



INSTRUCTION & MAINTENANCE

S-40EXIT RAILROAD HIGHWAY CROSSING GATE

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VERSION B

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Instruction & Maintenance Railroad Highway Crossing Exit Gate Model S-40EXIT

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INTRODUCTION

Safetran's Model S-40EXIT Railroad Highway Crossing Gate is a "default up" mechanism for use in four-quadrant gate applications. A typical four-quadrant installation will include two standard S-40 mechanisms and two S-40EXIT mechanisms. The Exit gate is designed to raise the arm in a loss of power condition clearing the exit portion of the crossing. This differs from the standard gate which is designed to lower the arm in a loss-of-power condition blocking access to the crossing.

While installation and operation differs, the model S-40 mechanism features of gate snubbing, over-speed control, and maintenance switch circuits have been incorporated into the model S-40EXIT.

OPERATION

Installation is counterweight-heavy where the arm will be between 70° and 83° in a free, or power-off, position. This necessitates full power-down drive to horizontal (0°) and power-up drive to vertical (90°), utilizing both power-up and power-down gate control circuits. A brake is used to hold the arm in both the vertical and horizontal positions.

With standard wiring as shown on page 3, positive and negative battery to terminal locations 4 & 5 is always present and serves to supply power to the motor. An additional positive battery "down control" serves to energize the control relay (K4). External switching by the user is required which will lower and hold the gate arm at horizontal when the control is energized and will raise the gate when de-energized. A test link connection "A" is provided that allows raising the gate arm at the mechanism.

A second test link connection "B" is provided to:

- a.) Protect control circuit by opening before using the maintenance switch
- b.) Release brake during installation arm torque measurements

Gate-down control energizes the down-control relay to release the brake and make power-down drive. At 1° the power-down contact #7 opens to de-energize the relay and the motor; and to energize the brake for hold down. Removing gate-down control drops relay K4 to energize the power-up circuit. At 90° the power up contact #8 opens to de-energize the up relay and the motor; and to energize the brake.

SPECIFICATIONS

Housing and cover:	Permanent mold alloy 356 aluminum castings. Precision CNC machining of all gear, shaft and motor surfaces.
Gear Train:	240 to 1 Reduction.
Bearings:	Maintenance free sealed – both main and gear shaft.
Motor:	12 VDC, 4 pole compound series/permanent magnet.
Brake:	Hold up, hold down =165ma @ 12VDC
Operating Voltage:	11 – 16 VDC.
Operating Current:	Up = 6 – 15 A @ 12 VDC, Down = 6 – 15 A @ 12 VDC.
Circuit Breaker	7 Amp Auto-reset.

STANDARD FEATURES

Makeup of the S-40EXIT Gate Mechanism – Internal:

- Relay panel assembly complete with down rate resistors and over-speed control.
- Auto-reset circuit breaker motor protection.
- Standard Gate Control Relays.
- Adjustable snap action contact actuating cam for power up and power down (positions 7 & 8).
- Adjustable contact and cam for flashing light control (position 9).
- Adjustable contact and cam for bell control (position 10).
- Adjustable horizontal snub contact and cam (position 11).

Note: Contact cams are factory set as shown on wiring diagram, page 3.

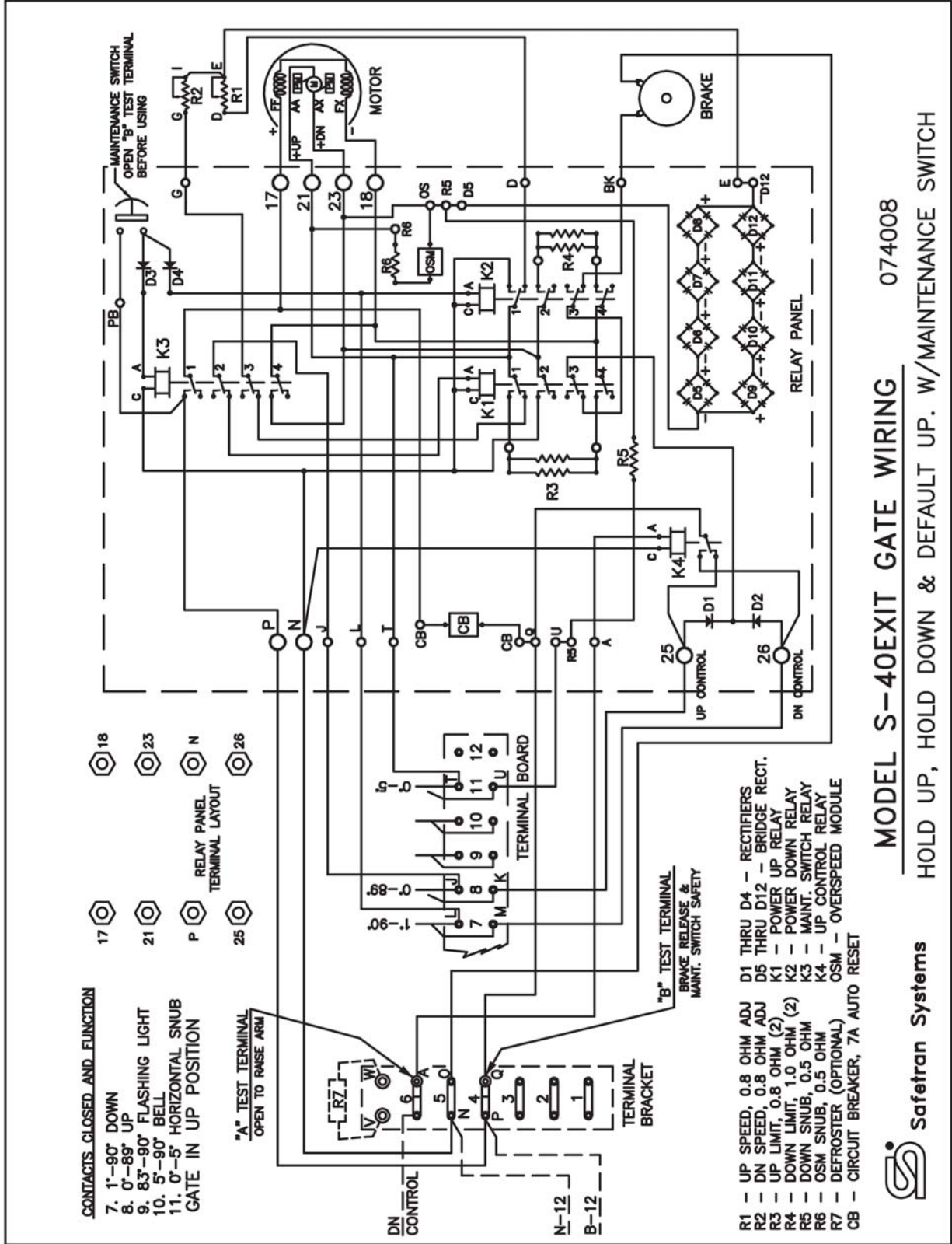
- Adjustable snub resistors to set up time and down time (.80 ohm max).
- 115 VAC Defroster located under motor end and wired to terminal block position 1 with insulated nuts.
- Mechanism serial number located on motor housing label.
- Maintenance switch assembly with stop bracket – see page 13.

Makeup of the S-40EXIT Gate Mechanism – External:

- Lifting eyebolt.
- Shaft ends with 1"-8 UNC nuts, lock washers and hub keys.
- Mounting bolts and saddles for 5" pipe mounting.
- Mechanism support clamp for 5" pipe mounting.
- 2" x 42" long liquid tight conduit with one straight and one 45 degree connector.
- Mechanism serial number stamped on top outside of cabinet.

OPTIONS

- Additional contact and cam.
- Special contact cam settings.
- Special defroster - 230 VAC, 12 or 24 VDC.



MODEL S-40EXIT GATE WIRING 074008

HOLD UP, HOLD DOWN & DEFAULT UP. W/MAINTENANCE SWITCH

Safetran Systems

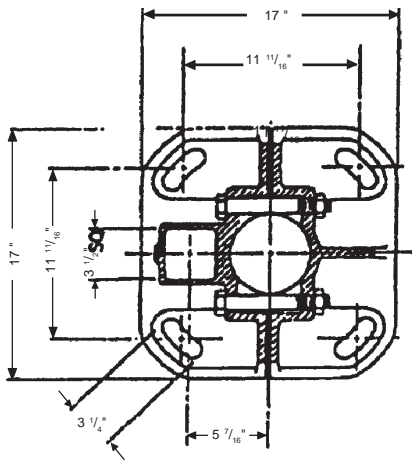
FOUNDATIONS

Prefabricated galvanized steel or poured concrete may be used for the foundation.

When using Safetran's galvanized steel foundation, part number 035903-500X, be sure bottom of excavation is flat and level to insure full support to the base plate. Backfill should be compacted, with height of exposure above ground limited to 4 inches.

Place foundation as dictated by local conditions and clearance requirements, remembering that gate arm lengths are measured from center of foundation to end of arm.

For field poured concrete foundation, 4 anchor bolts, part number 131702-26X, are required.



**Steel Foundation
035903-500X**

RECOMMENDED BATTERY AND WIRE REQUIREMENTS

Sizes of wire used for the motor circuit should be calculated so that there will be not more than 0.1 ohm resistance between the battery and mechanism terminals.

