

**KELLEY**

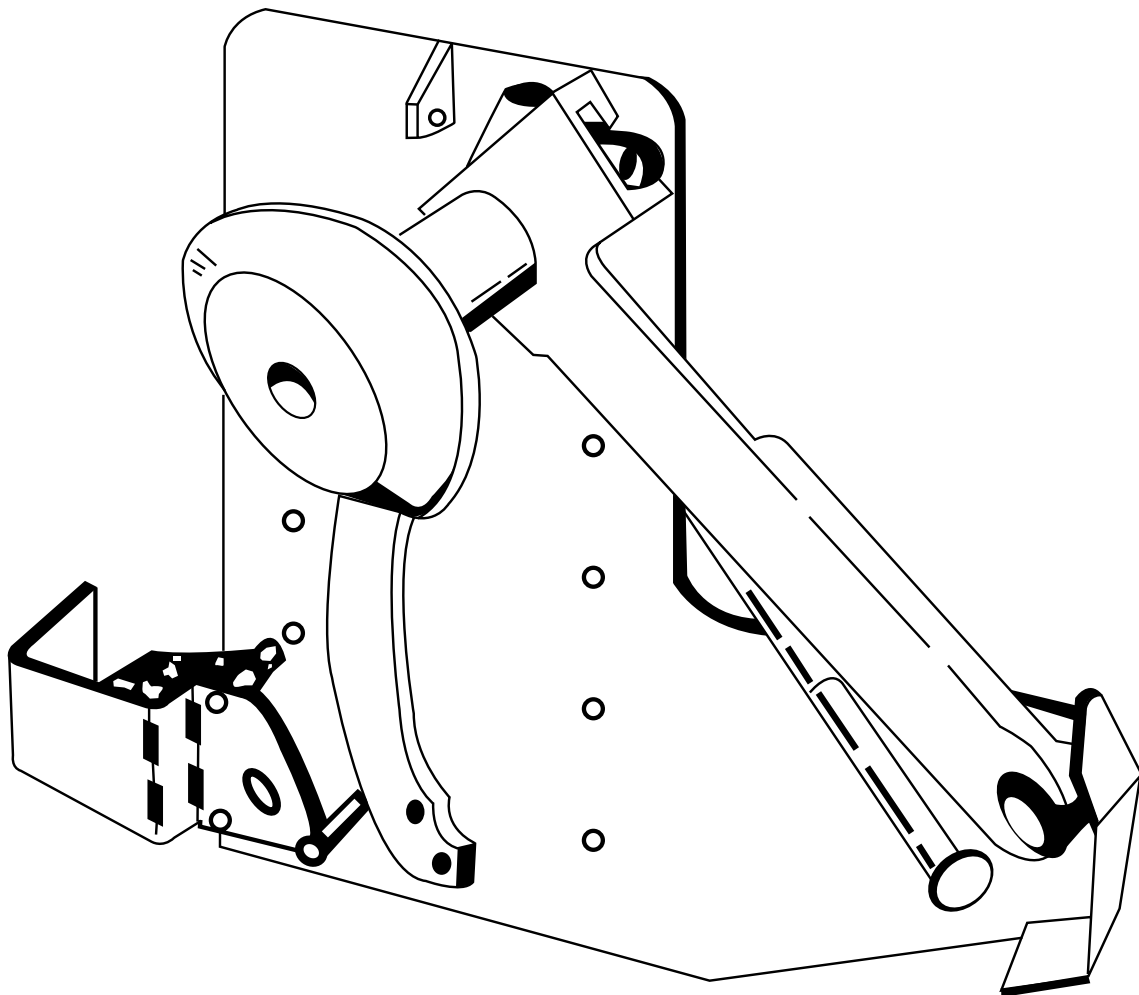
**STAR® TRUK STOP®**

**Vehicle Restraint**

**STAR® 2**

**w/ XController Module**

**ENTRE//MATIC**



This manual applies to vehicle restraints manufactured beginning February 2013 with the serial numbers 61074779 and higher.

**▲ WARNING**

*Do not install, operate or service this product unless you have read and understand the Safety Practices, Warnings, and Installation and Operating Instructions contained in this manual. Failure to do so could result in death or serious injury.*

# **User's Manual**

**Installation, Operations,  
Maintenance and Parts**

Part No. 6010005D

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# TABLE OF CONTENTS

Introduction.....	2	Troubleshooting.....	14
Safety Signal Words.....	2	Operational Checks.....	15
Safety Practices.....	3	Sensor Bar Switch Adjustment.....	16
Installation.....	4	Parts Replacement Instructions.....	17
Mounting Considerations.....	4	Latch Mechanism.....	17
Tools Required.....	4	Hook Arm and Gas Spring.....	17
Anchor Installation (Std. Installation).....	5	Subframe Reinforcing Kit.....	18
Installation with Pit Type Dock Levelers.....	6	Parts List.....	19
Installation with EOD Type Dock Levelers.....	10	Wiring Diagram.....	24
Optional Stanchion Mounting.....	11	Kit Instructions.....	25
Optional Snow Plow Guard Placement.....	12	Warranty Information.....	27
Operation.....	13	Distributor Information.....	28

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## INTRODUCTION

Welcome, and thank you for buying your vehicle restraint from Kelley®.

This User's Manual contains information that you need to safely install, operate and maintain the vehicle restraint. It also contains a complete parts list and information about ordering replacement parts. Please keep and read this User's Manual before using your new vehicle restraint.

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## SAFETY SIGNAL WORDS

ay find safety signal words such as DANGER, WARNING, CAUTION or NOTICE throughout this User's Manual. Their use is explained below:



***This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.***

### **▲ DANGER**

***Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.***

### **▲ CAUTION**

***Indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.***

### **▲ WARNING**

***Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.***

### **NOTICE**

***Notice is used to address practices not related to personal injury.***

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# SAFETY PRACTICES

## **▲ WARNING**

***Read these safety practices before installing, operating or servicing the vehicle restraint. Failure to follow these safety practices could result in death or serious injury.***

READ AND FOLLOW THE OPERATING INSTRUCTIONS IN THIS MANUAL BEFORE OPERATING THE VEHICLE RESTRAINT. If you do not understand the instructions, ask your supervisor to teach you how to use the vehicle restraint.

Improper installation of vehicle restraint could result in death or serious injury to dock workers or other users of the vehicle restraint .

Be certain to follow the installation instructions in this manual.

## **OPERATION**

Use by untrained people can cause property damage, bodily injury and/or death. Your supervisor should teach you the safe and proper way to use the vehicle restraint . Read and follow the complete OPERATION PROCEDURE on page 13 before use. **DO NOT USE THE VEHICLE RESTRAINT IF IT IS NOT WORKING RIGHT.** Tell your supervisor it needs repair.

Be certain bystanders in the driveway stand clear when vehicle restraint is operated.

Do not load or unload any vehicle unless you make certain the vehicle restraint has securely hitched the vehicle's rear impact guard (RIG) and set the brakes. If the vehicle restraint does not hitch the vehicle's RIG for any reason, **BE CERTAIN TO CHOCK THE VEHICLE WHEELS BEFORE LOADING OR UNLOADING.**

Before chocking wheels or engaging vehicle restraint, dump air from air ride suspensions and set parking brakes.

## **INSTALLATION, MAINTENANCE AND SERVICE**

If the vehicle restraint does not operate properly using the procedures in this manual, **BE CERTAIN TO CHOCK THE VEHICLE WHEELS BEFORE LOADING OR UNLOADING.** Call your local Kelley distributor for service.

Place barricades around pit on dock floor and drive while installing, maintaining or repairing vehicle restraining device.

Do not stand in the driveway between the dock and a backing vehicle.

Do not use the vehicle restraint as a step.

Do not install the vehicle restraint anchor bolts into aged or unsound concrete.

Keep hands and feet clear of guide tracks and moving parts at all times.

Do not weld on ductile iron hook casting (item 10, page 14).

All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes.

Before doing any electrical work (including changing bulbs), make certain the power is disconnected and properly tagged or locked off.

If it is necessary to make troubleshooting checks inside the control box with power on, **USE EXTREME CAUTION.** Do not place fingers or uninsulated tools inside the control box. Touching wires or other parts inside the control box could result in electrical shock, death or serious injury.

If you have any problems or questions, contact your local Kelley distributor for assistance.

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# INSTALLATION

## MOUNTING CONSIDERATIONS

### **▲ WARNING**

***Before installation read and follow the Safety Practices on page 3. Failure to follow these safety practices could result in death or serious injury.***

***READ AND FOLLOW THE OPERATION INSTRUCTIONS IN THIS MANUAL BEFORE OPERATING THE VEHICLE RESTRAINT. If you do not understand the instructions, ask your supervisor to teach you how to use the vehicle restraint.***

***Improper installation of the vehicle restraint could result in death or serious injury to dock workers or other users of the vehicle restraint.***

***Place barricades around pit on dock floor and drive while installing, maintaining or repairing vehicle restraining device.***

***Be certain bystanders in the driveway stand clear when vehicle restraint is operated.***

***Be certain to follow the installation instructions in this manual.***

***Do not install the vehicle restraint anchor bolts into aged or unsound concrete.***

1. The dock face on which the vehicle restraint will be mounted must be flat to prevent binding of the mechanism. If the dock face is not flat it may be necessary to use shims or physically modify the dock face to provide a flat mounting surface. If shimming is required it is necessary to shim behind the pivot pin as well as at the anchor bolts.

Vehicle restraints require a 4" bumper projection from the front of the bumper to the rear of the back plate of the restraint (the mounting surface). Less than 4" of projection can allow vehicle RIG to damage the restraint. Some lip saddle type dock levelers may require modifications – consult factory.

2. The standard anchors provided with this product may only be used on docks constructed of solid concrete. For mounting to block walls refer to Service Bulletin #1023. Docks constructed with other materials require special mounting consideration. Contact your local Kelley distributor for information.

3. Docks 46" and lower may require a specially modified vehicle restraint or operation of the dock leveler may need to be restricted. Contact your local Kelley distributor for information.
4. A 3/8" gap is required between the dock leveler front angle and pit floor to install the horizontal mounting plate.
5. Do not install the vehicle restraint anchor bolts into aged or unsound concrete.

### **NOTICE**

***If the driveway beneath the vehicle restraint is affected by frost heave:***

1. ***Raise restraint sufficient distance to prevent damage, or***
2. ***Modify driveway to provide additional clearance.***

***Consult registered architect or professional engineer.***

## TOOLS REQUIRED

- Welder
- Impact or rotary drill with 1/2" diameter concrete drill bit
- 9/16 inch wrench
- General hand tools
- Touch up paint (Gold)
- Torque wrench (45 ft-lb min.)
- Rebar cutting drill bit with rotary only drill motor.

