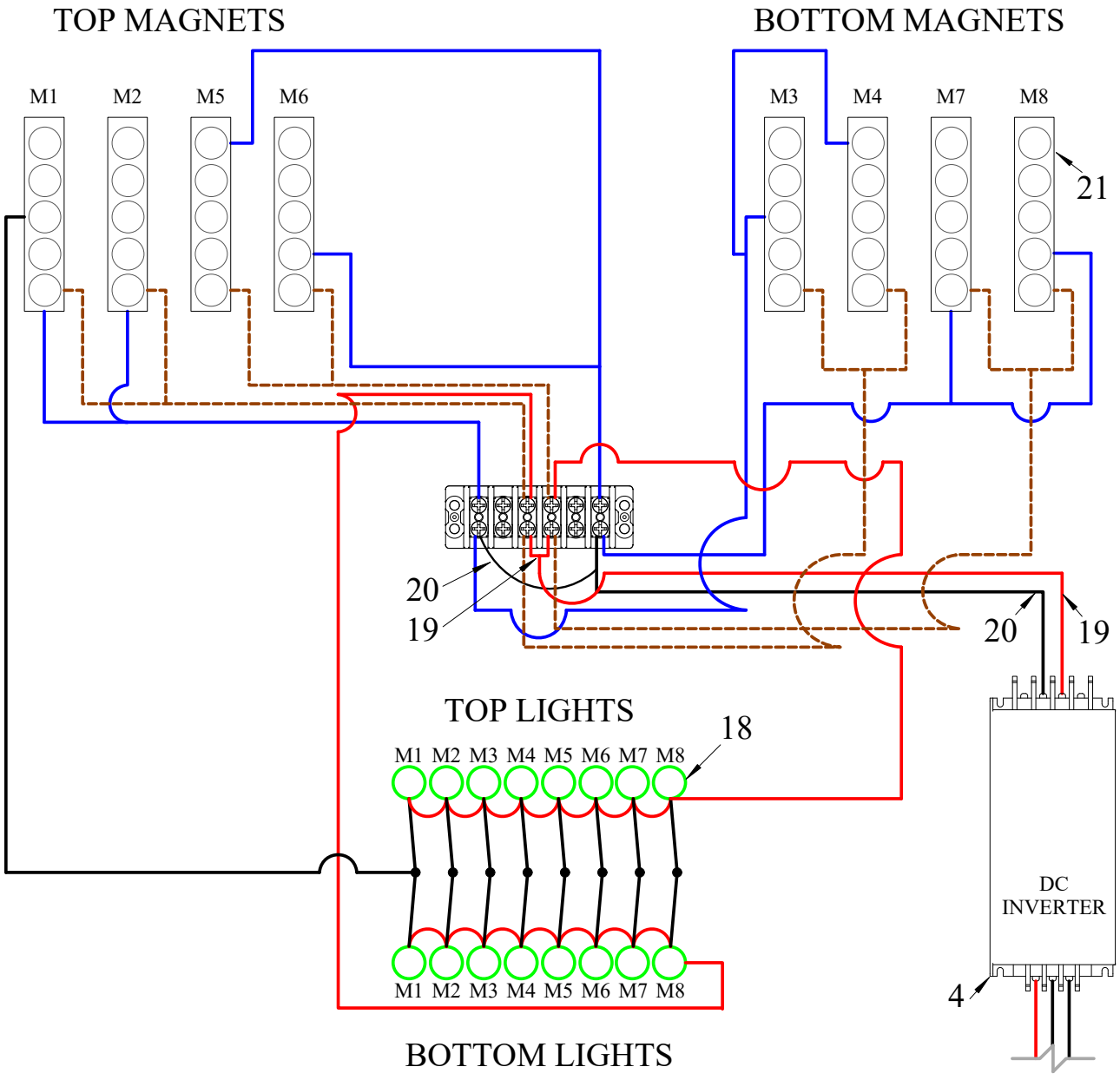
EAGLE GRIP EMPTY DRUM HANDLING ATTACHMENT WIRING ASSEMBLY (EG4M8DC2-F STARTING 2026) 1 OF 2



EAGLE GRIP EMPTY DRUM HANDLING ATTACHMENT WIRING ASSEMBLY (EG4M8DC2-F STARTING 2026) 2 OF 2



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EAGLE-GRIP® EMPTY DRUM HANDLING ATTACHMENT WIRING (EG4M8DC2-F STARTING 2026) PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	PA16529	Master Disconnect Switch	1
2	DCM0035L	12v DC 35Ah Deep Cycle Battery (List Price $ 140.00, Limited time promo price)	2
3	7527K64	Terminal Block (Strip) 7/16", 4 circuits	2
4	RSD-200B-24	DC /DC Converter 1 Output 24V 8.4 A	1
5	T101772	24 Volt Battery Discharge Indicator (906T24JWDGN)	1
6	113766-67-67-16	RED Battery Cable 16" - 4ga with (2) 5/16" Ring Terminal Ends	1
7	113766-67-68-10	RED Battery Cable 10" - 4ga (1) 5/16" and (1) 3/8" Ring Terminal Ends	1
8	IS2	12 amp 2 bank 110/220/50-60/1ph CE Charger	1
9	80097UZ-84-06-20	20" Black wire with (1) PA85884 & (1) PA80206 ends	2
10	80097UZ-29-06-8	8" Black Wire with PA80029 & PA80206 ends	1
11	80094UZ-06-29-4	4" Signal Wire with (1) .250 & (1) #10 end	1
12	80094UZ-06-29-8	8" Signal Wire with (1) .250 & (1) #10 end	1
13	210954-94-06	In Line Fuse Holder with (1) #3/8 and (1) #10 ends	1
14	PA82693	Auto Fuse, ATC Type, Red, 10A	1
15	80097UZ-06-06-24	24" Black Wire with (2) PA80206 ends	1
16	80094UZ-06-84-20	20" Signal Wire with (1) #10 & (1) #5/16 ends	1
17	80097UZ-1.5x2-06-06-14	(2) Lengths of Black Wire with (1) #10 Yel, & (2) #10 Blu Ends (2026)	1
18	A18033000UX0419	Green Indicator Light AC/DC 24V, 22mm Panel Mount	16
19	80094UZ-06-06-14-24-3	24" & 3" Red Wires with (2) PA80206 & (1) PA80214 ends	1
20	80097UZ-06-06-14-20-4	20" & 4" Black Wires with (2) PA80206 & (1) PA80214 ends	1
21	81401335	ELAY30x5 Magnet	8

200W Railway Single Output DC-DC Converter RSD-200 series

■ Features :

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- 2:1 wide input range
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity
- 4000VDC I/O isolation
- Cooling by free air convection
- Half encapsulated
- Built-in constant current limiting circuit
- 1U low profile 40mm
- All using 105℃ long life electrolytic capacitors
- LED indicator for power on
- 100% full load burn-in test
- 3 years warranty

