



KJB-25

HYDRAULIC VERTICAL PIVOT GATE

**Operator's & Parts
Manual**

TILT-A-WAY
TILT-A-WAY
TILT-A-WAY®

**NOTE: WHEN ORDERING PARTS, PLEASE HAVE YOUR SERIAL NUMBER
TO ENSURE THE CORRECT PARTS ARE SENT TO YOU.**

**Ideal Manufacturing, Inc. • 2011 Harnish Blvd. • Billings, MT 59101
P (406) 656-4360 • F (406) 656-4363**

\$15.00 USD Funds

SERIAL NUMBER _____



2011 Harnish Blvd.
Billings, MT 59101

Phone: (406)656-4360/(800)523-3888
Fax: (406)656-4363

TILT-A-WAY LIMITED WARRANTY

Ideal Manufacturing warrants that its Tilt-A-Way vertical pivot gate Model KJB-25, HYJD-25E and HYJD-25 products will be free from defects in materials and workmanship for a period of 3 years from the date of purchase. If the product fails to function because of defects in materials or workmanship within the 3 year period of time being used for the purpose for which it was designed, Ideal Manufacturing will repair or replace the defective part at its option. This warranty excludes electrical components and damage due to Acts of God, unauthorized modifications, misuse, abuse or negligence to this product.

In order to proceed with a warranty claim, Ideal Manufacturing must be notified of the problem. A new part will be shipped out prepaid (Ground UPS). If the customer requests that the part be expedited that shipping charge will be charged to the owner.

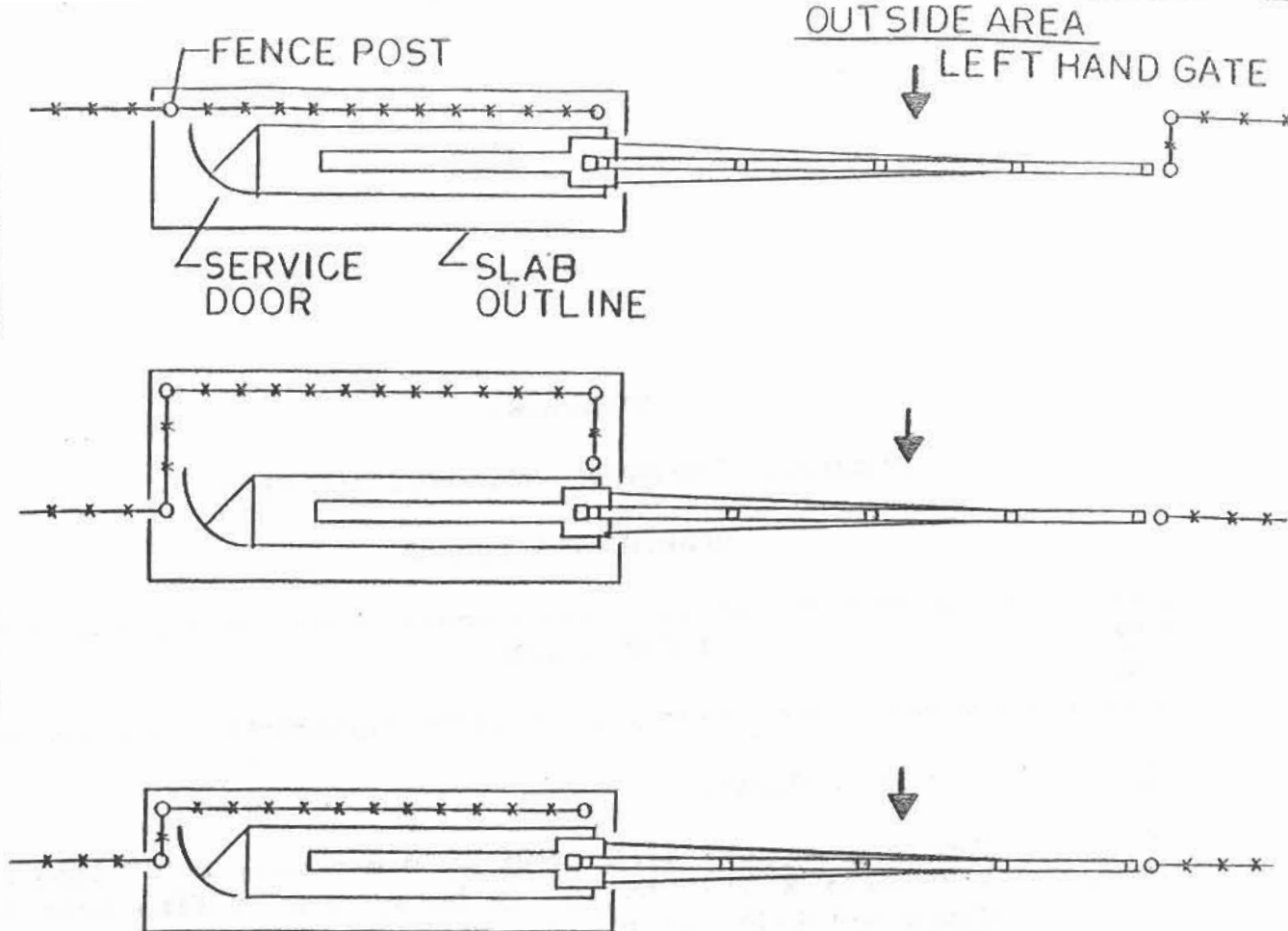
The part that is being warranted must be returned to Ideal Manufacturing, postage prepaid. When the new part is shipped out, it will go out with an invoice and a warranty part return number. The defective part must be returned to Ideal Manufacturing, freight prepaid, with the warranty part return number. At that time the invoice will be considered paid in full.

This warranty is exclusive and in lieu of all other obligation, liabilities or warranties. In no event shall Ideal Manufacturing be liable or responsible for incidental or consequential damage or for any other direct or indirect damage loss, cost, expense or fee.

This warranty shall not apply to any products or parts that have been altered or repaired without written consent of Ideal Manufacturing.

Labor to remove and reinstall defective product or parts will be paid from a labor rate and schedule only. Consult Ideal Manufacturing for that rate and schedule.

For further information on returning your product or questions concerning Ideal Manufacturing warranty, please contact Ideal Manufacturing.



INDICATED ARE THREE MOST COMMON WAYS
TO SET A TILT-A-WAY GATE
INDIVIDUAL CONDITIONS MAY REQUIRE
A SPECIAL ARRANGEMENT

TILT-A-WAY GATE ALTERNATE FENCE SCHEMES	
DATE	DRAWING
9-1-92	RGH-2001-A

TILT-A-WAY
HYDRAULIC OPERATOR FIELD INSTALLATION
DRAWING RGH 2002-A

REF. NO.	DESCRIPTION
1	Control Pedestal
2	Concrete Support Slab. Minimum dimensions 11'0" long X 4'0" wide X 1'6" thick. To be placed on firm soil or Compacted fill, reinforced with #4 rebar each way; and Cement pilings dug to frost line by purchaser. NOTE: Will withstand an estimated 100 MPH Wind in most soil conditions.
3	Electrical Conduit Area. Stub in Electrical supply, 30 Amp Power.
4	Four Anchor Bolts 3/4" Diameter with 2" projection. Set in slab or expansion type.
5	Two Base Plates, furnished loose with pedestal. Level with Grout and Bolt in Place.
6	Four Corner Field Welds. Place pedestal on base plates with exact alignment and weld.

TILT-A-WAY

HYDRAULIC OPERATOR INSTALLATION PROCEDURE

DRAWING RGH 2002-B

Gate will arrive at installation site as two separate units. One support & control pedestal and one road barrier unit.

1. Remove all materials used for protection during shipment.
2. Place pedestal on prepared foundation, do not secure at this point.
3. Open rear access door to expose spring tension adjustment screws, swing out spring release safety switch bars to provide access at adjustment screws.
4. Below hydraulic fluid reservoir find two fluid bypass valves, place in open position.
5. Back off spring tension screws to provide slack in tension cables.
6. Rotate barrier carriage to down position. Remove pivot shaft with attached components.
Install barrier and secure to vertical carriage post with four bolts and clamp at outer end of carriage horizontal channel.
7. Place plastic rub washer over pivot shaft collar on carriage. Align cylinder rod end bearing with collar and insert pivot shaft from far side. Secure with flat washer, lock washer and bolt.
8. Tighten spring tension screws while inspecting cables for proper wrap around balance sheaves. When slide members have reached marks indicated on tracks. Proper balance tension will have been achieved. If at a later date minor adjustment should be required, refer to balance system adjusting section.
9. Align gate for permanent position and secure pedestal to base plates with field welds at each corner.
10. Perform required electrical connections in accordance with diagrams shown in this manual.
11. Position fluid bypass valves to closed setting, close and secure access door.
12. If gate fails to function properly, contact manufacturer's Representative.

TILT-A-WAY
HYDRAULIC OPERATOR BALANCE SYSTEM ADJUSTMENT
DRAWING RGH-2003-A

TILT-A-WAY road gate must be balanced to offer the least amount of resistance against movement at both up and down extreme positions or any intermediate position.

Balance adjustment is accomplished by cable tension, cable sheave position or combination of both.

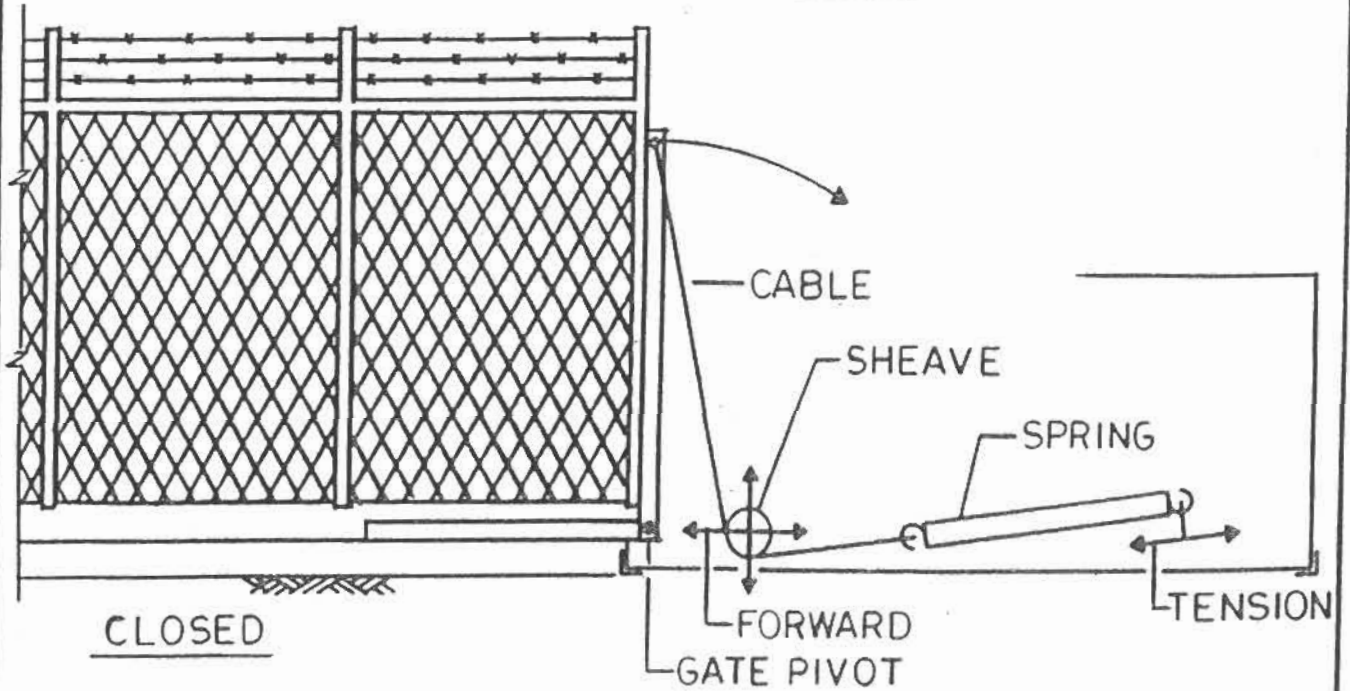
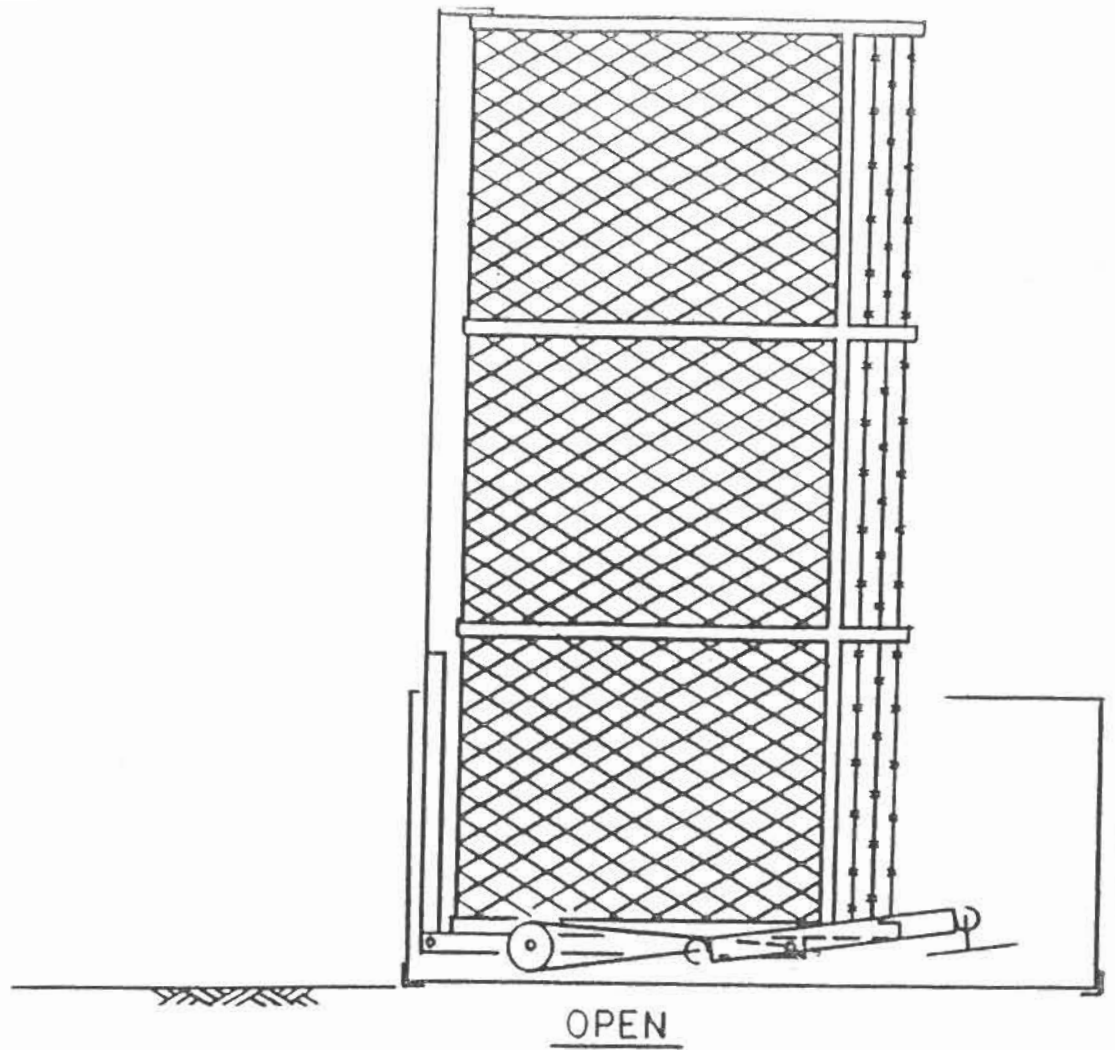
Two cable systems are incorporated and any adjustments performed at one side must be duplicated on the opposite side.

