INNOVATION • INTEGRITY • QUALITY • CLIENT SERVICE

OWNER/OPERATOR & MAINTENANCE MANUAL

GRAB

GRAB®-400

GROUND RETRACTABLE AUTOMOBILE BARRIER
K12/ASTM M50

277 Mallory Station Road, Suite 112 Franklin, Tennessee 37067-8251
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GLOBAL GRAB TECHNOLOGIES

GRAB®-400

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GRAB-400 OVERVIEW

Component Description

1. Foundation
2. Anchor Stanchions/Clevis Assembly
3. Net Lifting Arm Assembly
4. Net
5. Net Pads
6. Barrier Control Panel
7. Safety Equipment –
   (Traffic Lights and Safety Beacon)
8. Net Encasements
9. Cable Bumpers

Please note: GRAB-400 foundation shown

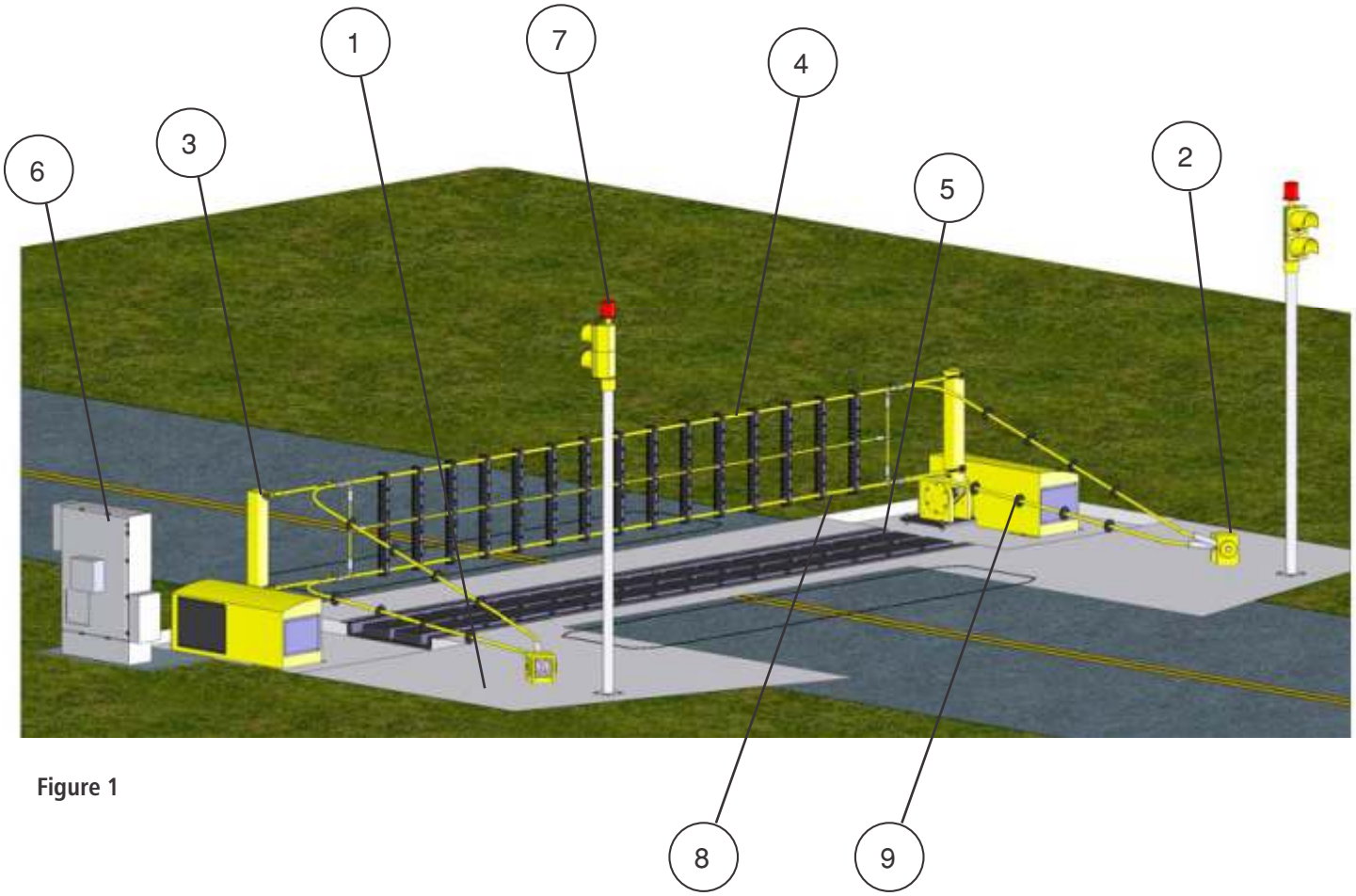

Figure 1

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GRAB OVERVIEW

The GRAB-400 is an active vehicle barrier designed to be used effectively as a final denial barrier or for access control. Its all-electric operation, low maintenance, high-cycle capacity, and multiple tested widths make it an attractive choice for a variety of perimeter security applications.

As an active vehicle barrier, the GRAB-400 alternately allows or denies vehicle access into your facility. When lowered, the GRAB net lies within the deep grooves of durable rubber pads that protect the net from passing traffic and support heavy traffic at high speeds. When raised, the GRAB-400 is capable of effectively stopping up to a 15,000 lb. vehicle traveling 40 mph as tested and certified to the ASTM M40 standard. To keep the system operating as designed, a simple and easy to follow schedule of preventive maintenance actions is included on page 52 of this manual. Completion of these actions per the schedule provided will preserve the warranty provided on the GRAB-400 and minimize the need for costly repairs during the system's long life.

GRAB -400 SPECIFICATIONS AND FEATURES

GRAB-400 SPECIFICATIONS AND FEATURES

The GRAB-400 is an energy-absorbing, net-type, ASTM M40 certified active vehicle barrier.

Specifications:

- ASTM M40 P1 Certified Barrier (12’ width)
- ASTM M40 P2 Certified Barrier (12’ – 60’ width)
- Energy-Absorbing Net Technology
- Resettable in as Little as 30 Minutes Following an Impact
- All-Electric Operation
- Cost Efficient – Protect Multiple Lanes with One GRAB-400
- Flexible Design Suitable for Final Denial or Access Control Applications
- Reusable System – Interchangeable Parts for Quick and Simple Replacement
- Low Maintenance
- No Hazardous Materials
- Bi-Directional Operation
- Shallow 18” Foundation for Easy Installation

Features:

- Flexible Power Supply (208VAC – 480 VAC)
- Less than 2 Second EFO Operation
- Capable of up to 1.2 Million Cycles per Year
- Custom Programmable Controls and Operator Panels
- Available Custom Decorative Covers
- Many Available Safety Features

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SAFETY

HAZARD DEFINITIONS

WARNING: Personnel intending to operate the GRAB should have completed the FNSS operators training. You must understand all warnings, controls, and labels included on your barrier before operating maintenance on this product. Failure to do so can result in serious injury or death.

For your safety and to prolong the life of your equipment, understand and heed the following safety words that may be seen throughout this manual:

DANGER:
Danger is used to indicate the presence of a hazard which ***will*** cause ***severe*** injury, death or substantial property damage if the warning is ignored.

WARNING:
Warning is used to indicate the presence of a hazard which ***can*** cause ***severe*** injury, death or substantial property damage if the warning is ignored.

CAUTION:
Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause injury or property damage if the warning is ignored.

SAFETY LABELS

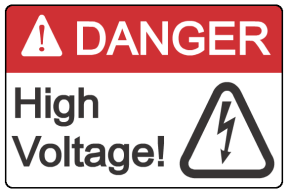
Safety labels are located on your barrier to alert you to possible hazards. Make sure you understand the information and follow the instructions before using the system. If the labels become illegible, damaged, or fall off the equipment, call FNSS for replacements. Do not deface the labels or remove them from the equipment.

The following is a guide to where the safety decals are found on your barrier:

(A)

(B)

(C)



(D)

- (A) A “No Step” decal is on each lifting arm and each motor cover.
- (B) A “Moving Parts” decal is on each lifting arm and each motor cover access panel.
- (C) A “High Voltage” decal is on each motor cover access panel.
- (C) A “High Voltage” decal is located on the exterior of the Barrier Control Panel door.
- (D) The GRAB Model number sticker is on the inside of the Barrier Control Panel and can be used as a reference when ordering parts.

SAFETY LABELS

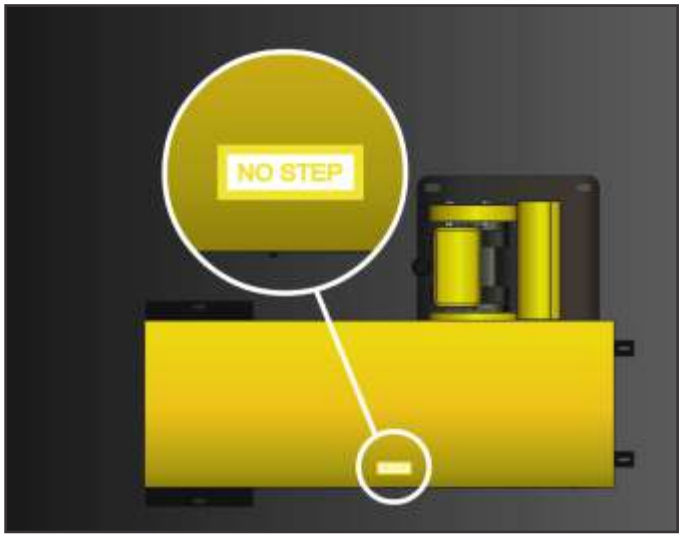
(THE BACK OF THE LIFT ARM)

SAFETY LABELS

(THE FRONT OF THE LIFT ARM AND MOTOR COVER)

SAFETY LABELS

(THE TOP OF THE MOTOR COVER)



SAFETY LABELS
(continued)

ELECTRICAL SAFETY

Only FNSS approved, qualified electricians or authorized technicians should be allowed to work on electrical components. Qualified personnel should know the location of all electrical shut-off boxes, disconnects and similar devices and be sure these are kept dry. If you suspect there is an electrical system failure, shut off power to the equipment and call FNSS for guidance. ***If your GRAB system includes the UPS/Battery Backup System, it must be de-energized as well otherwise your system could still have power.***

OSHA REQUIREMENTS

OSHA Regulation 1910.147(c)(1) states that the employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

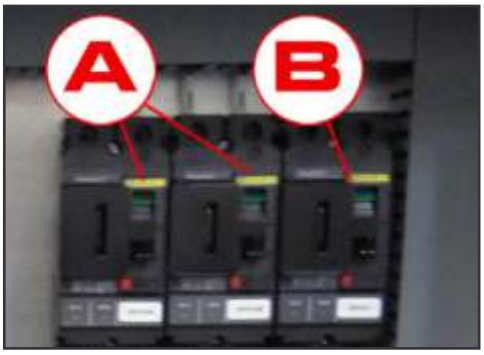
NFPA GUIDELINES

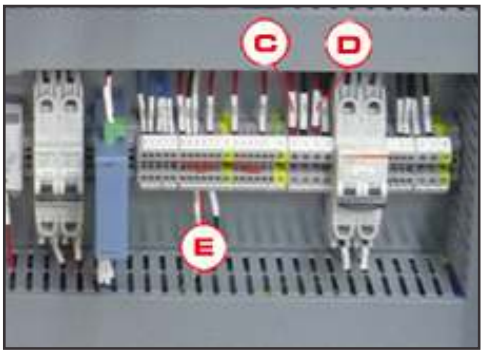
Qualified personnel must follow the lockout / tagout procedures established by the Employer as required by OSHA.