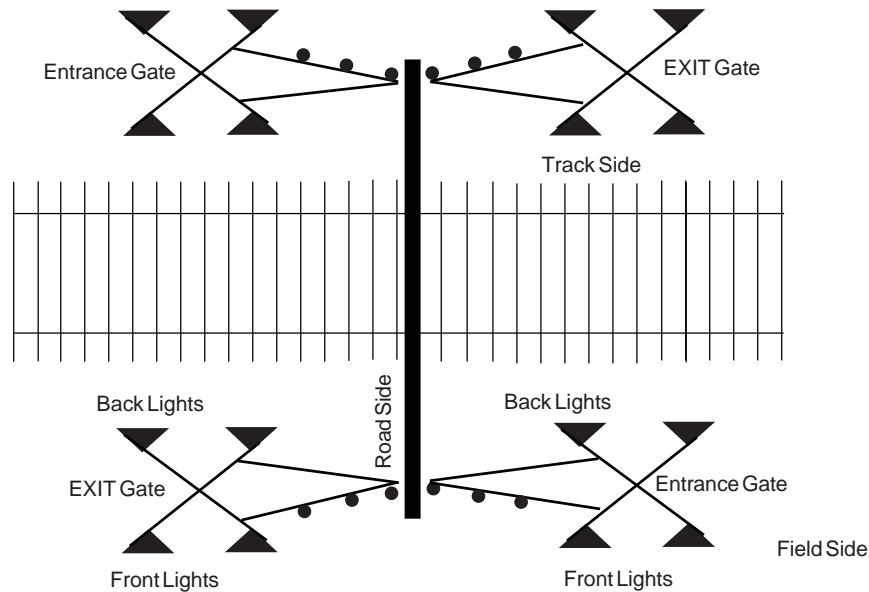
Wire sizes as follows are recommended:

Distance from Battery Terminals to Mechanism Terminals	Size of Soft Drawn Copper Wire to Use
Up to 60 feet (120 feet of wire)	No. 9 AWG
From 60 to 120 feet (240 feet of wire)	No. 6 AWG

The following battery is recommended with above wire sizes for gates of various lengths:

Gate Arm Length in Feet	Number of Cells		
	Lead	Nickel Iron	Nickel Cadmium
Up to 24	6	9	9
25 to 42	7	11	11

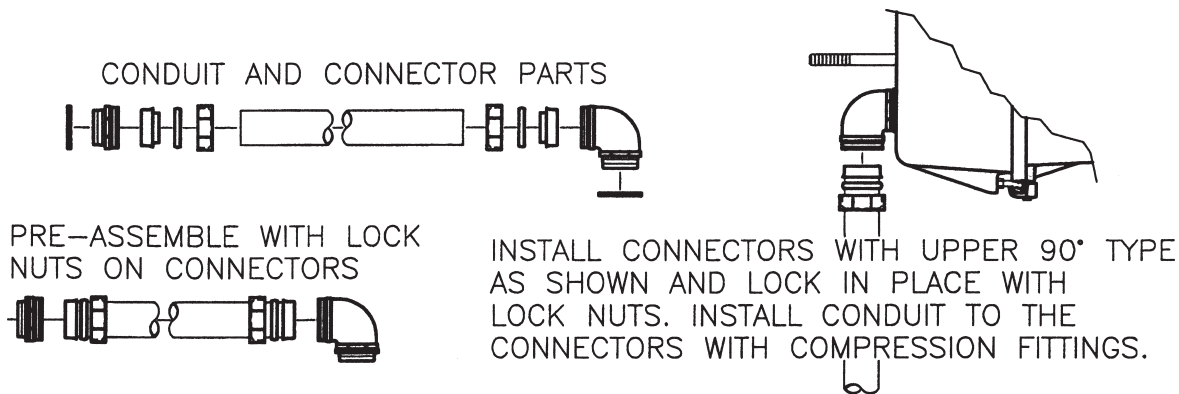
INSTALLATION STEPS



1. **Erect mast and base.** Erect five inch mast, with junction box base on the track side. Mounting hole for front and back flashing lights will be on the field side of mast. Place a level on the mast and plumb to vertical using large shim washers or leveling nuts on the foundation bolts.
2. **Mount support clamp on mast.** Support clamp 070786-5X mounts on the mast with casting facing 45° from the field side toward track. The top of casting should be approximately 51" above the top of foundation (page 16, item 5). (Actual height may vary depending on local conditions.)
3. **Prepare mechanism.** Thread 90° flex conduit coupling into the back of the gate cabinet and insert the 4 square head machine bolts into the slots on the back of cabinet (page 18, items 72 & 76).
4. **Clamp mechanism in place.** Lift mechanism (see page 7) and set on top of the support clamp. Clamp to mast with clamps, nuts and washers provided (page 18, items 75, 77, 78 & 79).
5. **Install arm supports.** Apply a small amount of Safetran No-oxide Grease PN 032401-X on the main shaft threads. Mount gate arm supports with bolted on hubs over the keys on the main shaft ends. Install main shaft nuts and washers (page 18, items 36 & 37) but **do not fully tighten** until after installing the conversion bracket.
6. **Install arm coupling or conversion bracket.** Bolt to the arm support castings and then **fully tighten** the main shaft nuts.
7. **Install flexible conduit.** Thread coupling into base and install conduit to base and rear of cabinet. See diagram page 6 (page 18, items 73 & 74).
8. **Mount flashing lights, bell and signs.** The flashing light units have been factory wired but control wires from the lights junction box to the junction box base must be field installed. **Align the flashing light units before placing the crossing in service.** Bell, when used, is mounted on top of the mast with the gong facing the roadway. A spare contact is provided on the gate controller to cut off bell when the gate arm is down (see wiring page 3). Mount the required signs.
9. **Connect power to mechanism.** See page 4 for recommended battery and wire requirements and connect per wiring diagram page 3. Seal conduit opening per AREMA Signal Manual Part 2.4.25.
10. **Install counterweight stud plates.** Ensure the roller spacers are over the studs and in the arm support slot before mounting clamp bar and locking piece. See page 22, items 8,4,11,12 & 13.
11. **Install counterweights and gate arm as follows:** If required, the back clamps can be loosened and the mechanism rotated parallel to the roadway for arm installation.
 - a. **Install counterweights.** With the arm supports in "arm up position", install up to 6 counter weights (12 short type) at this time. Total number required per tables on pages 10 & 24. Position the counterweights with the large corner radius to the field or up position and locate maximum to the field or up position (see diagram page 11). Short arm installations may require extending counterweights as shown on page 24.
 - b. **Raise counterweights.** Raise to horizontal using the maintenance switch per pages 13 and 14.

INSTALLATION STEPS (CONTINUED)

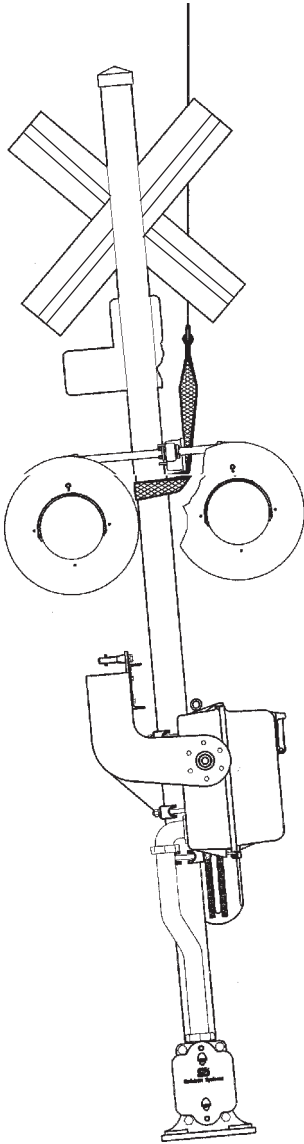
- c. **Install gate arm.** On breakaway pivot type assemblies, install number and type of shear bolts per arm manufacturers instructions.
- d. **Raise arm to vertical.** Install additional counterweights if required and preset them maximum to field (vertical torque adjustment).
- 12. Set horizontal torque and arm height.** Set horizontal torque to 100 ± 20 foot-pounds at counterweight side per instructions on page 10. **Note:** The default-up requirement of the model S-40EXIT gate requires counterweight heavy installation. Set arm height by rotating contact cam #7 and operating gate with down control. Be sure that horizontal buffer (upper position) is clear of segment gear. See pages 8 and 9.
- 13. Raise and check vertical position of arm.** Set the vertical position by rotating contact cam #8 and operating gate with up control (see page 8).
- 14. Adjust buffers.** Set both buffers to 1/32 clearance from segment gear per instructions on page 9.
- 15. Set vertical torque.** With arm horizontal, open test terminal "B." The counterweight heavy arm will move to a near vertical default position. Adjust the counterweights to obtain a default position between 70° and 83° . See instructions on pages 10 and 11.
- 16. Adjust clearing time.** Clearing time varies with length of arm but should be between 6 and 10 seconds. Adjust if needed with up speed resistor R1 (lower position item 54 page 18).
- 17. Adjust descending time.** Total descent time is a sum of the adjustable snubbing circuit ($90^\circ-5^\circ$) and the horizontal snub control through contact #11 ($5^\circ-0^\circ$). Adjust the down speed resistor R2 (upper position item 54 page 18) for 10-15 seconds descent time. If faster descent is desired after adjusting, reduce the horizontal snub travel as follows.
- Horizontal snub.** Contact #11 on the terminal board is factory set for approximately 5° full horizontal snub. This can be reduced to half (2.5°) by rotating the cam if less horizontal snub is desired.



FINAL CHECKS

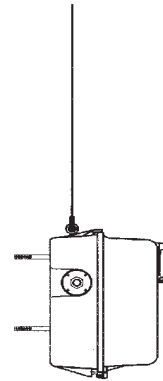
- A. Voltage at terminals P & N. Should be no less than 11 or more than 16 volts.**
- B. Check for possible grounds.**
- C. Check voltage and current during operation.**
- Voltage should not drop below 11 volts during gate up or gate down cycle.
 - Power up current should be 6-15 amps. Power down current should be 6-15 amps.
- D. Check clearing and descending times.**
- Clearing time as set per step 16 of 6-10 seconds.
 - Descending time as set per step 17 of 10-15 seconds.
 - Clear position with power removed (arm between 70° and 83°).
- E. Check terminal board contacts.** Check clearance, square contact and wiping action per page 8.

LIFTING RECOMMENDATIONS



Weight (as shown)
700 lbs.