SAFETY WARNINGS-VERY IMPORTANT

1. Before performing any maintenance or adjustment, open main power disconnect switch located adjacent to control panel enclosure. Prior to performing any adjustment, hydraulic fluid bypass valves must be placed in open position.
2. Any adjustment performed on cable sheave must be proceeded by the release of all cable tension at spring connections.

CONDITIONS AND SOLUTIONS

- | | | |
|----|------------|--|
| 1. | Condition: | Gate heavy at both up and down positions. |
| | Solution: | Increases cable tension. |
| 2. | Condition: | Gate light at both up and down positions. |
| | Solution: | Decrease cable tension. |
| 3. | Condition: | Gate heavy at down position only. |
| | Solution: | Lower cable sheave and increase cable tension. |
| 4. | Condition: | Gate light at down position only. |
| | Solution: | Raise cable sheave and decrease cable tension. |
| 5. | Condition: | Gate heavy at up position only. |
| | Solution: | Raise cable sheave and decrease cable tension. |
| 6. | Condition: | Gate light at up position only. |
| | Solution: | Lower cable sheave increase cable tension. |
| 7. | Condition: | Gate heavy at intermediate positions. |
| | Solution: | Move cable sheave forward. |
| 8. | Condition: | Gate light at intermediate positions. |
| | Solution: | Move cable sheave rearward. |



TILT-A-WAY GATE
BALANCE SYSTEM
ADJUSTING

DATE
9-1-92

DRAWING
RGH-2003-A

TILT-A-WAY

RECOMMENDED GENERAL MAINTENANCE

DRAWING RGH-2003-B

Check interior of pedestal for any accumulation of trash caused by blowing wind and remove.

On a regular basis the following maintenance steps should be performed.

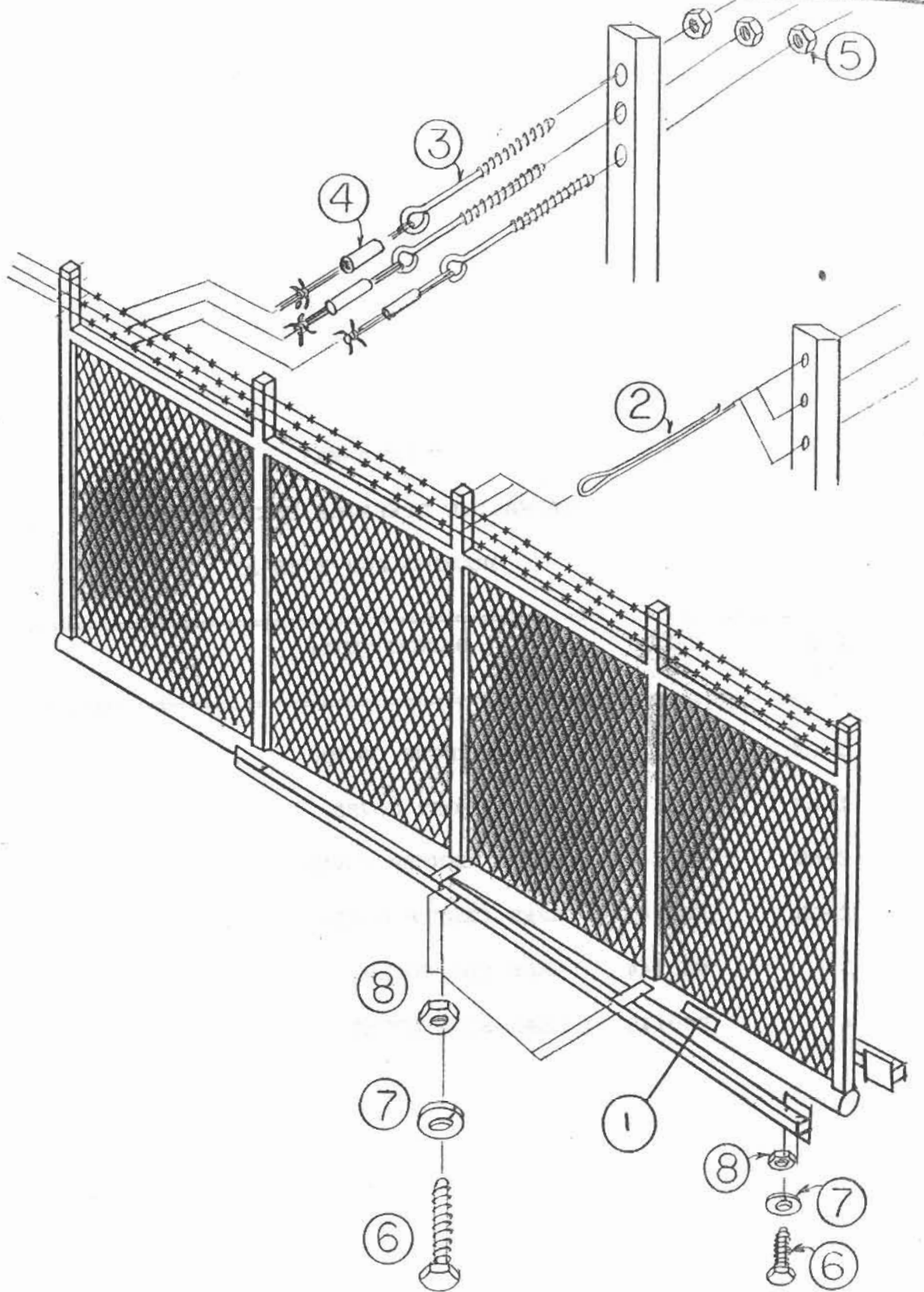
1. Check hydraulic fluid level at reservoir fill plug. Level to be approximately 2 1/2" below top of fill pipe. If required add Dextron #2 hydraulic fluid "same as automatic transmission fluid".
2. Clean and lubricate spring tension screws with "general purpose grease" to prevent rusting.
3. Lubricate with "general purpose grease" all points equipped with zerk fittings.
 - A. Barrier carriage pivot bearings.
 - B. Cylinder anchor pivot.
 - C. Cylinder rod end pivot bearing.

TILT-A-WAY GATE

BARRIER

DRAWING RGH-2004-A

REF. NO.	DESCRIPTION	
1	Metal plate embossed with barrier serial number.	
	Barrier assemblies are manufactured from steel or aluminum material and in varied lengths and heights.	
	When contacting manufacturer regarding a TILT-A-WAY gate, Always provide complete serial number.	
2 ID1066	3/16" X 2 1/2" Stainless Steel Cotters Pin 3 per inside tube.	
3 ID1063	5/16" X 4" Eye Bolts (3 per end)	6
4 ID1046	Wire Crimp	6
5 NA	5/16" Hex Nut	6
6 NA	3/8" X 2 1/4" Hex Bolt for Aluminum Brace or 3/8" X 2" Hex Bolt for Steel Brace	6 6
7 NA	3/8" Lockwasher	6
8 NA	3/8" Hex Nut	6



TILT-A-WAY GATE
BARRIER UNIT

DATE

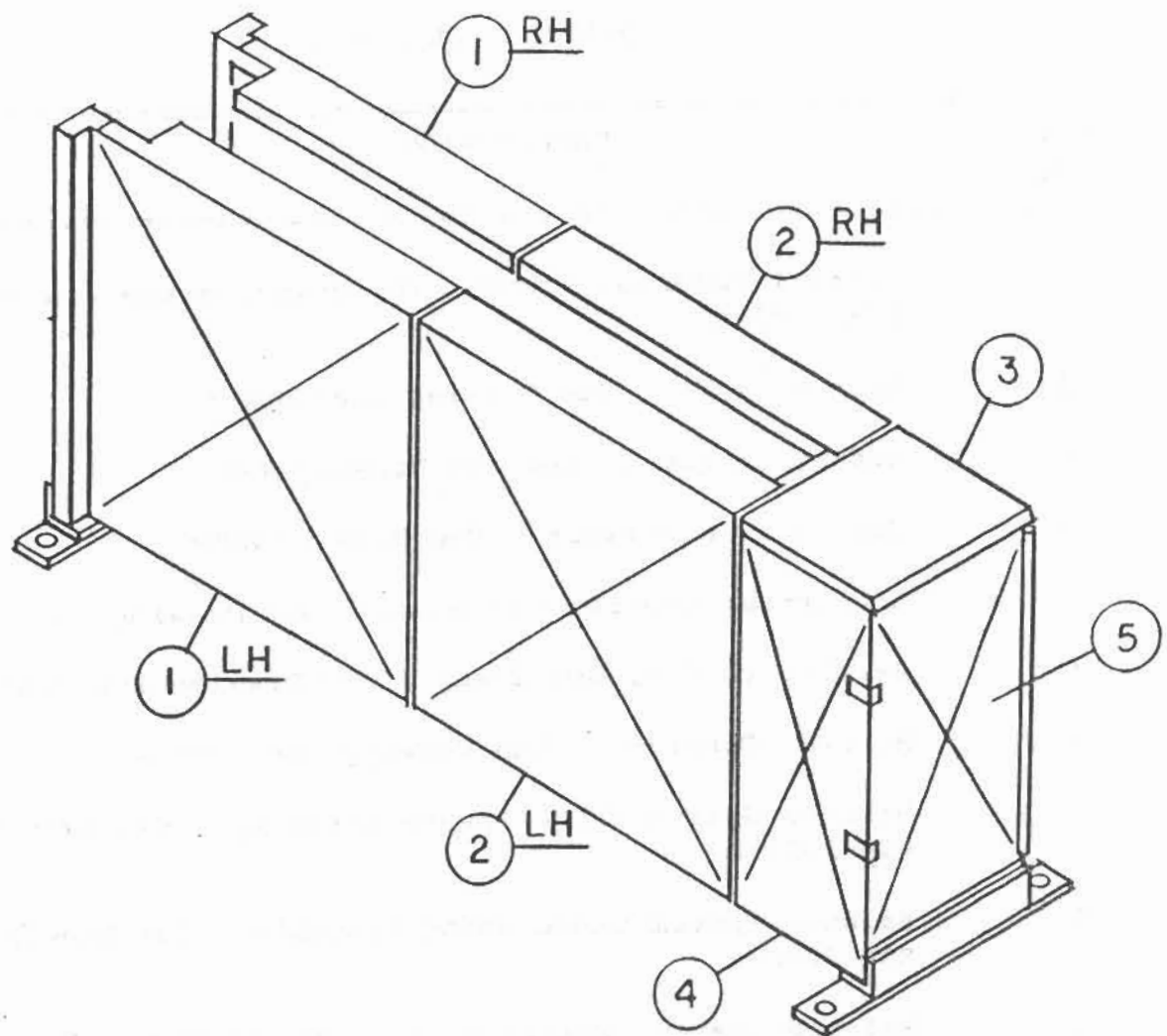
1-28-00

DRAWING

RGH-2004-A

TILT-A-WAY
HYDRAULIC OPERATOR ENCLOSURE
DRAWING RGH-2005-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1-RH	FG0140	RIGHT FRONT COVER	1
1-LH	FG0141	LEFT FRONT COVER	1
2-RH	FG0142	RIGHT CENTER COVER	1
2-LH	FG0143	LEFT CENTER COVER	1
3	FG0144	REAR TOP COVER	1
4	FG0145	REAR SIDE COVER	2