User's Manual

UL62368-1 AS/NZS62368-1 TPTC004 IEC62368-1

SPECIFICATION

MODEL			RSD-200B-12	RSD-200B-24	RSD-200B-48	RSD-200C-12	RSD-200C-24	RSD-200C-48	RSD-200D-12	RSD-200D-24	RSD-200D-48
OUTPUT	DC VOLTAGE		12V	24V	48V	12V	24V	48V	12V	24V	48V
	RATED CURRENT		16.7A	8.4A	4.2A	16.7A	8.4A	4.2A	16.7A	8.4A	4.2A
	CURRENT RANGE		0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A	0 ~ 16.7A	0 ~ 8.4A	0 ~ 4.2A
	RATED POWER		200.4W	201.6W	201.6W	200.4W	201.6W	201.6W	200.4W	201.6W	201.6W
	RIPPLE & NOISE (max.) Note.2		120mVp-p	150mVp-p	180mVp-p	120mVp-p	150mVp-p	180mVp-p	120mVp-p	150mVp-p	180mVp-p
	VOLTAGE TOLERANCE Note.3		±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION		±0.2%	±0.2%	±0.5%	±0.2%	±0.2%	±0.5%	±0.2%	±0.2%	±0.5%
	LOAD REGULATION		±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME		800ms, 50ms at full load								
	HOLD UP TIME (Typ.)		Please refer to page 3 Hold up Time(Load de-rating curve)								
INPUT	VOLTAGE RANGE	CONTINUOUS	16.8 ~ 31.2VDC			33.6 ~ 62.4VDC			67.2 ~ 143VDC		
		1 SEC.	14.4 ~ 33.6VDC			28.8 ~ 67.2VDC			57.6 ~ 154VDC		
	EFFICIENCY (Typ.)		89%	89%	89%	91%	91%	91%	91%	91%	91%
	DC CURRENT (Typ.)		9.6A/24V	9.6A/24V	9.6A/24V	4.8A/48V	4.8A/48V	4.8A/48V	2.1A/110V	2.1A/110V	2.1A/110V
	INRUSH CURRENT (Typ.)		45A/24VDC			45A/48VDC			45A/110VDC		
	INTERRUPTION OF VOLTAGE SUPPLY		EN50155:2007-B/C- type comply with S1 level @ full load, comply with S2 level @ 70% load ; D-type comply with S2 level @ full load								
			EN50155:2017-Comply with S1 level								
PROTECTION	OVERLOAD		105 ~ 135% rated output power								
			Protection type : Constant current limiting, recovers automatically after fault condition is removed								
	OVER VOLTAGE		13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V	13.8 ~ 16.2V	27.6 ~ 32.4V	55.2 ~ 64.8V
			Protection type : Shut down o/p voltage, re-power on to recover								
	OVER TEMPERATURE		Shut down o/p voltage, recovers automatically after temperature goes down								
ENVIRONMENT	WORKING TEMP.		-40 ~ +55℃ (no derating) ; +70℃ @ 60% load by free air convection ; +70℃ no derating with external base plate, TX class compliance								
	WORKING HUMIDITY		5 ~ 95% RH non-condensing								
	STORAGE TEMP.		-40 ~ +85℃								
	TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 50℃)								
	VIBRATION		10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes ; Mounting : compliance to IEC61373								
	OPERATING ALTITUDE		5000 meters								
SAFETY & EMC (Note 4)	SAFETY STANDARDS		UL 62368-1, IEC 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved, Design refer to BS EN/EN62368-1								
	WITHSTAND VOLTAGE		I/P-O/P:4KVDC I/P-FG:2.5KVDC O/P-FG:2.5KVDC								
	ISOLATION RESISTANCE		I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH								
	EMC EMISSION		Compliance to BS EN/EN55032 (CISPR32) Conduction Emission: Class A, Radiation Emission: Class B, EAC TP TC 020								
	EMC IMMUNITY		Compliance to BS EN/EN61000-4-2,3,4,5,6,8, light industry level, criteria A, EAC TP TC 020								
	RAILWAY STANDARD		BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC ;BS EN/EN45545-2 for fire protection								
OTHERS	MTBF		218.2K hrs min. MIL-HDBK-217F (25℃)								
	DIMENSION		191*86*40mm (L*W*H)								
	PACKING		0.94Kg; 12pcs/12.3Kg/0.73CUFT								

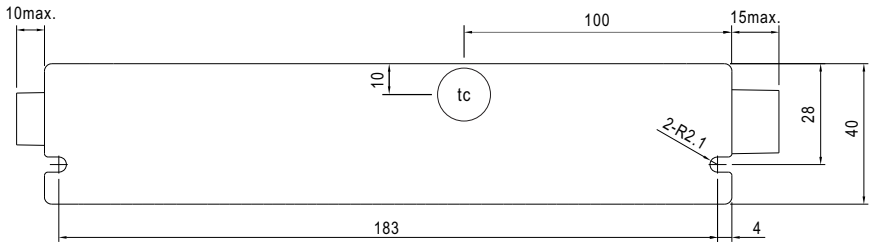
NOTE

1. All parameters NOT specially mentioned are measured at 24,48,110VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com)
5. Strongly recommended that external output capacitance should not exceed 5000uF. (Only for: RSD-200-12)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

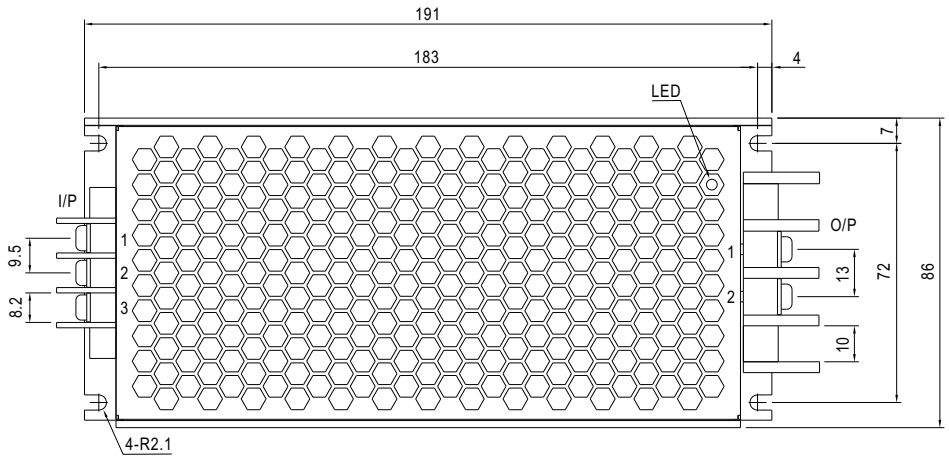
※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

■ Mechanical Specification

Case No.203A Unit:mm



• ⓣc : Max. Case Temperature



Input Terminal Pin No. Assignment :

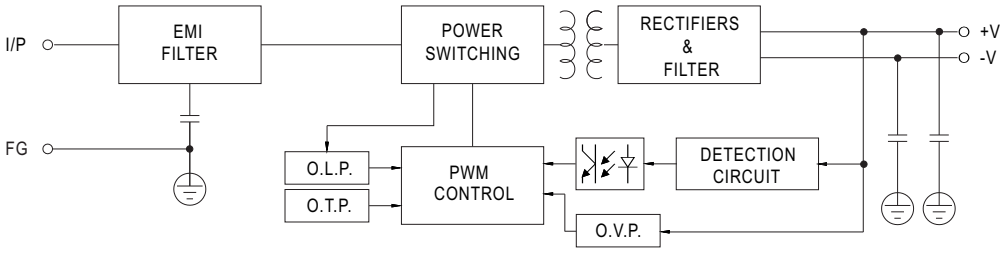
Pin No.	Assignment
1	DC INPUT V+
2	DC INPUT V-
3	FG ⏚

Output Terminal Pin No. Assignment :

Pin No.	Assignment
1	DC OUTPUT -V
2	DC OUTPUT +V

■ Block Diagram

fosc : 130KHz



■ Input Fuse

There are one or two fuses connected in series to the positive input line, which are used to protect against abnormal surge. Fuse specifications of each model are shown as below.