Weight (as shown)
350 lbs.



Mechanism only can be lifted into place using the lifting eye provided

Recommendations for lifting pre-assembled signals with gate mechanism.

1. Signal assembly must be without arm and counterweight.
2. Lift point should be a minimum of 15" above gate mechanism.
3. Lifting sling can be used around mast and under the junction box crossarm for lights as shown.

Description	Part Number	Dimensions	Weight
Adapter Cast	076203-510X		28 lbs.
Adapter Fab	076203-501X		20 lbs.
Conversion Bracket (cast adapter)	076227-X		75 lbs.
Conversion Bracke (fab adapter)	076227-22X		55 lbs.
J. B. Base Assy.	041931-X		85 lbs.
Mast & J. B. Base (5" Alum.)	070519-27AX		140 lbs.
Mast & J. B. Base (5" Alum.)	070519-40AX	14 feet - 0 inches	160 lbs.
Mast & J. B. Base Stud (5" Alum.)	070519-3AX	16 feet - 0 inches	100 lbs.
Sidelight Cantilever	041442-26X	7 feet - 0 inches	38 lbs.
Counterweight Std.	070755-4		63 lbs.
Counterweight Short	070755-34	15 x 30 x 1/2 inches	38 lbs.
Counterweight Stud Plate	070757-26X	15 x 15 x 5/8 inches	15 lbs.
Arm Supports (1 each)	070920-LX or 070921-RX		72 lbs. 30 lbs. each
Arm Supports (1 each)	035200-17X or 035236-2X		30 lbs. each 40 lbs.
R.R. Crossing Sign w/mtg. Hardware	042003-000616		25 lbs.
#2 Track Sign w/mtg. Hardware	074008-X		110 lbs.
J.B. Crossarm 2 Way w/FLX-12 Heads Complete	035903-911-1X		350 lbs.
S-40EXIT Gate Mechanism			200 lbs.
Galvanized Steel Foundation			

CIRCUIT CONTROLLER ADJUSTMENT

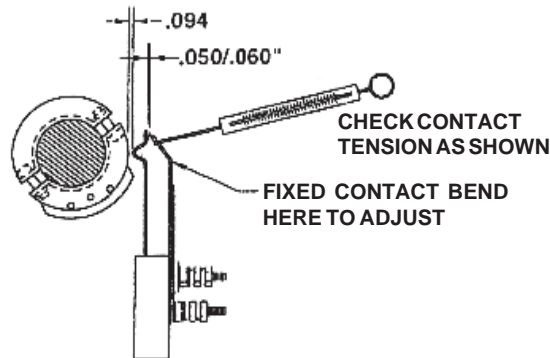
Five spring contacts are provided on a standard mechanism assembly. An additional contact can be furnished if required. Three contacts are required for gate operation (position 7, 8 & 11) and two contacts (position 9 & 10) are factory adjusted and may be used as indicated in the table below.

Contacts are factory set as shown below. The rear or moveable contact rarely requires adjustment unless being replaced. The contact opening can increase with use and should be checked periodically and adjusted if required. The openings should not exceed 1/16". Contact adjustment can be made by adjusting the bend angle of the front or fixed contact with a contact forming tool. Set contact opening to where there is a light drag on a 1/16" gage. Always check contact operation after adjustment to be sure there is square contact and a good wiping action when the contact closes. Tension pressure of closed contact to be between 28 and 48 oz.

Contact tools and gages are available, see page 15 for ordering information.

CAUTION: Repeated or overbending of a contact may cause damage and not allow proper tension when closed or gap when open

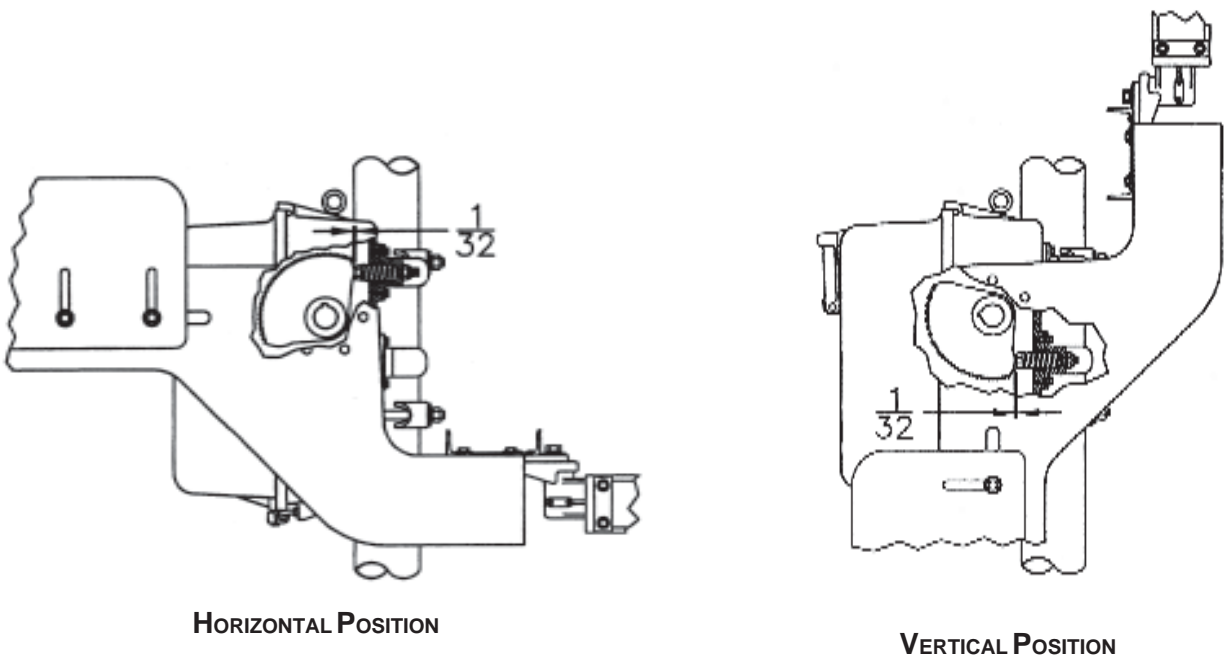
Contact cams are factory set for contact function as shown in the table below, or as specified by customer. Adjustment may be required at installation. Use the allen wrench provided to loosen the cam locking screw, then using the allen wrench as a lever, shift the cam position and retighten the screw.



Term. Board Position Number	Wire Designation	Contact Closed at Gate Arm at:	Function of Contact
7	L-M	1 degrees - 90 degrees	Power Down Control
8	J-K	0 degrees - 89 degrees	Power Up Control
9	R-S	83 degrees - 90 degrees	Spare (Suggest Flashing Light Control)
10	H-I	5 degrees - 90 degrees	Spare (Bell Control)
11	T-U	0 degrees - 5 degrees	Horizontal Snub Control

SPRING BUFFER ADJUSTMENT

The model S-40EXIT gate mechanism is equipped with adjustable spring buffers to back up the horizontal and vertical gate arm positioning. They are factory-adjusted for 1/32" clearance between the buffer and segment gear; however, if the gate arm is repositioned they will require readjustment as shown below.



To adjust the vertical buffer: With arm vertical, remove the cap and 3/16" cotter pin at the lower buffer. Turn the nut to obtain 1/32" clearance between buffer and segment gear. Replace cotter pin and cap.

To adjust the horizontal buffer: With arm horizontal, remove the cap and 3/16" cotter pin at the upper buffer. Turn the nut to obtain 1/32" clearance between buffer and segment gear. Replace cotter pin and cap.

COUNTERWEIGHT GUIDELINES

Counterweight requirements depend on the weight and length of the gate arm, and on the weight and position of the arm coupling or conversion bracket. The counterweights listed in the tables below are based on new Safetran arms, conversion bracket and adapter.

--NOTE: If using a gate protection device, refer to counterweight tables Appendix A.

Counterweights can be mounted on a single counterweight support arm for arms up to 22'. Longer arms require counterweight supports on both sides of the mechanism.

Counterweight Requirement Model S-40EXIT (Standard arms, conversion bracket and adapter)					
		Counterweights Required		Stud Plate	
			Short	Standard 070757-26X	Short 070757-30X
	12 – 14	3 (2+1XT)	6	1	1
	15 – 18	4	8	1	1
	19 – 22	5	10	1	1
	23 – 28	6	12	2	2
Counterweights mounted on two Support Arms	29 – 32	7	14	2	2
	33 - 36	8	16	2	2
	37 - 40	9	18	2	2
	41 - 44	10	20	2	2
	45 -46	11	22	2	2

(+1XT)= One counterweight extended up with support bracket and hardware #070925-4X.

-- See diagram Appendix A

TORQUE ADJUSTMENTS

Horizontal torque. Set horizontal torque to 100 ±20 foot-pounds at counterweight side as follows:

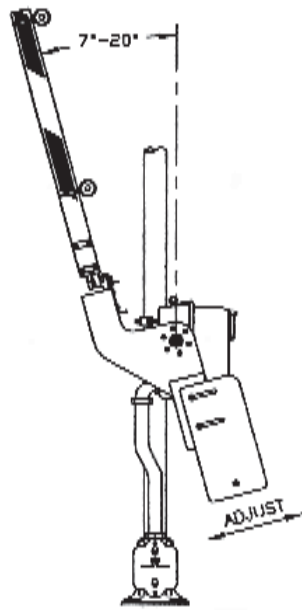
1. Close test terminal A (pos. 6) to lower arm to horizontal.
2. Place torque wrench (see page 12) over the ½” hexagon end of the motor shaft (or attach scale to arm as shown page 11).
3. Holding the torque wrench firmly, release the brake by opening test terminal B (pos. 4).
4. Allow wrench to rotate slowly, then hold steady and read torque. Do not rotate the wrench against the torque direction as a false high reading will result.
5. Close test terminal B (pos. 4), remove torque wrench and adjust counterweights as needed.