The following minimum NFPA steps must be taken to ensure an electrically safe work condition:

1. Determine all sources of energy by reviewing up-to-date drawing
2. Disconnect all sources of energy by operating adequately rat disconnecting means.
3. Inspect, whenever possible, energy-isolating devices for visible brea in the power conductors.
4. Perform a voltage test to determine the absence of voltag
5. Install grounding devices, if determined necessa .
6. Install locks and tags per facility lockout / tagout procedure

GRAB SHUTDOWN WITH BATTERY BACKUP



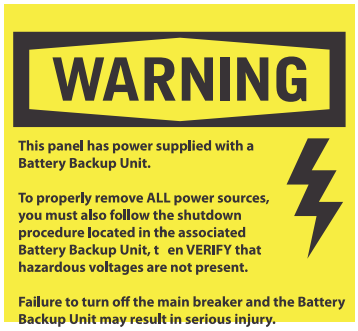


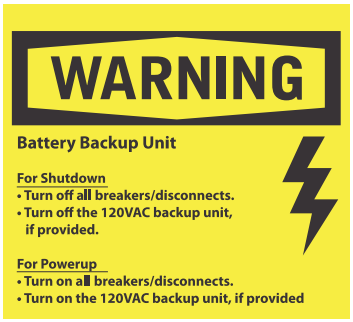
WARNING: When performing maintenance on the GRAB Barrier, be sure to check for 120 Volts AC from the UPS per the prints. Prints could be located in the BBU or in the Barrier Control Panel.

WARNING: When performing maintenance on the GRAB Barrier, have a clear understanding that even though the main power may be shut off at the breaker, the system still has power via the UPS/Battery Backup System. As a result, de-energize the Battery Backup System before performing any maintenance by performing the following steps:

1) Turn off Breaker (A) (these breakers supply the DC Bus voltage to the Variable Frequency Drives).
2) Turn off Breaker (B) (this breaker supplies AC power to Booster Module).
3) Turn off the 120 volt Uninterruptible Power Supply unit.
4) Use a voltage meter to ensure that no DC voltage is present betwe terminals +1PC & -1PC. (C)
5) Use a voltage meter to ensure that no DC voltage is prese between terminals +2PC & -2PC. (D)
6) Use a voltage meter to ensure that n AC voltage is present between Terminals 2032 & 2039. (E)
7) When no voltage is present on the terminals in steps 4,5 & 6, t system has been successfully shut down.

GRAB SHUTDOWN WITHOUT BATTERY BACKUP





WARNING: In the event of a power failure or while equipment is being serviced, be sure all switches are locked in the OFF position following lock-out/ tag-out procedures. Accidental start-up could result in serious injury or death.

GRAB SHUTDOWN WITHOUT BATTER BACKUP
(continued)

The Barrier Control Panel has HIGH VOLTAGE inside. NEVER work inside the Barrier Control Panel with the power on.

Perform the following step to shut down the GRAB without battery backup present:

Turn the main disconnect located in the BCP to the “OFF” position.

PROTECTIVE GROUND or EARTH GROUND
(Protective Earth)

Earth Ground

NEVER disconnect the grounding wire from the GRAB control panel.

The ground wire, attached to a copper rod driven into the ground and connected to the barrier control panel, provides protection against unequal potential between panel components and the surface on which a maintenance technician may stand while working in the control panel. While the voltage at this connection point may rise above zero volts-to-earth-ground under fault conditions, the entire system will also rise at the same rate to the same voltage. This helps minimize any circulating currents between components from lightning or power surges.

The removal of this conductor or wires to/from the conductor will impede the protection for which it is designed to provide.

GENERAL SAFETY

This manual should be read and understood by the person operating the equipment. Extra copies are available from the manufacturer.

WARNING: Do not modify the equipment in any way. Modifications made to this equipment can be dangerous and could result in serious injury or death. Making changes to the equipment also voids the equipment warranty.

- NEVER defeat a safety guard or device to make a task easier.
- When operating the equipment, always wear proper apparel. Loos clothing could get caught in moving parts.
- Never operate equipment with guards or covers removed. Moving part can cause severe injury. Keep hands, feet, hair, jewelry and clothing away from all moving parts.
- Keep walking and driving surfaces around the barrier clean an uncluttered to prevent a slip or trip hazard.

OPERATIONAL SAFETY

Never operate the equipment if you are under the influence of drugs, alcohol or medications that may make you less alert or affect your judgment.

- Make sure all mechanical guards and safety devices are in place an are working properly.
- Check that all hardware, fasteners, etc. are in good condition an tightly fastened. Replace any worn or damaged items with replacements supplied by the manufacturer.
- Personnel who are not required to be in the work area should be kep away. NEVER operate the equipment unless you are absolutely certain that all personnel are clear of the barrier and are made aware it is about to move.
- HORN: Follow the recommended start-up procedure described in your operations manual. The horn operates is adjustable to operate between 78 dB-103 dB. Prolonged exposure to this level may require the use of ear protection.

GENERAL MAINTENANCE SAFETY

WARNING: Do not remove any guards while power is ON at the control panel.

WARNING: Before work is performed, be sure power is off and the main ON/OFF switch or button is locked in the OFF position. The main disconnect is always located on the primary control panel. For exact location, check the drawings for the unit.

- Following maintenance work, ensure all mechanical guards and othe safety devices are installed and are in proper working order.
- NEVER clean, lubricate or adjust the equipment while any parts are moving or while the equipment power is ON.

TRAFFIC SAFETY

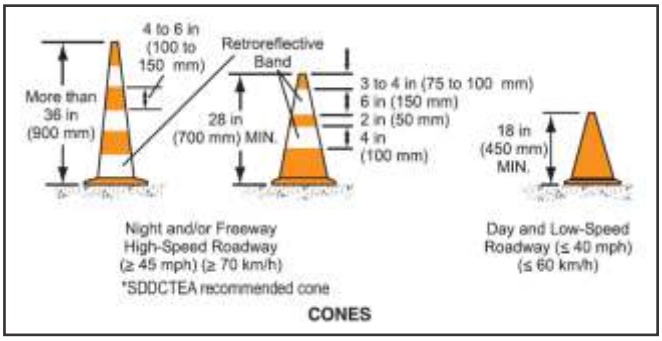
Consult Property Owner / Manager:

- In the event of operating the barrier outside normal sequence o operation, contact owner to verify proper procedure for controlling or rerouting traffic at the barrier.
- The property owner or manager must have full knowledge of traffic plans to reroute traffic, or of plans for a complete roadway shutdown.

Consult facility traffic control plans to ensure that one-way, two-way, or other forms of traffic control are performed in accordance with established safety standards.

Stop or Detour Traffic

- Ensure that safety cones are properly utilized to e fectively stop or detour traffic around the barrier while maintenance is being performed.
- Ensure that the properly sized cones are utilized given the sit conditions and time of day/night.



Be aware of vehicle traffic when working on the GRAB barrier system. Always wear reflective clothing/vest. Use orange cones when available.

ENTRAPMENT HAZARDS

NEVER stand on the net pads or near the lifting arms. When the barrier is down, it could raise under you causing a fall. When the barrier is up, it could lower quickly and trap you.

TRIPPING HAZARDS

There are many trip hazards near the GRAB barrier system. Watch your step.

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GUARD BOOTH PANEL (TYPICAL)
(GB)

Red Illuminated "EFO" Push Button: Emergency Fast Operate

Used to deploy the barrier in an emergency situation. When pressed, the barrier will cycle through traffic light sequence and barrier will deploy after the vehicle safety loops are clear.

Red EFO light
- Illuminate An EFO button has been pressed
- Flashin THIS EFO has been pressed
- Extinguishe No EFO button has been pressed

Red "OVERSPEED" Pilot Light

- Illuminated Overspeed vehicle has been detected.
- Extinguished No overspeed vehicle detected.

Red "WRONG WAY" Pilot Light

- Illuminated A vehicle traveling the wrong way has been detected.
- Extinguished No wrong way detected.

"ALARM"

- Sounds when a fault is detected, overspeed vehicle or wrong way vehicle detected.

GUARD BOOTH PANEL (TYPICAL)
(continued)

"GUARD BOOTH ARMED" Pilot Light

- Illuminated The Guard Booth has been armed by both the Master switch and the Power Key Switch and the Security Booth station is operational.
- Extinguished The Guard Booth is either disabled by the Master Key Switch or the Power Key Switch.

Black "LAMP TEST" Push Button

Used to test all LED lights on the Guard Booth Station. When pressed, all pilot lights should illuminate on the panel. If any of the lights do not illuminate after pressing the *"LAMP TEST"* pushbutton, the LED needs to be replaced in that light.

MASTER CONTROL PANEL (TYPICAL)

(MCP)

Red Illuminated "BARRIER UP" Push Button (*"TEST"* mode only)

Used to raise the barrier in a non-emergency situation (*"TEST"* mode only)

- Flashing The Pilot light will flash when the push button is pressed. It will continue to flash until the barrier is completely in the up position. Once in the fully up position the light will turn solid.
- Illuminated Barrier is in the fully up position. Road is Closed.
- Extinguished The light extinguishes as soon as the *"BARRIER DOWN"* button is pushed. The barrier is either in the process of going down or in the fully down position

Green Illuminated "BARRIER DOWN" Push Button (*"TEST"* mode only)

Used to lower the barrier in a non-emergency situation (*"TEST"* mode only)

- Flashing: The pilot light will flash when the push button is pressed. It will continue to flash until the barrier is completely in the down position. Once in the fully Down position, the light will turn solid.
- Illuminated Barrier is in the fully down position. Road is open.
- Extinguished The light extinguishes as soon as the "*BARRIER UP* " button is pushed. The barrier is either in the process of going up or in the fully up position.

MASTER CONTROL PANEL (TYPICAL)
(continued)

Amber "EFO MODE" Pilot Light

- Illuminated The Master Control Panel is in EFO Mode. All EFO's are active; The Maintenance Panel is disabled; The Master Panel *"BARRIER UP/DOWN "* pushbuttons are disabled.
- Extinguished: The Master Control Panel is either in Maintenance/ Local or Test Mode. EFOs are not active.