TILT-A-WAY GATE
PEDESTAL ENCLOSURE

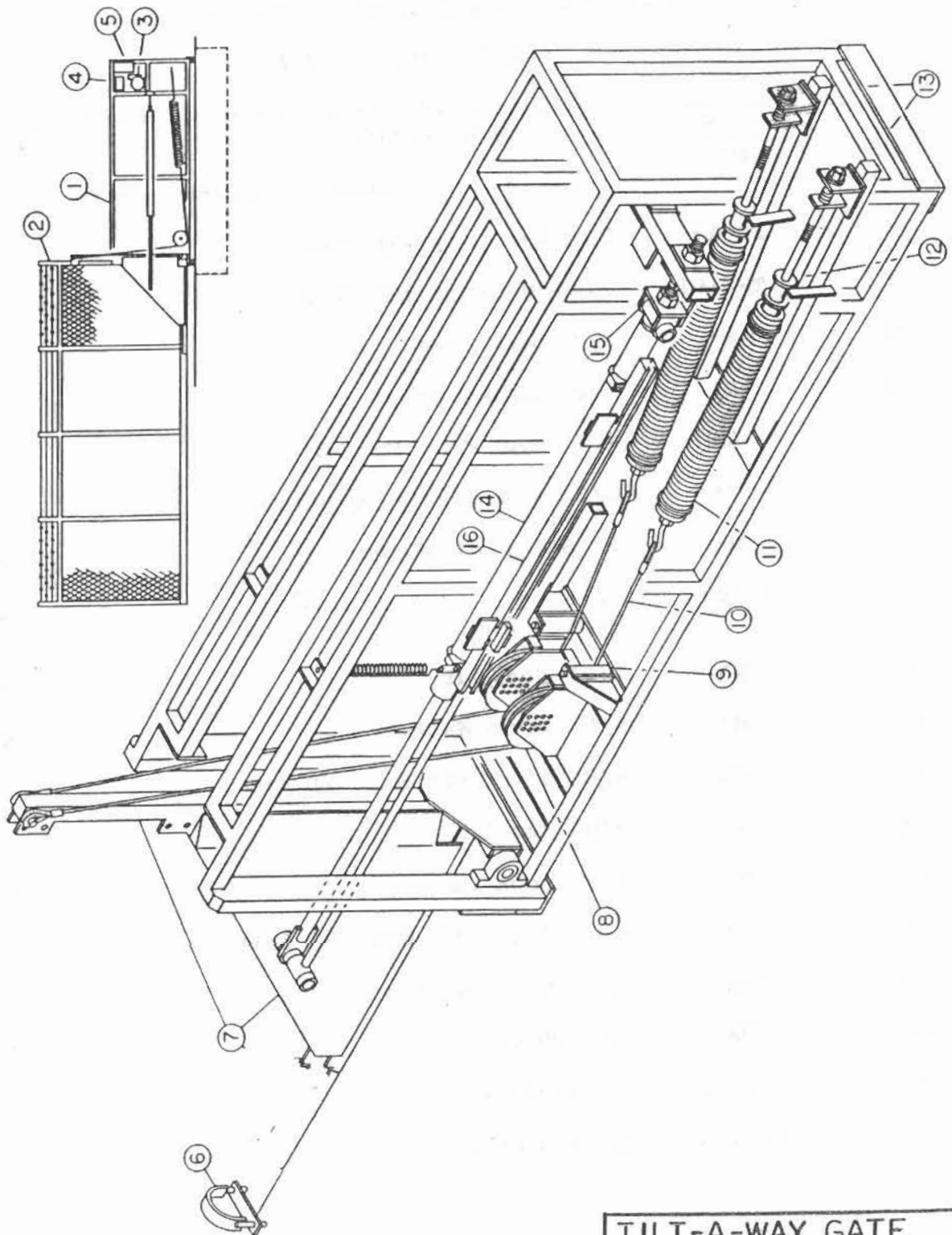
DATE
9-1-92

DRAWING
RGH-2005-A

TILT-A-WAY
HYDRAULIC OPERATOR GENERAL ARRANGEMENT

DRAWING RGH-2006-A

REF. NO.	DESCRIPTION
1	Control Pedestal Frame. For covering see Drawing RGH-2005-A.
2	Barrier Unit. See Drawing RGH-2004-A.
3	Hydraulic Pump. Set see Drawing RGH-
4	Hydraulic Reservoir. See Drawing RGH-
5	Electrical Control Enclosure. See Drawing RGH-
6	Barrier to Carriage Clamp. See Drawing RGH-2007-A.
7	Barrier Carriage. See Drawing RGH-2007-A.
8	Balance System Cable Sheave Assembly. See Drawing RGH-2009-A.
9	Balance System Cable Guide Assemble. See Drawing RGH-2010-A.
10	Balance System Tension Cable. See Drawing RGH-2009-A.
11	Balance System Tension Spring. See Drawing RGH-2012-A.
12	Balance System Spring Tension Adjusting Limit. See Drawing RGH-2011-A.
13	Balance System Spring Tension Release. "POWER OFF" Safety switch "NOT SHOWN". See Drawing RGH-2013-A.
14	Hydraulic Actuating Cylinder. See Drawing RGH-2008-A.
15	Cylinder Control Actuating System. See Drawing RGH-2008-A



**TILT-A-WAY GATE
CONTROL PEDESTAL
GENERAL ARRANGEMENT**

DATE

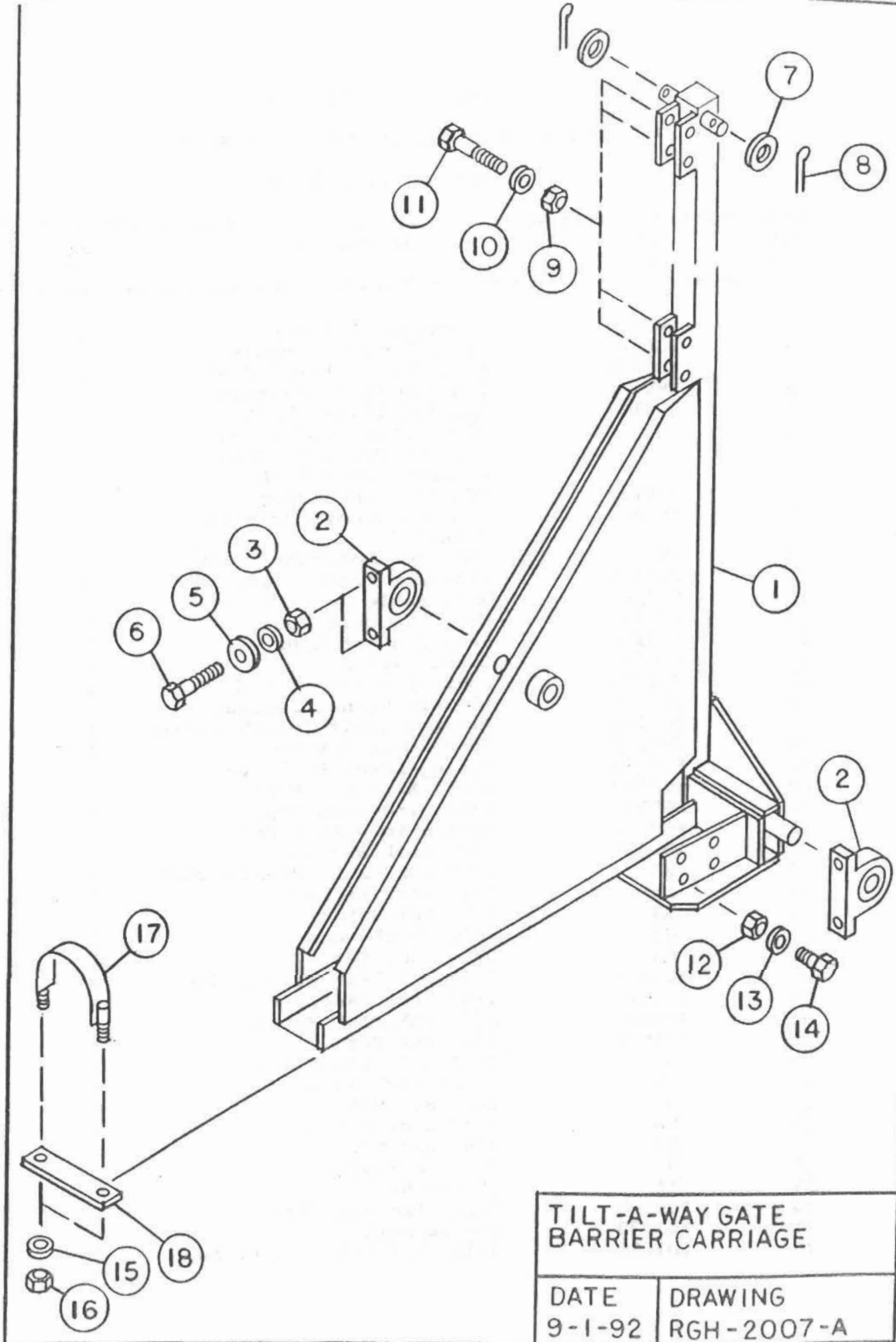
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DRAWING

RGH-2006-A

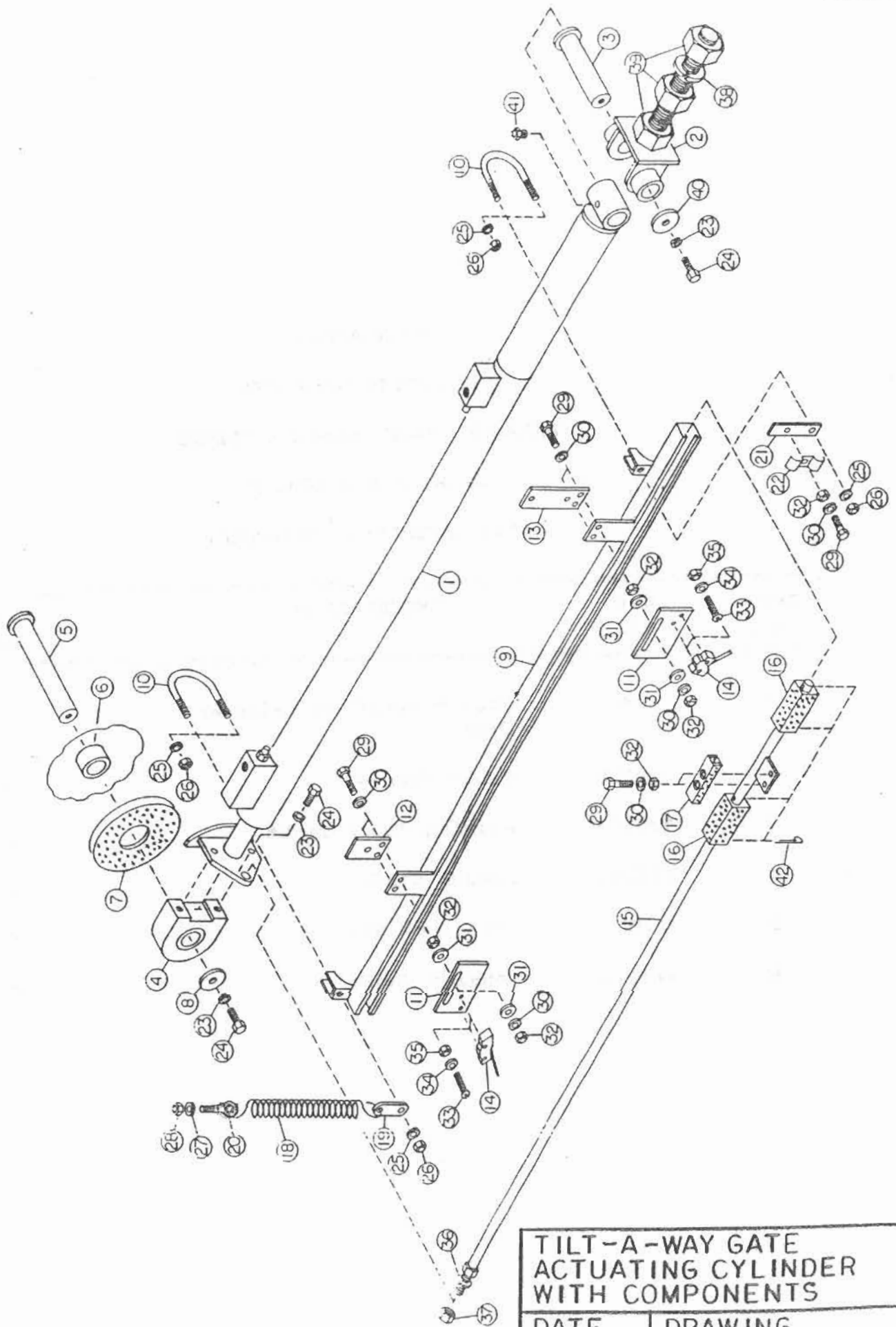
TILT-A-WAY
HYDRAULIC OPERATOR BARRIER CARRIAGE
DRAWING RGH-2007-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	FG0147	Barrier Carriage Frame	1
2	TW0101	Pillow Block Bearing	2
3	NA	1/2" Hex. Nut	4
4	NA	1/2" Lock Washer	4
5	NA	1/2" SAE Flat Washer	4
6	NA	1/2" X 4 1/2" Hex. HD Bolt	4
7	NA	1" SAE Flat Washer	2
8	ID1006	3/16" X 1 1/2" Stainless Cotter Pin	2
9	NA	5/8" Hex Nut	4
10	NA	5/8" Lock Washer	4
11	NA	5/8" X 3 1/4" Hex. HD Bolt	4
12	NA	3/8" Hex Nut	4
13	NA	3/8" Lock Washer	4
14	NA	3/8" X 2 1/4" Hex. HD Bolt	4
15	NA	3/8" Lock Washer	2
16	NA	3/8" Hex. Nut	2
17	FG0112	Clamp Band	1
18	FG0113	Clamp Plate	1