Vertical torque. Set vertical torque to obtain a free position of 70° to 83° as follows:

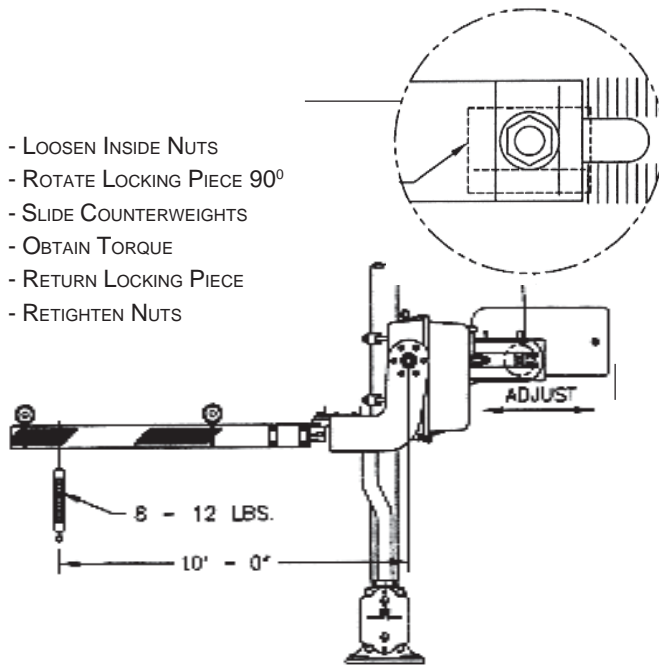
1. Close test terminal A (pos. 6) to lower arm to horizontal.
2. Open test terminal B (pos. 4) allowing arm to raise to a free balanced condition.
3. Check position of arm per diagram page 11 and adjust counterweights for vertical torque to obtain an arm position of 70° to 83°.
4. Repeat steps 1, 2 and 3 as required allowing for arm up momentum. Close test terminal B.

Note: The free or “default up” position is based on 70° minimum to clear roadway and 83° maximum so as to not close contact #9.

TORQUE ADJUSTMENTS

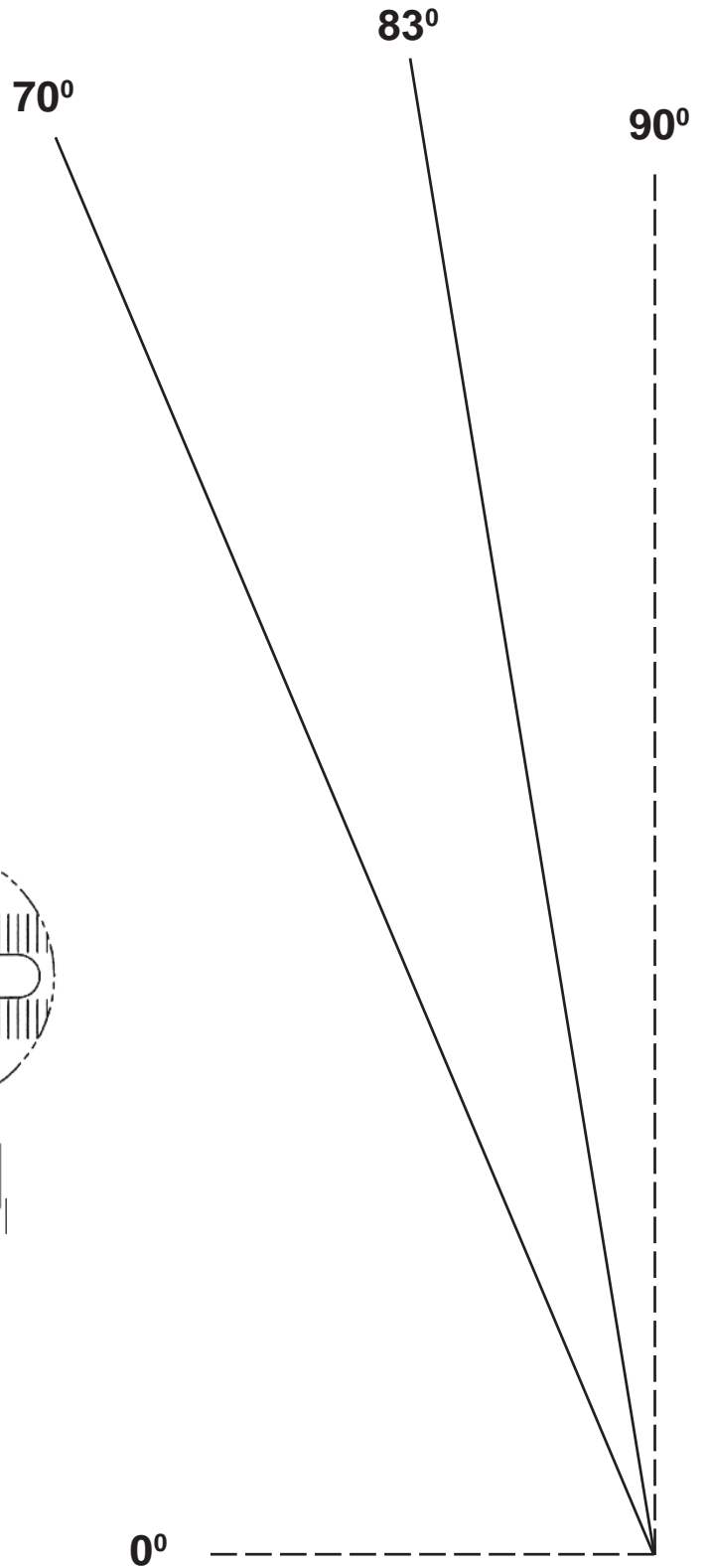


VERTICAL TORQUE



- LOOSEN INSIDE NUTS
- ROTATE LOCKING PIECE 90°
- SLIDE COUNTERWEIGHTS
- OBTAIN TORQUE
- RETURN LOCKING PIECE
- RETIGHTEN NUTS

HORIZONTAL TORQUE



TORQUE WRENCH KIT #070981-X

Safetran's Torque Wrench Kit permits torque measurements to be taken from the ½ inch hexagon end of the motor shaft providing a simpler method than that of using a spring scale on the arm. The kit also supplies ratchets for hand cranking the gate mechanism.

The torque wrench is calibrated for both inch-pound and foot-pound readings through the 240 to 1 gear ratio to the ½ inch hexagon end of the motor shaft.

NOTE: Other torque wrenches should not be used.

The Torque Wrench Kit consists of:

- Torque Wrench
- Ratchet Wrench (3/8 inch drive)
- Ratcheting Box End Wrench (1/2 and 9/16 inch openings)
- Socket (½ inch, 3/8 inch drive)
- Hex Key Wrench (3/16 inch)
- Tool Box
- Instruction Sheet

HAND CRANKING OF GATE MECHANISM

Warning: Disconnect power to gate mechanism before inserting tools for hand cranking.

The gate mechanism hand crank feature may be used either to crank the gate up, or in a case where the arm has been sheared off, to crank the counterweights to the horizontal position. The tools required are a ratchet wrench with 3/8 inch drive, a ½ inch socket for 3/8 inch drive, and a ratcheting box end wrench for ½ inch hexagon shaft; all of which are included in the Safetran Torque Wrench Kit.

1. Place ratcheting box end wrench over the hexagon shaft and slide towards motor. The ratchet should be set in the direction to prevent its rotation backward (ON to raise arm, OFF to raise counterweights).
2. Place the socket ratchet wrench over the end of the hexagon shaft and crank in the desired direction.
3. At the desired height, align the hole in the lower gear with the hole in the gear frame and insert a 3/8 inch pin or bolt. The gear train should be locked in this manner whenever working with the unbalanced condition of removing or replacing an arm or counterweights.

MAINTENANCE SWITCH OPERATION

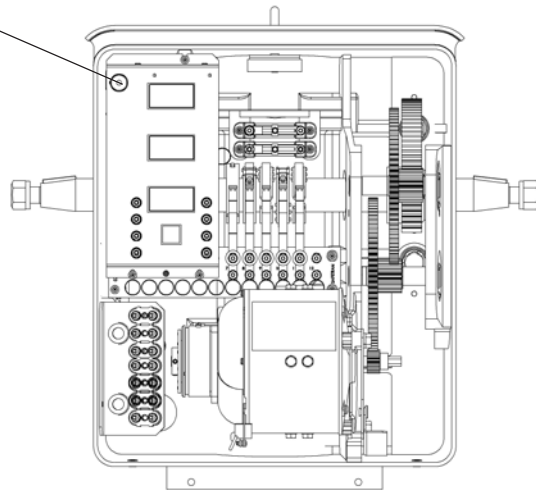
The Maintenance Switch (patent no. 5,852,350) consists of a push button switch and operating relay as part of the relay panel located in the upper left area of the gate cabinet, and a stop bar assembly located at the motor end of the gear train. See diagram below and on next page.

The Maintenance Switch is applicable to fiberglass/aluminum gate arms up to 32' long. Activating the normally open, momentary contact, push button switch will raise up to seven full size counterweight plates* to a horizontal position when the gate arm is removed. Once raised the stop bar is used to hold the counterweights at horizontal until the arm is in place.

OPERATING STEPS

1. Close test terminal A (pos. 6) and open test terminal B (pos. 4)
2. Position the Stop Bar with key-slot over the pivot lug in a ready position (see next page).
3. Depress and hold the Push Button until counterweights are fully raised.
4. Rotate the Stop Bar end against the motor pinion teeth and release the Push Button.
5. Install gate arm.
6. Close test terminal B and replace stop bar.
7. Open test terminal A to raise arm.