Type	Fuse Type	Reference and Rating
B	Time-Lag	2*Conquer UDA-A, 10A, 250V
C	Time-Lag	Conquer UDA-A, 10A, 250V
D	Time-Lag	Conquer UDA-A, 5A, 250V

Input Reverse Polarity Protection

There is a MOSFET connected in series to the negative input line. If the input polarity is connected reversely, the MOSFET opens and there will be no output to protect the unit.

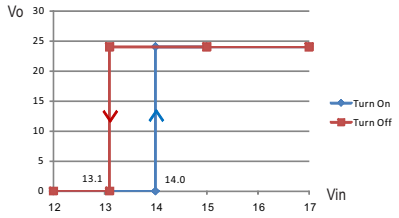
Input Range and Transient Ability

The series has a wide range input capability. Within ±30% of rated input voltage, it can be executed at full-load operation and operate properly; with ±40% of rated input voltage, it can withstand that for 1 second.

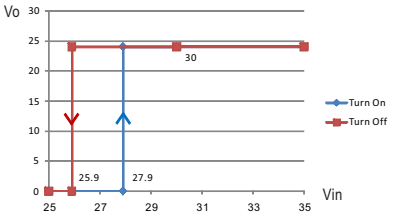
Input Under-Voltage Protection

If input voltage drops below Vimin, the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above Vimin, please refer to the cruve below.

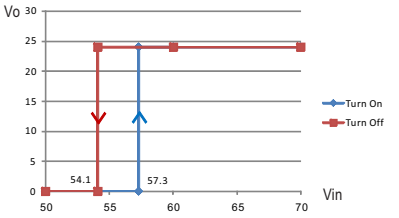
RSD-200B-24



RSD-200C-24



RSD-200D-24



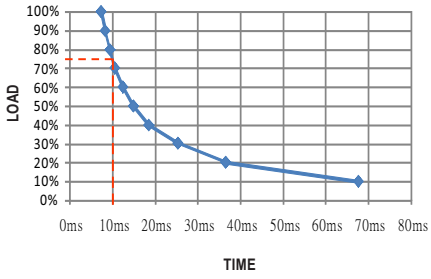
Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by a MOSFET to reduce power consumption after accomplishing the start-up.

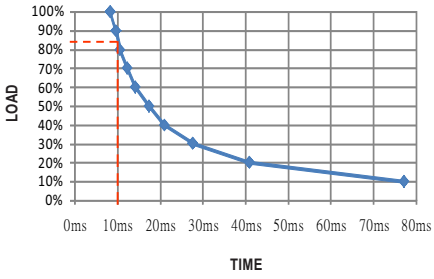
Hold-up Time

- EN50155: 2007 version - D type is in compliance with S2 level, while B and C types are in compliance with S1 level at full load output condition. To fulfil the requirements of S2 level, B and C types require de-rating their output load to 70%, please refer to the curve diagrams below.

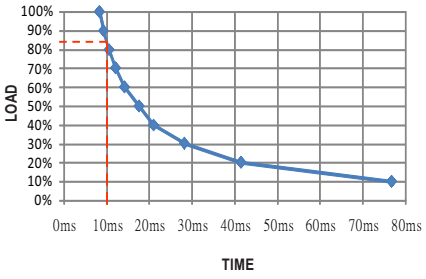
RSD-200B-12



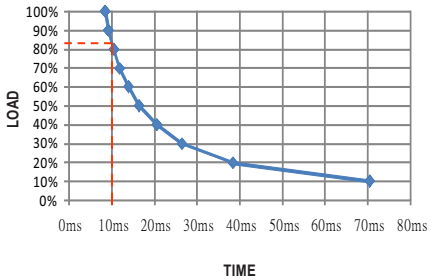
RSD-200B-24



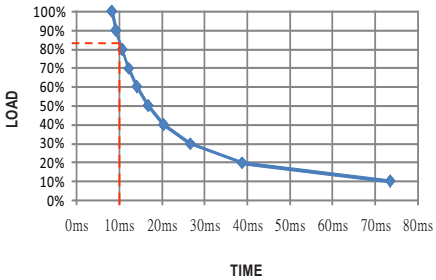
RSD-200B-48



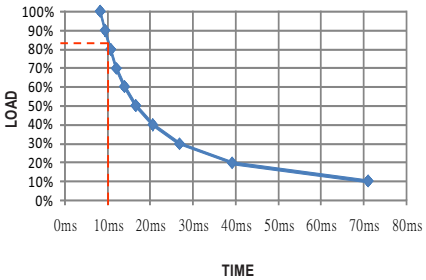
RSD-200C-12



RSD-200C-24



RSD-200C-48



- EN50155: 2017 version - Comply with S1 level

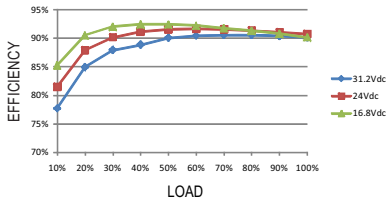
Output Voltage Adjustment

This function is optional, which the standard product does not have it. If you do need the function, please contact MW for details.

■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.

RSD-200B-12



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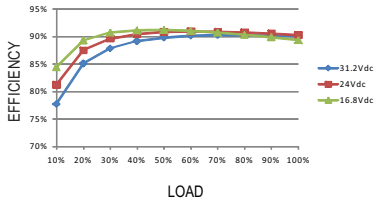
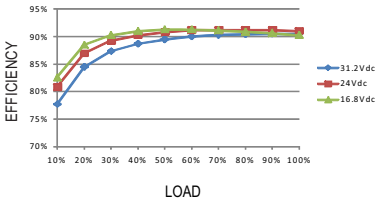
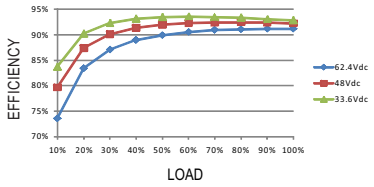


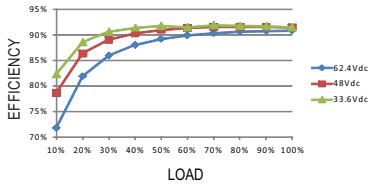
RSD-200B-48



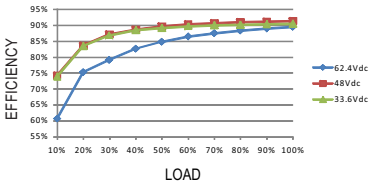
RSD-200C-12



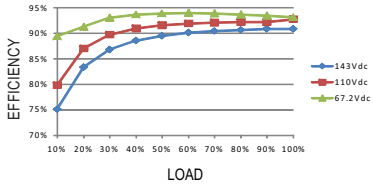
RSD-200C-24



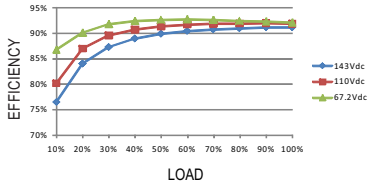
RSD-200C-48



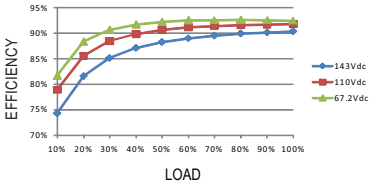
RSD-200D-12



RSD-200D-24



RSD-200D-48

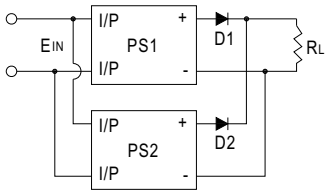


■ Parallel and Series Connection

A.Operation in Parallel

Since RSD-200 series don't have built-in parallel circuit, it can only use external circuits to achieve the redundant operation but not increase the current rating.