## ANCHOR INSTALLATION (STANDARD INSTALLATION)

### ⚠ WARNING

Do not install the vehicle restraint anchor bolts into aged or unsound concrete.

Use standard anchors on smooth 4,000 PSI concrete walls only. For aggregate, cinder block or tilt walls - consult factory.

### ⚠ CAUTION

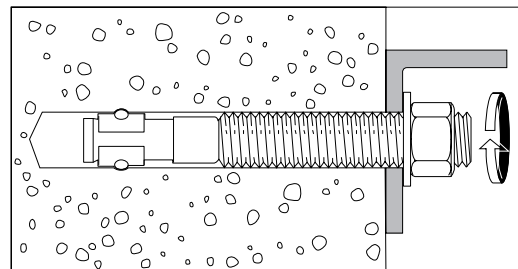
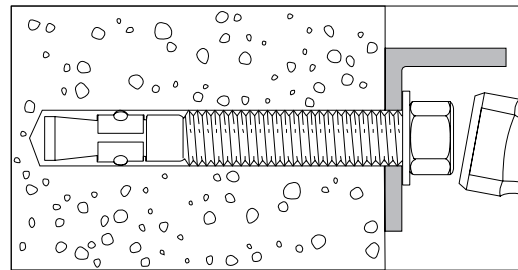
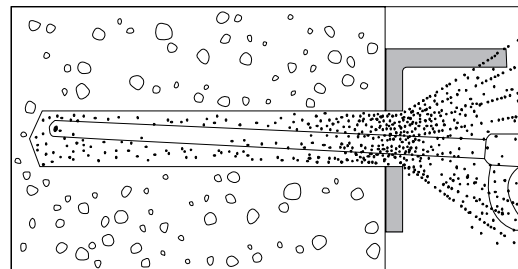
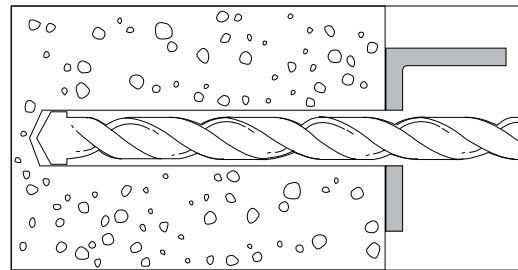
Oversized holes in the base material will make it difficult to set the anchor and will reduce the anchor's load capacity.

### NOTICE

Do not use an impact wrench to set or tighten the anchors.

1. Using a 1/2" diameter bit, drill a hole into the base material to a depth of at least 1/2" deeper than the embedment. The minimum embed depth of the 1/2" anchor is 3-3/8". The tolerances of the drill bit should meet the requirements of ANSI Std. B212.15.
2. Blow the hole clean of dust and other material. Do not expand the anchor or screw the bolt in the anchor assembly prior to installation.
3. Drive the anchor through the fixture into the anchor hole until the bolt head is firmly seated against the fixture. Be sure the anchor attains the minimum embed depth of 3-3/8".
4. Tighten the anchor by applying 40 ft. lbs. torque. See Fig 1.

Fig. 1



# INSTALLATION, continued

## INSTALLATION WITH PIT TYPE DOCK LEVELERS

### **⚠ WARNING**

*Do not install, operate or service this product unless you have read and followed the Safety Practices, Warnings, and Installation and Operating Instructions contained in this manual. Failure to do so could result in death or serious injury. ALWAYS USE DOCK LEVELER SUPPORT WHEN WORKING UNDER A DOCK LEVELER RAMP OR LIP.*

*Place barricades around pit on dock floor and drive while installing, maintaining or repairing dock leveler.*

*Improper installation of anchoring devices or installation into aged or unsound concrete could result in death or serious injury.*

1. Insert the horizontal mounting plate into the gap between the dock leveler front angle and the pit floor.

### **NOTE:**

When used with older style Kelley Mechanical “MK” or “K” series and Kelley Hydraulic EHD 60,000 lb. capacity dock levelers, the mounting plate must be mounted to the left of the dock leveler centerline as shown in Fig. 2. This off-center mounting is to allow for dock leveler spring adjustment and to prevent interference with lip rod lugs. For other dock levelers the horizontal mounting plate may be centered with the dock leveler. See Fig. 3.

If the horizontal mounting plate cannot be used, the top portion of the vehicle restraint must be welded to the dock leveler front angle and additional anchor plates installed to fasten the dock leveler subframe securely to the pit floor. A dock leveler reinforcing kit Kelley part number (P/N) 901-323 is available for this purpose. Recommended reinforcing is illustrated on page 18.

2. Check access to the mounting plate anchor holes. A minimum of four (4) anchor holes spaced across the plate must be accessible. Drill additional 9/16 inch diameter anchor holes through the mounting plate if required. See Fig. 4.
3. Place the bottom edge of vehicle restraint 1/2" above the driveway and align the backplate with the horizontal mounting plate. See Fig. 5. If the driveway is affected by heaving from frost, follow NOTICE on page 4 to prevent damage from the driveway movement.

Fig. 2

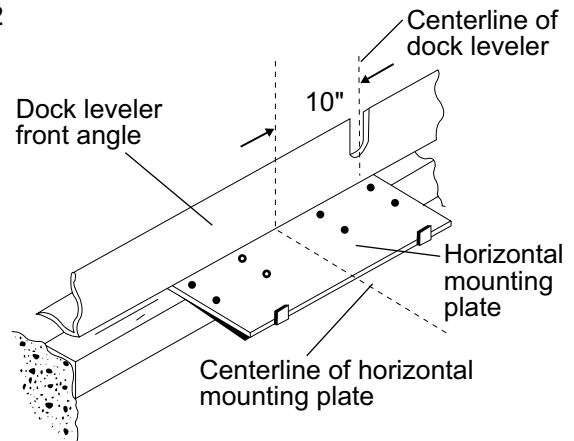


Fig. 3

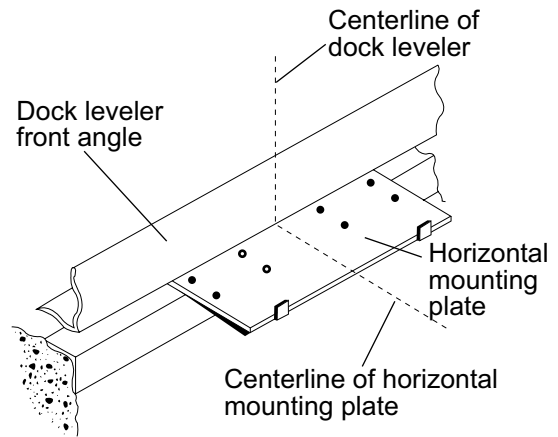
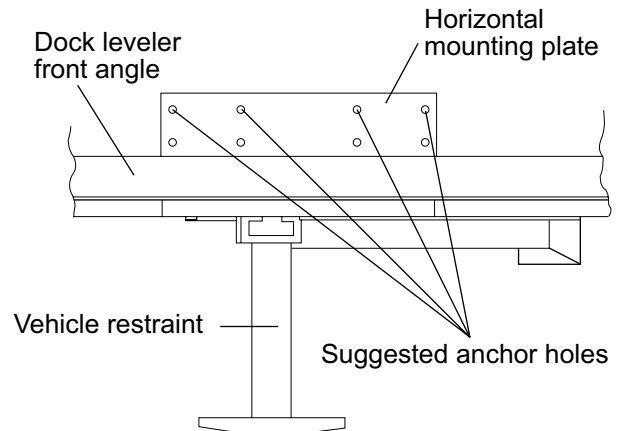


Fig. 4

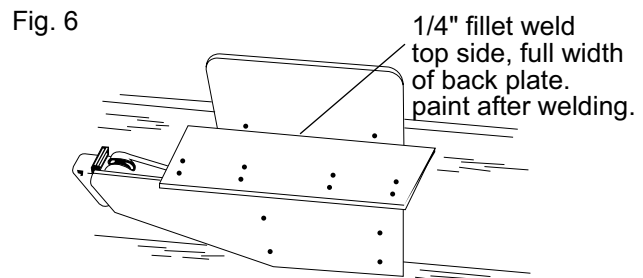
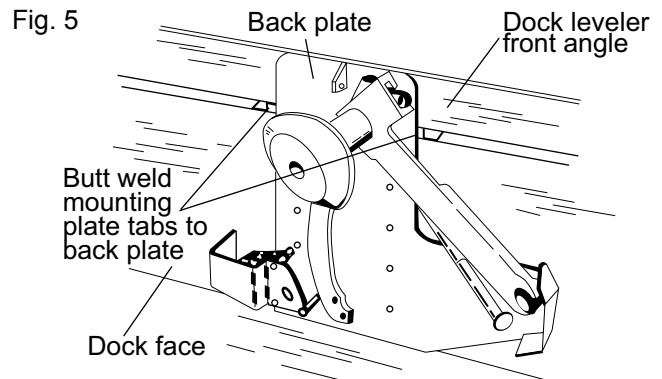


## INSTALLATION, continued

### ⚠ WARNING

*Inadequate lifting equipment or practices can cause a load to fall unexpectedly. Make sure the lifting chain or other lifting devices are in good condition and have a rated capacity of at least 500 lbs for the lifting angle used. Never allow anyone to stand on or near the restraint when it is lifted or positioned. Stand clear of the restraint when it is positioned. Failure to follow this warning can allow the restraint to fall, tip, or swing into people, causing death or serious injury.*

4. Tack weld the vehicle restraint to the horizontal mounting plate using the tabs on the front of the plate. See Fig. 5.
5. Pull the vehicle restraint and mounting plate away from the dock and weld the full width of the horizontal mounting plate with a 1/4 inch fillet weld on the top side. Paint welded area to prevent rust. See Fig. 6.
6. Slide the vehicle restraint/Mounting Plate assembly back into position on the dock. See Step 1, page 6 for location.
7. Before anchoring vehicle restraint, operate the dock leveler with the vehicle restraint in its intended mounting position. Check that the vehicle restraint does not interfere with below dock operation and that the pendant dock leveler lip does not support the weight of the dock leveler on any part of the vehicle restraint. Operate in the below dock and dock level end load position with the lip pendant and with the lip extended. Store the dock leveler several times to be sure the pendant lip does not come to rest supporting the weight of the dock leveler on the vehicle restraint. Readjust mounting position as required. The vehicle restraint may be moved such that the horizontal mounting plate is up to 12 inches off center.
8. Anchor the vehicle restraint back plate to the dock face using the anchors provided. The anchor bolts must be torqued to 40 ft-lbs to achieve maximum holding strength. See Fig. 7 and anchor installation instructions on page 5.
9. Anchor the horizontal mounting plate to the pit floor using the concrete anchors provided with the vehicle restraint. The anchor bolts must be torqued to 40 ft-lbs to achieve maximum holding strength. A minimum of (4) anchors across the plate must be used. See Fig. 8 and anchor installation instructions on page 5.