MAINTENANCE SWITCH PUSH BUTTON



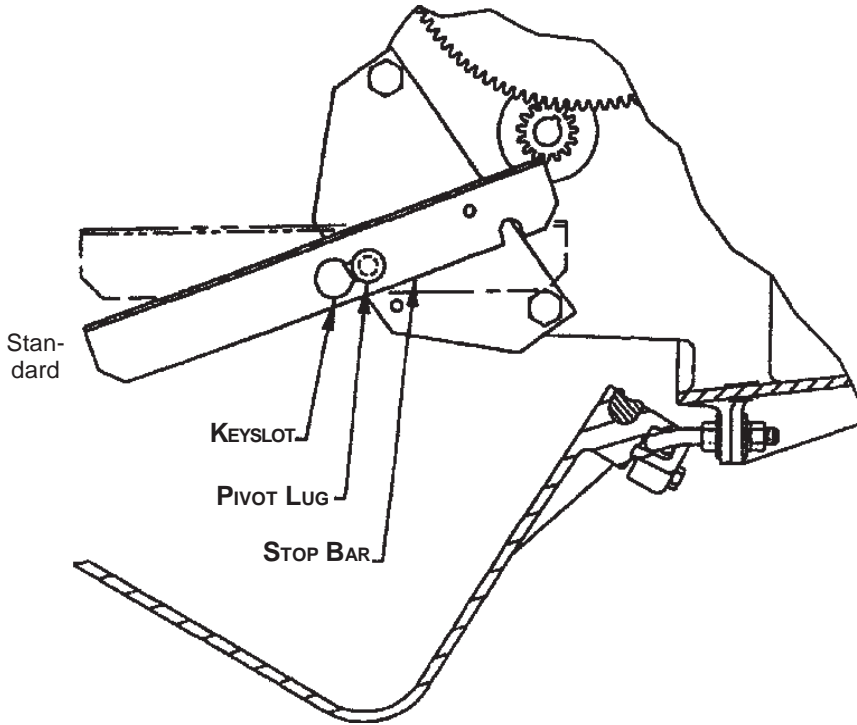
* Tests show that six of the full size 58# counterweights in a centered position with 13 VDC at gate terminals can be raised to a full horizontal position. Five counterweights in a maximum extended position can be raised to full horizontal with the minimum 11 VDC at gate terminals.

Gates with 7 or more counterweights will require the added use of a come-along or hand cranking to reach full horizontal position.

MAINTENANCE STOP BAR APPLICATION

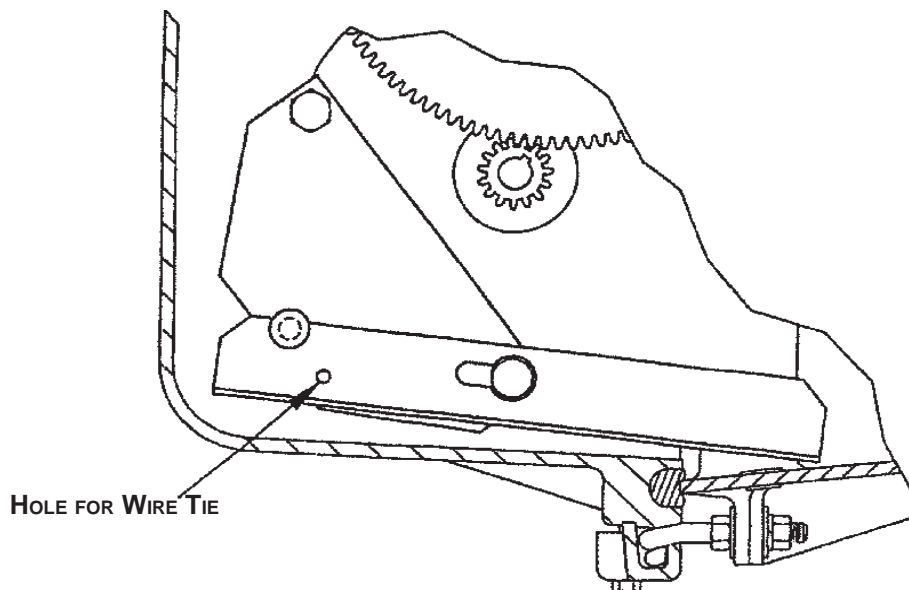
MAINTENANCE HOLD POSITION (DOOR OPEN)

Position Stop Bar with key-slot over pivot lug. When counterweights are fully raised, rotate Stop Bar up against motor pinion teeth as shown and release the maintenance switch push button.



STORAGE POSITION

Remove Stop Bar, rotate it and place the key-slot over the lower motor mount bolt head, then rotate up with the notch under the pivot lug as shown.



GENERAL MAINTENANCE

Model S-40EXIT gate mechanisms have self lubricating bearings on the main shaft, gear shafts and on the auxiliary sidewalk arm shaft when so equipped. No lubrication is required.

Gears should be coated with a thin film of all temperature grease, such as Aeroshell 7, at 3 to 6 month intervals depending on number of gate operations. Clean thoroughly and reapply grease every two years or when signs of gear wear are evident.

Ensure that air vents are kept unobstructed and flexible conduit between the gate mechanism and the junction box base is kept sealed.

MOTOR

Motor Shaft bearings are sealed with all-temperature grease and no lubrication is required. The brush pressure should be between 10 and 16 ounces. Normally the brush pressure, as adjusted at the factory, will be retained within proper limits throughout the long life of the brushes.

Required maintenance is to inspect the brushes and commutator annually and following a broken or fouled gate arm condition that may have held the motor in stall. Clean a darkened commutator by holding a commutator cleaning stone or non-metallic abrasive cloth to it while rotating the motor shaft. After cleaning, cycle the gate 2-3 times to clear brushes, then wipe commutator with a lint free cloth. Brushes worn to less than 3/4" length should be replaced.

MAINTENANCE TOOLS

Torque Wrench Kit (contents listed on page 12) - 070981-X

Maintenance Kit Complete-073112-3X (includes following items which can be ordered separately)

- Contact Forming Tool-073112
- Contact Setting Gage-073112-1
- Commutator Cleaning Tool-073112-2
- Contact Cleaning Strips (box of 12)-073000-15
- Tension Gage for Motor Brush Springs and Controller Contacts-073000-16

Torque Card - 070982-2

RELAYS

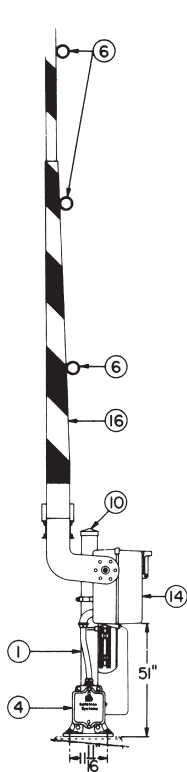
The relay panel assembly (page 18, item 63) contains the Maintenance Switch Relay K3 (top), the Power Down Relay K2 (middle) and the Power Up Relay K1 (bottom). Up Control Relay K4 is mounted on the terminal bracket.

Gate-down control energizes the down-control relay to release the brake and make power-down drive. At 1^o the power-down contact #7 opens to de-energize the relay and the motor; and to energize the brake for hold down. Removing gate-down control drops relay K4 to energize the power-up circuit. At 90^o the power up contact #8 opens to de-energize the up relay and the motor; and to energize the brake.

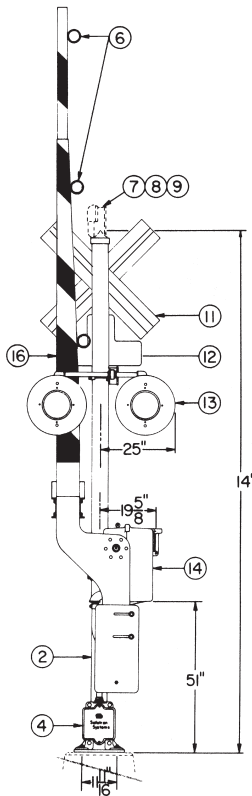
Field adjustment of relays is not recommended. Relays failing to pick up at 9.0 volts or release at 2.5 volts require replacement of the K4 relay or the relay panel assembly.

Relay Specifications			
Relay	Coil Resistance	Pick Up	Drop Away
12VDC Std	33 Ohm	9.0V max.	2.5V min.
24VDC Std	132 Ohm	18.0 V max.	1.0V nominal

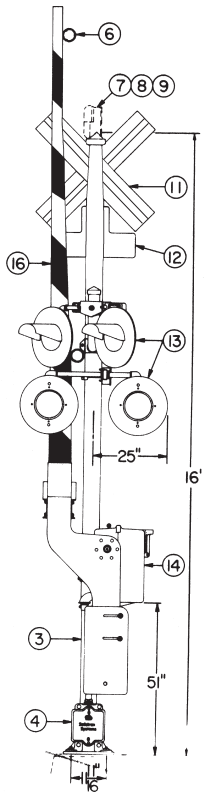
MODEL S-40EXIT GATE TYPES 50, 51, AND 52 REPLACEMENT PARTS



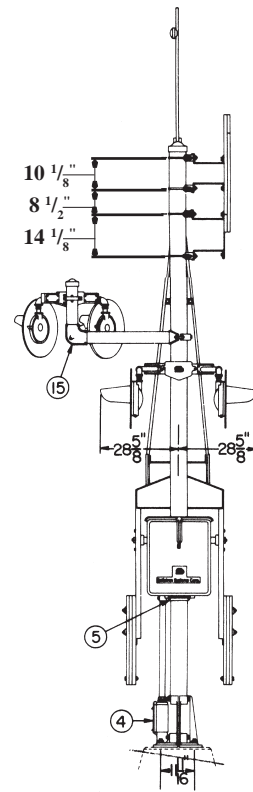
Type 50 S-40EXIT Gate mounted on stub mast