1.Add a diode at the positive-output of each power supply (as shown as below), the current rating of the diode should be larger than the maximum output current rating and attached to a suitable heat sink. This is only for redundant use (increase the reliability of the system) and users have to check suitability of the circuit by themselves.

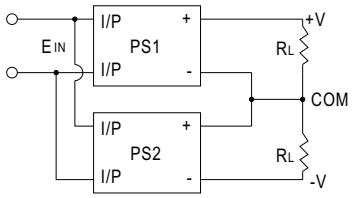


2.When using S.P.S. in parallel connection, the leakage current will increase at the same time. This could pose as a shock hazard for the user. So please contact the supplier if you have this kind of application.

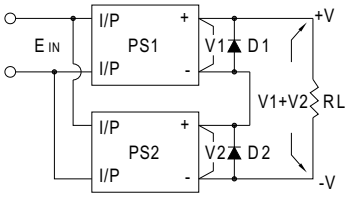
B.Operation in Series

RSD-200 can be operated in series. Here are the methods of doing it:

1.Positive and negative terminals are connected as shown as below. According to the connection, you can get the positive and negative output voltages for your loads.

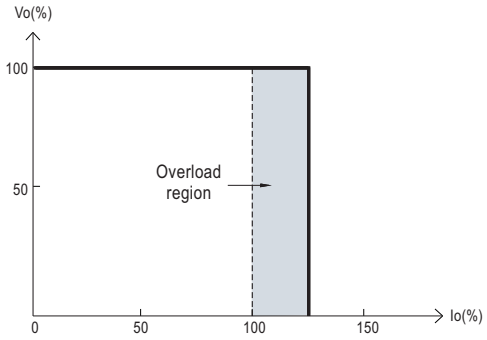


2.Increase the output voltage (current does not change). Because RSD-200 series have no reverse blocking diode in the unit, you should add an external blocking diode to prevent the damage of every unit while starting up. The voltage rating of the external diode should be larger than V1+V2 (as shown as below).



■ Overload Protection

If the output draw up to 105~135% of its output power rating, the converter will go into overload protection which is constant current mode. After the faulty condition is removed, it will recover automatically. Please refer to the diagram below for the detail operation characteristic. Please note that it's not suitable to operate within the overload region continuously, or it may cause to over temperature and reduce the life of the power supply unit or even damage it.



■ Over Voltage Protection

The converter shuts off to protect itself when the output voltage drawn exceeds 115~135% of its output rating. It must be repowered on to recover.

■ Over Temperature Protection

The converter shuts off to protect itself when the built-in temperature sensor mounted on the main power transformer senses a high temperature. The output recovers automatically if the temperature drops below the limit.

■ LED Indicator

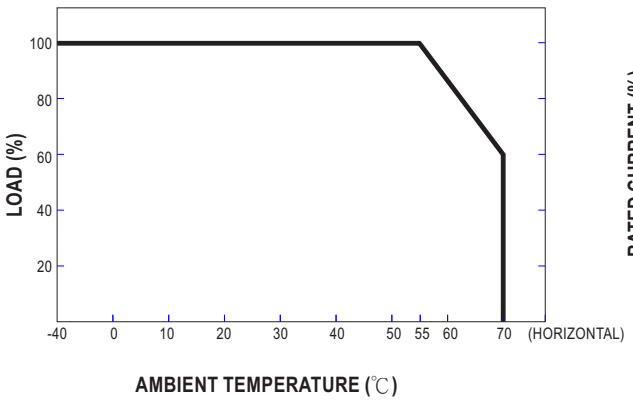
Equipped with a built-in LED indicator, the converter provides an easy way for users to check its condition through the LED indicator.

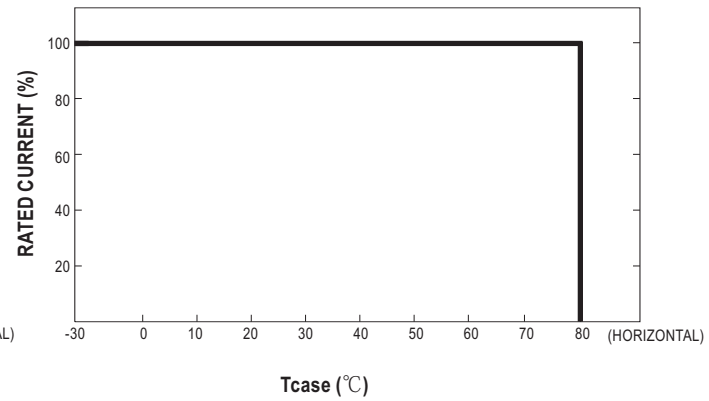
Green : normal operation; No signal: no power or failure.

■ Derating Curve

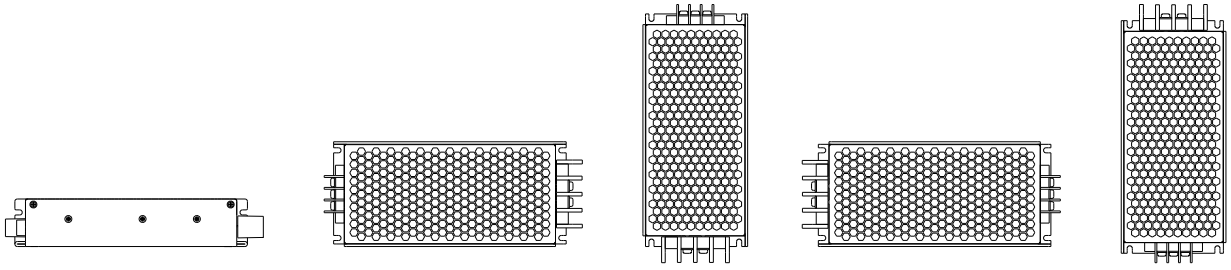
a.Single unit operation

If the unit has no iron plate mounted on its bottom, the maximum ambient temperature for the unit will be 55℃ as operating under full load condition. It requires de-rating output current when ambient temperature is between 55-70℃, please refer to the de-rating curve as below.