Red Illuminated "EFO" Push Button: Emergency Fast Operate

Used to deploy the barrier in an emergency situation. When pressed, the barrier will cycle through traffic light sequence and barrier will deploy after the vehicle safety loops are clear.

Red EFO light

- Illuminated An EFO button has been pressed
- Flashing This EFO has been pressed
- Extinguished No EFO button has been pressed

"POWER ON" / Disarmed/Armed Key Switches

This is the master switch controlling all Guard Booths and the Master Control Panel. This switch has the ability to either enable or disable all guard booths to function. If in the *"ON"* state, each individual guard booth can then be armed or disarmed. If in the *"OFF"* state, none of the security booths can be activated and the Master Control Panel lights, pushbuttons, and Maintenance Panel will not operate.

"POWER ON" Pilot Light

- Illuminated All guard booth switches have been enabled and each are operational to function on their own. All Master Control Panel controls are functional.
- Extinguished All security booths switches are disabled. None are operational. The Master Control Panel is not operational.

Guard Booth (X) Panel "NO/YES" Key Switch

Used to allow operation: Either arms or disarms Guard Booth (X). The Master "*POWER ON* " key switch must be on for this key switch to function.

Guard Booth (X) "YES" Pilot Light

- Illuminated: The Guard Booth has been armed by both the Master *"POWER ON"* Key Switch and the Guard Booth (X) Panel "*NO/YES* " Key Switch and the Guard Booth station is operational.
- Extinguished The Guard Booth is either disarmed by the "Power On" Key Switch or the Guard Booth (X) Panel *"NO/YES"* Key Switch.

Note: Also applies to Overwatch Panel (if installed)

MASTER CONTROL PANEL (TYPICAL)
(continued)

"OVERSPEED" Pilot Light

- Turns on when an overspeed condition has been detected by ODDS

"WRONG WAY" Pilot Light

- Turns on when a wrong way condition has been detected by ODDS

"DURESS" Illuminated Push Button

- Used to alert an external system that a duress condition exists

Red "LOOP ON" Pilot Light

- Turns on when a barrier loop has been on longer than 15 seconds. (Time is adjustable).

Red "TROUBLE" Pilot Light

- Turns on when there is a problem with the barrier (motion fault, power supply fault, Battery low voltage fault for battery backup systems)

"LOCAL/EFO/TEST" Keyswitch

- Local Mode (Barrier Mode Switch) - only the barrier up/down illuminated push buttons at the Maintenance Panel are operational
- EFO mode - only the barrier EFO illuminated push buttons are operational;
- Test mode - only the Master Operator Panel barrier up/down illuminated push buttons are operational

"ALARM"

- Sounds when the barrier is in motion or if there is a power suppl fault

"SILENCE ALARM" Pushbutton

- Used to silence the Alarm

"LAMP TEST" Pushbutton

- Tests the functionality of all the pilot lights on the panel

MAINTENANCE/LOCAL PANEL (TYPICAL)
(MP)

"EFO/LOCAL" System Key Switch

- LOCAL: Only the Maintenance Panel controls the operation of the barrier. The Master Panel, and if present: card reader, and loop detectors do not function.
- EFO When in EFO mode, the barrier will respond to an EFO button when pressed, and can be operated by a card reader if present. Neither the Maintenance/Local Panel nor the Master Control Panel can operate the barrier.

Red "TROUBLE" Pilot Light

- Illuminated Exists when a hard fault occurs and stops the operation of equipment.
- Extinguished No faults exist.

Red Illuminated "BARRIER UP" Push Button (in "*LOCAL* " mode)
Used to raise the barrier in a non-emergency situation in *"LOCAL"* mode.

- Flashing The pilot light will flash when the push button is pressed. It will continue to flash until the barrier is completely in the up position. Once in the fully up position, the light will turn solid.
- Illuminated: Barrier is in the fully up position. Road is closed.
- Extinguished The light extinguishes as soon as the "*BARRIER DOWN* " button is pushed. The barrier is either in the process of going down or in the fully down position.

MAINTENANCE/LOCAL PANEL (TYPICAL)
(continued)

Green Illuminated "BARRIER DOWN" Push Button (in "*LOCAL* " mode)

Used to lower the barrier in a non-emergency situation.

- Flashing The pilot light will flash when the push button is pressed. It will continue to flash until the barrier is completely in the Down Position. Once in the fully down position, the light will turn solid.
- Illuminated Barrier is in the fully down position. Road is Open.
- Extinguished The light extinguishes as soon as the "*BARRIER UP* " button is pushed. The barrier is either in the process of going up or in the fully up position.

Amber "LOCAL MODE" Pilot Light

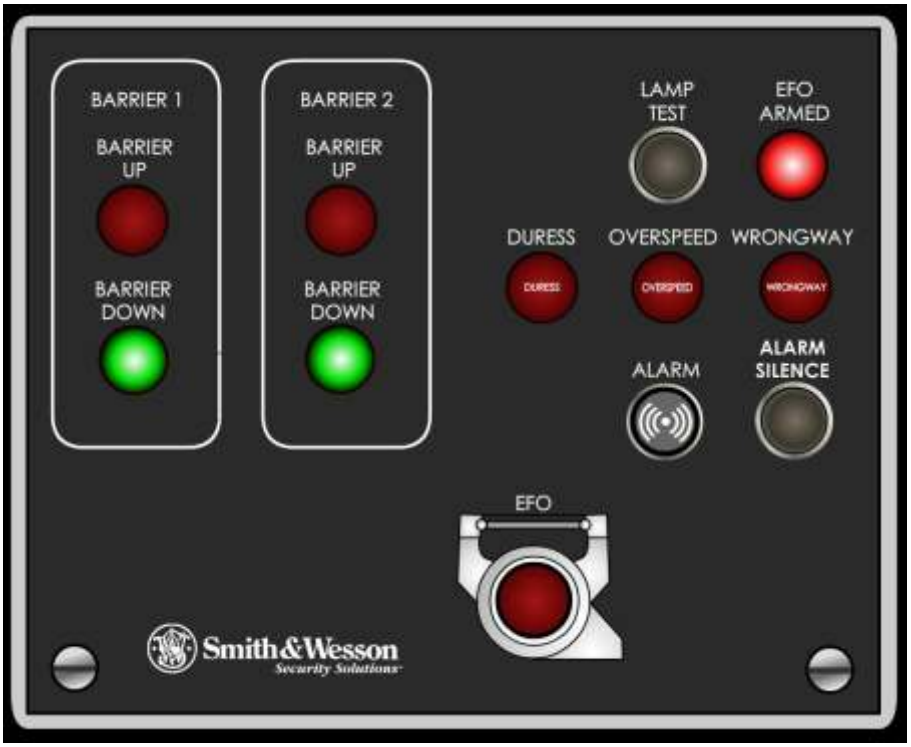
- Illuminated The Maintenance Panel and Master Control Panel has been turned to "*LOCAL* " mode.
- Extinguished The Maintenance Panel is in *"EFO"* mode.

"BARRIER MOTORS DISABLE/ENABLE" Key Switch

Interrupts the circuit between the power and the motor for wedges and bollards. This feature is a safety lockout to disable the barrier.

- Disable The barrier motors are locked out and will not operate. The switch disables the system so that maintenance can be performed without accident. This is a safety switch.
- Enabled The barrier is in normal operating conditions. Motion can occur.

OVERWATCH PANEL (TYPICAL)
(OW)



Red "BARRIER UP" Pilot Light

Used only to indicate if the barrier is coming up. This is not a button.

- Flashing The Pilot Light will flash when the push button is pressed at the Maintenance/Local Panel or the Master Control Panel. It will continue to flash until the barrier is completely in the up position. Once in the up position, the light will turn solid.
- Illuminated Barrier is in the fully up position. Road is closed
- Extinguished The light extinguishes as soon as the *"BARRIER DOWN"* button is pushed. The barrier is either in the process of going down or in the down position.

Green "BARRIER DOWN" Pilot Light

Used only to indicate if the barrier is going down. This is not a button.

- Flashing The Pilot Light will flash when the push button is pressed at the Maintenance/Local Panel or the Master Control Panel. It will continue to flash until the barrier is completely in the down position. Once in the down position, the light will turn solid.
- Illuminated Barrier is in the down position. Road is open.
- Extinguished The light extinguishes as soon as the *"BARRIER UP"* button is pushed. The barrier is either in the process of going up or in the up position.

Red "EFO ARMED" Pilot Light

- Illuminated The Overwatch Panel has been armed at the Master Control Panel.
- Extinguished The Overwatch Panel is disarmed.

OVERWATCH PANEL (TYPICAL) (continued)

Red Illuminated "EFO" Push Button: Emergency Fast Operate

Used to deploy the barrier in an emergency situation. When pressed, the barrier will cycle through traffic light sequence and barrier will deploy after the vehicle safety loops are clear. The Maintenance/Local Panel must be in *"EFO"* mode for this EFO button to operate.

Red EFO light

- Illuminate An EFO button has been pressed
- Flashin THIS EFO has been pressed
- Extinguishe No EFO button has been pressed

"Overspeed" Pilot Light

- Turns on when an overspeed condition has been detected by ODDS

"Wrong Way" Pilot Light

- Turns on when a wrong way condition has been detected by ODDS

"Duress" Illuminated Push Button

- Used to alert an external system that a duress condition exists

"Alarm"

- Sounds when the barrier is in motion or if there is a power suppl fault

BARRIER ORIENTATION

BARRIER NET
Constructed from steel cable.

TURNBUCKLE
Used to tension the net.

CABLE BUMPER
Keeps cables off the concrete, which reduces wear on the cables.

NET ENCASEMENT
(optional)
Aids in preventing small wheels/tires from dropping into net pads.

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NET PADS
Used to recess the net into the road surface.

LIFT ARMS
Used to lift the net.

ANCHOR STANCHIONS
Tie back point for the net used to absorb impact energy.

BARRIER ORIENTATION (continued)

TRAFFIC LIGHTS
(optional)
Used for traffic control around barriers.

HORN
(optional)
Sounds when barrier is
in motion (adjustable to operate between
78 dB-103 dB)

SAFETY LOOPS
(optional)
Used to detect presence of vehicle over
the barrier.

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OBSERVE AND INSPECT OPERATION OF EQUIPMENT

Check that the net (C) Figure 3 goes up and down in a continuous motion and that the arms (B) travel in unison.

Barriers are activated by control buttons located at operator's stations and main panel. Consult your facility's specific layout for functions of control panel and sequence of operation.

In any of the above cases, if a system is not functioning properly, call your FNSS representative.