Type 51 S-40EXIT Gate with front and/or back flashing lights



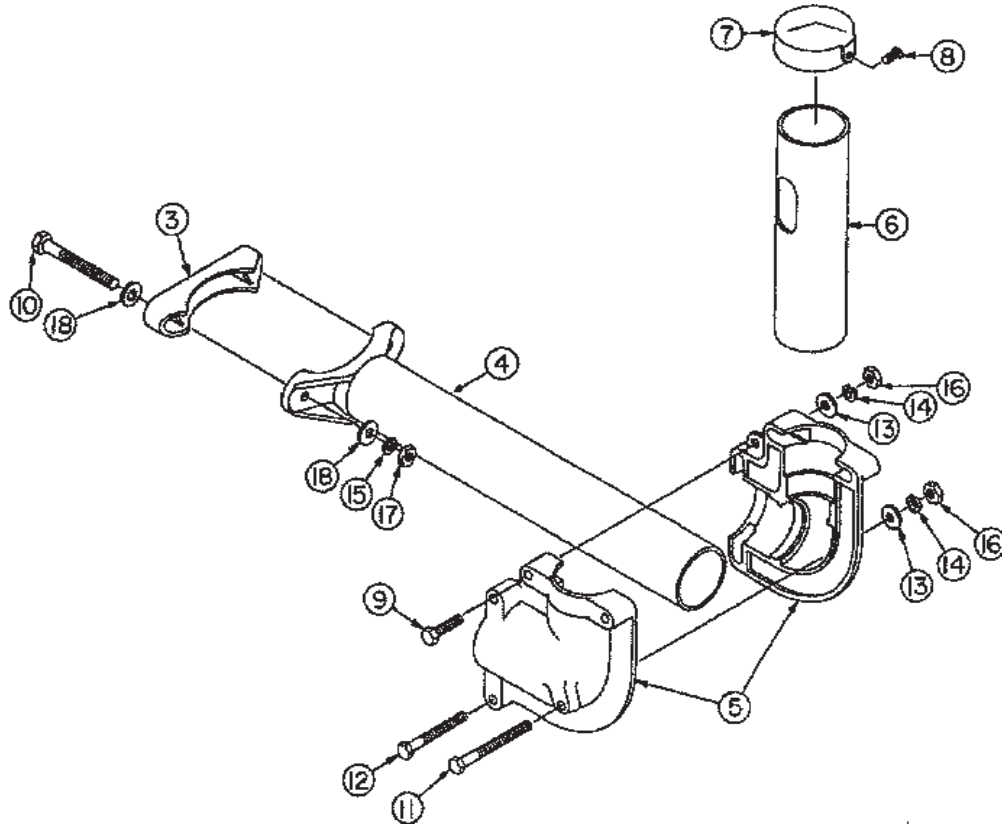
Type 50 S-40EXIT Gate with front and/or back flashing lights and cantilever mounted sidelights



To order, specify description and part number.

Item No.	Description	Part Number
1	Mast, 5" Stub	070519-3A
2	Mast, 5" Standard	070519-27A
3	Mast, 5", for Front, Back, and 45° Left Lights	070519-43A
4	Base, Junction Box, 11-11/16" Bolt Spacing for 5" Pipe	041931-2X
5	Clamp, Mechanism Support	070786-5X
6	Lamp, Gate Arm	075970-AX
7	Bell, 8-12 VDC Operation, for 5" Mounting	040200-4X
8	Bell, 120 VAC Operation, for 5" Mounting	040200-8X
9	Bell, 12-16 VAC/10-12 VDC Operation, for 5" Mounting	040200-10X
10	Pinnacle, 5"	035045-503X
11	Sign, Railroad Crossing, for 5" Mounting	035200-17X
12	Sign, Track, for 5" Mounting, (specify # of tracks)	035236-(#)X
13	Lamp, Flashing — See flashing lamp section of catalog	Specified
14	Mechanism, S-40EXIT Gate	074008-X
15	Cantilever, Sidelight (required for left hand sidelights)	041442-26X
16	Gate Arm & Conversion Bracket — See gate arm section of catalog	Specified

SIDELIGHT CANTILEVER ASSEMBLY AND REPLACEMENT PARTS

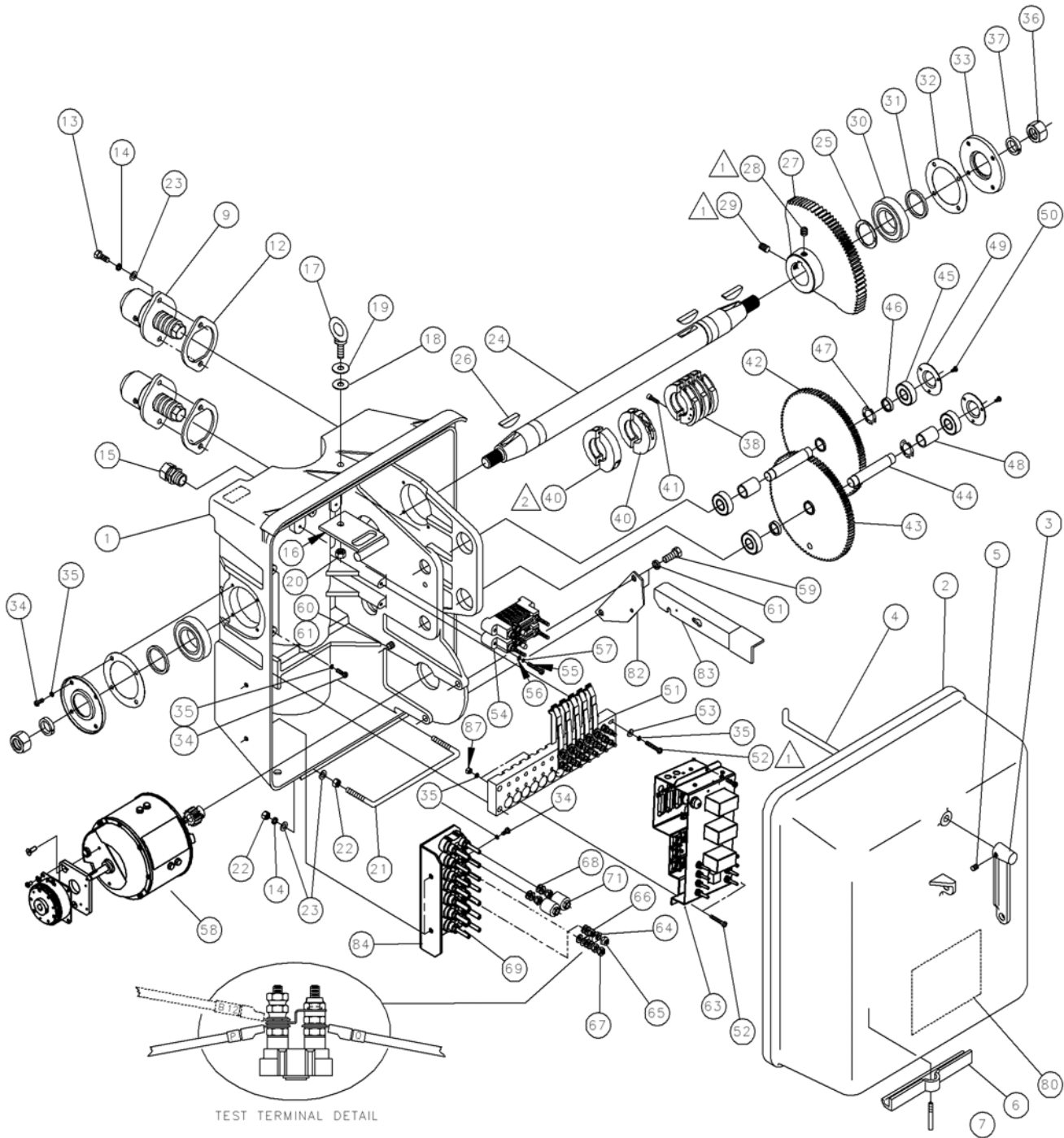


FOR COMPLETE ASSEMBLY, ORDER NUMBER 041442-26X

To order, specify description and part number

Item No.	Description	Qty. Req'd.	Part Number
1			
2			
3	Casting, Aluminum Clamp	1	070950
4	Pipe, Lower	1	041442-25X
5	Casting, Aluminum Elbow	2	041442-515
6	Pipe, Upper	1	041442-29
7	Pinnacle, 4" - 5"	1	035045-502
8	Set Screw, Square Head, 3/8" - 16 x 1"	1	4932-SC
9	Cap Screw, Hex Head, 1/2" - 13 x 2"	2	4170-HSC
10	Cap Screw, Hex Head, 3/4" - 10 x 6"	2	4286-HSC
11	Cap Screw, Hex Head, 1/2" - 13 x 6"	1	4182-HSC
12	Cap Screw, Hex Head, 1/2" - 13 x 5"	4	4180-HSC
13	Washer, Wrought, 1/2"	7	1755-C
14	Washer, Spring Lock, M, 1/2"	7	1812-MSC
15	Washer, Spring Lock, M, 3/4"	7	1815-MSC
16	Nut, Hex, 1/2" - 13	7	2108-SC
17	Nut, Hex, 3/4" - 10	2	2114-SC
18	Washer, Flat, 3/4"	4	1737-SC