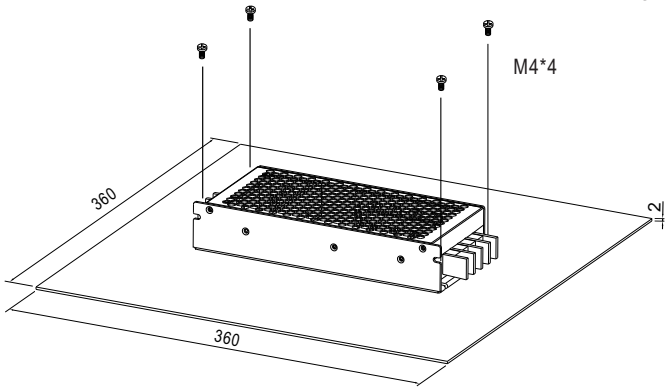
Suitable installation methods are shown as below. Since RSD-200 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



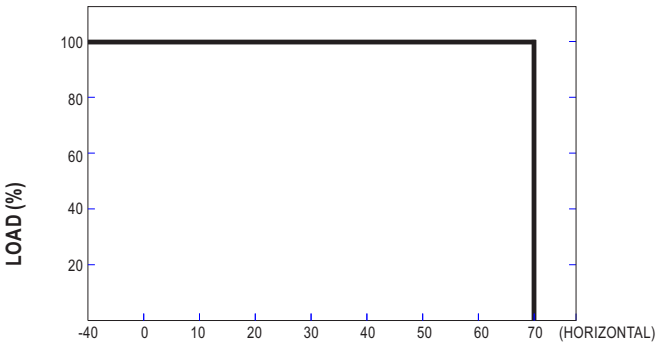
b.Operate with additional iron plate

If it is necessary to fulfil the requirements of EN50155 TX level that operate the unit fully-loaded at 70℃, RSD-200 series must be installed onto an iron plate on the bottom. The size of the suggested iron plate is shown as below. In order for optimal thermal performance, the iron plate must have an even & smooth surface and RSD-200 series must be firmly mounted at the center of the iron plate.

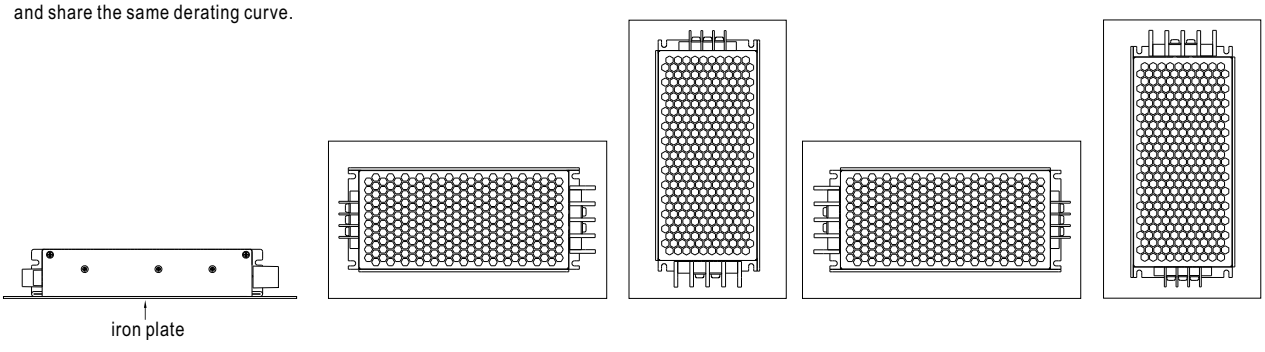
Unit:mm



The load vs ambient temperature curve is shown as below.



Suitable installation methods are shown as below. Since RSD-200 is a semi-potted model, its thermal performances for the following installation methods are similar and share the same derating curve.



■ Immunity to Environmental Conditions

Test method	Standard	Test conditions	Status
Cooling Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 2 hrs/cycle	No damage
Dry Heat Test	EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2	Temperature: 70℃ / 85℃ Duration: 6 hrs / 10min	PASS
Damp Heat Test, Cyclic	EN 50155 section 12.2.5 EN 60068-2-30	Temperature: 25℃~55℃ Humidity: 90%~100% RH Duration: 48 hrs	PASS
Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 10 mins	PASS
Increased Vibration Test	EN 50155 section 12.2.11 EN 61373	Temperature: 19℃ Humidity: 65% Duration: 5 hrs	PASS
Shock Test	EN 50155 section 12.2.11 EN 61373	Temperature: 21± 3℃ Humidity: 65 ± 5% Duration: 30ms*18	PASS
Low Temperature Storage Test	EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1	Temperature: -40℃ Dwell Time: 16 hrs	PASS
Salt Mist Test	EN 50155 section 12.2.10 (Class ST4)	Temperature: 35℃ ±2℃ Duration: 96 hrs	PASS

■ EN45545-2 Fire Test Conditions

Test Items			Hazard Level		
Items		Standard	HL1	HL2	HL3
R22	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
	Smoke density test	EN 45545-2:2013 EN ISO 5659-2:2006	PASS	PASS	PASS
	Smoke toxicity test	EN 45545-2:2013 NF X70-100:2006	PASS	PASS	PASS
R24	Oxygen index test	EN 45545-2:2013 EN ISO 4589-2:1996	PASS	PASS	PASS
R25	Glow-wire test	EN 45545-2:2013 EN 60695-2-11:2000	PASS	PASS	PASS
R26	Vertical flame test	EN 45545-2:2013 EN 60695-11:2003	PASS	PASS	PASS

DEEP CYCLE

DCM0035L

Technical Specifications

Nominal Voltage	12V
Nominal Capacity	35Ah (20 Hr Rate to 1.75V/cell)
Chemistry	Lead Acid -AGM

Physical Specifications

Length	195mm	7.68in
Width	130mm	5.12in
Height	164mm	6.46in
Height w/Terminal	180mm	73.09n
Weight (+/- 5%)	10.4Kg	22.9bs
Terminal Type	INSERT TERMINALS	
Case Material	ABS	

Charging Specifications

Charge Voltage	Battery	Per Cell
Float	13.5V~13.8V	2.25V~2.30V
Cycle	14.4V~15.0V	2.40V~2.50V
Max. Charge Current	9.9A	

Capacity Specifications

5 Second Discharge Current	495A
Self Discharge (to 80% capacity	3 Months 91% 6 Months 82% 12 Months 64%
Internal Resistance	11mΩ(25°C)

Temperature Specifications

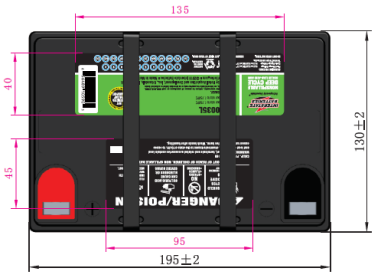
Operating Temperature Capablity	-40° F (-40° C) to 140° F (60° C)

Recommended parameters for optimal battery life and performance:

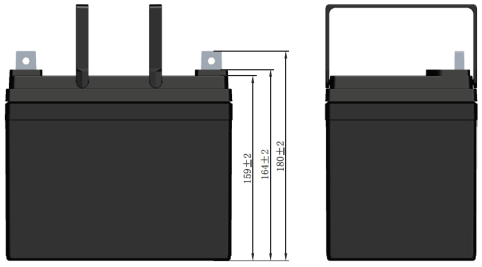
Charging: 32° F to 104° F (0° C to 50° C), Discharging: 5° F to 122° F (-15° to 50° C),
Storage: 50° to 77° F (10° C to 25° C)

FEATURES:

- Long life for deep discharge uses
- Ideal for applications using major capacity prior to recharging
- Depth of discharge should be between 50% & 80% and recharged as soon as possible
- Flexibility of mounting orientation
- VRLA technology to eliminate spills and over-pressurization
- Maintenance-free



FOR REFERENCE ONLY
HANDLE TRUE TO PHOTO ABOVE



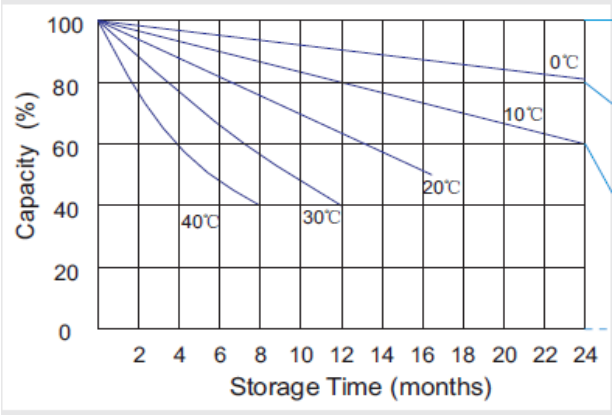
LEAD RETURN RECYCLE

Pb

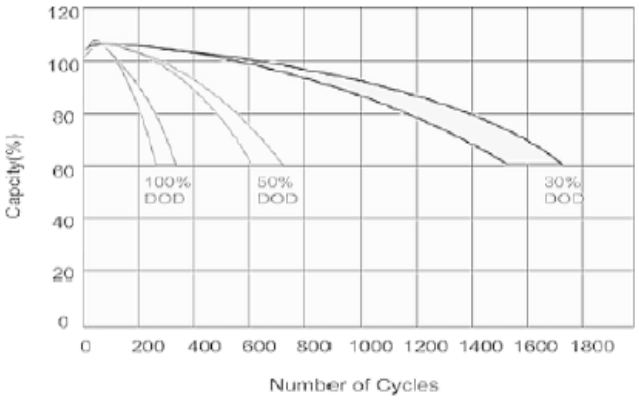
NOT RESTRICTED FOR ANY TRANSPORT

6/19

Storage Characteristics



Cycle Life of Deep Cycle



Constant Current Discharge Characteristics: A (25°C)							
F.V/Time	5 min	30 min	1 hr	3 hr	5 hr	10 hr	20 hr
1.85V/cell	42.00	26.00	16.50	7.63	5.26	3.12	1.75
1.80V/cell	51.70	28.90	18.50	8.28	5.64	3.30	1.77
1.75V/cell	60.00	31.20	19.30	8.60	5.83	3.33	1.79
1.70V/cell	64.70	32.70	1909.00	8.83	5.93	3.37	1.82
1.67V/cell	69.90	34.00	20.60	9.08	6.10	3.44	1.84
1.60V/cell	75.60	35.60	21.30	9.27	6.24	3.47	1.85

Constant Power Discharge Characteristics: W (25°C)							
F.V/Time	5 min	30 min	1 hr	3 hr	5 hr	10 hr	20 hr
1.85V/cell	78.30	50.00	32.00	14.90	10.30	6.17	3.51
1.80V/cell	95.10	54.90	35.60	16.10	11.00	6.53	3.53
1.75V/cell	109.10	59.00	37.10	16.70	11.40	6.59	3.56
1.70V/cell	116.10	61.60	38.20	17.10	11.60	6.65	3.63
1.67V/cell	124.40	63.70	39.30	17.50	11.90	6.78	3.67
1.60V/cell	132.40	66.10	40.40	17.80	12.10	6.85	3.68

PRO Charging Systems

Installation and Operating Instructions

(for chargers shown below)

Industrial SERIES

IS1- One 6 amp output

IS2- Two 6 amp outputs

IS3- Three 6 amp outputs

For additional information please call our Technical Support Group 800.742.2740

DUAL PRO™
Pro Quality Pro Performance

081512

PRO CHARGING SYSTEMS, LLC
1551 Heil Quaker Boulevard, LaVergne, TN 37086-3539

INSTALLATION AND OPERATING INSTRUCTIONS
FOR THE FOLLOWING BATTERY CHARGING SYSTEMS:

Model #	Description	Total Output	Independently charge 12V batteries in the following systems:
Recreation Series			
IS1	One 6 Amp Bank	6 Amps	12V
IS2	Two 6 Amp Banks	12 Amps	12V, 24V
IS3	Three 6 Amp Banks	18 Amps	12V, 24V or 36V

IMPORTANT NOTICE

Please save and read all safety, operating and installation instructions before installing or applying AC power to your PCS on-board battery charging system. Please contact PCS with any product, installation, or service questions at technical support (800.742.2740).

INTRODUCTION

Pro Charging Systems (PCS) has been manufacturing waterproof, on-board battery charging systems since 1989. Our charging systems are designed and built tough to withstand intense vibration, extreme temperature variations and submersion without damaging the unit. Our systems use temperature compensation in order to fully charge a battery in hot or cold environments and are controlled by microprocessors in order to assure precise control over each totally independent charging bank. All of our chargers have true reverse polarity protection and incorporated a float maintenance mode upon completion of each charge cycle.

TABLE OF CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

Use of attachments not recommended or sold by PCS may result in a risk of fire, electrical shock, or injury to persons.

To reduce risk of damage to the electrical plug and power cord, always pull by the plug rather than by the power cord when disconnecting charger.

When using an extension cord, make sure:

1. That pins on the extension cord plug are the same number, size and shape as those of the charger's plug;
2. That extension cord meets UL (Underwriters Laboratories, Inc.) acceptance and is in proper operating condition;

3. That wire size is large enough for the ac ampere rating of charger.

Do not operate charger with a damaged cord or plug—replace the cord or plug immediately.

Do not operate charger if it has received a sharp blow, been dropped or otherwise damaged in any way; contact our technical support group for assistance (800.742.2740).

Do not disassemble charger; contact technical support when service or repair is required. Incorrect reassembly may result in risk of electrical shock or fire.

To reduce risk of electrical shock, unplug charger from outlet before attempting any maintenance or cleaning.

WARNING: RISK OF EXPLOSIVE GASES

1. WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance that each time before using your charger, you read this manual and follow the instructions exactly.

2. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and by the manufacturer of any equipment you intend to use in the vicinity of battery. Review all cautionary markings on any product being utilized in or around the charging device.

PERSONAL PRECAUTIONS

Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.

Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, eyes, or other surfaces.

Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.

If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and seek medical attention.

NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.

Be extra cautious to reduce risk of dropping a metal tool onto battery. This might cause a spark or short-circuit a battery, possibly resulting in an explosion.

Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring, or the like, to metal, causing a severe burn.

Use charger for charging a LEAD-ACID (lead acid, sealed lead acid, gel cell, and AGM) battery only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These dry cell batteries may explode, causing personal injury and damage to property.

NEVER charge a frozen battery.

PREPARING TO CHARGE

If it is necessary to remove the battery or batteries to charge, always remove grounded terminal from battery first. Make sure all accessories are off, so as not to cause battery arcing.

Be sure the area around any battery is well ventilated while batteries are being charged. On occasion, "gas fumes" may be present during charging and can be forcefully blown away by using a piece of cardboard or other nonmetallic material as a fan. Proper ventilation is always recommended in the charging area.