# INSTALLATION, continued

## ⚠ WARNING

*Improper installation that allows the pendant dock leveler lip to support the weight of the dock leveler could result in death or serious injury. It is sometimes necessary to install lip deflector plates as indicated in Fig. 7 to avoid any chance of the pendant lip storing on top of or behind the backplate. Materials supplied by installer.*

*anchors must be installed in a minimum of six (6) back plate mounting holes. The anchor bolts should be installed as the holes are drilled to prevent the vehicle restraint from shifting.*

## NOTICE

*The anchor bolt heads must be tight against the back plate to prevent interference with the hook arm and gas spring.*

10. Move the hook up and down to be certain the hook does not contact the track. Washers on the pivot pin may be moved from front to rear or vice versa to shim hook in or out as required. See "PARTS REPLACEMENT INSTRUCTIONS - Hook and Gas Spring" on page 17 for instructions on how to remove the hook to gain access to the rear shim washers.
11. Permanently mount the dock workers instruction sign to the inside building wall. See Fig. 9.
12. Permanently mount the pushbar hanger bracket to the inside building wall. See Fig. 9.

## ⚠ WARNING

*Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so could result in death or serious injury. All electrical work must be done by a qualified technician and must meet applicable codes.*

*Do not route control wiring for any other device through this control box unless properly shielded.*

*All motor power wires or other high voltage wires, must be run in a separate conduit from all low voltage control circuit wiring.*

Fig. 7

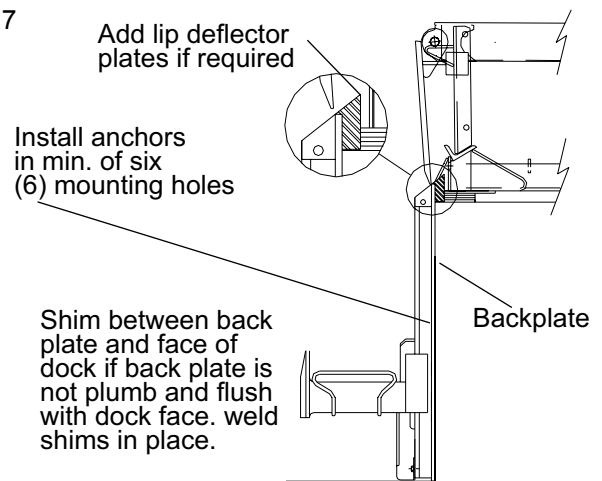


Fig. 8

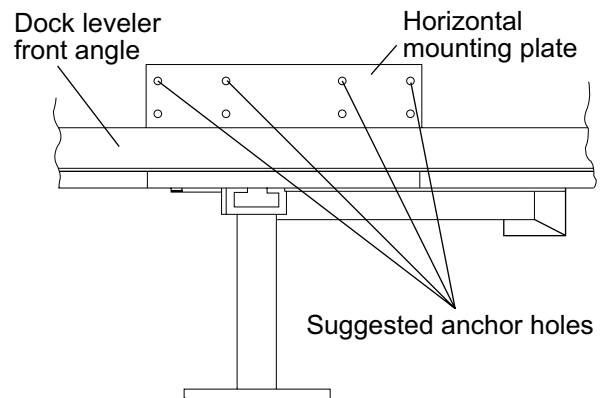
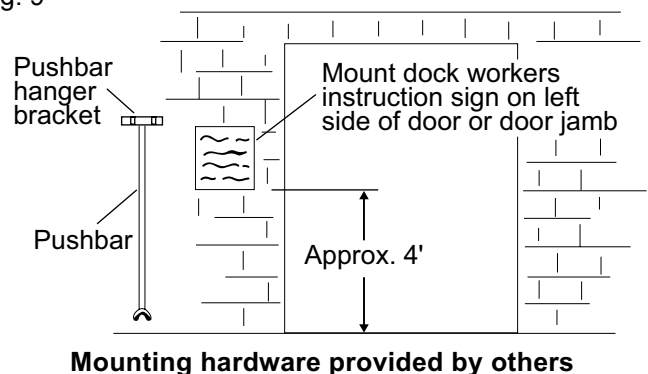


Fig. 9





## INSTALLATION, continued

13. Mount control box inside the building 4 ft above the floor, to the left of the doorway. See Fig. 10.

Fig. 10

14. Locate the position of the outside signal light assembly and drill a hole through the wall at the center of this position. See Fig. 11. Run the three #16 conduits from the control box through the wall. Connect light leads per Fig. 12 and Wiring Diagram on page 25.

### ▲ WARNING

**Be certain power is off when wiring to the control box or signal lights. Failure to do so could result in electrical shock, death or serious injury.**

15. Permanently mount the “MOVE ON GREEN ONLY” sign on the outside wall under the signal light. See Fig. 11.

16. Mount electrical junction box (NOT SUPPLIED) near vehicle restraint. See Fig. 11.

17. Run three #16 conductors from the control box and into the junction box. Run the hook position and proximity switch cables into the junction box. Connect cable leads per Wiring Diagram on page 25.

18. If restraint is to be wired to interlock power to a Kelley dock leveler remove the optional interlock jumper in the dock leveler control box and replace it with two wires that connect those terminals to the Vehicle restraint control module terminals IL1 and IL2. Refer to wiring diagram on page 25. This will make the dock leveler controls not function unless a proper hitch is signaled or an override mode has been selected.

19. Apply 120V power to the control box.

20. Check for proper operation. One light must be on, inside and outside, at all times. When the GREEN inside light is on, the RED outside light must be on (flashing). When the RED inside light is on, the GREEN outside light must be on (flashing).

21. If the lights do not operate properly, turn off power to control box and check the wiring per Wiring Diagram on page 25. Rewire as required.

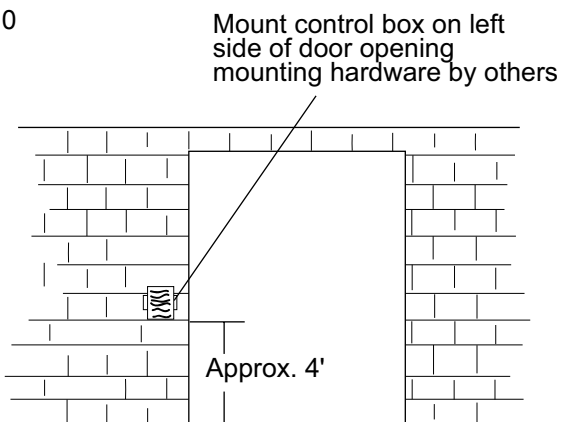


Fig. 11

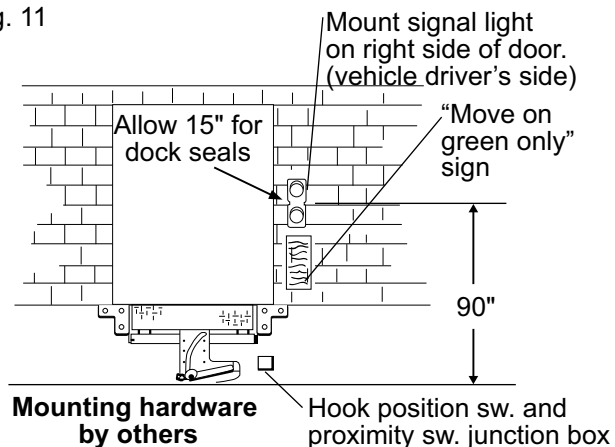
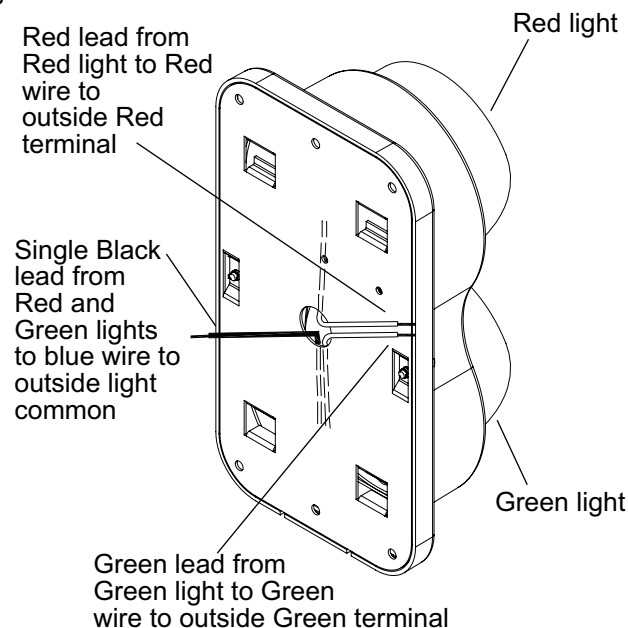


Fig. 12



## INSTALLATION, continued

22. Install pivot pin guard per instructions on page 26.
23. Instruct the dock workers how to use the vehicle restraint using Operation procedure on page 13 and make sure customer receives the User's Manual.

### INSTALLATION WITH EOD TYPE DOCK LEVELERS AND LOADHOG DOCK BRIDGES

1. Position the stand-off so that it is centered on the dock face in front of the dock leveler. See Fig. 13.

#### **▲ WARNING**

**Do not install, operate or service this product unless you have read and followed the Safety Practices, Warnings, and Installation and Operating Instructions contained in this manual. Failure to do so could result in death or serious injury. ALWAYS USE DOCK LEVELER SUPPORT WHEN WORKING UNDER A DOCK LEVELER RAMP OR LIP.**

**Inadequate lifting equipment or practices can cause a load to fall unexpectedly. Make sure the lifting chain or other lifting devices are in good condition and have a rated capacity of at least 500 lbs for the lifting angle used. Never allow anyone to stand on or near the restraint when it is lifted or positioned. Stand clear of the vehicle restraint when it is positioned. Failure to follow this warning can allow the restraint to fall, tip, or swing into people, causing death or serious injury.**

**Place barricades around pit on dock floor and drive while installing, maintaining or repairing dock leveler.**

**Improper installation of anchoring devices or installation into aged or unsound concrete could result in death or serious injury.**

2. Place the bottom edge of vehicle restraint 1/2" above the driveway. Anchor the stand-off to the dock face using the 10 anchors provided. The anchors must be torqued to 40 ft-lbs to achieve maximum holding strength. For anchor installation instructions see page 5.
3. Position and anchor the pin support as shown in Fig. 13 using four (4) anchor fasteners. The pin support is used to prevent bending of the back plate if the pin area is struck. The pivot pin area must not be fastened but left free to float.
4. Bolt the vehicle restraint to the stand-off. See Fig. 14.
5. Bolt the lip deflector (if supplied) to the STAR lip deflector using 5/8-11 x 2" bolt and nut. See Fig. 15.
6. Follow applicable instructions 10 through 23 on pages 8 through 10 for remaining installation.