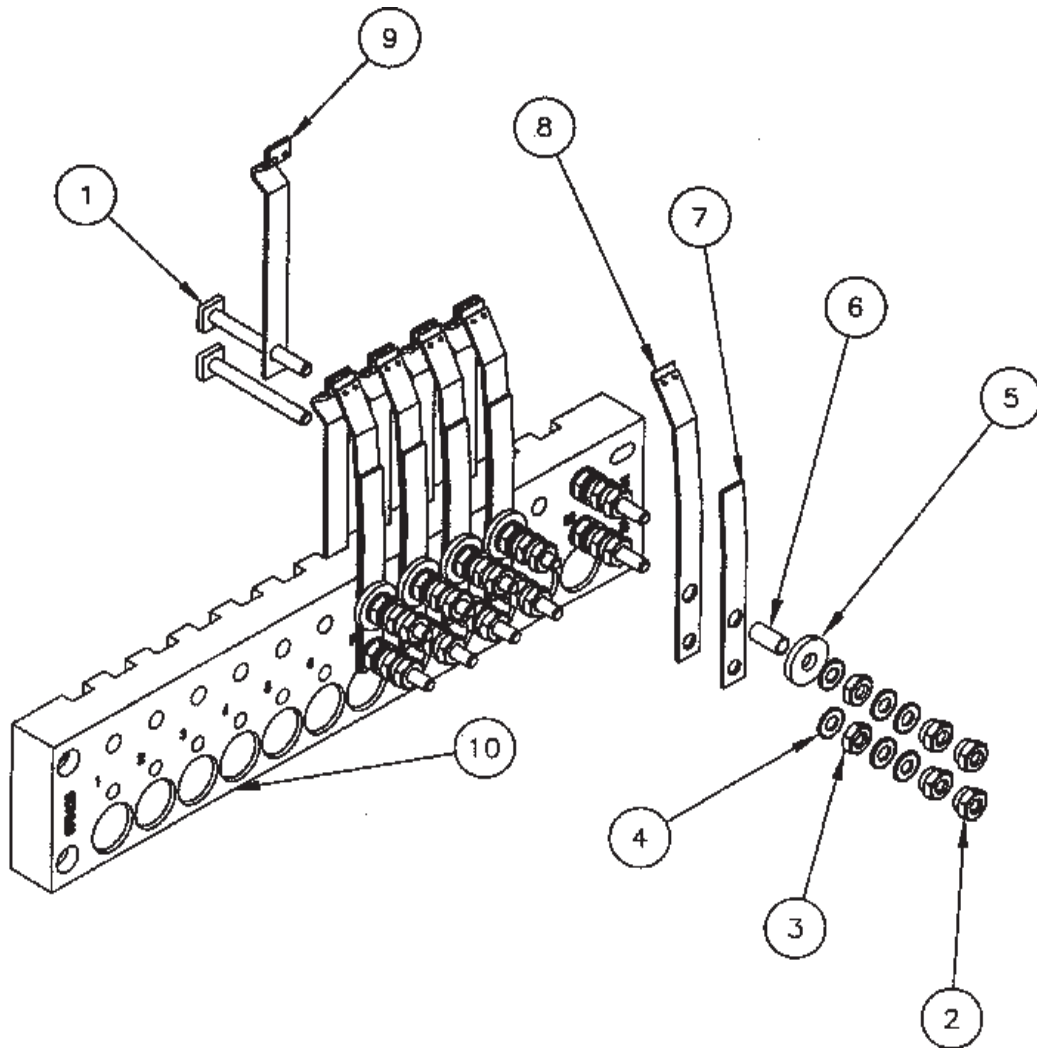
S-40EXIT Gate Exploded View



S-40EXIT Gate Replacement Parts

ITFM NO.	QTY.	PART NO.	DESCRIPTION	NOT SHOWN	ITFM NO.	QTY.	PART NO.	DESCRIPTION	NOT SHOWN
1	1	073001-4	CABINET, GATE		46	2	073009-3	SPACER, 1/4	
2	1	073002-X	WELDMENT, COVER		47	2	070695-500	WASHER, SPRING	
3	1	070909-4	HANDLE, LATCH		48	2	073009-2	SPACER, 1 1/2	
4	1	070919-2	ROD, LATCH		49	2	073007-2	COVER, BEARING	
5	1	004658-E	SS SH 3/8-16 X .50		50	6	002614-TEX	MS TR 10-32 X .375	
6	1	070968-4	RETAINER, HINGE		51	1	074030-5X	ASSY, TERM BD 6 CNCT	
7	1	002692-HE	MS HH 5/16-18 X 2.5		52	6	002665-PEX	MS PH 1/4-20 X 1.5	
8	1	070559-A	GASKET, COVER	*	53	2	001717-E	W FA 1/4 STNLS	
9	2	074045-X	BUFFER ASSY		54	2	029602-2X	RESISTOR, ADJ .8 OHM	
12	2	070926-1	GASKET, BUFFER		55	4	002625-PEX	MS PH 10-32 X 1.75	
13	4	004089-HE	CS HH 3/8-16 X 1.25		56	4	001712-E	W FA #10	
14	6	001810-ME	W LKS M 3/8		57	4	001806-ME	W LKS M #10	
15	1	007304-2	CONNECTOR, RELIEF		58	1	074027-2X	MOTOR BRAKE ASSY.	
16	1	070919-3X	WLDMENT, PLATE		59	2	004168-HSC	CS HH 1/2-13 X 1.5	
17	1	007099	EB 1/2-13 X 1.50		60	1	004166-HSC	CS HH 1/2-13 X 1.0	
18	1	070980-4	WASHER, NEOPRENE		61	3	001812-MSC	W LKS M 1/2	
19	1	001755-E	W FA 1/2		63	1	074010-225X	RELAY PANEL ASSY.	
20	1	002327-FLSC	N HX FL 1/2-13 LK		64	2	024620-19X	TEST LINK ASSY.	
21	1	070968-2	BOLT, HINGE		65	2	024620-13	NUT, GOLD TEST	
22	4	002104-E	N HX 3/8-16		66	2	023832	NUT, CLAMP	
23	8	001726-E	W WR 3/8		67	52	023831	NUT, BINDING	
24	1	074028	MAIN SHAFT, GATE		68	60	023834	WASHER, BEVELED	
25	1	070584	RING, RETAINING		69	4	023839-2	LINK, COPPER 1" CTRS	
26	3	007149	KEY, 1422-1 WOODRUFF		73	1	074040-5X	KIT, LEAD WIRE	*
27	1	073003	GEAR, SEGMENT		74	1	074044-3X	KIT, I & M	*
28	1	004706-SC	SS SH 1/2-13 X .50		75	2	012-00-000	ADHESIVE, GASKET	*
29	1	004708-SC	SS SH 1/2-13 X .75		76	4	017-00-000	LUBRICANT, GEAR	*
30	2	075284	BEARING, 2"		77	.001	017-00-004	SPRAY, TEFLON	*
31	2	070585	O-RING, 2"		78	2	019-02-000	TP 2" MASKING	*
32	2	070747-3	GASKET, SEAL PLATE		79	6	104824	TIE, CABLE	*
33	2	073008	PLATE, BEARING SEAL		80	1	074008-4	DECAL, S-40EXIT GATE	
34	15	002659-PEX	MS PH 1/4-20 X .625		82	1	074034-X	PLATE ASSY. MOUNT	
35	19	001808-ME	W LKS M 1/4		83	1	074035-X	BAR ASSY. STOP	
36	2	002118-SC	N HX 1-8		84	1	074036-21X	BRACKET ASSY, TERM	
37	2	001817-MSC	W LKS M 1"		87	2	002100-E	NUT HEX 1/4-20	
38	4	070633-2AX	CAM ASSY. PLASTIC		90	1	070698-11X	DEFROSTER, 12VDC 25W	*
40	2	073014-AX	SWITCH ASSY, SNAP						
41	6	004003-SSC	CS SH 1/4-20 X .875						
42	1	073004	GEAR & PINION UPPER						
43	1	073005	GEAR & PINION LOWER						
44	2	073007-1	SHAFT, GEAR						
45	4	070588	BEARING, 3/4						

TERMINAL BOARD ASSEMBLY AND REPLACEMENT PARTS

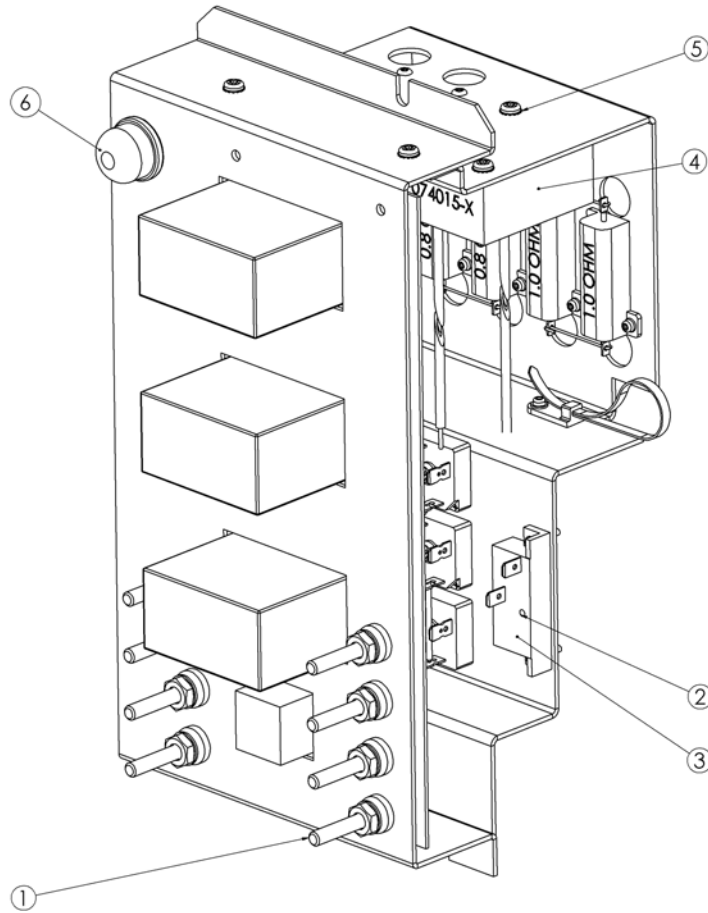


TERMINAL BOARD ASSEMBLY COMPLETE 074030-4XR

To order, specify description and part number

Item No.	Qty.	Part No.	Description
1	12	010427-6	Terminal Post
2	24	023831	Nut Binding
3	12	023832	Nut Clamp
4	36	023834	Washer Beveled
5	5	070627	Washer, Insulating
6	5	041414	Bushing, Insulating
7	5	073012-2	Spring, Reinforcing
8	5	073012-X	Contact, Fixed (Front)
9	5	073011-X	Contact, Moveable (Back)
10	1	070625	Board, Terminal