TILT-A-WAY
HYDRAULIC OPERATOR
ACTUATING CYLINDER WITH COMPONENTS
DRAWING RGH 2008-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	TW0117	Hydraulic Cylinder	1
2	FG0187	Foot Clevis Assembly	1
3	FG0118	Foot Clevis Pivot Shaft	1
4	TW0118	Rod End Pivot Bearing	1
5	FG0198	Rod End Pivot Shaft	1
6	NA	Pivot Shaft Collar on Barrier Carriage (See Drawing RGH-2007-A)	1
7	FG0199	Plastic Rub Washer	1
8	FG0200	Bearing Sleeve Pressure Washer	1
9	FG0201	Cylinder Actuator Track	1
10	TW0119	Actuator Track Clamp	2
11	FG0166	Adjustable Mount Plate	2
12	FG0192	Front Conduit Mount	1
13	FG0196	Rear Conduit Mount	1
14	PE0112	Limit Switch	2
15	FG0202	Control Actuator Rod	1
16	FG0194	Plastic Runner Bearing	2
17	FG0195	Plastic Limit Switch Actuator	1
18	TW0120	Suspension Spring	1
19	FG0190	Spring Lower Hook Eye	1
20	ID1062	5/16" X 1" Eye Bolt	1
21	FG0130	Hydraulic Hose Support	1
22	FG0206	Hydraulic Hose Clamp	1
23	ID1002	1/2" Lock Washer	4
24	NA	1/2"-13NC X 1" Machine Bolt	4
25	NA	3/8" Lock Washer	6
26	NA	3/8" Hex Nut	6
27	NA	5/16" Lock Washer	1
28	NA	5/16" Hex Nut	1
29	ID1018	1/4" X 1 1/4" Hex Hd. Bolt	7
30	ID1019	1/4" Lock Washer	11
31	ID1020	1/4" SAE Flat Washer	8
32	ID1021	1/4" Hex Nut	11
33	NA	6-32 X 1" Stove Bolt	4
34	NA	5/32" Lock Washer	4
35	NA	6-32 Hex Nut	4
36	NA	3/4" Lock Washer	1
37	NA	3/4" Hex Nut	1
38	NA	1" Lock Washer	1
39	NA	1" Hex Nut	3
40	FG0208	Shaft Pressure Washer	1
41	ID1030	Grease Zerk	1
42	ID1031	3/32" X 1 1/2" Cotter Key	4

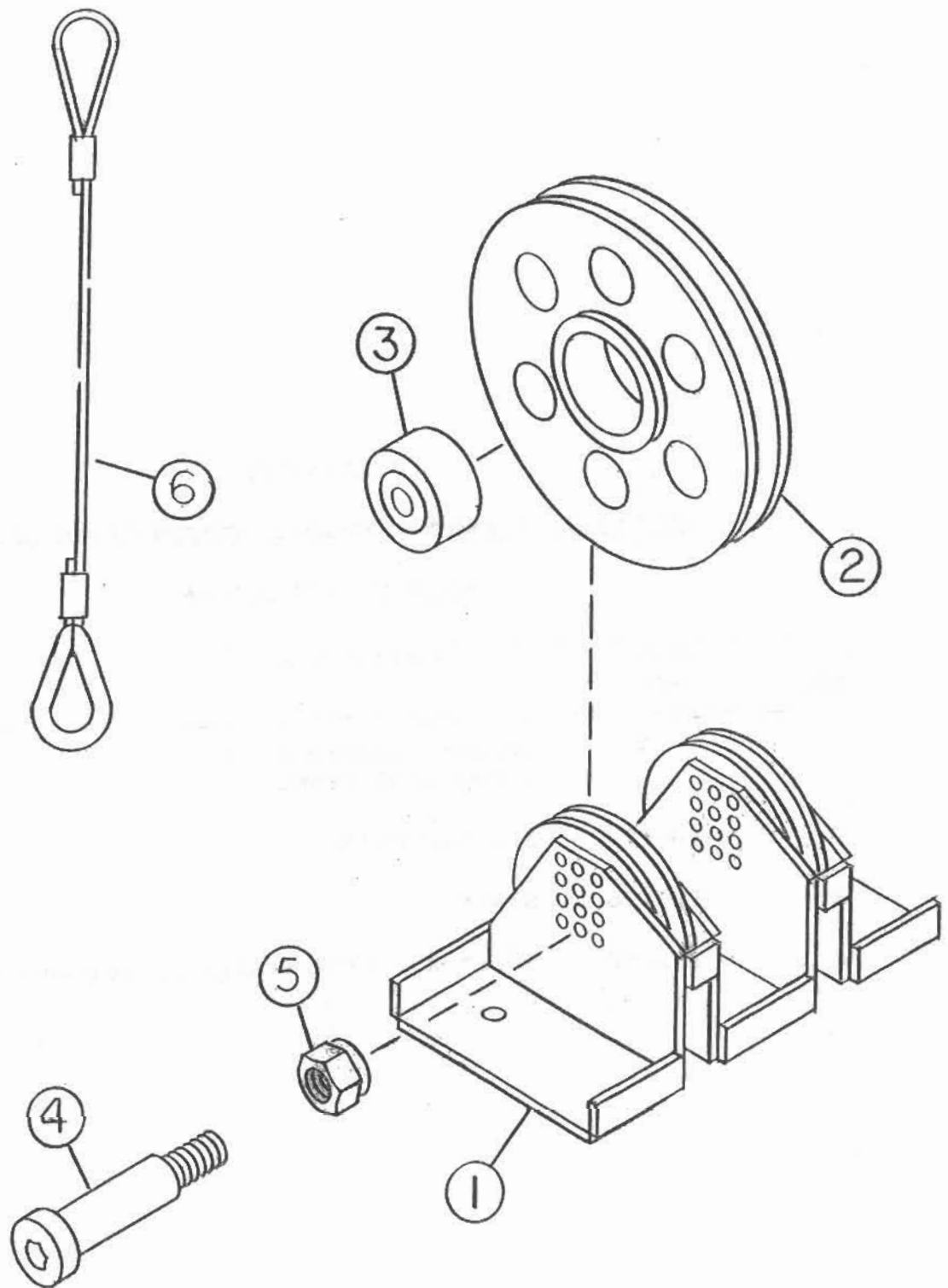


**TILT-A-WAY GATE
ACTUATING CYLINDER
WITH COMPONENTS**

DATE	DRAWING
2-1-2000	RGH-2008-A

TILT-A-WAY
HYDRAULIC OPERATOR
BALANCE SYSTEM CABLE & SHEAVE
DRAWING RGH-2009-A
(TWO ASSEMBLIES INCLUDED)

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Sheave Mount On Pedestal Frame	
2	TW0105	Cable Sheave	2
3	TW0106	Bearing "Lock Tight"	2
4	TW0103	Sheave Shaft	2
5	NA	1/2" Lock Nut	2
6	TW0110	Tension Cable	2



TILT-A-WAY GATE
BALANCE SYSTEM
CABLE-SHEAVE

DATE

DRAWING

1-21-2000

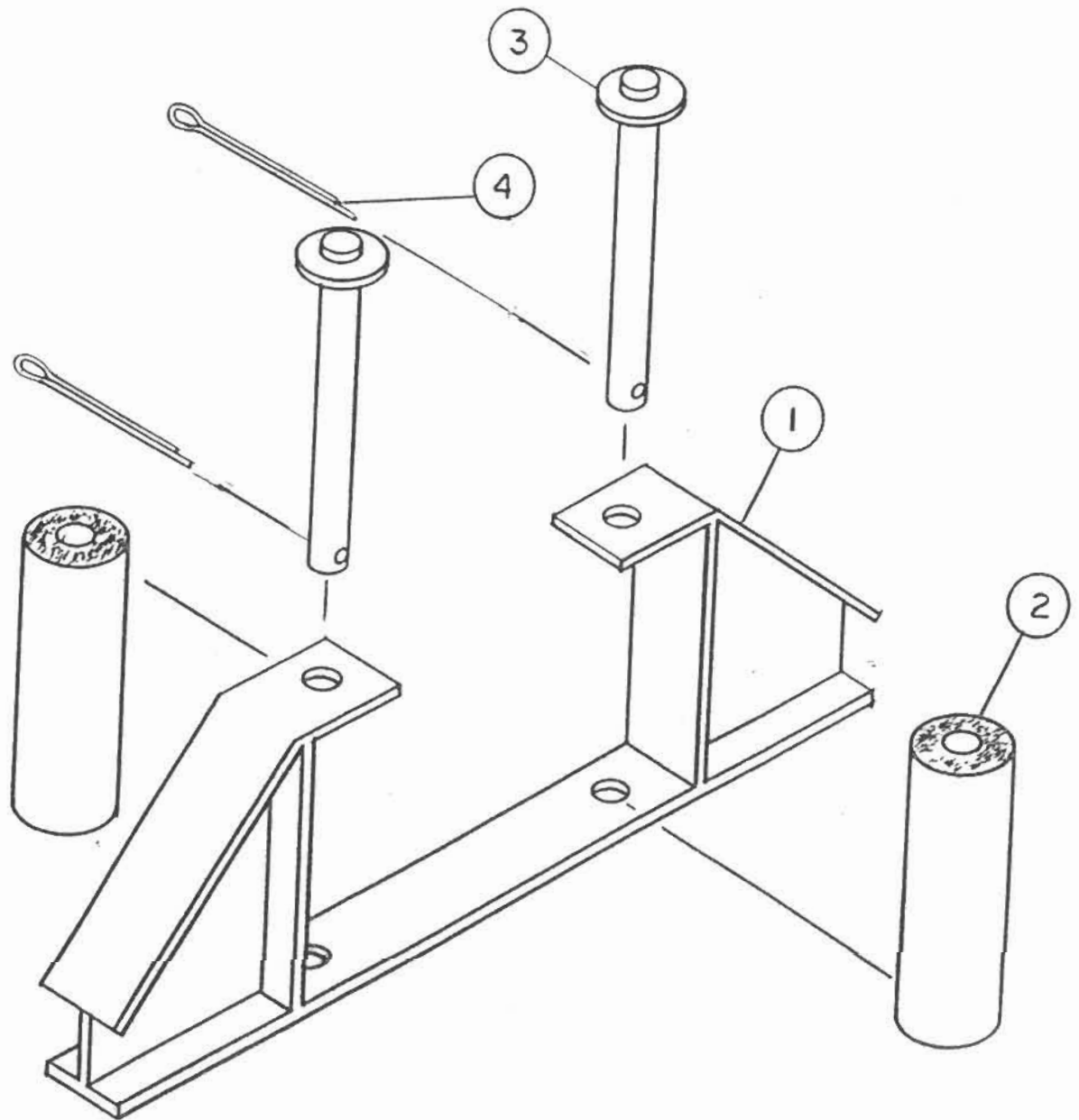
RGH-2009-A

TILT-A-WAY

HYDRAULIC OPERATOR BALANCE SYSTEM CABLE GUIDE

DRAWING RGH-2010-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Support Carriage on Pedestal Frame	
2	FG0127	Plastic Roller	2
3	FG0128	Shaft	2
4	ID1006	3/16" X 1 1/2" Stainless Cotters Pin	2