Clean all of the battery terminals. Be careful to keep corrosion from coming into contact with eyes.

Add distilled water in each cell (wet cell batteries) until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.

Study all battery manufacturers' specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.

Extension cords should be industrial grade/heavy duty UL approved and grounded. Check extension cord before use for damage, bent prongs and cuts. Replace if damaged.

Always make your extension cord connection on the charger side first. After connecting the extension cord to the charger, proceed to plug the extension cord into a 120VAC GFCI protected (Ground Fault Circuit Interrupt) A/C outlet. The unit will operate with a VAC input range of 90VAC-264VAC.

Always remove the extension cord from the A/C outlet first when charging is completed followed by unplugging the charger.

PRODUCT SUMMARY

General Operation:

Use the following guidelines in this manual to install your fully automatic PCS battery charging system.

Assure that the area around your charger and batteries is properly ventilated. Connect your extension cord with no A/C power present to the battery charger and proceed to plug your extension cord in at a nearby A/C outlet.

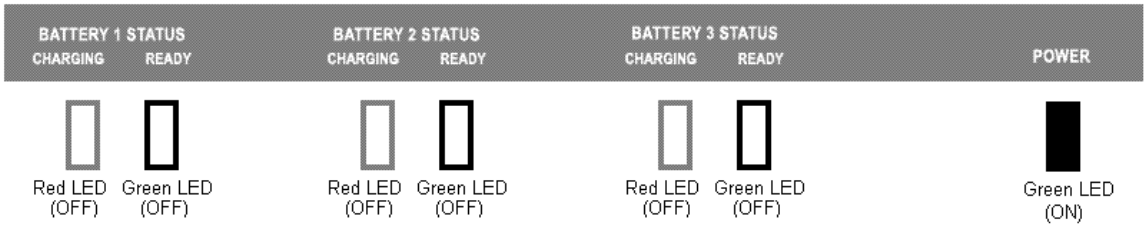
Once you plug in your PCS battery charging system, your batteries will be simultaneously and independently charged to 100%. Unlike systems that utilize one large charger to attempt to charge multiple batteries, your system utilizes a totally independent battery charger for each battery. Each charging bank will remain in a "float" stage once the battery is charged and then monitor and/or maintain the battery indefinitely.

We recommend that you leave your system plugged in. This will reduce sulfation on the lead plates of the batteries and allow your PCS charging system to keep your batteries fully maintained and ready to perform at their best.

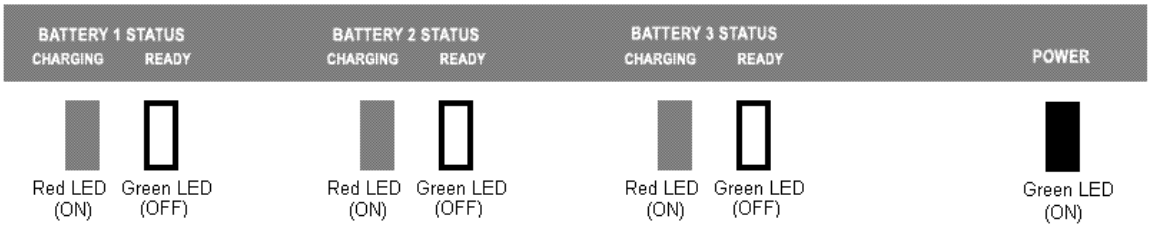
Independent Charging Bank Indications

When your battery charging system is activated, each bank provides charging information utilizing 1 red Light Emitting Diode (LED) indicator and one green Light Emitting Diode (LED) indicator. The Red (CHARGING) LED indicates d/c current is flowing to the battery and the Green (READY) LED indicates that the charger has finished it's bulk and absorption stage and has entered the float maintenance mode. There is also a Green (POWER) LED that illuminates to indicate that power is supplied to the charger when it is plugged in properly to a functioning A/C outlet.

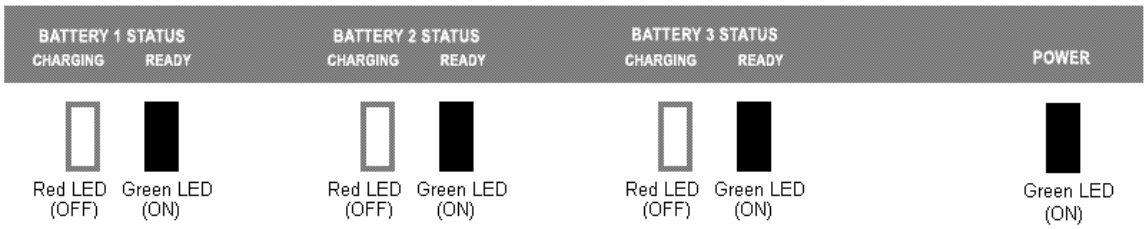
Below is an example of the display on a Three output Industrial Series Charger (IS3):



The above display indicates that power is on but there is no connection to a battery. The charger must see approximately 5 volts on a battery in order to deliver d/c current.



The above display indicates that power is on and that all three outputs are delivering d/c current to the batteries.



The above display indicates that power is on and that all three outputs are finished charging and are in a float maintenance mode.

INSTALLATION INSTRUCTIONS

All PCS battery charging systems are designed to be permanently installed in a well-ventilated area and have no mounting restrictions.

Do not make any electrical connections to the power supply (AC) or to a battery (DC) until the installation process has been completed.

If mounting the charger in a boat, please choose a flat surface as high above the water level as possible. If a compartment wall is chosen, make certain its strength is adequate to support the weight of the charger.

Use the mounting flanges of the charger to mark locations for starter holes. Drill a 1/16 inch hole at each marked location. Then, utilize all stainless steel screws that have been provided and install the charger securely, being cautious not to over tighten the screws. Silicon sealer should be used to secure and waterproof the screw holes.

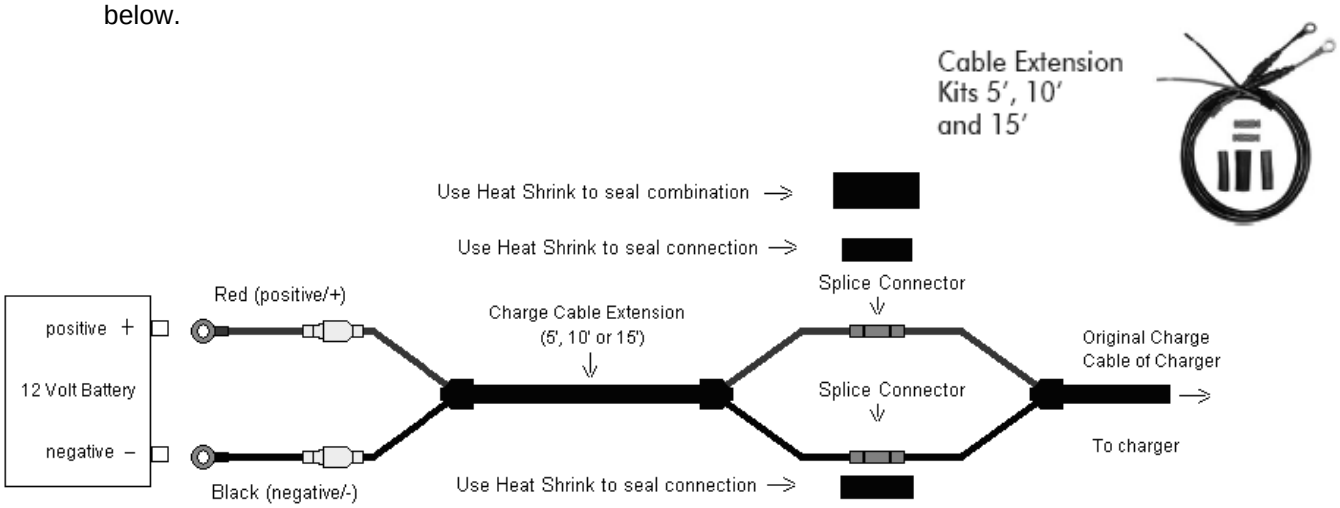
IMPORTANT NOTICE
The mounting brackets of the system may contain keyholes that are designed so that screws can be started before putting the charger into place. If applicable, the keyhole locations vary depending on which model you own.