RELAY PANEL ASSEMBLY AND REPLACEMENT PARTS

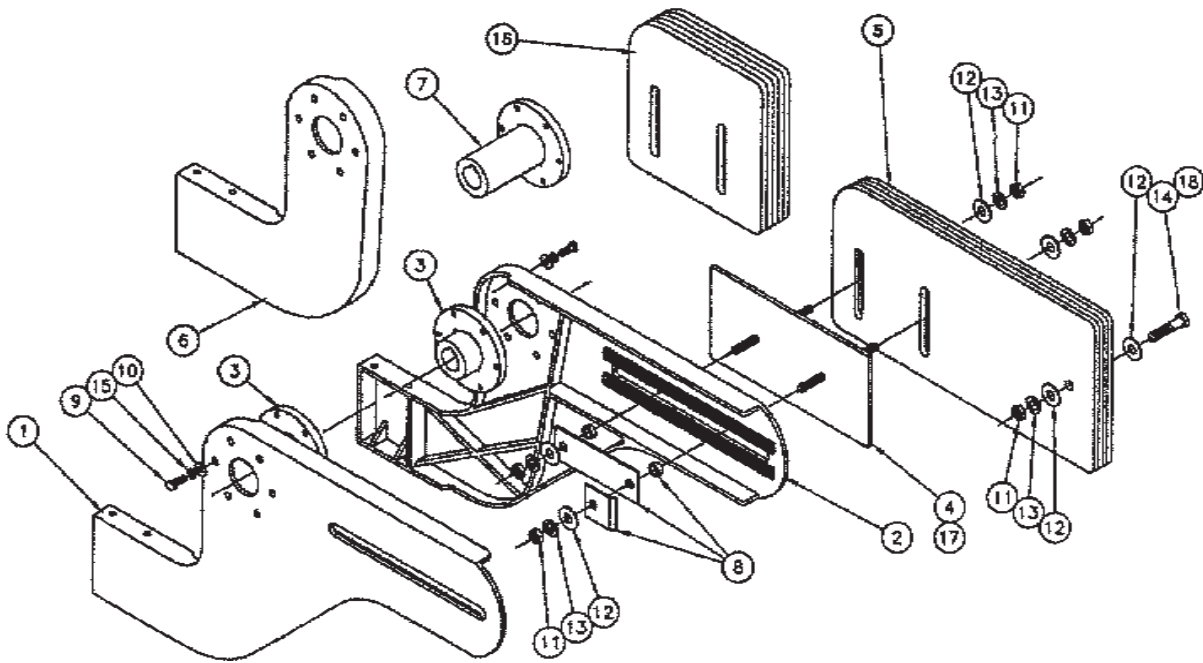


RELAY PANEL ASSEMBLY COMPLETE #074010-225X

To order, specify description and part number

Item No.	Qty.	Part No.	Description
1	8	023835-40X	Terminal Post Assembly
2	1	074046-2	Circuit Breaker 7A Auto
3	1	002560-RSC	Screw RD HD 4-40 X 5/8
4	1	074015-X	Overspeed Module
5	2	002572-1	Screw Pan HD 10-32 X 3/8
6	1	092431-81	Pushbutton

GATE ARM SUPPORTS/COUNTERWEIGHTS REPLACEMENT PARTS



To order, specify description and part number.

Item No.	Description	Part Number
1	Support, Left Hand Support, Left Hand with Hub and Mounting Bolts	070920-L 070920-LX
2	Support, Right Hand Support, Right Hand with Hub and Mounting Bolts	070920-R 070920-RX
3	Hub, Gate Arm Support	070923-3
4	Plate, Stud for standard counterweight w/hardware	070757-26X
5	Counterweight, Galvanized Steel, 1/2" x 15" x 30", 58 lbs (standard)	070755-4G
6	Support, Left Hand for use without counterweights Support, LH w/o counterweights with Hub and Mounting Bolts	070921-L 070921-LX
6A	Support, Right Hand (not shown) w/o counterweights Support, RH w/o counterweights with Hub and Mounting Bolts	070921-R 070921-RX
7	Hub, Extended (for sidewalk arms)	070575-1X
8	Clamp Assembly for Stud Plate	070925-X
9	Cap Screw, Hex Head, 1/2" – 13 x 1.25"	4167-HSC
10	Washer, Wrought, 1/2"	1755-C
11	Nut, Hex, 3/4" – 10	2114-SC
12	Washer, Wrought, 3/4"	1737-SC
13	Washer, Spring Lock, M, 3/4"	1815-MSC
14	Cap Screw, Hex Head, 3/4" – 10 x 3" for 3 – 4 standard counterweights Cap Screw, Hex Head, 3/4" – 10 x 4" for 5 – 6 standard counterweights Machine Bolt, Hex Head, 3/4" – 10 x 6.5" for 7 – 10 standard counterweights	4278-HSC 4282-HSC 3177-SC
15	Washer, Spring Lock, M, 1/2"	1812-MSC
16	Counterweight, Galvanized Steel, 5/8" x 15" x 15", 38 lbs (short)	070755-34G
17	Plate, Stud for short counterweight w/hardware	070757-30X
18	Cap Screw, Hex Head, 3/4" – 10 x 5" for 4 – 6 short counterweights Machine Bolt, Hex Head, 3/4" – 10 x 8" for 7 – 11 short counterweights Machine Bolt, Hex Head, 3/4" – 10 x 14" for 12 – 21 short counterweights	4284-HSC 3180-SC 3190-SC
19	Bracket, Support w/hardware--Use for extending counterweight vertically	070925-4X

HARDWARE TORQUE GUIDELINES

Thread Size	Hex Nut Size	Torque - Ft. Lb.
1/4-20	7/16	6
5/16-18	1/2	15
3/8-16	9/16	25
1/2-13	3/4	55
5/8-11	15/16	90
3/4-10	1 1/8	105
1"-8	1 1/2	140

Appendix A

Counterweight Guidelines Using Gate Protection Devices

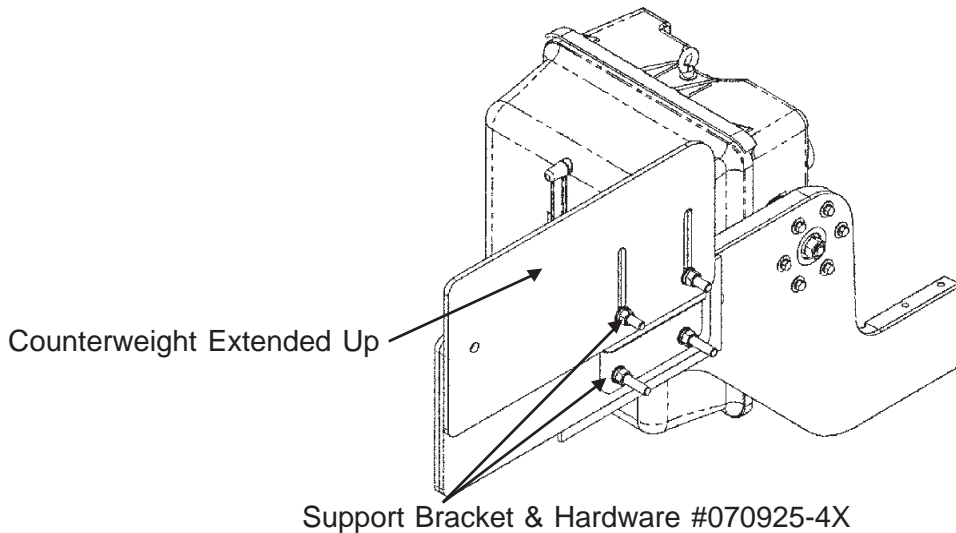
STANDARD COUNTERWEIGHTS REQUIRED WITH GATE PROTECTION DEVICES			
	Arm Length	NEG Gate Saver	GSI Gate Keeper
ONE SUPT. ARM REQ'D	12	3 (1+2XT)	3 (1+2XT)
	14	4 (2+2XT)	4 (3+1XT)
	16	4 (4+2XT)	4 (3+1XT)
	18	5 (4+1XT)	5 (4+1XT)
	20	5 (3+2XT)	5 (4+1XT)
TWO SUPT. ARMS REQ'D	22	6 (5+1XT)	6
	24	6 (5+1XT)	6
	26	7	7
	28	7	7
	30	8	7
	32	8	7
	34	9	8
	36	9	9
	38	10	9
	40	10	9
	42	10	10
44	11	10	
46	11	11	

(+1XT) = 1 COUNTERWEIGHT EXTENDED UP W/SUPPORT BRACKET
 (+2XT) = 2 COUNTERWEIGHTS EXTENDED UP W/SUPPORT BRACKET

SHORT COUNTERWEIGHTS REQUIRED WITH GATE PROTECTION DEVICES			
	Arm Length	NEG Gate	GSI Gate Keeper
ONE SUPT. ARM REQ'D	12	6 (3+3XT)	6 (5+1XT)
	14	8 (7+1XT)	8
	16	8 (6+2XT)	8
	18	10	10
TWO SUPT. ARMS REQ'D	20	12	10
	22	12	12
	24	14	12
	26	14	14
	28	16	14
	30	16	14
	32	18	16
	34	18	16
	36	20	18
	38	20	18
	40	22	20
	42	22	20
	44	24	24
	46	24	24

(+1XT) = 1 COUNTERWEIGHT EXTENDED UP W/SUPPORT BRACKET
 (+2XT) = 2 COUNTERWEIGHTS EXTENDED UP W/SUPPORT BRACKET
 (+3XT) = 3 COUNTERWEIGHTS EXTENDED UP W/SUPPORT BRACKET

COUNTERWEIGHT EXTENDED UP WITH SUPPORT BRACKET



SIEMENS

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