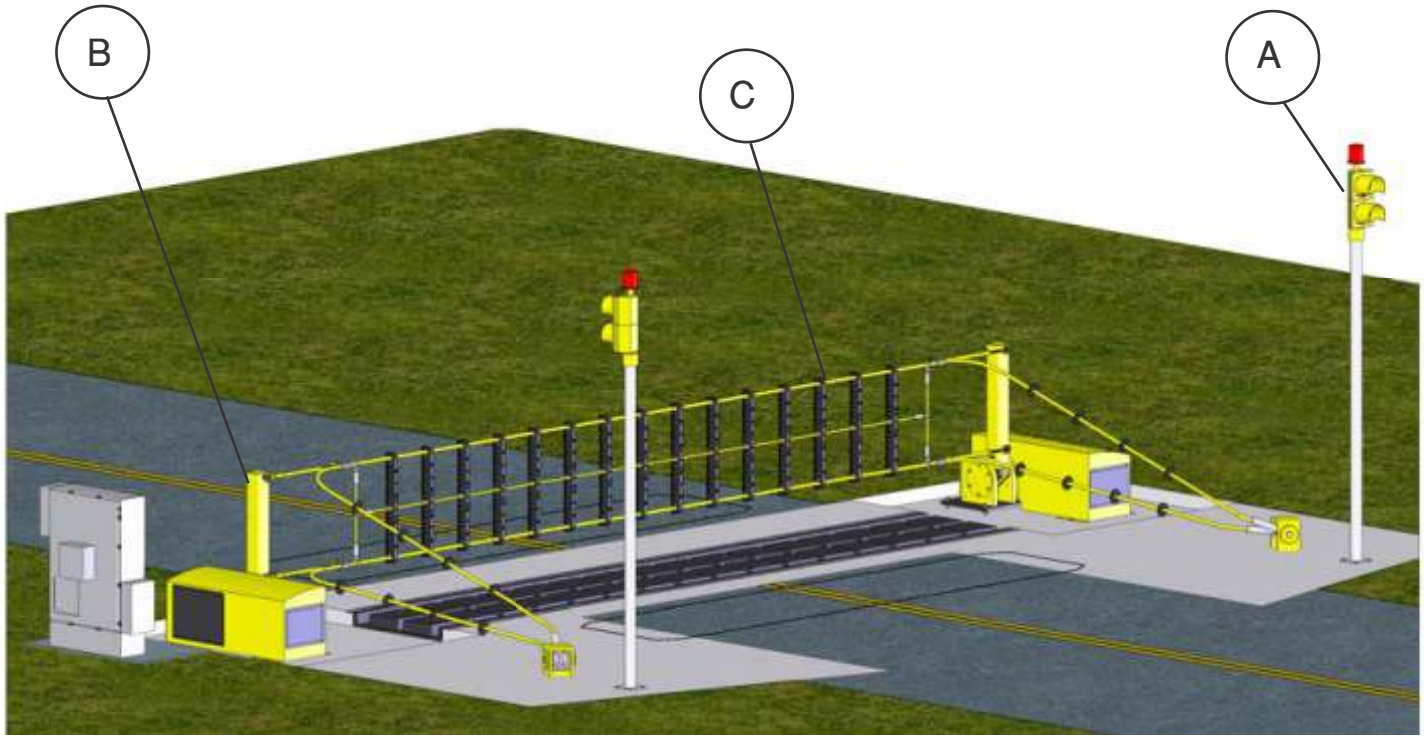
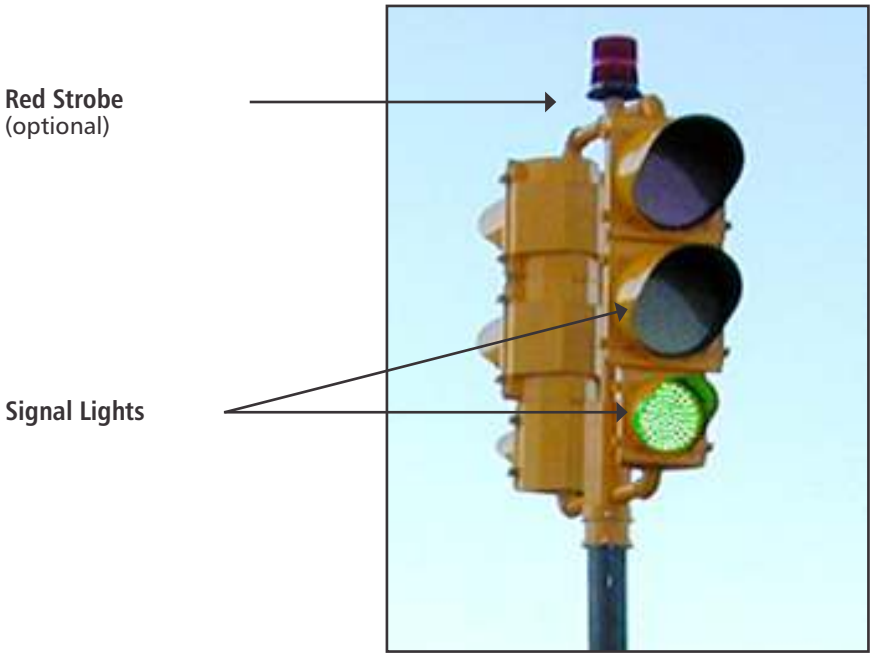


Figure 3

VISUALLY CHECK OPERATION OF SAFETY DEVICES

Verify that safety warning equipment is working properly.



Detail from Figure 3 (A)

FOUNDATION

Inspect foundation for cracks.

NET PADS

Perform a visual inspection on the net pads to see if any are raised up due to sediment under the mat.

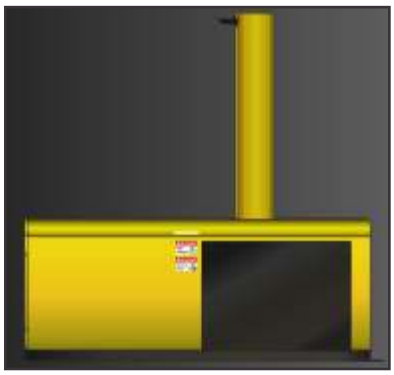
CABLE BUMBERS

Perform visual inspection of the net cable bumpers. They should be positioned to keep the portion of cable that would touch the ground in the lowered position from touching the ground during the raising and lowering of the GRAB.

NET ENCASEMENT

If the net encasement becomes cracked or damaged, replace the encasements necessary using the steps supplied on page 46 in the “Net Encasement Maintinenance” section of this manual.

ARM ALIGNMENT



CORRECT ALLIGNMENT

INCORRECT ALIGNMENT

MONTHLY INSPECTION OF NET TENSION

Verify the net is properly tensioned. The ideal tension is 1” to 1-1/2” of sag for every 10 feet of road span. For example, a 40-foot barrier should have 4” to 6” of sag.

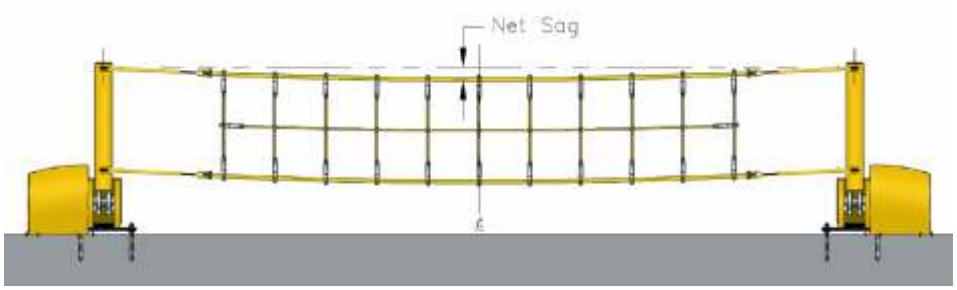


Figure 4

Refer to the steps in the FNSS Maintenance section of this manual. Address any maintenance or repair necessary to correct any discrepancies listed above.

RESETTING THE GRAB-400 FOLLOWING AN IMPACT

Should the net be deployed to stop a moving vehicle, perform the following steps to reset the GRAB. Immediately call FutureNet Security Solutions if you are unable to perform any of the steps.

1. Shut down the GRAB as instructed in the Maintenance Manu to ensure that the system is de-energized prior to resetting the GRAB.
2. Ensure that traffic control procedures and safety protocols a immediately put into effect per facility guidelines.
3. Ensure that the area is clear of any pieces of debris which may ha broken off of the vehicle or any fluids which may have leaked out of the vehicle during the strike.

In an emergency event, upon impact, the net breaks free from four turnbuckles. Each turnbuckle is secured to the net with one shear pin (as shown here).

Figure 5

4. Check the entire GRAB concrete foundation for any signs impact fatigue cracks or anchor bolts pulled from the concrete; repair immediately.

5. Check the condition of all netting and net encasement

    a. Damaged net encasements should be replaced as discuss on page 46 in the “Net Encasement Maintinenance” section in this Manual.

    b. Damaged netting should be replaced immediate .

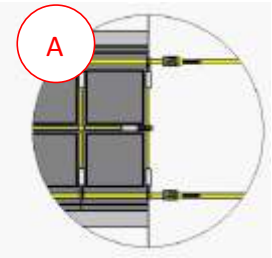
RESETTING THE GRAB-400 FOLLOWING AN IMPACT
(continued)

6. Before re-installing the net, check the condition of the swive turnbuckle. Replace as necessary.

7. Check the lifting arm. Examine the cotter pin that connects t swivel/turnbuckle to the lift arm. Replace as necessary.

8. Once thorough inspections has been done, you may proceed re-installing the net.

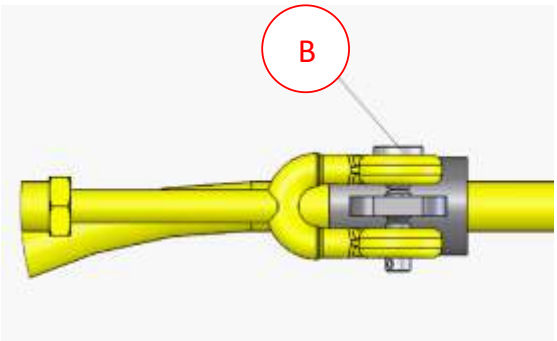
9. Place the net into the net pad recesses to ensure the net res centered in the grooves of the net pad when it is in the down position as shown below (A). Adjust the turnbuckles as required to make sure the net is centered. The net here is shown without the net encasements for illustration purposes.



CAUTION: Follow all OSHA and facility guidelines when moving the net pads. Net pads range from 100 to 140 lbs. per section.

10. Install new shear p (B) to secure the turnbuckles to the lifting arms as shown here.

11. Re-energize the system and raise the net into position to che the sag. Adjust the sag if necessary as instructed on page 40 in the "Monthly Maintenance Section" of this manual.