TILT-A-WAY GATE
BALANCE SYSTEM
CABLE GUIDE

DATE

1-20-2000

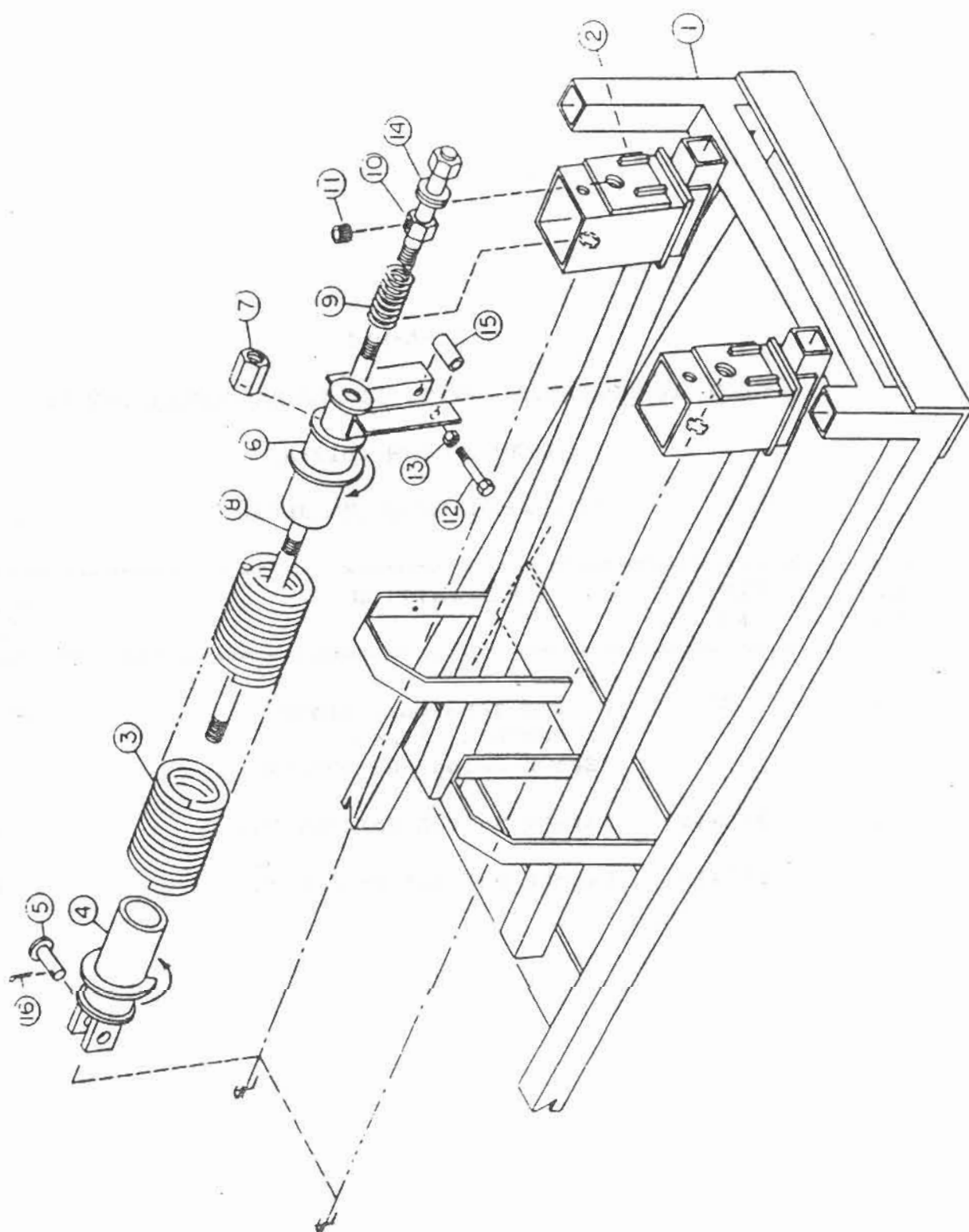
DRAWING

RGH-2010-A

TILT-A-WAY
HYDRAULIC OPERATOR
BALANCE SYSTEM SPRING TENSIONER UNIT
DRAWING RGH-2011-A
(TWO ASSEMBLIES INCLUDED)

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.	
1	NA	Pedestal Frame		
2	NA	Safety Device Brackets See Drawing RGH-2013-A		
3		Tension Spring		Color
	TWO137	500 Pound	2	Blue
	TWO138	1000 Pound	2	Yellow
	TWO139	1500 Pound	2	Orange
	TWO112	1750 Pound	2	Green
	TWO140	2000 Pound	2	Red
	TWO113	2500 Pound	2	White
4		Front Spring Connector		
	FGO168	For 500 or 1000 Pound Spring	2	
	FGO170	For 1500 or 1750 Pound Spring	2	
	FGO171	For 2000 or 2500 Pound Spring	2	
5	TWO104	Clevis Pin	2	
6		Rear Spring Connector		
	FGO139	For 500 or 1000 Pound Spring	2	
	FGO157	For 1500 or 1750 Pound Spring	2	
	FGO159	For 2000 or 2500 Pound Spring	2	
7	TWO155	Threaded Bronze Hex Stock Encased in Item 6	2	
8	FGO130	Tension Screw with End Nut Welded	2	
9	TWO133	Safety Compression Spring	2	
10	FGO131	Safety Nut	2	
11	TWO108	Set Screw	2	
12	NA	1/2" x 3" Hex Head Bolt	2	
13	NA	1/2" Lock Nut	2	
14	NA	1" SAE Washer	4	
15	FGO174	Pipe Spacer	2	
16	ID1061	Cotter Pin	2	

TILT-A-WAY GATE



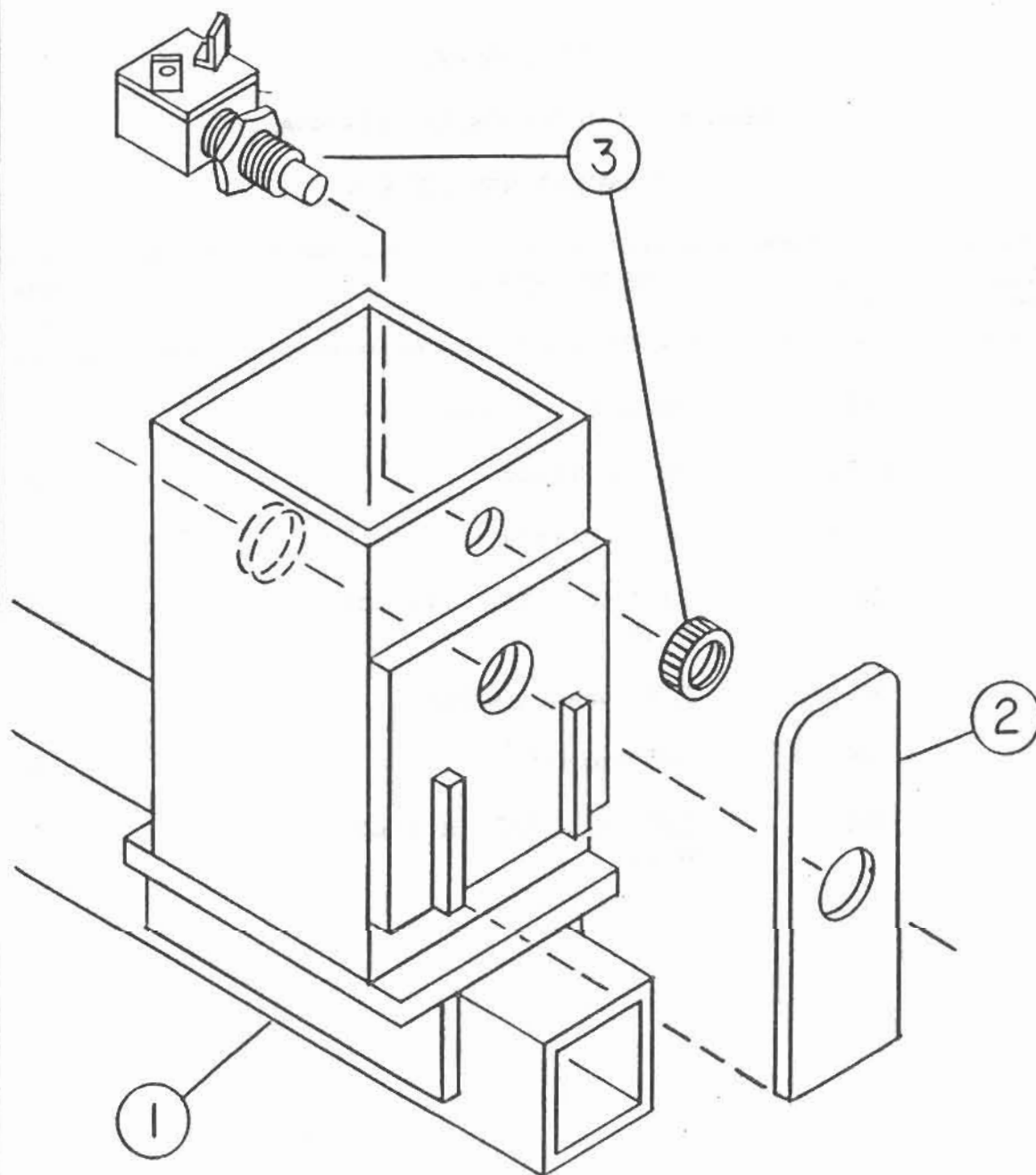
**TILT-A-WAY GATE
BALANCE SYSTEM
SPRING TENSIONER UNIT**

DATE
9-26-95

DRAWING
RGH-2011-A

TILT-A-WAY
HYDRAULIC OPERATOR SPRING TENSIONER SAFETY DEVICE
DRAWING RGH-2013-A
(TWO ASSEMBLIES INCLUDED)

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Spring Tensioner Track On Pedestal Frame (See Drawing RGH 2011-A)	
2	FG0161	Safety Switch Release Bar	2
3	PE0113	Electrical Safety Switch	2



TILT-A-WAY GATE
SPRING TENSIONER
SAFETY DEVICE

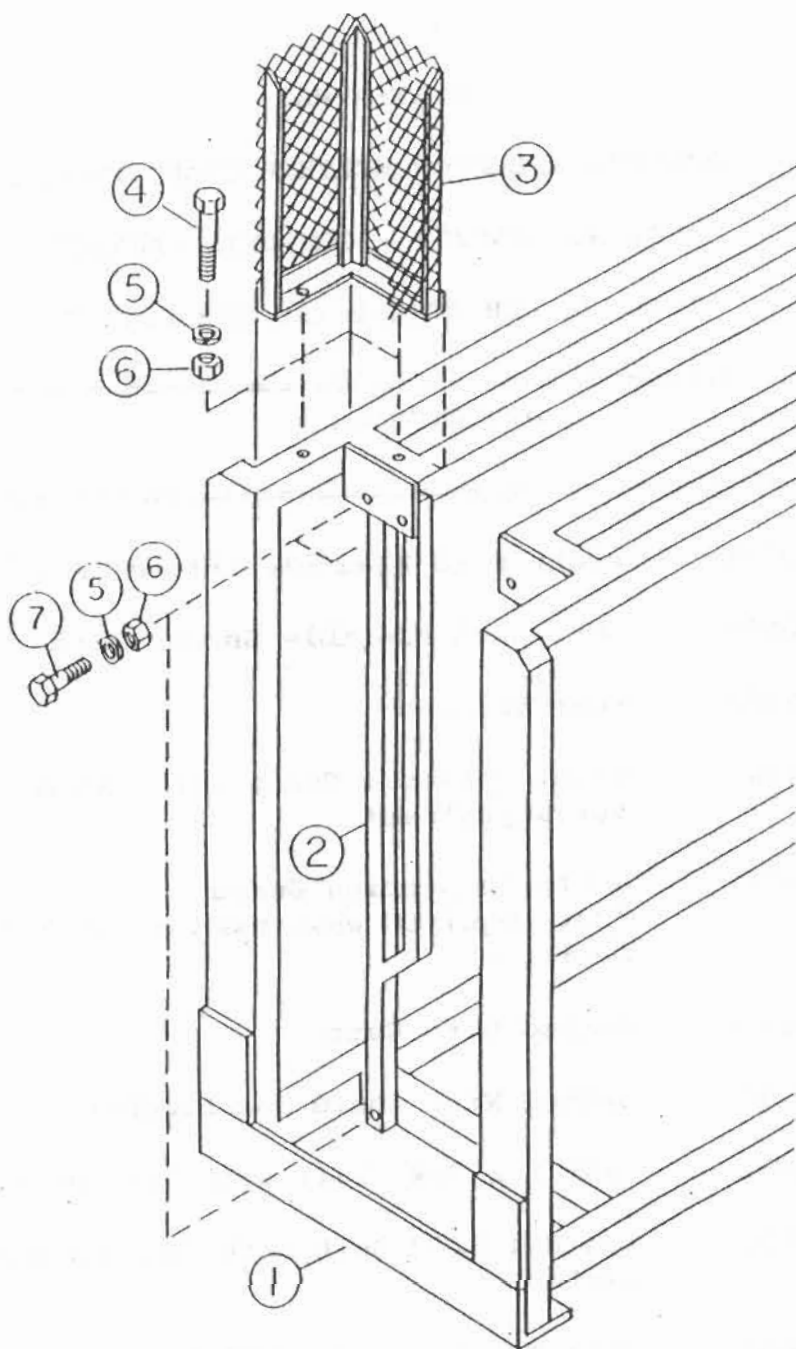
DATE	DRAWING
9-20-95	RGH-2013-A

TILT-A-WAY
HYDRAULIC OPERATOR ACCESS GUARDS
DRAWING RGH-2014-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Pedestal Frame	
2	FG0185	Inner Guard	1
3	FG0175	Outer Guard	1
4	NA	3/8" X 2 3/4" Hex HD Bolt	2
5	NA	3/8" Lock Washer	5
6	NA	3/8"HexNut	5
7	NA	3/8" X 1 1/2" Hex HD Bolt	3

TILT-A-WAY
HYDRAULIC OPERATOR ACCESS GUARDS
DRAWING RGH-2014-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Pedestal Frame	
2	FG0185	Inner Guard	1
3	FG0175	Outer Guard	1
4	NA	3/8" X 2 3/4" Hex HD Bolt	2
5	NA	3/8" Lock Washer	5
6	NA	3/8"HexNut	5
7	NA	3/8" X 1 1/2" Hex HD Bolt	3