Fig. 13

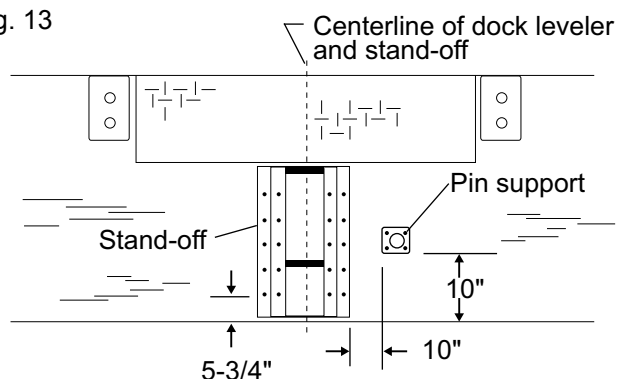
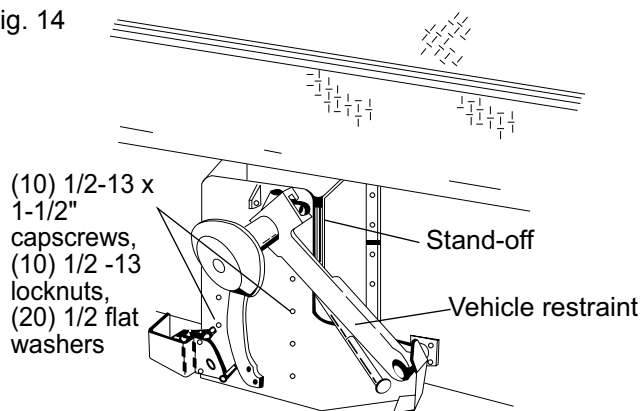
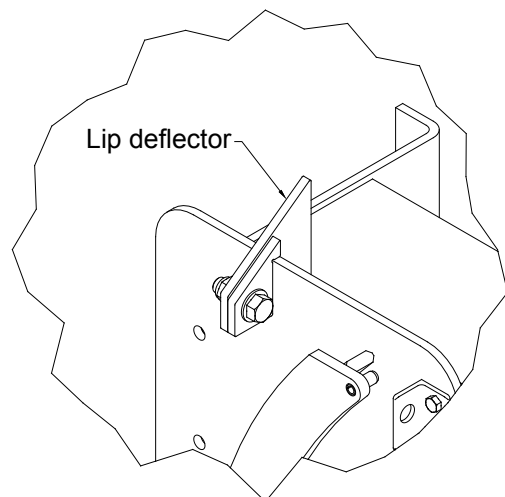


Fig. 14



**Mounting hardware supplied by others**

Fig. 15



# INSTALLATION, continued

### OPTIONAL STANCHION MOUNTING

1. Anchor the stanchion to the dock floor, at the left side of the dock position, in a location so that the signal light assembly will be easily visible to the vehicle driver.
2. Permanently mount the “MOVE ON GREEN ONLY” sign on the dock wall under the signal light assembly. See Fig. 15.

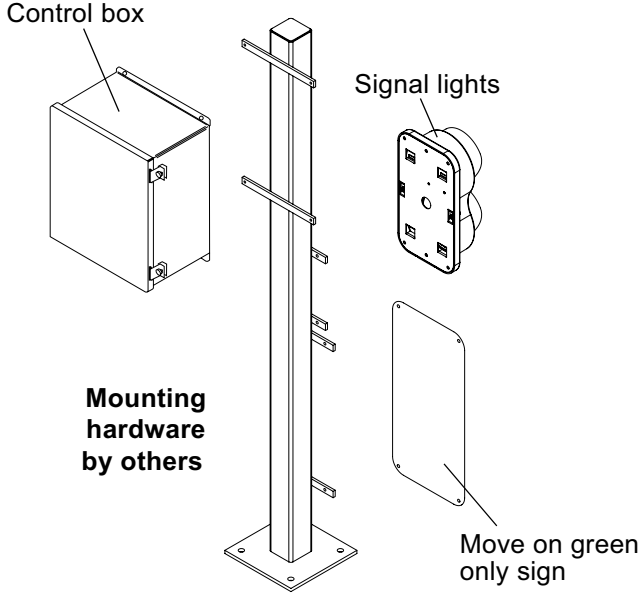
**⚠ WARNING**

*Do not install, operate or service this product unless you Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical work must be done by a qualified technician and must meet all applicable codes.*

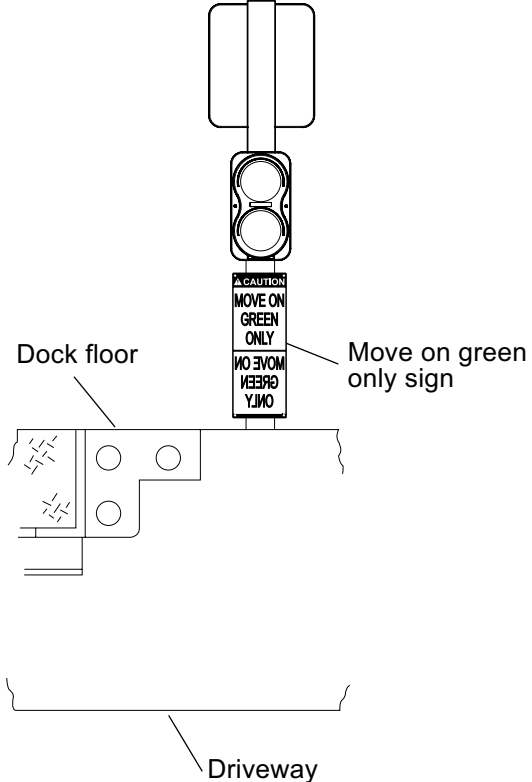
*All motor power wires or other high voltage wires, should be run in a separate conduit from all low voltage control circuit wiring.*

3. Mount the control box to the stanchion. See Fig. 16.
4. Run three #16 conductors from the control box through the access hole in the signal light mounting plate. Connect light leads per Fig. 12, page 9, and Wiring Diagram on page 25. Fasten light housing to stanchion. See Fig. 16.
5. Follow applicable instructions 16 through 22 on page 9 for remaining installation.

Fig. 16



Stanchion weldment available from Kelley  
Part number 6005018



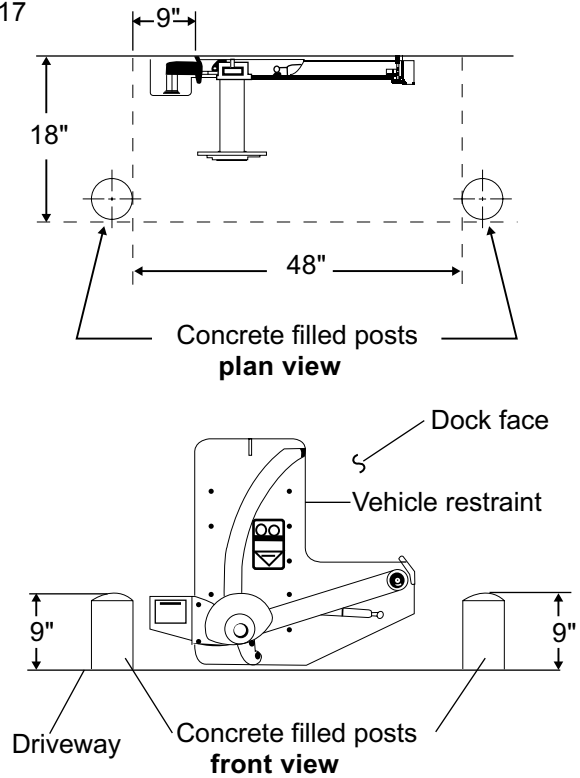
Mounting hardware by others

# INSTALLATION, continued

## OPTIONAL SNOW PLOW GUARD PLACEMENT

If desired, install concrete filled posts for protection from damage that may be caused by snow removal equipment. See Fig. 17 for suggested placement.

Fig. 17



# OPERATION

## ⚠ WARNING

*Before operating the vehicle restraining device, read and follow the Safety Practices, Warnings, and Operation instructions contained in this manual. Use by untrained people could result in death or serious injury.*

*Do not load or unload any vehicle unless you make certain the vehicle restraint has securely hitched the vehicle's RIG and set the brakes. If the vehicle restraint does not hitch the vehicle's RIG for any reason, **BE CERTAIN TO CHOCK THE VEHICLE WHEELS BEFORE LOADING OR UNLOADING.***

*Enter the vehicle only when the green signal light on the control box is on. You must check the green signal light each time that the vehicle is entered. If the green light goes off at any time during loading operations, immediately cease loading operations and check the vehicle restraint to ensure that it is securely hitched. If power to the vehicle restraint is interrupted, immediately cease operations and check the unit.*

*Vehicles leaving or moving when loading and unloading are in process could result in death or serious injury.*

*Failure to place the hook in the stored position when not in use could result in damage to the vehicle restraint and incoming vehicles. Be certain bystanders in the driveway stand clear when the vehicle restraint is operated.*

## TO HITCH VEHICLE

1. Position vehicle against dock bumpers and set brakes.
2. Using the pushbar supplied with the vehicle restraint, push latch lever down with pushbar. Hook will rise and hitch the RIG. See Fig. 19.
3. If vehicle cannot be hitched, RED light will continue to flash (and alarm will sound if so equipped). Make certain wheels are chocked and brakes are set. Press **VERRIDE** push-button. (See Fig. 18.) Inside lights will flash alternately RED and GREEN. (See page 14 for correct light sequence.)

## TO RELEASE VEHICLE

1. Remove chocks from wheels if present.
2. Push hook down into latched position with pushbar. (See Fig. 20.)
3. Vehicle may now pull out.