INSPECT THE NET RETRACTION SYSTEM

INSPECTION OF THE NET RETRACTION SYSTEM

(The system is option and inspection is only required where installed)

In conjunction with resetting the GRAB after an impact has occured, always inspect the net retraction system. Immediately call FutureNet Security Solutions if you are unable to perform any of the steps.

1. Shut down the GRAB as instructed in this Maintenance Manual to ensure that the system is de-energized prior to resetting the GRAB.
2. Ensure that traffic control procedures and safety protocols are immediately put into effect per facility guidelines.
3. Ensure that the area is clear of any pieces of debris which may have broken off of the vehicle or any fluids which may have leaked out of the vehicle during the strike.

CAUTION: Follow all OSHA and facility guidelines when moving the net pads. Net pads range from 100 to 140 lbs. per section.

4. Check the shear pins at the net connection for damage. If damage is present, shear pins must be replaced.
5. Inspect the entire length of the cable for damage from the impact. If any damage is present, the cable must also be replaced.
6. Once the integrity of the shear pins and the cable have been checked and or replaced, the barrier should be cycled several times to verify that the impact did not adversely affect the pulleys and bearing positions in the cable system. The net retraction system should allow smooth easy cycling.

If there is any indication of

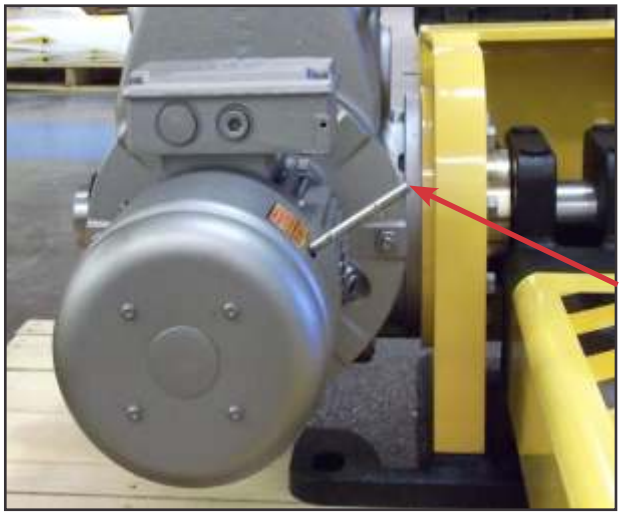
a. Binding of the cab
b. Jerking movement
c. ear to the shear pins or cables.

This could indicate that damage to the pulley system has occurred and additional maintenance may be required.

FNSS Maintenance # 1.866.504.4722

MANUAL RAISING AND LOWERING OF THE GRAB®

RAISING AND LOWERING THE GRAB-400



LOWER THE BARRIER

Remove the rear cover access panel on motor cover.

Pull the brake release toward you to lower the barrier.

RAISE THE BARRIER

Remove the rear cover access panel on motor cover.

Remove the plate.

Attach the 9/16”deep well socket to a drill and rotate clockwise while pulling the brake release toward you.

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TOOLS

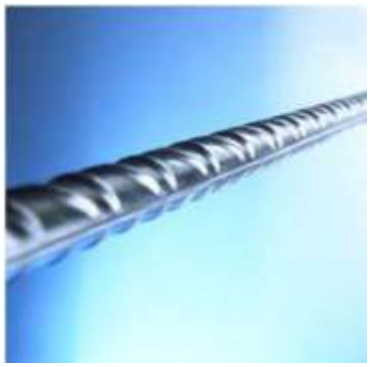
Note to maintenance technician: In order to assist with scheduling maintenance, a digital cycle counter is located inside the control panel.

Tools needed for the following maintenance tasks include:

- Grease gun for arm bearing and turnbuckles.

- Bearing Greas
  Note: Bearing grease should be purchased from FNSS as it meets strict penetration testing, operating temperature guidelines and provides the necessary mixes of detergents and lubricants to keep the GRAB-sp components operating at optimal levels.

- Two-foot rebar (rebar diameter may vary) and/or a spud crescent wrench can be used for tensioning the net turnbuckles.



TOOLS
(continued)

- 15/16” or 1-1/8” wrench or socket (depends on unit installed for arm bearing dust cover
- 24mm or 30mm wrench or socket (depends on unit installed for the gearbox

- 3/4” hex key for the arm shaft collar

- 9/16” deep well socket for the motor cover anchor

TOOLS
(continued)

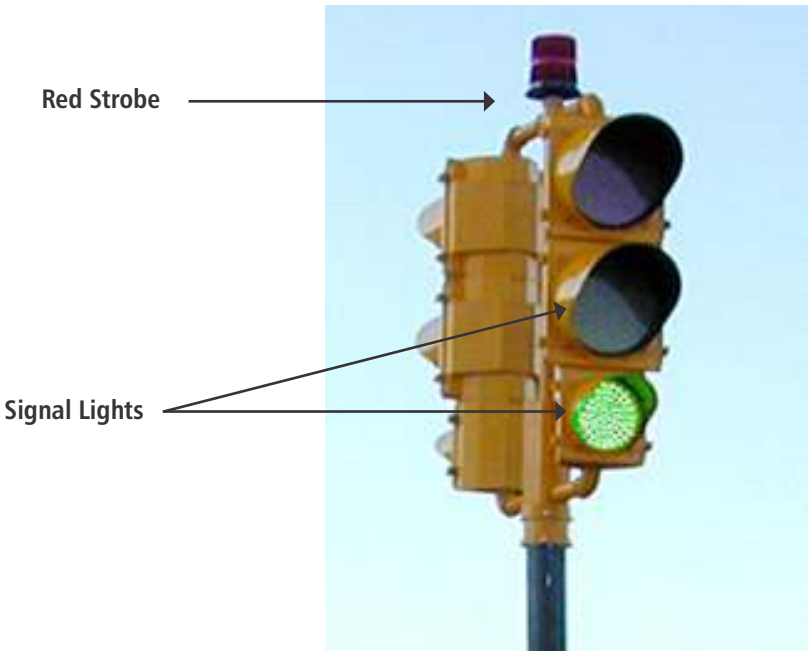
- Phillips Head Screw Driver or 7/16” nut driver for moto cover access panels

- 1-1/2” wrench for Arm Anchors

OPERATIONAL MAINTENANCE

Verify that safety detection equipment purchased with the barrier is working properly. Refer to the documentation that was provided with each item.

Verify that safety warning equipment (A)(Figure 6) is working properly.



Check that the net (C) Figure 6 goes up and down in a continuous motion and that the arms (B) travel in unison.

Test all buttons at all operator's stations and main panel.

In any of the above cases, if a system is not functioning properly, call your FNSS representative.

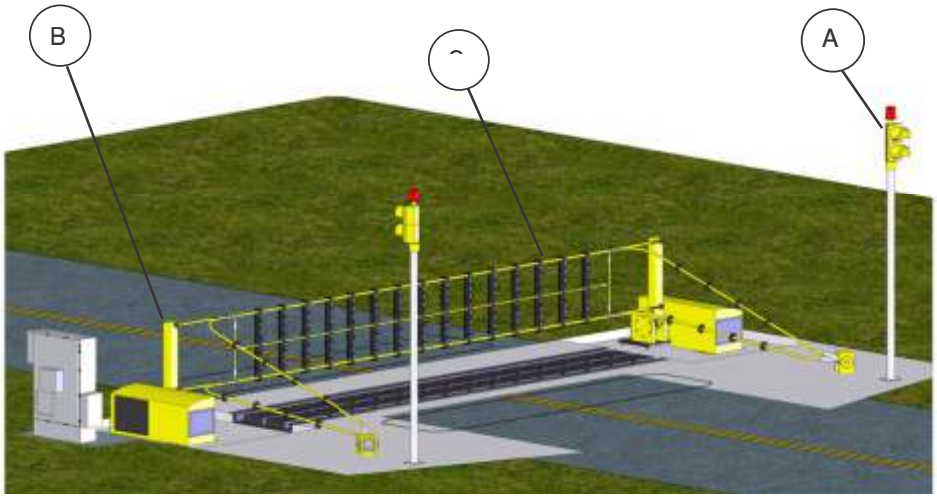


Figure 6

MONTHLY MAINTENANCE (or every 3,000 cycles)

FOUNDATION

Inspect foundation for cracks. Fill with suitable concrete crack filler if cracks are present.

NET PADS

Net Pads
Raise the net to the “UP” position.
CAUTION: Before proceeding, ensure that all power is removed from the system and that proper lockout-tagout procedures are followed.

Perform a visual inspection on the net pads to see if any are raised up due to sediment under the mat. If sediment is present, remove the net pads and thoroughly sweep the sediment out from the net pad depression. Follow OSHA or facility safety guidelines for lifting. Replace the net pads. Remove the safety lockouts and apply power to the system. Lower the net into the net pads.

NET ENCASEMENT

Refer to pages 46-50 for Net Encasement Maintenance.

NET CABLE BUMPERS

Net Cable Bumper Alignment
While the net is in the lowered position, ensure that safety precautions are taken to remove power from the system and ensure that all lockout/tagout procedures are in place.

The net cable bumpers should be positioned to keep the portion of cable that would touch the ground in the lowered position from touching and scraping the ground during the raising and lowering of the GRAB.

If adjustment is necessary, loosen the retaining screw, viewable from the side of the bumper, reposition the bumper on the cable and retighten the retaining screw.

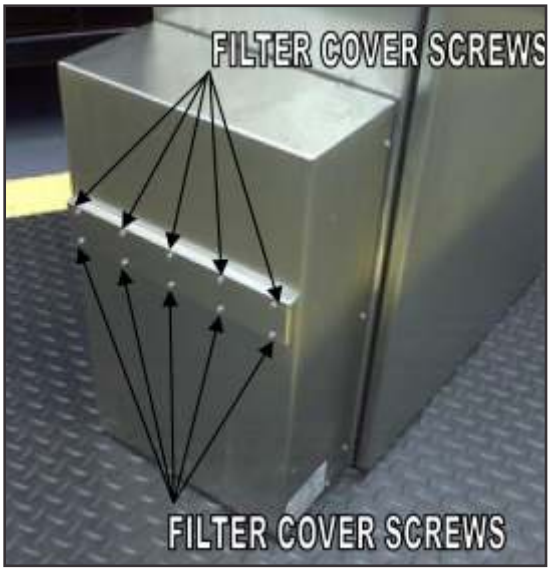
MONTHLY MAINTENANCE (or every 3,000 cycles)

PAINT

Touch up paint as required.

BARRIER CONTROL PANEL

Inspect the intake fan filter located on the barrier control panel and battery backup panel. Replace clogged filter as required. Never operate system without proper filters in place. To access the fan filter, remove the ten (10) screws and fan filter cover as shown.



Slide the filter out for inspection, remove and replace if necessary. Perform this on the filter located on battery backup is so equipped.