**TILT-A-WAY GATE
ACCESS GUARDS**

DATE
11-17-92

DRAWING
RGH-2014-A

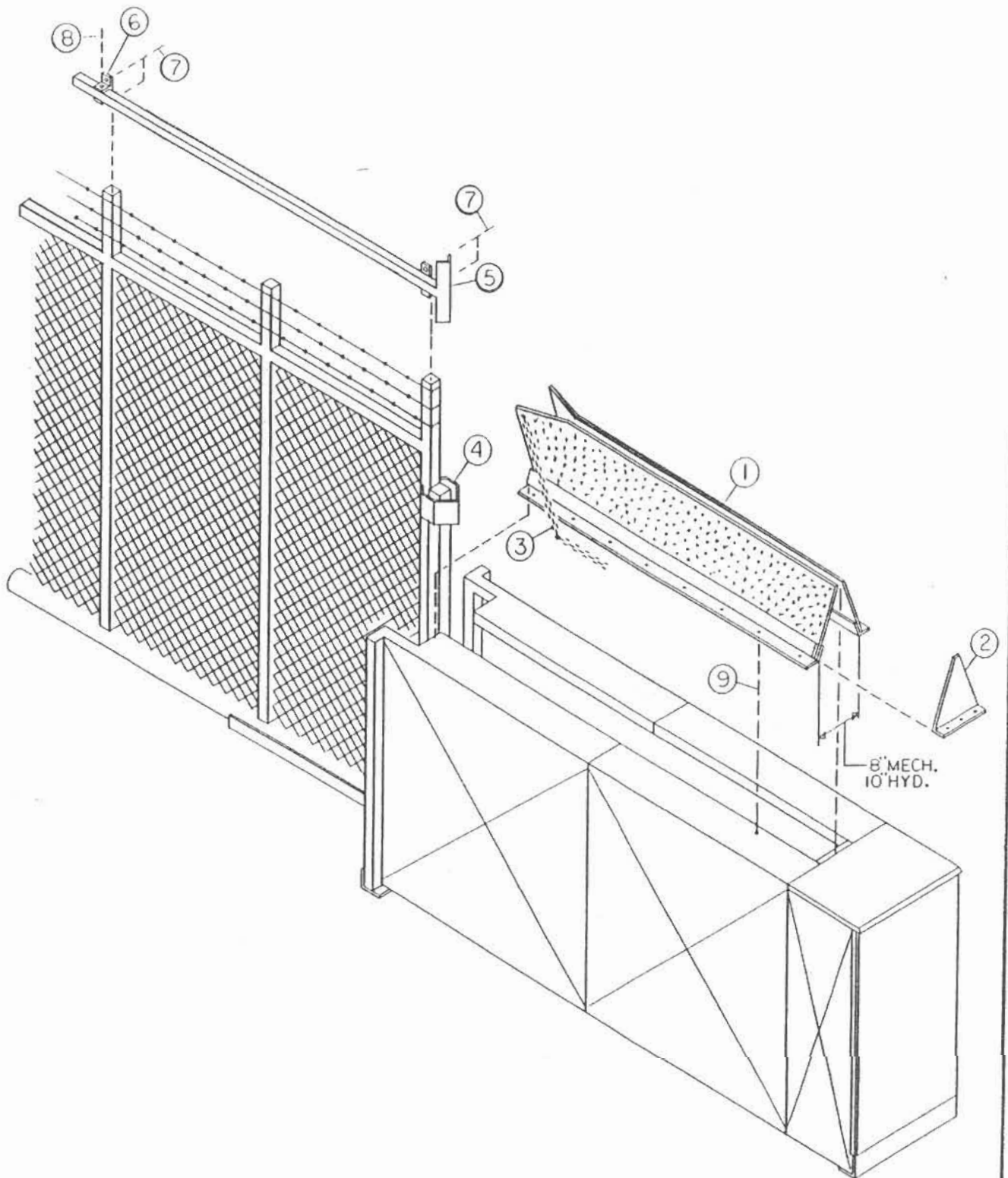
TILT-A-WAY

HYDRAULIC OPERATOR WEATHER GUARD PACKAGE

PART No. FG0207 - COMPLETE PACKAGE

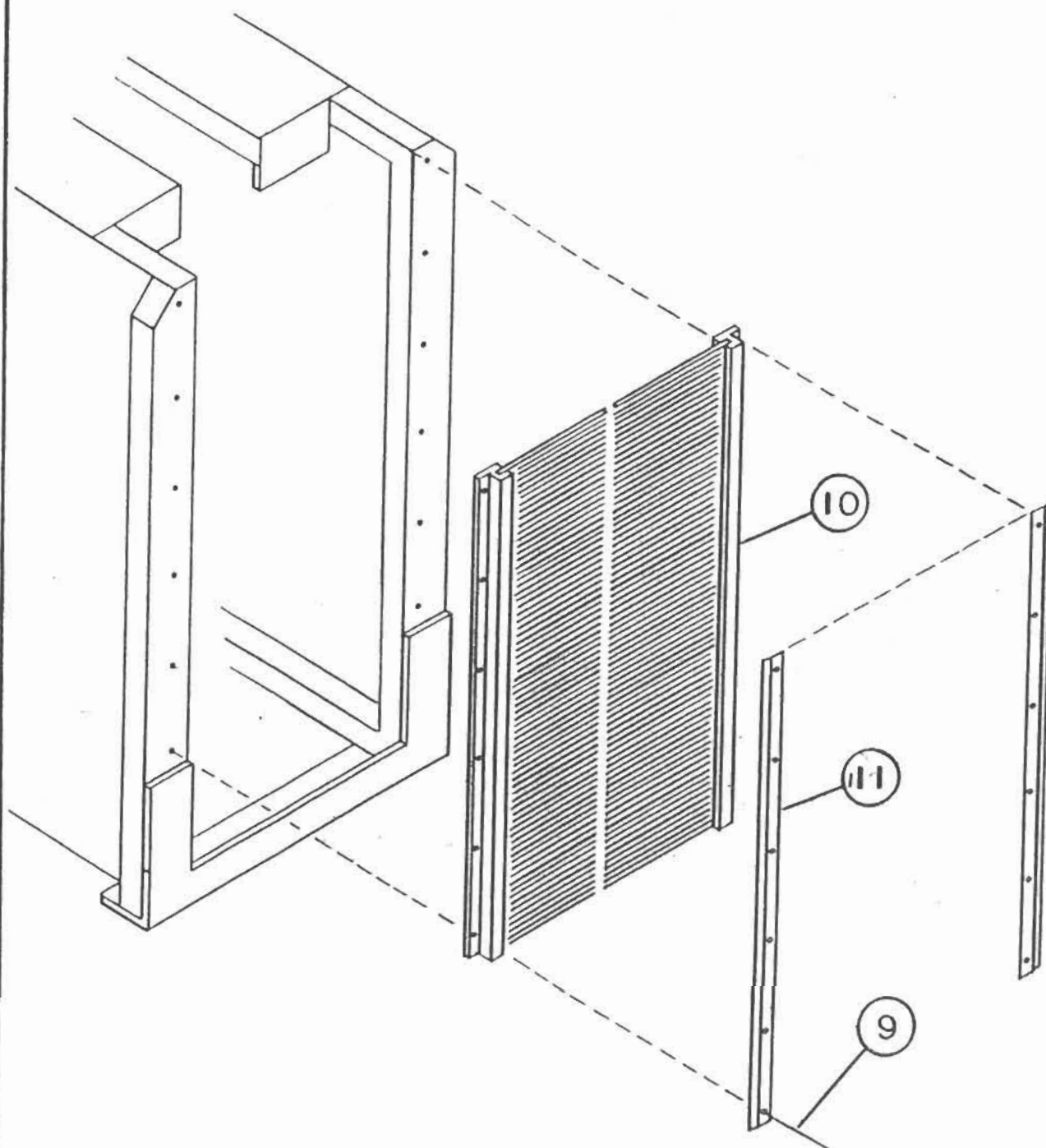
DRAWING RGH 2014-B and RGH 2014-C

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	FG0213	Right Hand Flexible Shroud Unit	1
	FG0109	Left Hand Flexible Shroud Unit	1
2	FG0203	Rear End Cap	1
3	TW0161	Front Spreader Chain with extra length For adjustment	2
4	FG0204	Cable Connection Guard "Not required when used on Mechanical Operator"	1
5	FG0210	Barbed Wire Guard	1
6	FG0211	Barbed Wire Guard End Bracket	1
7	ID1072	1/4" X 2 3/4" Bolt with Nut and Lock	4
8	ID1071	1/4 X 1 3/4" Bolt with Nut and Lock Washer	1
9	ID1069	Self Tapping screws 10-16 3/4" Hex with washer head	req'd
10	TW0162	Weather Brush Unit	2
11	FG0214	Holding Cap Bar	2



**TILT-A-WAY GATE
WEATHER GUARD
OVERHEAD PROTECTION**

DATE	DRAWING
1-20-2000	RGH-2014-B



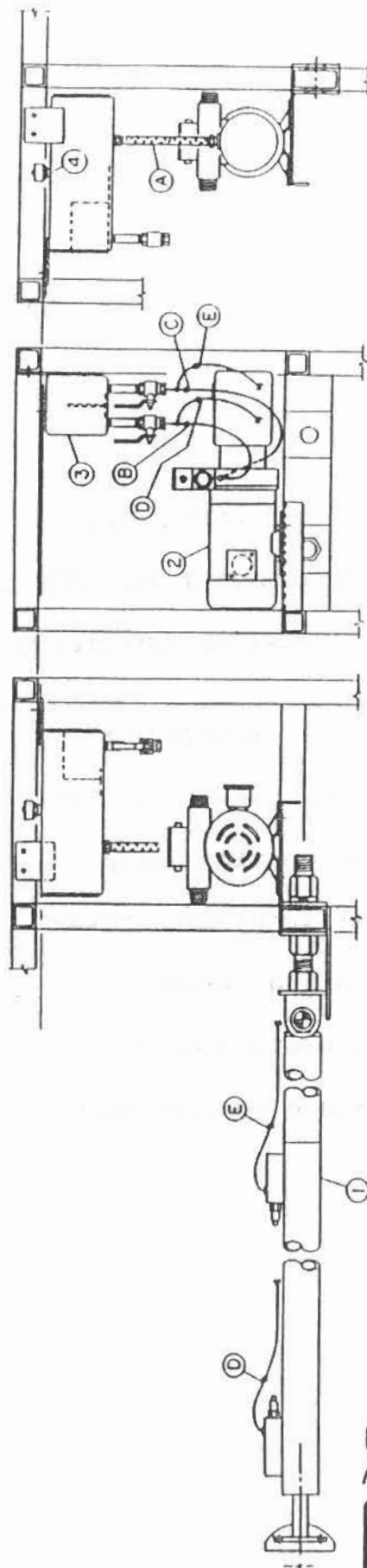
TILT-A-WAY GATE
WEATHER GUARD
FRONT PROTECTION

DATE
5-13-65

DRAWING
RGH-2014-C

TILT-A-WAY
HYDRAULIC OPERATOR HYDRAULIC SYSTEM
DRAWING RGH-2015-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	TW0117	Hydraulic Cylinder	1
2	TW0122	Hydraulic Pump Set	1
3	FG0205	Fluid Reservoir	1
4	TW0124	Vent Fill Plug Relocated from Pump Set	1
5	TW0130	1/2" Male NPT X 1/2" Hose Barb	1
6	TW0143	Low Pressure Hose, 8" Long	1
7	TW0144	3/8" Male NPT X 1/2" hose Barb	1
8	TW0170	1/2" Brass Pipe Nipple	2
9	TW0145	Ball Valve	2
10	TW0146	1/2" X 3/8" NPT Reducer Bushing	2
11	TW0147	3/8" NPT x 3/8" JIC X 3/8" JIC Tee	2
13	TW0149	3/8" Pressure Hose, 27" Long	1
14	TW0158	3/8" Pressure Hose, 22" Long	1
16	TW0151	Male 1/4" NPT X 3/8" JIC Adapter	2
17		Short 3/8" Pressure Hose	
	TW0152	R.H. Gate - 54" Long	1
	TW0159	L.H. Gate - 48" Long	1
	TW0160	R.H. Gate Extended 12" - 66" Long	1
	TW0163	L.H. Gate Extended 12" - 60" Long	1
18		Long 3/8" Pressure Hose	
	TW0153	R.H. Gate - 95" Long	1
	TW0164	L.H. Gate - 87" Long	1
	TW0165	R.H. Gate Extended 12" - 107" Long	1
	TW0166	L.H. Gate Extended 12" - 99" Long	1
19	TW0154	3/8" NPT X 3/8" JIC Elbow	2