Fig. 18

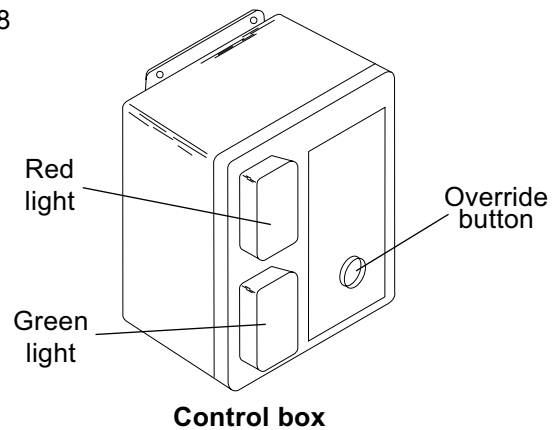


Fig. 19

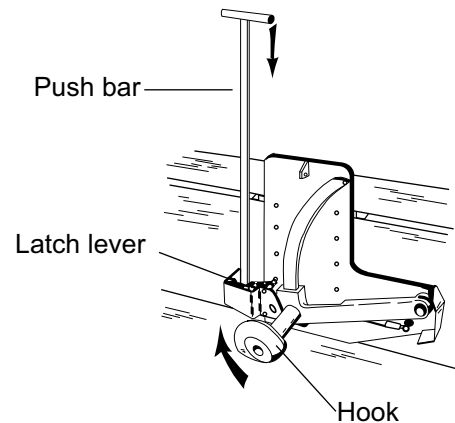
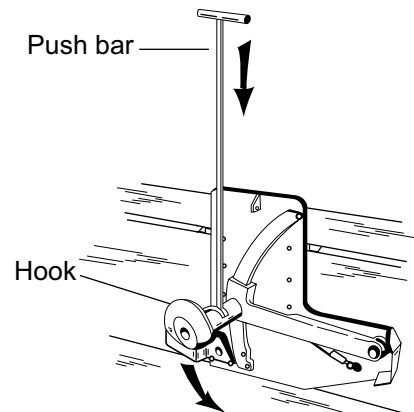


Fig. 20



# TROUBLESHOOTING

	CORRECT LIGHT SEQUENCE			
	INSIDE	*OUTSIDE	ALARM	AUX
<b>VEHICLE HITCHED</b>				
Hook Stored.....	RED	GREEN	OFF	OFF
Hook Released .....	RED/FLASH	RED	OFF	OFF
Hook Contacts ICC Bar Sensor Bar Deflects.....	GREEN	RED	OFF	ON
Store Hook.....	RED	GREEN	OFF	OFF
<b>VEHICLE NOT HITCHED</b>				
Hook Stored.....	RED	GREEN	OFF	OFF
Hook Released .....	RED/FLASH	RED	OFF	OFF
Hook Does Not Contact ICC Bar Sensor Bar Does Not Deflects.....	RED/FLASH	RED	ON	OFF
Press <b>OVERRIDE</b> Button .....	ALT. RED/ GREEN FLASH	RED	OFF	ON
Store Hook.....	RED	GREEN	OFF	OFF

**\*Outside Lights Always Flash**

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# OPERATIONAL CHECKS

## **⚠ WARNING**

**Do not service this product unless you have read and followed the Safety Practices, Warnings, and Operation instructions contained in this manual. Failure to follow these safety practices could result in death or serious injury.**

**Before doing any electrical work (including changing lights), make certain the power is disconnected and properly tagged or locked off.**

**After checking lights daily, be certain lights are returned to the proper display. If no vehicle is at the dock, or the vehicle is not hitched, the red inside light should be lit and green outside light should be flashing. If a vehicle is at the dock and is hitched, the green inside light should be lit and the red outside light should be flashing. If a vehicle is at the dock and the vehicle has been manually chocked and the restraint is in "override" mode, the green and red inside light should be alternately flashing and the red outside light should be flashing.**

## **DAILY**

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1. Operate the vehicle restraint to assure that it operates smoothly and that the hook moves freely along the entire length of track.
2. Check the lights on the control box. The RED or GREEN light must be on at all times. Operate unit to be certain both lights are working. Replace LEDs as required.
3. Check the outside signal lights (See Note). A RED or GREEN light must be flashing at all times. Operate unit to be certain both lights are working. Replace LEDs as required.

## **WEEKLY**

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Inspect the vehicle restraint for damage which may weaken the anchoring strength. Retighten the concrete anchors if necessary. (40 ft-lbs.)

## **MONTHLY**

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Check all operating, warning, and caution labels, lights and signs to be sure they can be read. Replace them if required. See the Parts List, on page 19, for part numbers.

## **QUARTERLY**

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Inspect dock bumpers. Four inches (4") of protection is required. Worn, torn, or missing bumpers must be replaced.

## SENSOR BAR SWITCH ADJUSTMENT

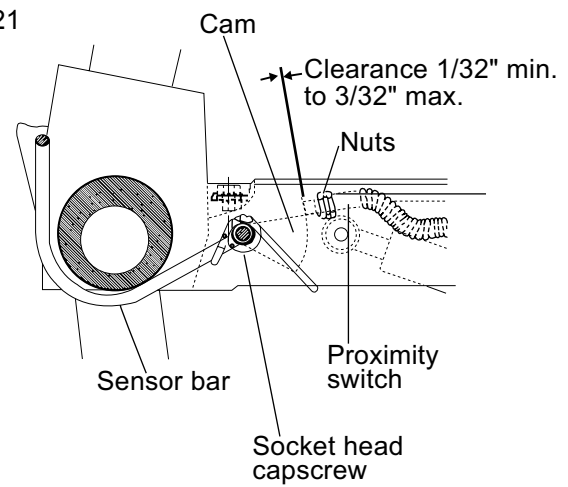
The operation range for ICC bar sensing of the vehicle restraints is from 11" to 30" above the drive. If the 11" minimum specification cannot be achieved, the proximity switch cam and sensor bar have come out of adjustment. When properly adjusted, a slight (about 3/16") deflection of the sensor bar will turn the proximity switch on. Readjustment is accomplished as follows:

1. Loosen the square head set screw that locks the proximity switch cam to the pivot shaft (see Fig. 21). This screw is locked in place at the factory with Loctite 222 and may have to be heated to loosen the Loctite.
2. Apply Loctite 222 to the screw threads. Keep the sensor bar up against the bottom of the hook and rotate the proximity switch cam counterclockwise until the proximity switch turns on and then clockwise until the switch just turns off. At this position tighten the set screw to a torque of 60 in.-lb.

Check to make sure that the proximity switch does not turn on until the sensor bar is deflected slightly. Re-adjust the cam as necessary to achieve a slight (approximately 3/16") deflection of the sensor bar before the proximity switch turns on.

Stepping on the sensor arm or otherwise manually deflecting the sensor arm farther than possible in normal operation can cause this out of adjustment problem.

Fig. 21





# PARTS REPLACEMENT INSTRUCTIONS

## ⚠ WARNING

*Do not service this product unless you have read and followed the Safety Practices, Warnings, and Operation instructions contained in this manual. Failure to follow these safety practices could result in death or serious injury.*

*Place barricades around pit on dock floor and drive while installing, maintaining or repairing vehicle restraining device.*

## PARTS REPLACEMENT INSTRUCTIONS

### LATCH MECHANISM – Fig. 22

1. Release hook by pressing down the latch lever.
2. Remove three (3) 3/8-16 x 3-1/2" capscrews.
3. Carefully remove pretensioned spring.
4. Slide lever off of mounting pin.

### HOOK ARM AND GAS SPRING – Fig. 23

1. Release hook by pressing down the latch lever.
2. Hold hook partially down and drive the top spring pin through the track.
3. Slowly release the hook arm to allow the gas spring to fully extend.
4. SUPPORT THE HOOK SO THAT IT DOES NOT FALL WHEN THE GAS SPRING IS REMOVED. Remove clips on gas spring ball studs. Carefully pry the gas spring off of the ball stud on each end of the gas spring.
5. Remove the klipring from the pivot pin.
6. With the hook arm in the highest position, slide the arm off of the pin.
7. Reverse above sequence to replace parts. Lubricate the pivot pin and ball studs.

Fig. 22

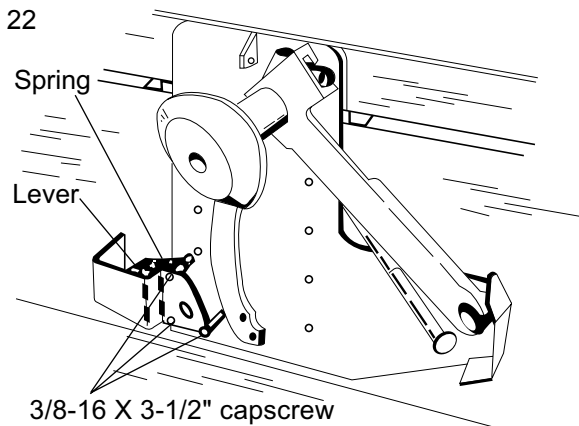
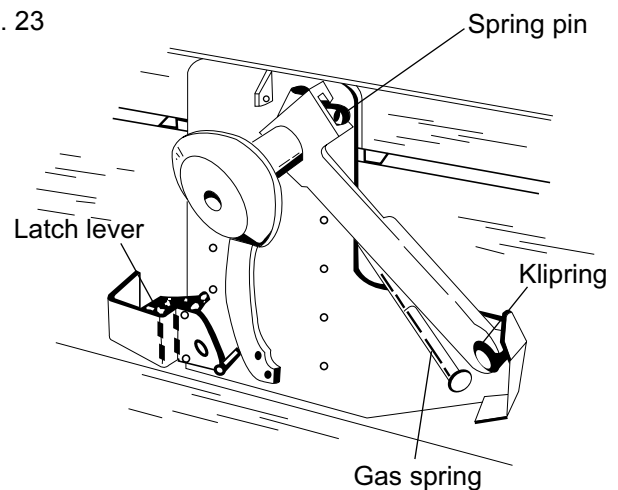


Fig. 23



# SUBFRAME REINFORCING KIT

**⚠ WARNING**

*Do not install this product unless you have read and followed the Safety Practices, Warnings, and Operation instructions contained in this manual. Failure to follow these safety practices could result in death or serious injury.*

*Place barricades around pit on dock floor and drive while installing, maintaining or repairing vehicle restraining device.*

## SUBFRAME REINFORCING KIT

Use the Dock Leveler Reinforcing Kit P/N 901-323 when a horizontal mounting plate cannot be used to anchor the top of the vehicle restraint. This kit provides brackets that can be used to securely anchor the dock leveler to the pit so that the vehicle restraint can be anchored to the dock leveler. See Fig. 24, 26, and 26.