Ensure that you replace the filter cover and reinstall all ten screws.

Test fans and thermostat operation by adjusting thermostat throughout its limits. The fans should turn on when the temperature is set lowest and off when the temperature is set highest. Return the thermostat to its normal setting of 80-degrees.

STANCHIONS

Inspect the stanchions (Figure 7) for loose stanchion pin and retainer.

Figure 7

NET LIFTING ARMS

Grease the four arm bearings. Each arm has two bearings as shown in Figure 8a . Each bearing has one grease fitting.

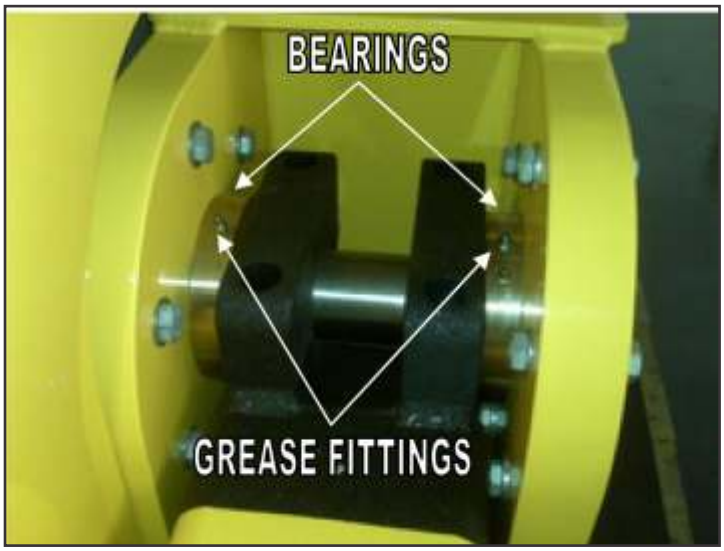


Figure 8a

Use high-grade lithium grease. Pump in the grease until it comes out of the side of the bearing. Ensure that the tip of the grease gun is securely held in place on the fitting while pumping as shown in Figure 8b .

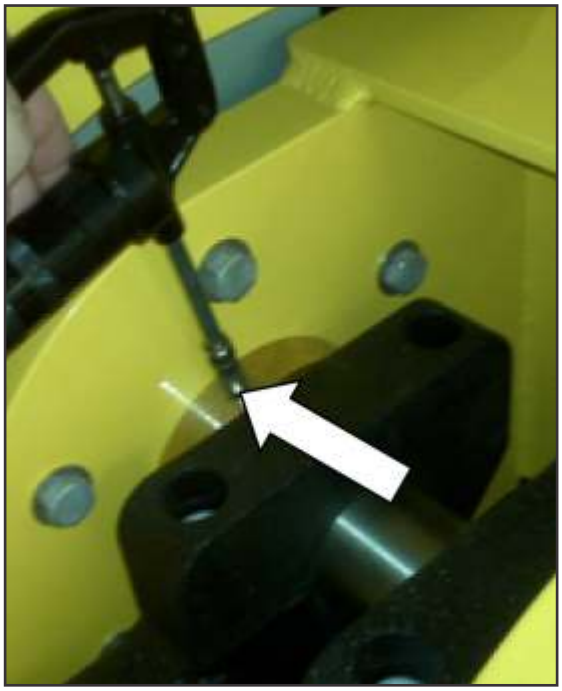


Figure 8b

NET LIFTING ARMS

Inspect the gearbox for leaks. If leaks are found coming from the gearbox, contact FNSS.

Inspect the net lifting arms for loose bolts and tighten as needed.

TURNBUCKLES

Grease the turnbuckle bearings (A) Figure 8c . Use high-grade lithium grease. Pump in the grease until it comes out of the bearing. Ensure that the turnbuckle lock nut (B) Figure 8c is tight.

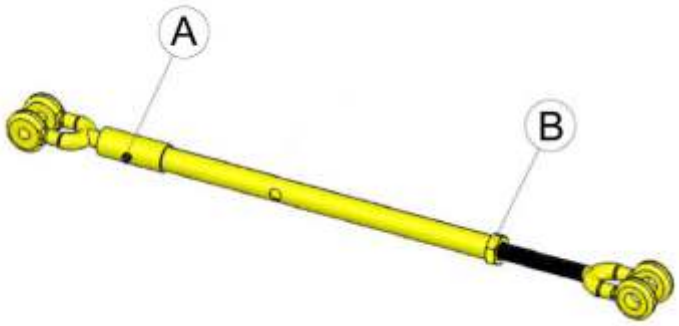


Figure 8c

NET TENSION

Verify the net is properly tensioned. The ideal tension is 1” to 1-1/2” of sag for every 10 feet of road span. For example, a 30-foot barrier should have 3” to 4½” of sag.

Measure the sag by running a string (see dotted line in Figure 8d) between the two net lifting arm pad eyes, Figure 8d , and measure the difference between the string and the center of the net as shown

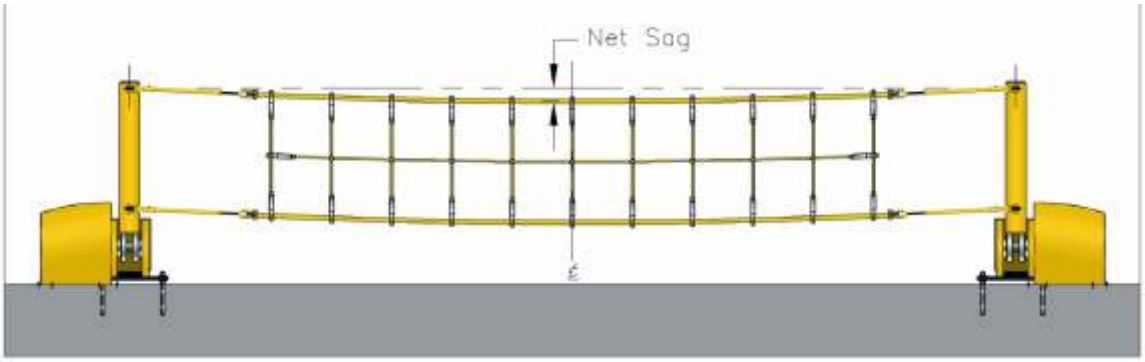


Figure 8d

If the sag is outside the recommended parameters, perform the following steps to ensure that the net is properly tensioned at all four turnbuckles:

1. Position the net into the “lowered” position; remove power from syst and ensure that all lockout/tagout procedures are in-place.

2. Loosen all four turnbuckle locking nut

3. Relieve tension on the net by loosening all four turnbuckle

4. Ensure the net is centered in the net pad

5. Evenly tighten all four turnbuckles by hand while net is in the net pa

6. Once the turnbuckles are hand-tightened, return power to the barri and engage the barrier into the “raised” position.

7. Remove power from system and ensure that all lockout/tago procedures are in-place.

8. Measure the net sag again. At this time, the net sag should exceed the 1” to 1-1/2” per 10 feet of net recommendation.

9. Tighten the four turnbuckles ½ turn at a time, using a bar inserted into the adjustment hole, shown in Figure 9 , in the turnbuckle until the recommended 1” to 1-1/2” per 10’ of net is achieved. This should place the same amount of tension at each of the four turnbuckle’s shear\pins.

NET TENSION
(continued)

10. Retighten the locking nuts on the turnbuckl

11. Re-energize the barrier system and ensure that the net fits into the n pads when lowered.

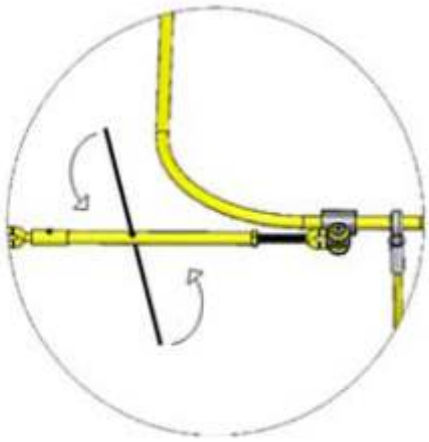


Figure 9

Shown below is the detail involved with adjusting the net tension to ensure the net rests centered in the grooves of the net pad when it is in the down position as shown in Figure 10 .

Move the net pad (A) right or left or adjust turnbuckles to center the net in the grooves as shown in Figure 10 . The net is shown without the net encasement option.

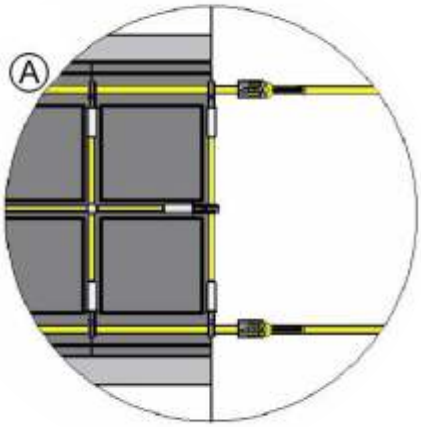


Figure 10

CAUTION: Follow all OSHA and facility guidelines when moving net pads. Net pads range from 100 lbs to 140 lbs per section.

NET ENCASEMENT MAINTENANCE

NET ENCASEMENT REMOVAL

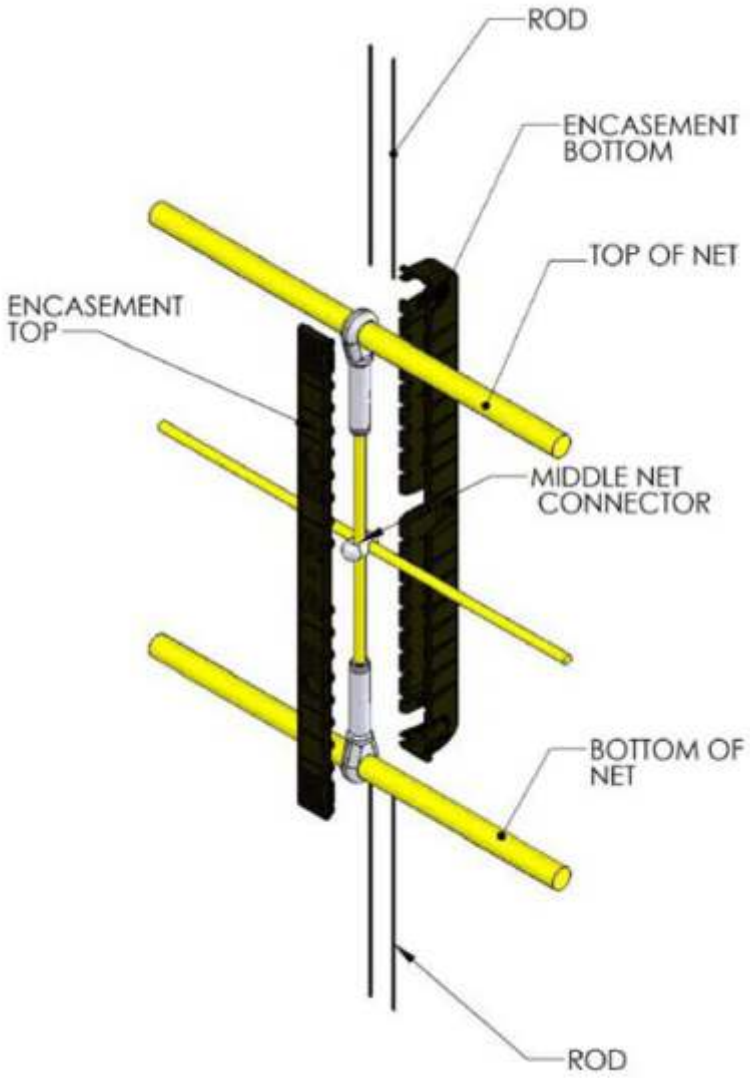
If the net encasements become cracked or damaged, replace the encasements as necessary using the following steps:

NOTE: Ensure that traffic is properly controlled during all maintenance activity in coordination with the owner/manager.