TILT-A-WAY GATE HYDRAULIC SYSTEM

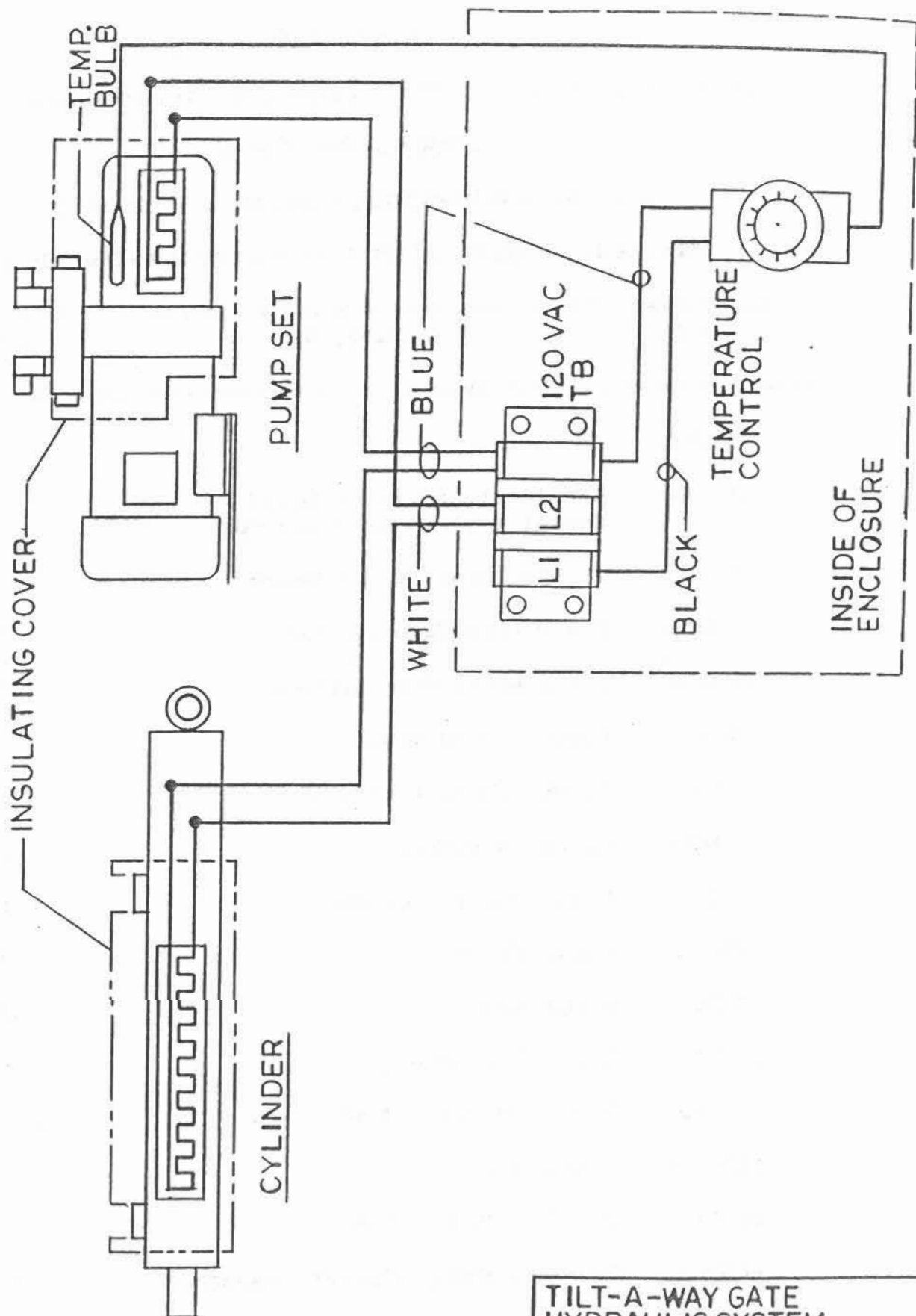
DRAWING
RGH-2015-A

TILT-A-WAY

HYDRAULIC OPERATOR HEATING COMPONENTS

DRAWING RGH-2015-B

PART NO.	DESCRIPTION	REQ'D NO.
PE0247	Cylinder Heating Strip	1
PE0248	Cylinder Insulating Cover	1
PE0249	Pump Heating Strip	1
PE0250	Pump Insulating Cover	1
PE0251	Temperature Control Unit	1



**TILT-A-WAY GATE
HYDRAULIC SYSTEM
HEATING COMPONENTS**

DATE

7-13-93

DRAWING

RGH-2015-B

TILT-A-WAY

HYDRAULIC OPERATOR ELECTRICAL ENCLOSURE INTERNAL COMPONENTS

DRAWING RGH-2030-A

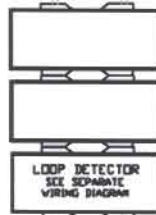
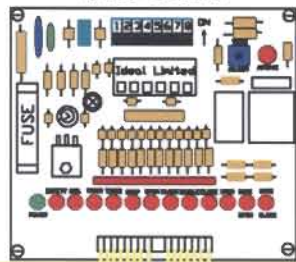
FOR GATES MANUFACTURED BEFORE 12-1-95 ONLY

FOR GATES MANUFACTURED AFTER 12-1-95/SEE DRAWING RGH-2101-A

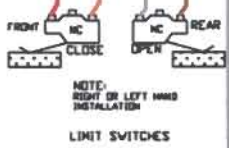
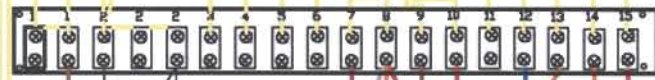
PART NO.	DESCRIPTION	REQ'D NO.
PE0201	Enclosure	1
PE0202P	4" Electronic Timer Board Serial # B120499267 and up	1
PE0202	7" Electronic Timer Board	1
PE0203	Board Left Wire Harness	1
PE0204	Board Right Wire Harness	1
PE0205	Block, 15 Terminal	1
PE0206	Block Label, 1 thru 15	1
PE0207	Block, 3 Terminal	1
PE0208	Reversing Controller	1
PE0209	Delay Timer	2
PE0210	Relay Socket	2
PE0211	Relay (not shown)	2
PE0212	DIN Track (not shown)	2 at 7"
PE0213	Transformer	1
PE0267	Overload Relay Base	1
PE0268	Overload Relay (Specify Amperage)	1

ENCLOSURE OUTLINE

TIMER BOARD



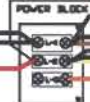
ENCLOSURE OUTLINE



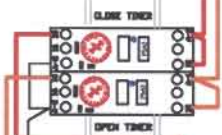
NOTE:
RIGHT OR LEFT HAND
INSTALLATION

LIMIT SWITCHES

NOTE:
RECONNECT TRANSFORMER
TO CORRECT PRIMARY VOLTAGE

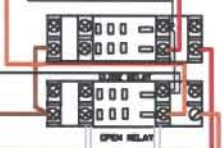


POWER BLOCK



CLOSE TIMER

OPEN TIMER



OVERLOAD RELAY

USE MOTOR NAMEPLATE
FOR SIZE AND SETTING

NOTE:
RECONNECT TRANSFORMER
TO CORRECT PRIMARY VOLTAGE



24 VAC
TRANSFORMER



PUSHBUTTON
STATION



SPRING RELEASE
SAFETY SWITCHES

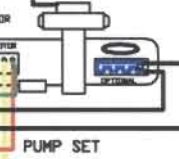


3 PHASE MOTOR

SWITCH SUPPLIED
BY CUSTOMER



CYLINDER HEATER
OPTIONAL

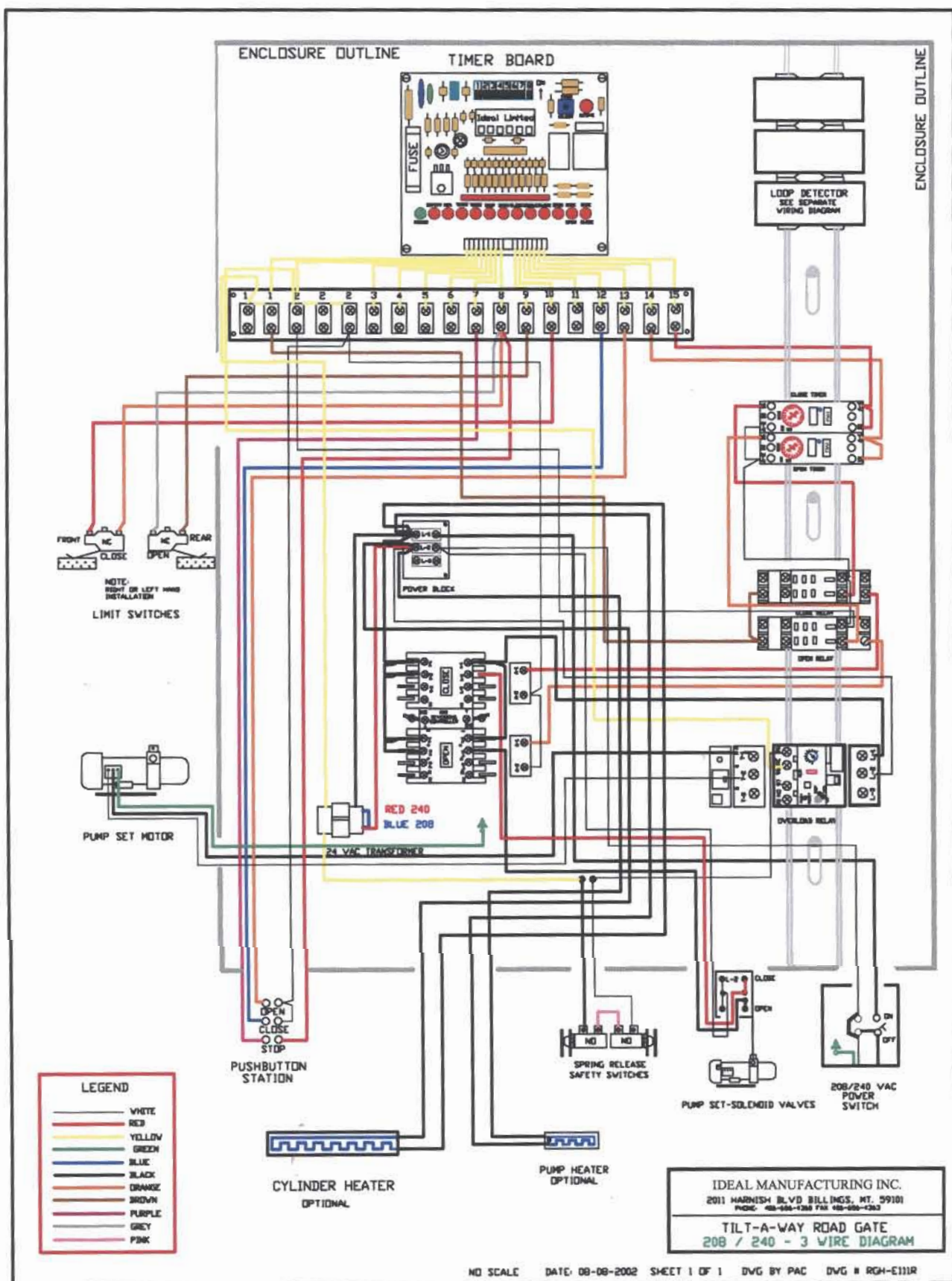


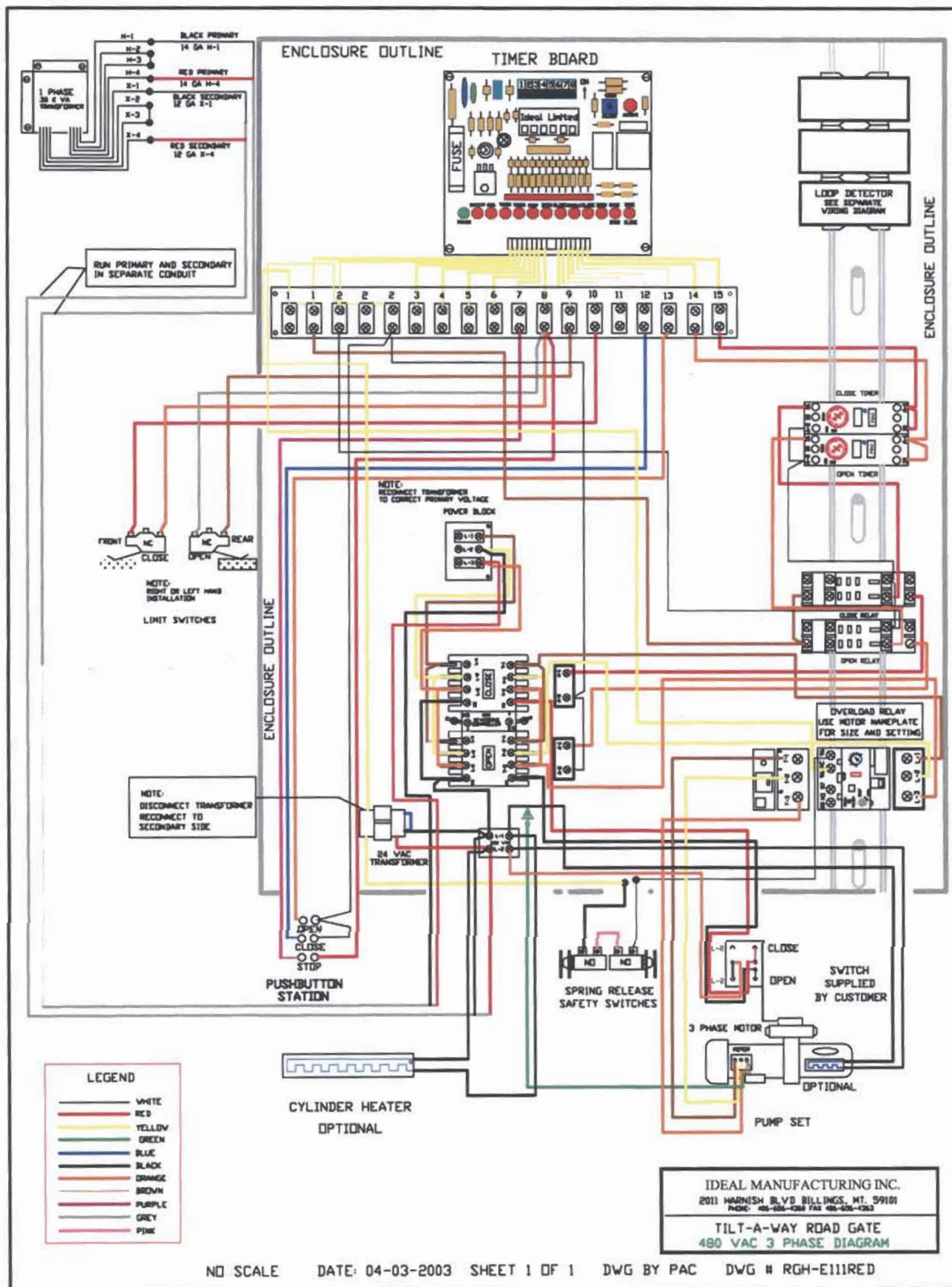
PUMP SET

LEGEND

- WHITE
- RED
- YELLOW
- GREEN
- BLUE
- BLACK
- BROWN
- PURPLE
- GREY
- PINK

IDEAL MANUFACTURING INC.
2011 HARNISH BLVD BILLINGS, MT. 59101
PHONE: 406-636-4360 FAX 406-636-4363
TILT-A-WAY ROAD GATE
208/240 VAC 3 PHASE