Fig. 24

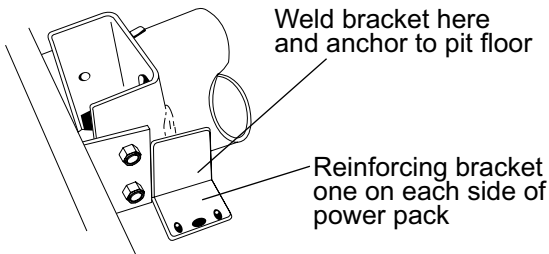


Fig. 25

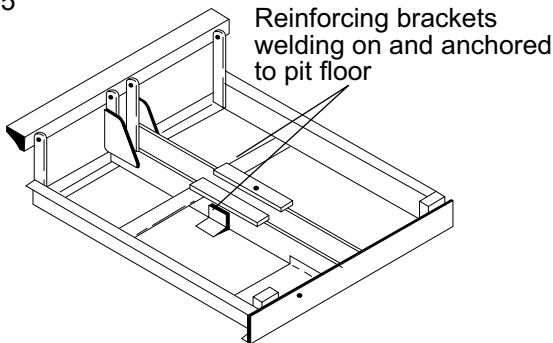
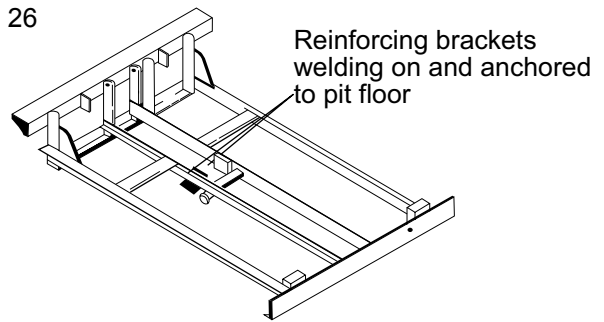
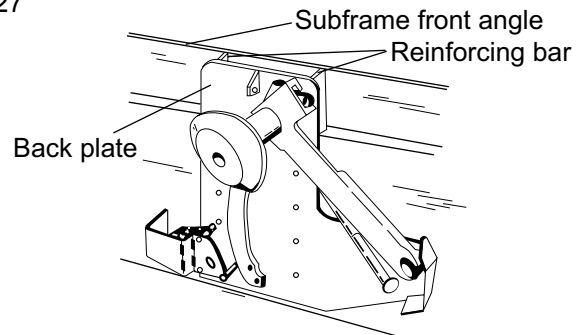


Fig. 26



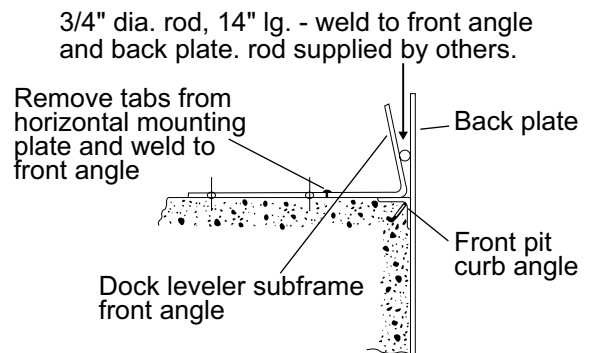
Weld reinforcing bars between the back of the vehicle restraint back plate and the front of the subframe front angle. Reinforcing bars provided by the installer. See Fig. 27.

Fig. 27



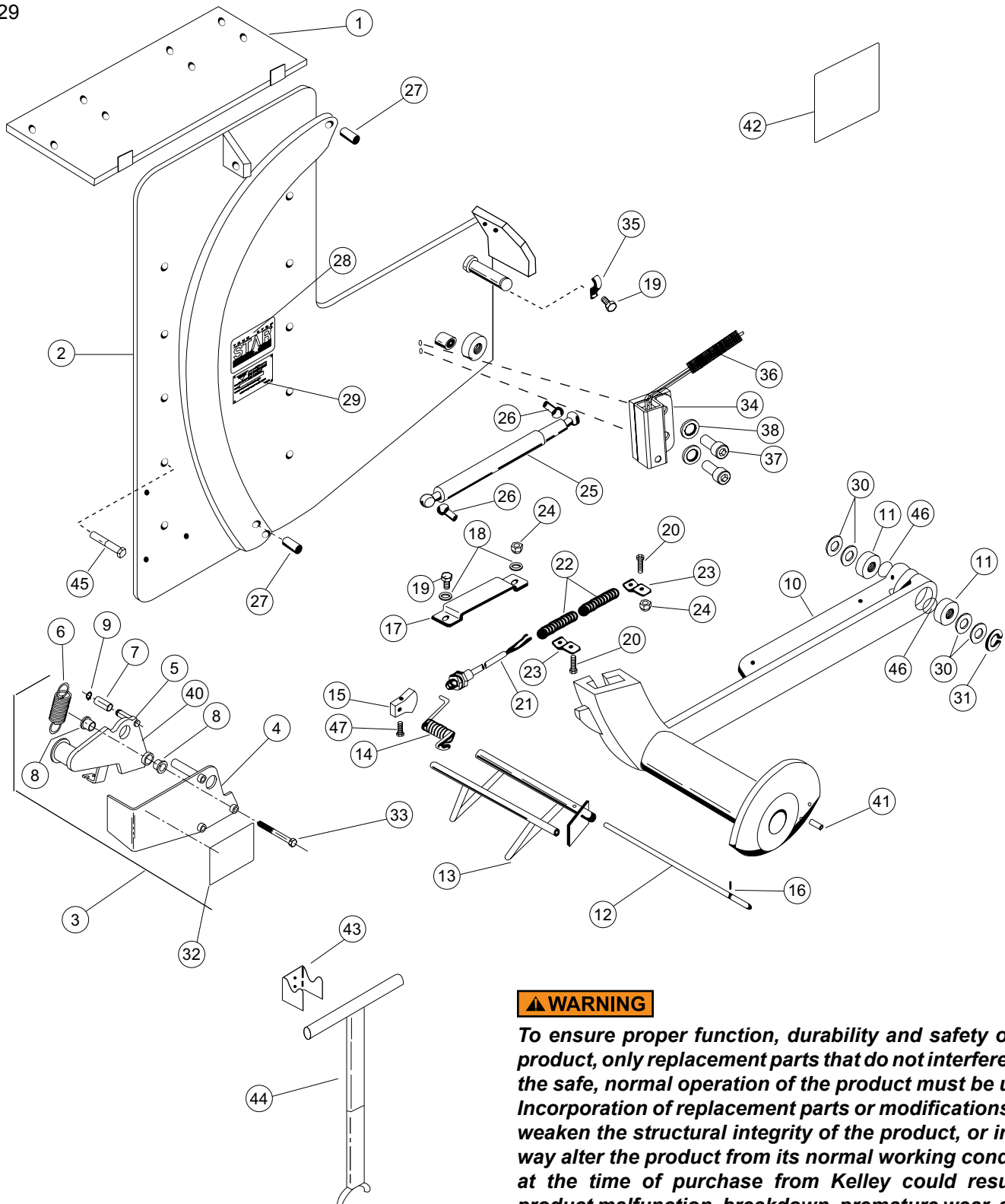
For dock levelers with angled front angles, reinforce as shown in Fig. 28. Locate horizontal mounting plate and vehicle restraint as shown in Fig. 2 page 6. Anchor horizontal mounting plate to pit floor per Fig. 4, page 6.

Fig. 28



# PARTS LIST

Fig. 29



**▲ WARNING**

*To ensure proper function, durability and safety of the product, only replacement parts that do not interfere with the safe, normal operation of the product must be used. Incorporation of replacement parts or modifications that weaken the structural integrity of the product, or in any way alter the product from its normal working condition at the time of purchase from Kelley could result in product malfunction, breakdown, premature wear, death or serious injury.*

## PARTS LIST — STAR® 2 ASSEMBLY

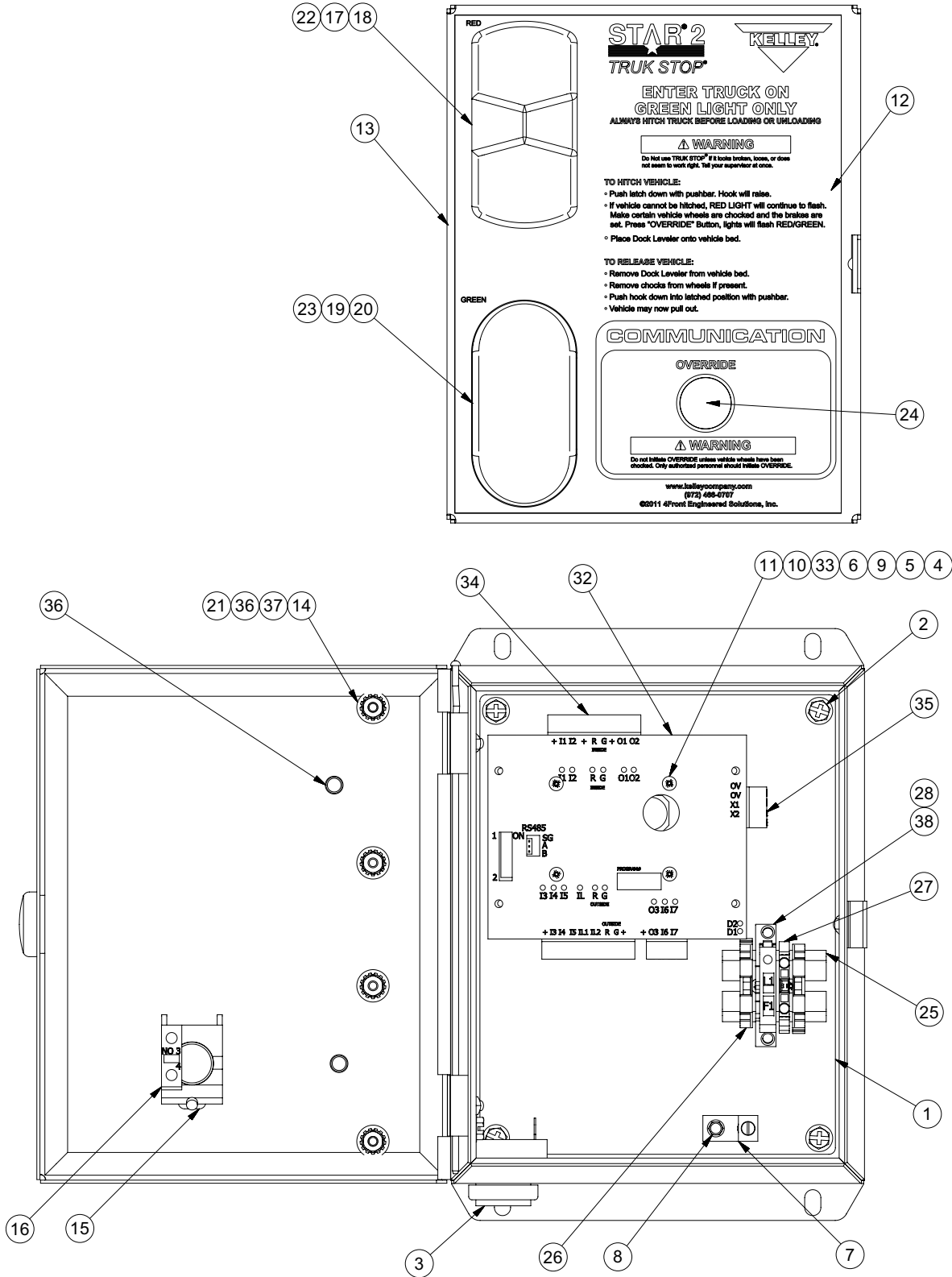
Item	Quantity	Description	Part Number
1	1	HORIZONTAL MOUNTING PLATE GREEN PAINT	709-470
2	1	BACK PLATE WELDMENT PLATED	713-397
3	1	LATCH ASSEMBLY	713-025
4	1	LATCH ARM GUARD WELDMENT (INCL. IN ITEM 3) PLATED	713-024
5	1	RELEASE LEVER WELDMENT (INCL. IN ITEM 3)	713-023
6	1	SPRING, EXTENSION (INCL. IN ITEM 3)	101-077
7	1	CYLINDRICAL BEARING (INCL. IN ITEM 3)	091-095
8	2	FLANGED BEARING (INCL. IN ITEM 3)	091-094
9	1	RETAINING RING, 1/2" (INCL. IN ITEM 3)	131-351
10	1	HOOK ARM W/BEARING YELLOW PAINT PLATED	709-469 675-411
11	2	BALL BEARING (INCL. IN ITEM 10)	091-097
12	1	SHAFT, SENSOR BAR	155-643
13	1	WELDMENT, SENSOR BAR	712-914
14	1	SPRING, TORSION - SENSOR BAR	101-079
15	1	CAM, PROXIMITY SWITCH	155-642
16	1	SCREW, SOC. HD. #10 - 24 X 5/8" LG.	131-250
17	1	BRACKET, PROXIMITY SWITCH	154-134
18	2	WASHER, FLAT 3/8"	000-214
19	2	SCREW, CAP 3/8" - 16 X 1/2" LG.	000-310
20	2	BOLT, HEX HD. 3/8" - 16 X 1-1/4" LG.	000-003
21	1	SWITCH, PROXIMITY - 12 VOLT	061-551
22	6'	TUBING, FLEXIBLE, LIQUID TIGHT	154-201
23	2	CLIP, WIRE -.562 DIA. 1/2 ROUND	154-202
24	2	NUT, LOCK ELASTIC 3/8" - 16	000-253
25	1	GAS SPRING	709-472
26	2	ROD END (INCL. IN ITEM 25)	708-829
27	2	PIN, ROLL 1/2" DIA. X 1-1/4" LG.	035-100
28	1	LABEL, STAR® TRUK STOP® LOGO	709-624
29	1	SERIAL TAG	6009761
30	A/R	WASHER, 1-1/2" OD X 1-1/16" ID	000-064