1. Raise the net into the “UP” positio

2. Ensure power to the system is disengaged and all safety procedur are followed to prevent accidental startup during the net encasement maintenance.

3. The net encasement consists of (4) stainless steel rods, the encasement top, and the encasement bottom. See Detail A for a breakaway.



Detail A

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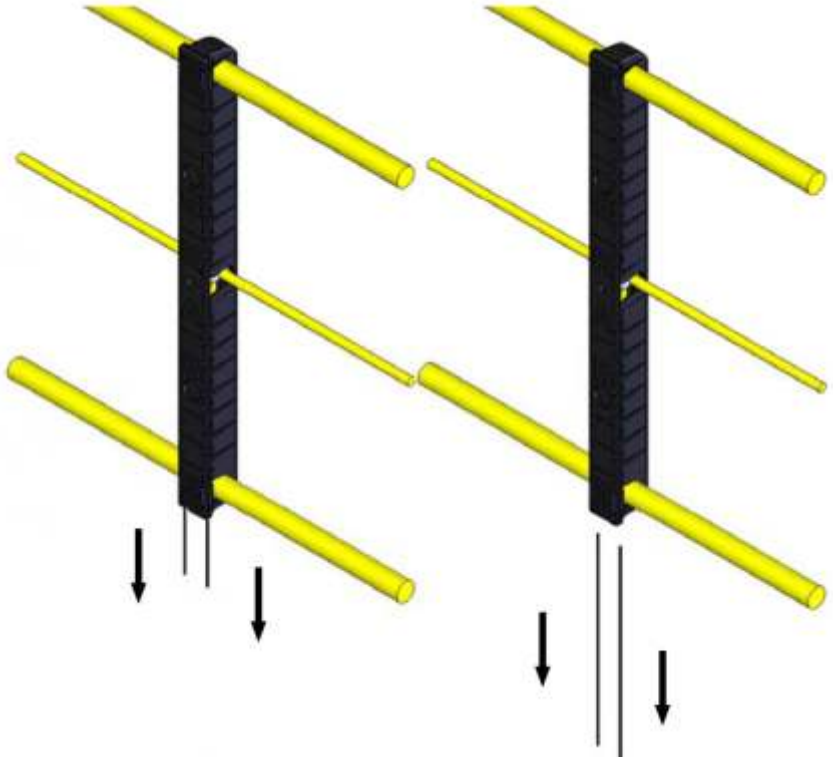
NET ENCASEMENT REMOVAL
(continued)

4. The ends of the stainless steel rods are bent 90 degrees to secure them in place. Bend the ends straight and remove by pulling them straight up (top) or straight down (bottom).

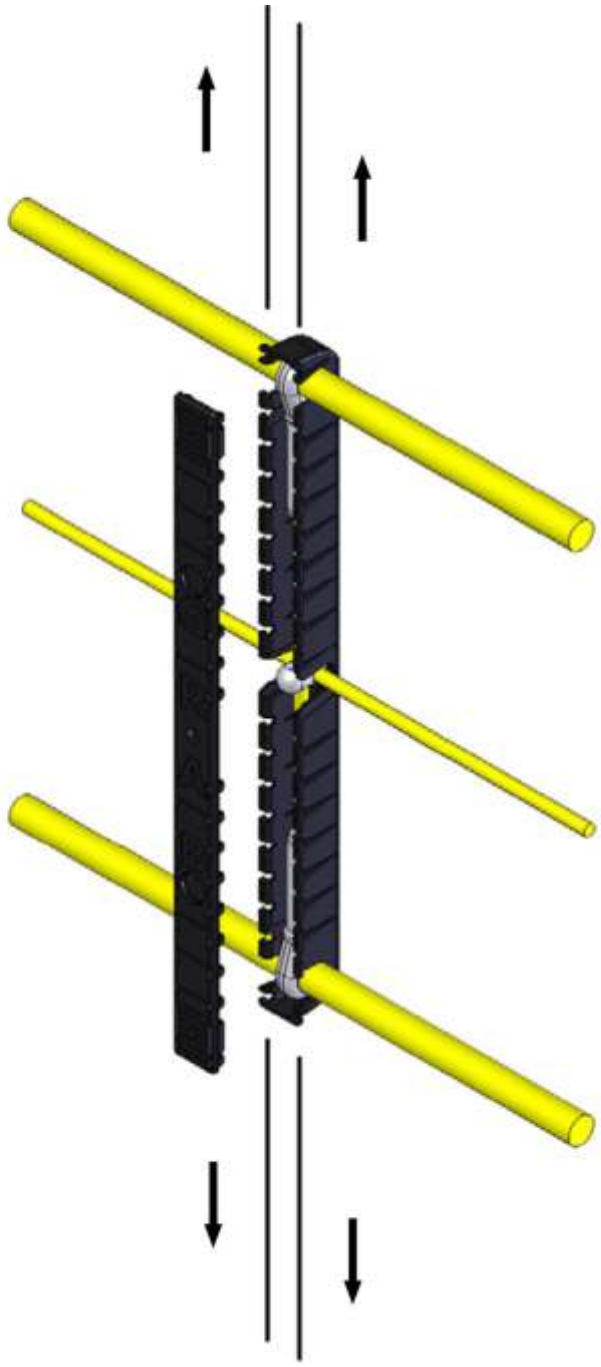


Detail B

Detail A

NET ENCASEMENT REMOVAL
(continued)

5. Separate top encasement from the U-shaped encasemen



Detail C

6. Discard the old net encasement and proceed to NET ENCASEMENT ASSEMBLY ".

NET ENCASEMENT ASSEMBLY

1. Make sure you have the matched pairs of net encasemen

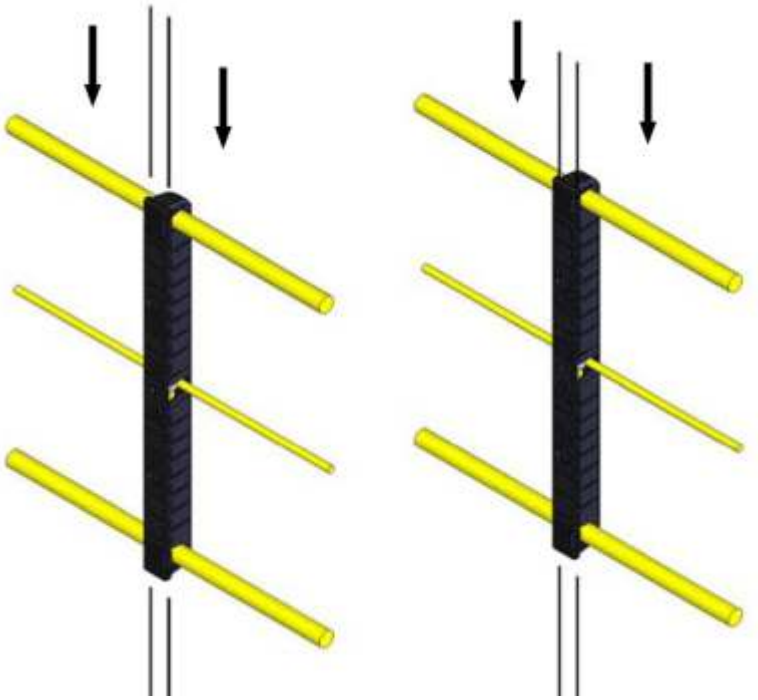
2. With the net in the raised position, working on the side of the n that rests on the net pad when lowered, place the net encasement bottom over the vertical cable orienting the logo upright if present.

3. Place the net encasement top onto the bottom capturing t cable. The parts have features that interleave like a hinge. Ensure that the hinges are aligned and seated together. See Detail C .

4. Insert the stainless steel rod into the hole in the t net encasement.

5. ork the stainless steel rod into the U-shaped lip of the bottom net encasement. Twist the stainless steel rod to help feed it through. Continue until the stainless steel rod is completely inserted and bend both ends 90 degrees to secure them in the net encasement.