Before making any connections, prepare batteries as follows:

(a) With caps securely in place, thoroughly clean the case and posts with a solution of baking soda and water. Be careful not to allow any baking soda to get inside the case.

(b) All posts, terminals, and connectors should be cleaned to a shiny bright finish, using a wire brush or sand paper. This should be done periodically to assure maximum conductivity between the battery and the charger.

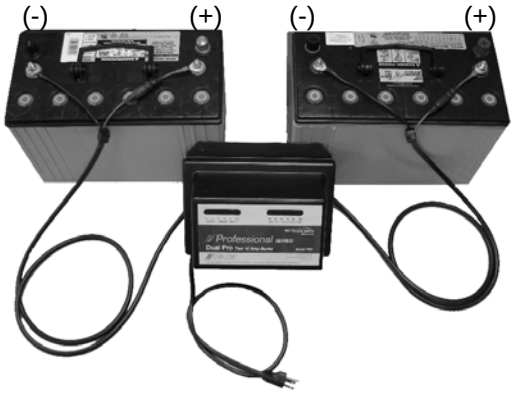
Each charge cable assembly is equipped with a temperature sensor located at the junction of each set of ring terminals. Attempts to shorten the cables could partially disable the charger. Therefore, we recommend that you do not make any adjustments without first consulting our technical support group (800.742.2740). Proper cable extensions may be purchased in 5', 10', and 15' lengths. See picture below.



To connect the charger to the battery (batteries), route your charge cables from the charger to the batteries, being cautious to avoid sharp objects, and use the supplied wire ties to hold them securely and neatly in place.

Securely attach each charge cable independently to one 12V battery by connecting the red (positive/+) lead ring terminal to the positive (+) battery post and the black (negative/-) lead ring terminal to the negative (-) battery post. See picture below:

*The charger pictured is a **Professional Series Dual Pro**, which has two independent 15 amp outputs.*



Connect a heavy duty UL approved extension cord to the power cord of your charger and then plug the extension cord into a nearby 120VAC GFI protected (Ground Fault Circuit Interrupt) outlet.
You should now observe a red LED indication on each bank of the charger representing each individual battery being charged. The voltage of each battery will reflect the number of LED indicators illuminated.

When charging is complete, remove the extension cord from the 120VAC outlet first and then unplug the charger.

TROUBLE SHOOTING

PROBLEM: No LED indicators illuminate on the charger.

Solution Sequence: Check the AC power supply from its source through all connecting points up to the charger by using a meter or test light to confirm that current is being delivered to the charger.

PROBLEM: The Green (POWER) LED is illuminated, but the Red (CHARGING) LED and the Green (READY) LED are off.

Solution Sequence: This indicates that the charger does not recognize that it is connected properly to a battery that has at least 2Volts. With the AC power supply cord unplugged, check the ring terminals for correct polarity (Red to positive or +) and (Black to negative or -). Also check for corrosion free secure connections to the batteries. Check in-line fuses in charge cable for any signs of opening or corroded connections. Call the technical support group for further assistance (800.742.2420).

PROBLEM: The RED (CHARGING) LED remains illuminated for more than 16 hours and the Green (READY) LED does not come on.

Solution Sequence: This indicates that the battery is not reaching a sufficient voltage to indicate that the battery is fully charged. Disconnect AC power to the charging system. On multi bank chargers, remove the charge cable assembly of the affected bank from the battery and attach it to another battery in the boat. Take the original charge cable assembly from this battery and attach it to the battery from which you removed the first cable. Plug the charger in and observe the LED indications. If the rapid LED sequence (red to green repeatedly) occurs on a different bank of the charger, this confirms the existence of a battery problem.

On single bank systems, simply try the charger on another battery. If the charger now operates normally (steady red LEDs or changes to green and holds), this indicates a possible problem with the original battery.

If the same bank continues to malfunction, please call our technical support group (800.742.2740).

PROBLEM: The green (READY) LED was illuminated before disconnecting the power from the charger, but upon reconnection, the red (CHARGING) LED appears and remains on.

Solution Sequence: This is normal operating procedure for the system and simply indicates that a re-analysis of the battery status has been initiated and after a series of steps, the green LED will illuminate.

LIMITED WARRANTY

Pro Charging Systems, LLC (PCS) makes this Limited Warranty only to the original retail purchaser.

PCS warrants this battery charger for 18 months from the date of retail purchase against defective materials and/or workmanship. If such defects should occur, this unit will either be repaired or replaced at the discretion of the manufacturer. It is the responsibility of the original purchaser to return the charger along with proof of purchase, transportation, and/or any mailing or handling charges prepaid to the manufacturer or its authorized representative.

This limited warranty is void if the product is misused, improperly maintained, handled carelessly or incorrectly operated. Additionally, this warranty is void if the charger is disassembled, the charger's charge cables are cut, the power cord is cut off, the charger is altered without authorization from PCS, the serial number is removed, or repair is attempted by anyone other than an authorized representative.

PCS makes no other warranty other than this limited warranty and expressly excludes any implied warranty, including warranty for any incidental or consequential damages.

This is the only expressed limited 18 month warranty authorized by PCS and does not authorize anyone to assume or make any other obligation towards the product other than this three year Limited Warranty. Some states do not allow limitation of incidental or consequential damages.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Please call Pro Charging Systems, LLC (800.742.2740) for full warranty information and/or service.

Below are some of our other options in chargers and battery accessories. Call our technical support group for more detailed information or visit our web site www.dualpro.com.

Professional SERIES

Uni Pro
One 15 Amp
Bank

Dual Pro
Two 15 Amp
Banks

Tri Pro
Three 15 Amp
Banks

Quad Pro
Four 15 Amp
Banks

Sportsman SERIES

Uni Pro
One 10 Amp
Bank

Dual Pro
Two 10 Amp
Banks

Tri Pro
Three 10 Amp
Banks

Quad Pro
Four 10 Amp
Banks

Eagle Performance SERIES

Available in 12 to 48 Volts
and 9 to 25 Amps

Charge On The Run SERIES

12 Volt, Available in 1, 2 or 3
Banks

Go Charge

Maintainer/Charger
Available in 1.25 Amp and
2 Amp Units

For more information and products:

www.dualpro.com

Technical Support: 800.742.2740

Accessories

Cable Extension
Kits 5', 10'
and 15'

Remote Battery Status
Indicators 2 and 3 Banks