## PARTS LIST — STAR® 2 ASSEMBLY, continued

Item	Quantity	Description	Part Number
31	1	KLIPRING, 1" DIA.	049-064
32	1	LABEL, WARNING STAND CLEAR	708-778
33	3	CAP SCREW, HX. HD. 3/8" - 16 X 3-1/2" LG.	131-364
34	1	SWITCH, MAGNETIC	061-812
35	1	DUAL HOSE CLAMP	709-683
36	5'	TUBING, FLEXIBLE, LIQUID TIGHT	154-201
37	2	SCREW, SOCKET. HD. 1/4" - 20 X 5/8" LG. SS	131-275
38	2	WASHER, LOCK 1/4" INTERNAL TOOTH	131-518
40	1	GREASE FITTING (INCLUDED IN ITEM 5)	127-002
41	1	PIN, ROLL, 3/8" X 1-1/2" LG.	035-031
42	1	SIGN, DOCK WORKERS INFORMATION	708-779
43	1	HANGER BRACKET	152-814
44	1	PUSH BAR	708-736
45	1 PKG.	ANCHORS, 18 PER PACKAGE	287-510
46	2	RING, RETAINING (INCLUDED IN ITEM 10)	049-067
47	1	SCREW, SQUARE HD, 1/4-20 X 3/8" LG.	131-471

# PARTS LIST — CONTROL BOX ASSEMBLY

Fig. 30



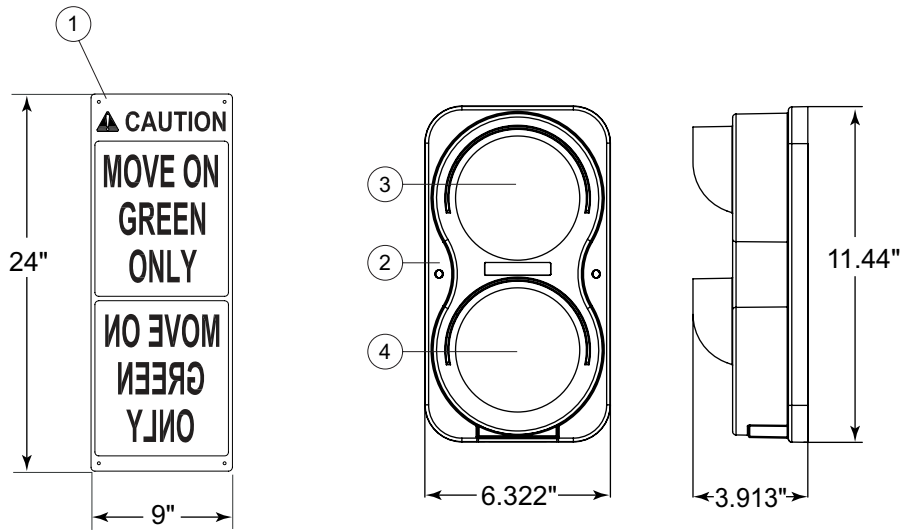
## PARTS LIST — CONTROL BOX ASSEMBLY, continued

Item	Quantity	Description	Part Number
1	1	BACK PLATE CONTROL ENCLOSURE 10"X8" NEMA 12	6009172
2	4	SCREW, M6 -1 X 8MM	6008810
3	1	AUDIBLE ALARM KIT* (OPTIONAL)	6009889
4	4	SCREW, 6-32 X 2"	6008803
5	4	SPACER, 1/2" OD X 0.17" ID X 5/8"	6008805
6	4	STANDOFF, 6-32 X 3/4" ALUMINUM	6008806
7	1	LUG, GROUNDING, 4-14 ALUMINUM	6008813
8	1	#6 X 1/2" HEX HEAD W/WASHER SELF TAPPING SCREW	6008814
9	1	TRANSFORMER,CONTROL 120/17 50VA	6008636
10	4	STANDOFF, 6-32 X 1/2"	6014058
11	6	SCREW, 6-32 X 1/4"	6008807
12	1	CONTROL PANEL DECAL	6009521
13	1	CONTROL PANEL ENCLOSURE	6009171
14	6	NUT, HEX, LOCK, 10-24	6008816
15	1	MOUNTING COLLAR	6012562
16	1	CONTACT BLOCK N/O	6012563
17	1	LIGHT BASE RED	826107
18	1	RED LENS - RECTANGLE	823100
19	1	LIGHT BASE GREEN	823111
20	1	GREEN LENS - OVAL	AP0027
21	4	SCREW, 10-24 X 3/4"	6008815
22	2	LRU, RED, CURRENT REGULATED	6006375
23	2	LRU, GREEN, CURRENT REGULATED	6006377
24	1	PUSH BUTTON, WHITE	6013064
25	1	DIN RAIL, 35MM X 44.5	6009175
26	2	TERMINAL, END STOP, SCREWLESS	6000549
27	1	TERMINAL, 2 POLE	6000542
28	1	TERMINAL BLOCK, FUSED DISCONNECT	6000538
29*	1	STAR 2 WIRING DIAGRAM	6013859S
30	1	END PLATE – 2 CONDUCTOR TERMINAL	6006848
31	1	END/INTERMEDIATE PLATE	6008853
32	1	COVER PLATE - X CONTROLLER	6013870
33	1	X CONTROLLER PCB W/ STAR 2 PROGRAM	6014046
34	2	ANGLED FEMALE PLUG 9 POLE	6008824
35	2	ANGLED FEMALE PLUG 4 POLE	6008822
36	6	BUSHING, 0.492" OD X 0.315" X 0.11"	6008818
37	4	WASHER, 5/8 OD X 1/4 ID X .132	6008817
38*	1	FUSE, 0.5A BUSSMAN MDA	6008836

\*Not shown.

# PARTS LIST — EXTERIOR SIGNS AND LIGHTS

Fig. 31



Item	Quantity	Part Description	Part Number
1	1	OUTSIDE SIGN	709-832
2	1	LIGHT ASSEMBLY - COMPLETE (LEDS), 24VDC	6007798
3*	1	RED LED LIGHT ASSY., 24VDC	6007800
4*	1	GREEN LED LIGHT ASSY., 24VDC	6007801

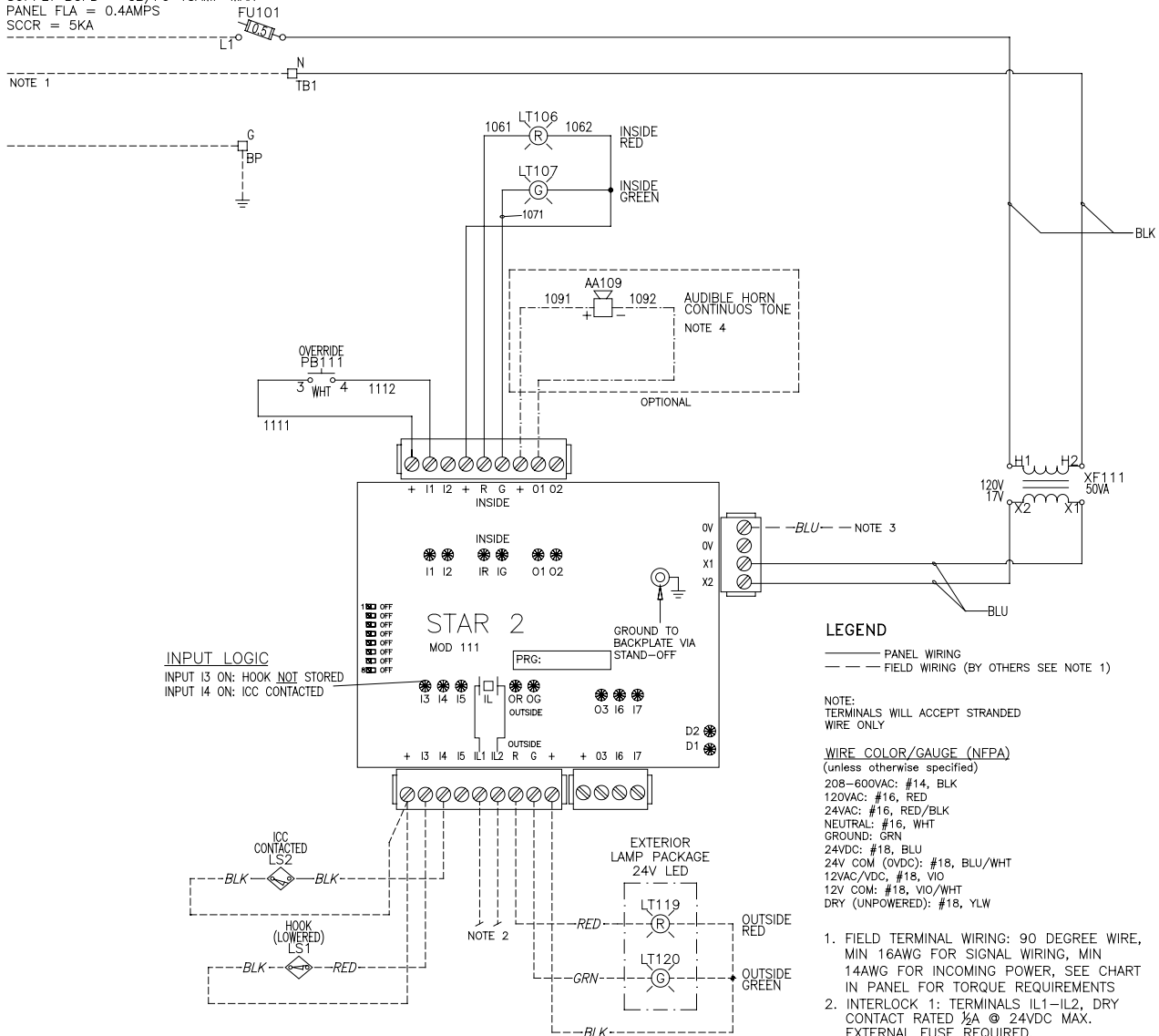
\*Part of Item 2 (Light Assembly – Complete).