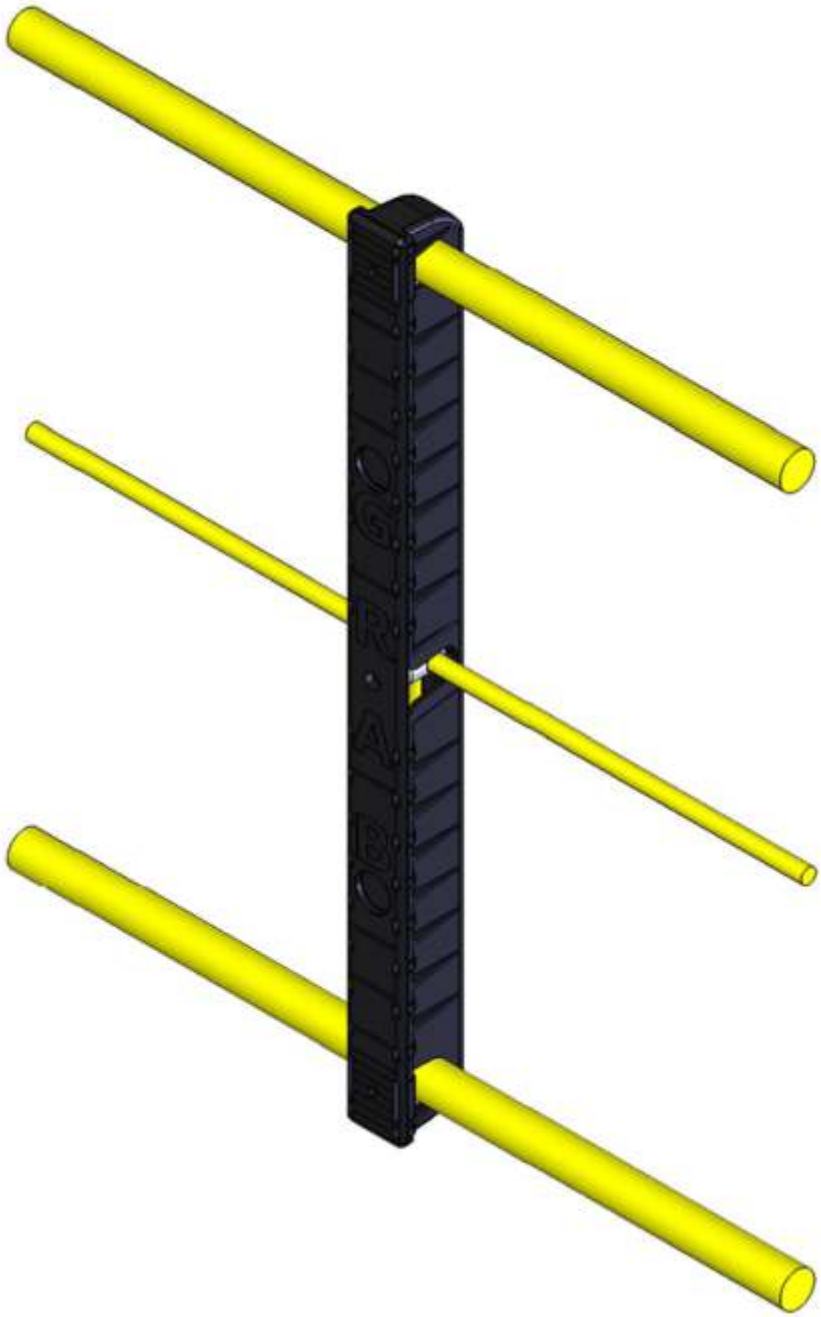
6. Repea Step 5 with the other top side. See Detail D .



Detail D

NET ENCASEMENT ASSEMBLY
(continued)

7. Insert the bottom stainless steel rods in a similar manner a step 5 . At this time the net encasement should be fully installed and held firmly in-place around the net, as shown below.



SHEAR PINS

Every year or 36,000 cycles, the SHEAR PINS (P) Figure 12 should be removed and replaced in each of the turnbuckles.

CAUTION: Use only the FNSS replacement shear pins. Do not substitute any other material for these parts. Doing so may cause the barrier to become inoperable if an impact occurs and voids the warranty on the equipment.

To replace the pins:

1. Contact owner to verify proper procedure for controlling rerouting traffic at the barrier scheduled to be serviced.

2. Lower the net down and turn power f to the unit.

3. Before loosening the tension, legibly mark the position of t turnbuckles on their threaded posts.

4. Loosen all four turnbuckles using a piece of rebar or a spud wrenc

5. Remove the cotter pins and then shear pins and discard the o shear pins.

6. Replace the shear pins with the proper replacements available fr FNSS.

7. Replace the cotter pins and tighten all four turnbuckles back the mark on the threaded posts.

8. Check the net tension and net sag. If necessa , tension the net as described on page 44.

9. Ensure that net is centered in net pad

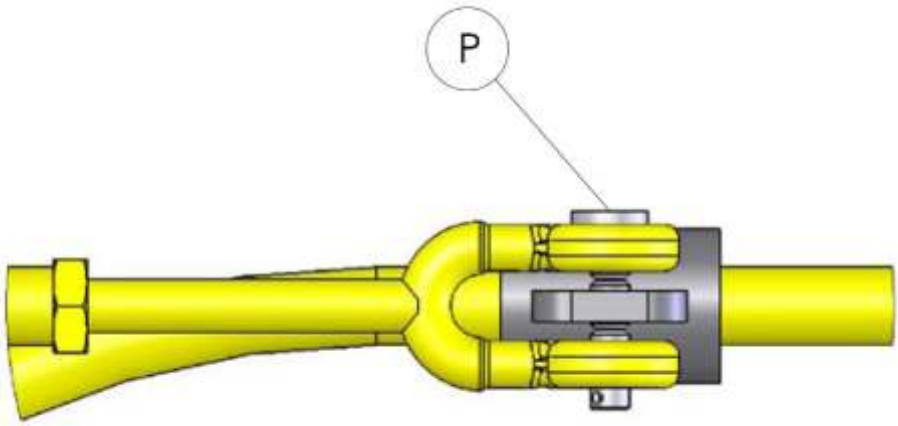


Figure 12

MAINTENANCE SCHEDULE

Period	Weekly	Monthly	Yearly
Test safety detection and warning equipment	●		
Check that net movement is continuous and that both arms move in unison	●		
Test all buttons at operator stations	●		
Visually inspect for missing, torn, or illegible safety labels		●	
Visually inspect concrete for cracks		●	
If necessary, clean net pads		●	
If necessary, clean net pits		●	
Visually inspect net encasements and re-place if necessary		●	
Visually inspect protective net bumpers (placement and condition)		●	
Check net tension; adjust if necessary		●	
Check net position in net pads; adjust if necessary		●	
Check stanchions and net lifting arms for loose bolts and worn hardware		●	
Visually inspect net retraction cannisters for loose debri. Clean out if necessary.		●	
Visually inspect net arm gearbox for leaks		●	
Grease the four (4) turnbuckles		●	
Grease the four (4) arm bearings		●	
Inspect and replace if necessary Barrier Control Panel Filters		●	
Test operation of Barrier Control Panel fans and thermostat		●	
Touch-up paint as required		●	
Replace shear pins and cotter pins & retension the net			●

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MAINTENANCE RECORD

Month	Cycles (from digital counter)	Signature	Date
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

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GLOBAL GRAB TECHNOLOGIES

SPARE PARTS GUIDE

Following is a list of spare parts which, if ordered, are specific to the model of GRAB-400 at your facility and specific to any customizations made throughout the life of the project. If you have questions regarding which part(s) you should order, please contact FNSS.

Item Number	Description	Usage Net Length (ft)	Qty
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 8 ft. GRAB-400 10 ft. GRAB-400 12 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 14 ft. GRAB-400 16 ft. GRAB-400 18 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 20 ft. GRAB-400 22 ft. GRAB-400 24 ft. GRAB-400 26 ft. GRAB-400 28 ft. GRAB-400 30 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 32 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 34 ft. GRAB-400 36 ft. GRAB-400 38 ft. GRAB-400 40 ft. GRAB-400 42 ft. GRAB-400 44 ft. GRAB-400 46 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 48 ft. GRAB-400 56 ft. GRAB-400 58 ft. GRAB-400 60 ft. GRAB-400 62 ft.	4
-	CONTACT FNSS FOR SPECIFIC SHEAR PIN INFO	GRAB-400 64 ft. GRAB-400 66 ft. GRAB-400 68 ft. GRAB-400 70 ft.	4
001235	TURNBUCKLE- ASSM 1X23” w/ STATIONARY JAW FOR 5/8 (0.63) SHEAR PIN	GRAB-400 8 ft. GRAB-400 10 ft. GRAB-400 12 ft. GRAB-400 14 ft. GRAB-400 16 ft. GRAB-400 18 ft. GRAB-400 20 ft. GRAB-400 22 ft. GRAB-400 24 ft. GRAB-400 26 ft. GRAB-400 28 ft. GRAB-400 30 ft.	1

Item Number	Description	Usage K Rating- Net Length (ft)	Qty
001236	TURNBUCKLE- ASSM 1X23" w/ STATIONARY JAW FOR 7/8 (0.88) SHEAR PIN	GRAB-400 32 ft. GRAB-400 34 ft. GRAB-400 36 ft. GRAB-400 38 ft. GRAB-400 40 ft. GRAB-400 42 ft. GRAB-400 44 ft. GRAB-400 46 ft. GRAB-400 48 ft. GRAB-400 56 ft. GRAB-400 58 ft. GRAB-400 60 ft. GRAB-400 62 ft. GRAB-400 64 ft. GRAB-400 66 ft. GRAB-400 68 ft. GRAB-400 70 ft.	1
000191	IMPACT SOCKET 15/16" HEX X 3/4" DRIVE	Used on the motor and shaft to manually lift the arm	1
000030	WEDGE STEEL ANCHOR 3/8 -16X5 MAGNI	Anchors used for the motor covers and as net pad retention	10
000269	FAN FILTERS - 5 PACK	Replacements for Control Panels so Equipped	1
000198	COTTER PIN - 3/16 DIA X 1.50 ~18-8 SS	Used when replacing sheer pins	4
000007	STROBE LIGHT	Red strobe bulb replacement	1
000012	USR SAFETY YELLOW PPG W43597	Safety Yellow Paint	1
000027	HORN - 350 WB-120	Safety Warning Device	1
000040	RED 22mm PILOT LIGHT	Illuminates 22mm Red pilot light on control station	1
000041	GREEN 22mm PILOT LIGHT	Illuminates 22mm Green pilot light on control station	1
000056	RENO LOOP DETECTOR	Loop detector for vehicle detection over inductive loop	1
000062	GREASE	Grease for stanchions, lifting, arms and turnbuckles	1
000150	SCREW - 1/4- 20 UNC X .75 SET SCREW ~SS (100 QTY)	Top & Bottom Net Verticals	30
000151	SCREW -1/4-20 UNC X .50 SET SCREW ~SS (100 QTY)	Center Cable of Net	30
000232	WHITE 22mm PILOT LIGHT	Illuminates 22mm white pilot light on control station	1
000269	FAN FILTERS	Replacement Air Filter	1
000400	REFLECTOR (bottom of net encasement)	Replacement reflector for bottom of net encasement	10
000401	REFLECTOR (top of net encasement)	Replacement reflector for top of net encasement	10

Item Number	Description	Usage K Rating- Net Length (ft)	Qty
001162	8” Green LED	8” replacement Green LED for signal light	1
000446	8” Red LED	8” replacement Red LED for signal light	1
000448	8” Yellow LED	8” replacement Yellow LED for signal light	1
000862	12” Green LED	12” replacement Green LED for signal light	1
000163	12” Red LED	12” replacement Red LED for signal light	1
000164	12” Yellow LED	12” replacement Yellow LED for signal light	1
000490	PROXIMITY SWITCH	Replacement proximity switch for net arm	1
000806	LOOP SEALANT	Sealant to cover vehicle detection loop	1
001179	STAINLESS STEEL RETAINER ROD	Replacement retainer rod for one net encasement	4
500094	NET ENCASEMENT (TOP)	Replacement for Top portion of Net Encasement	1
000896	CABLE BUMPERS	Placed on cables to decrease wear and tear	1

CONTACT INFORMATION

Global Grab Technologies:

277 Mallory Station Road, Suite 112

Franklin, TN 37067

Main: 615.224.0400

Fax: 615.224.0411

Email:Info@grabglobal.com