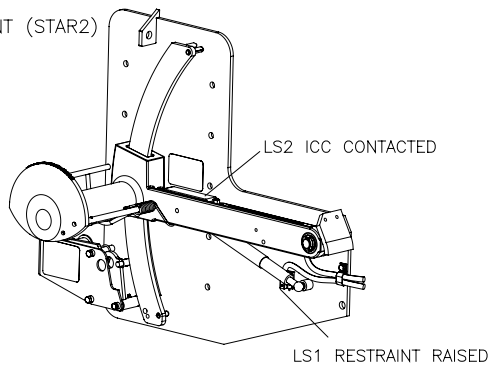
# WIRING DIAGRAM

Fig. 32

CB/FU TO BE SUPPLIED BY OTHERS  
 SUPPLY BCPD = CB/FU 15AMP MAX  
 PANEL FLA = 0.4AMPS  
 SCCR = 5KA



VEHICLE RESTRAINT (STAR2)



STAR 2, LIMIT-SWITCH TABLE

RESTRAINT STATE	LS1	LS2
1 - STORED		
2 - ENGAGED	X	X
3 - PAST ENGAGED	X	

# KIT INSTRUCTIONS

## INSTALLATION INSTRUCTIONS

1. Place hook in the down position.
2. Located Item 1 directly above the existing pin guard. (See Fig. 33.) with its bottom edge aligned as shown in detail 'A'.
3. Using Item 1 as a template drill four 1/2" dia. x 3-1/2" deep mounting holes.

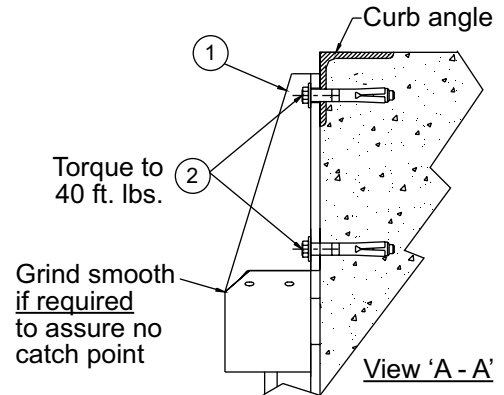
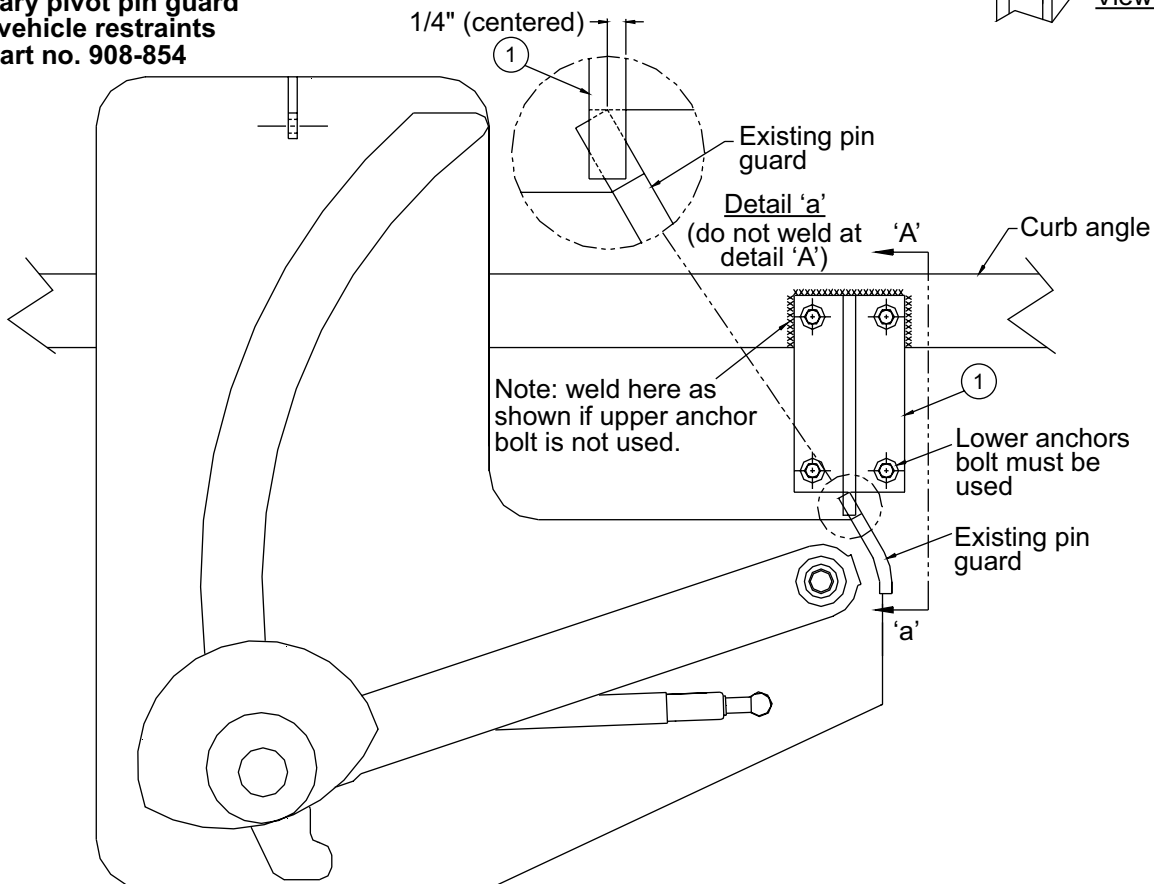
4. Fasten Item 1 to the dock face using the 4 anchor bolts (two anchor bolt if welding) torqued to 40 ft.-lbs. See anchor installation instructions on page 5.
5. Grind smooth the mating surfaces of Item 1 and existing pin guard. Repaint this area and any welds to prevent rust.

### NOTE:

To Eliminate drilling through the curb angle, weld the upper end of the pin guard to the curb angle as noted below. Do not weld Item 1 to the existing pin guard. This area of the restraint must be free to move.

Fig. 33

**Installation instructions  
auxiliary pivot pin guard  
for vehicle restraints  
part no. 908-854**



Item	Quantity	Description	Part Number
1	1	GUARD, PIVOT PIN	712-634
2	4	ANCHOR BOLT, 1/2 X 3-1/2	131-260

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## LIMITED WARRANTY

4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> warrants that this VEHICLE RESTRAINT will be free from flaws in material and workmanship under normal use for a period of one (1) year from the earlier of 1) 60 days after the date of initial shipment by 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup>, or 2) the date of installation of the VEHICLE RESTRAINT by the original purchaser, provided that the owner maintains and operates the VEHICLE RESTRAINT in accordance with this User's Manual. In the event that this VEHICLE RESTRAINT proves deficient in material or workmanship within the applicable limited warranty period, 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> will, at its option:

1. Replace the VEHICLE RESTRAINT, or the deficient portion of either, without charge to the owner (excluding any cost of removal or reinstallation which shall be the sole responsibility of the purchaser); or
2. Alter or repair the VEHICLE RESTRAINT, on site or elsewhere, without charge to the owner.

The limited warranty stated in the preceding paragraph IS EXCLUSIVE AND IT IS IN LIEU OF ANY OTHER GUARANTEES AND WARRANTIES, EXPRESS OR IMPLIED. The limited warranty does not cover any failure caused by improper installation, abuse, negligence, or failure to maintain and adjust the VEHICLE RESTRAINT properly. Parts requiring replacement due to damage resulting from vehicle impact, abuse, or improper operation are not covered by this warranty. 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> disclaims any responsibility or liability for any loss or damage (including, without limitation, direct, indirect or consequential damages, or lost profits or production time) that results from the use of unauthorized replacement parts or modification of the VEHICLE RESTRAINT. 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> sole obligation with regard to a VEHICLE RESTRAINT that proves to be deficient in material or workmanship shall be as set forth in its standard warranty above (i.e., 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> will, at its option, repair or replace the VEHICLE RESTRAINT or portion thereof, without charge to the purchaser.).

This limited warranty does not cover any failure caused by improper installation, abuse, negligence, or failure to properly maintain and adjust the VEHICLE RESTRAINT. This limited warranty will be void or of no effect if the original purchaser does not notify 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> warranty department within ninety (90) days after the product deficiency is discovered. Parts requiring replacement due to damage resulting from vehicle impact, abuse, or improper operation are not covered by this warranty. 4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> disclaims any responsibility or liability for any loss or damage that results from the use of unauthorized replacement parts or modification of the VEHICLE RESTRAINT.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, AND THERE IS NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> warranties extend only to the VEHICLE RESTRAINT itself.

4FRONT ENGINEERED SOLUTIONS, INC<sup>®</sup> DISCLAIMS all warranties, express or implied, responsibility or liability for loss or damage of any kind associated with the installation or maintenance of the VEHICLE RESTRAINT, including any liability for premature product wear, product failure, property damage or bodily injury arising from improper installation or maintenance of the VEHICLE RESTRAINT.

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Please direct questions about your vehicle restraint to your local distributor or to 4Front Engineered Solutions, Inc.

Your local Kelley® distributor is:

Corporate Head Office:

1612 Hutton Dr. Suite 140

Carrollton, TX. 75006

Tel. (972) 466-0707

Fax (972) 323-2661