TILT-A-WAY

HYDRAULIC OPERATOR

AUXILLARY ELECTRICAL ENCLOSURE INTERNAL COMPONENTS

DRAWING RGH-2030-B

FOR GATES MANUFACTURED BEFORE 12-1-95 ONLY

FOR GATES MANUFACTURED AFTER 12-1-95/SEE DRAWING RGH-2102-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0214	Loop Detector Socket	As Req'd
PE0215	Loop Detector (Not Shown)	As Req'd

TILT-A-WAY

HYDRAULIC OPERATOR

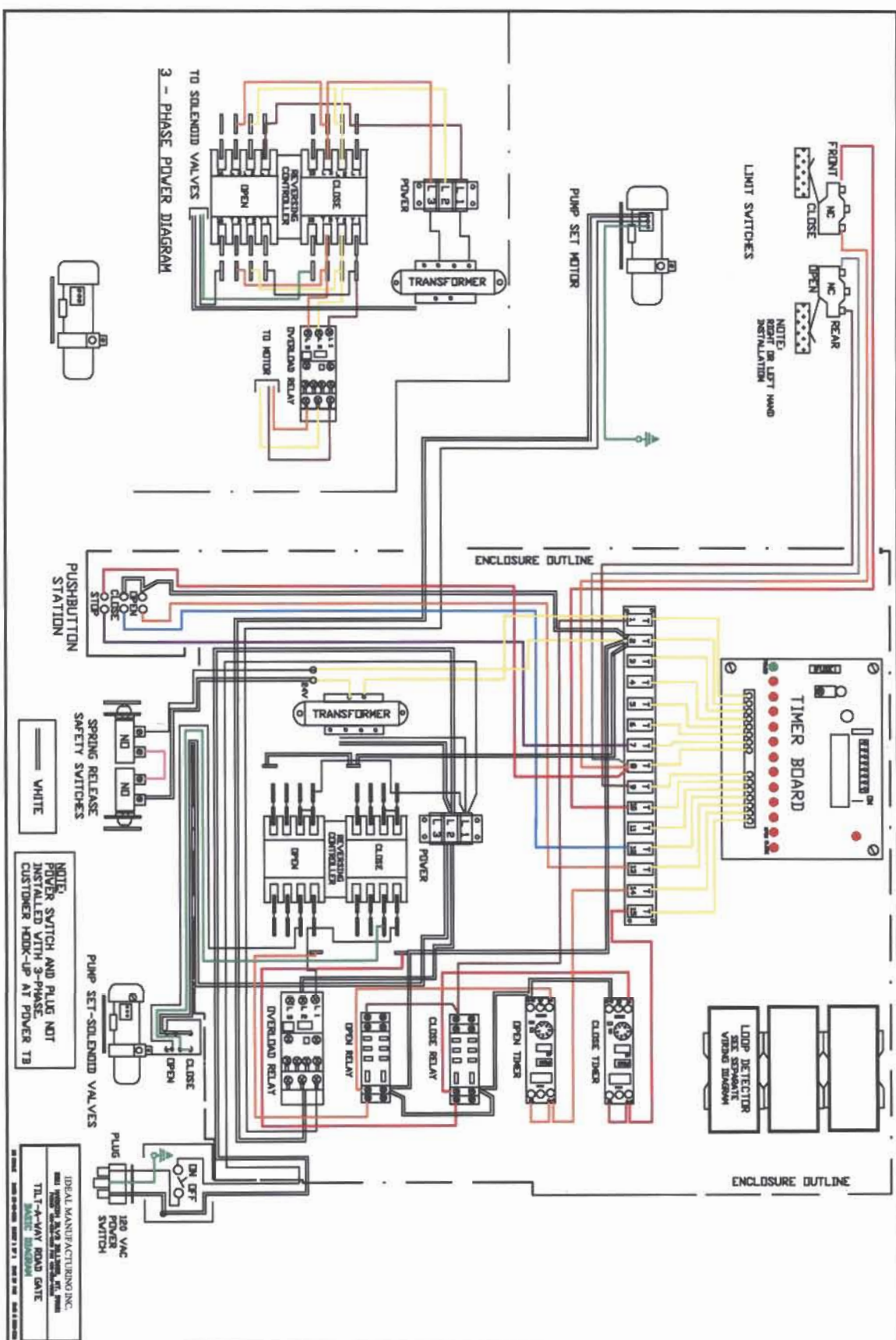
AUXILLARY ELECTRICAL ENCLOSURE INTERNAL COMPONENTS

DRAWING RGH-2030-C

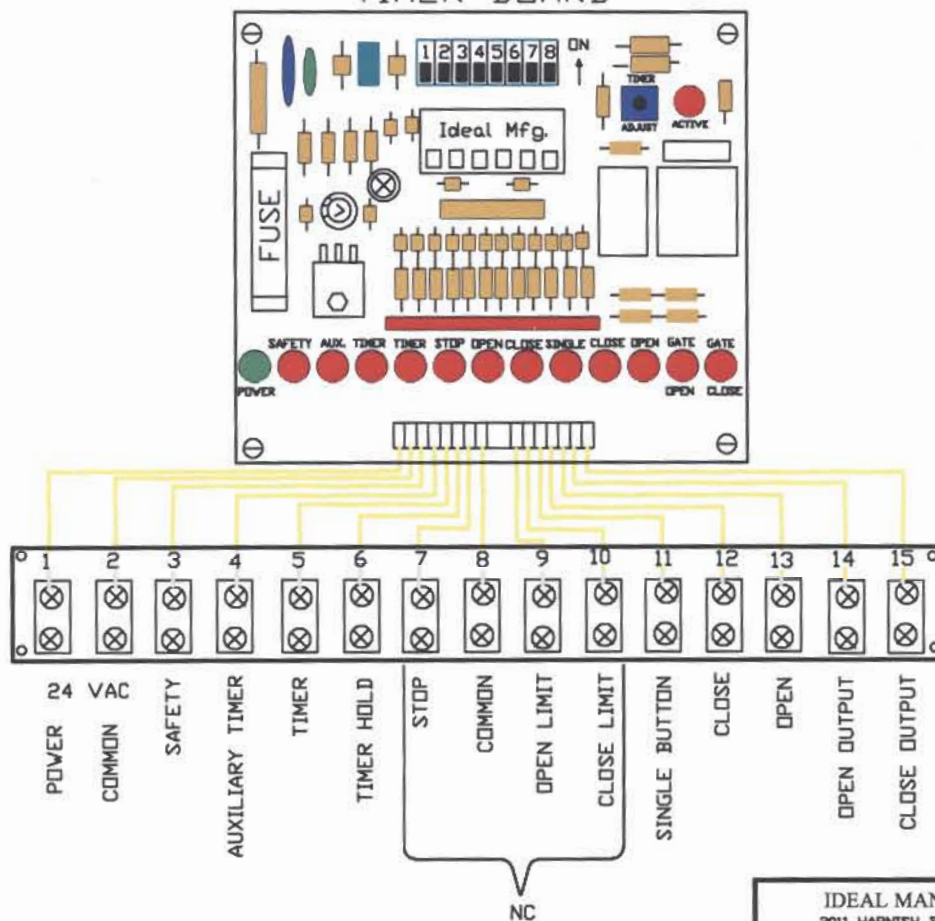
FOR GATES MANUFACTURED BEFORE 12-1-95 ONLY

FOR GATES MANUFACTURED AFTER 12-1-95/SEE DRAWING RGH-2104-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0216	Enclosure	1
PE0205	Block, 15 Terminal, Modified	1
PE0210	Relay Socket	4
PE0211	Relay (not shown)	4
PE0217	DIN Track (not shown)	1 at 7"

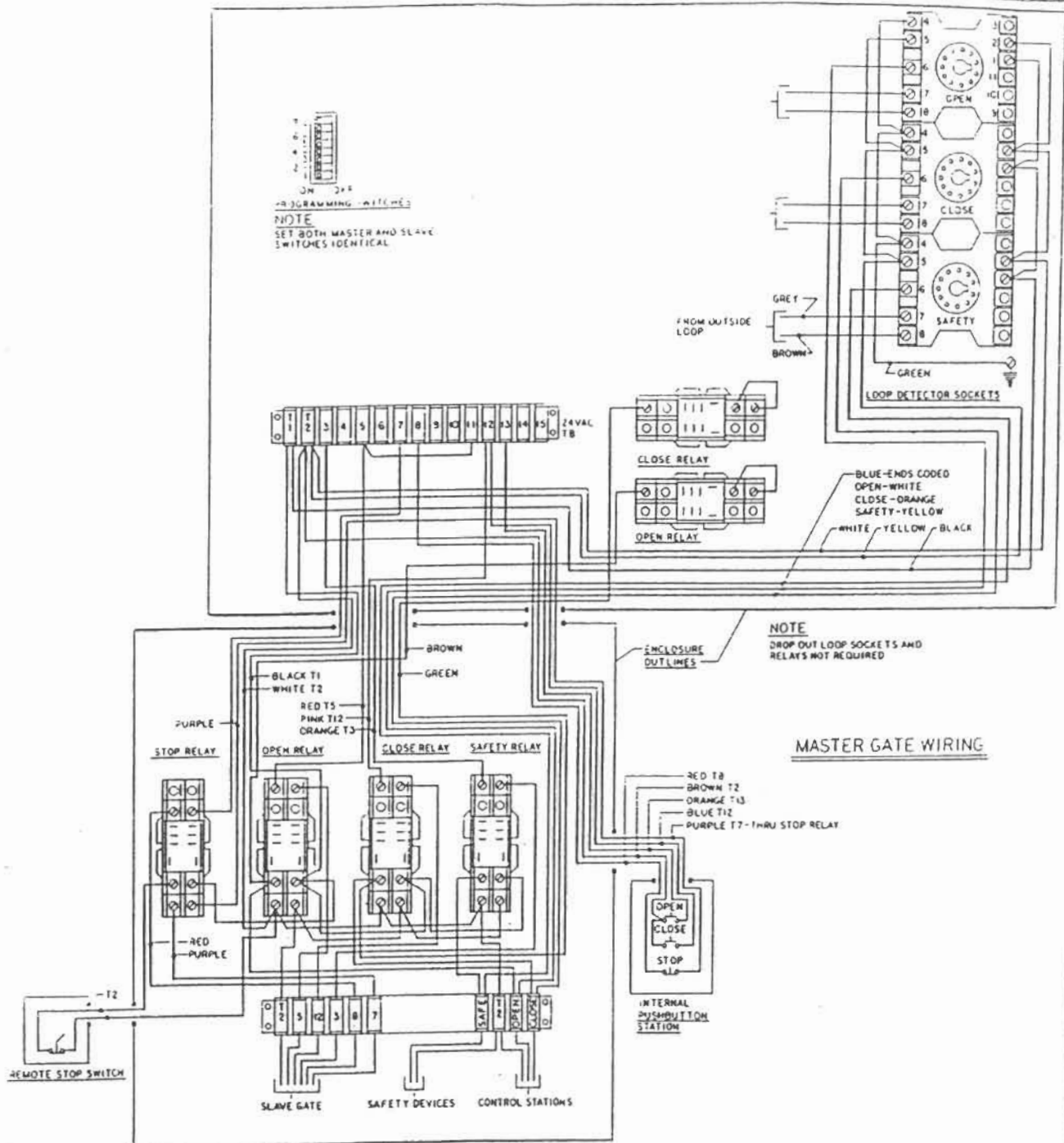


TIMER BOARD

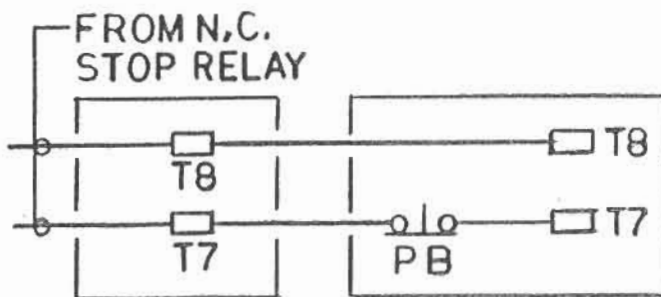


IDEAL MANUFACTURING INC.
2011 HARNISH BLVD BILLINGS, MT. 59101
PHONE: 406-656-4360 FAX 406-656-4363

TILT-A-WAY ROAD GATE
LOGIC BOARD



ADDED STOP RELAY 12-7-93

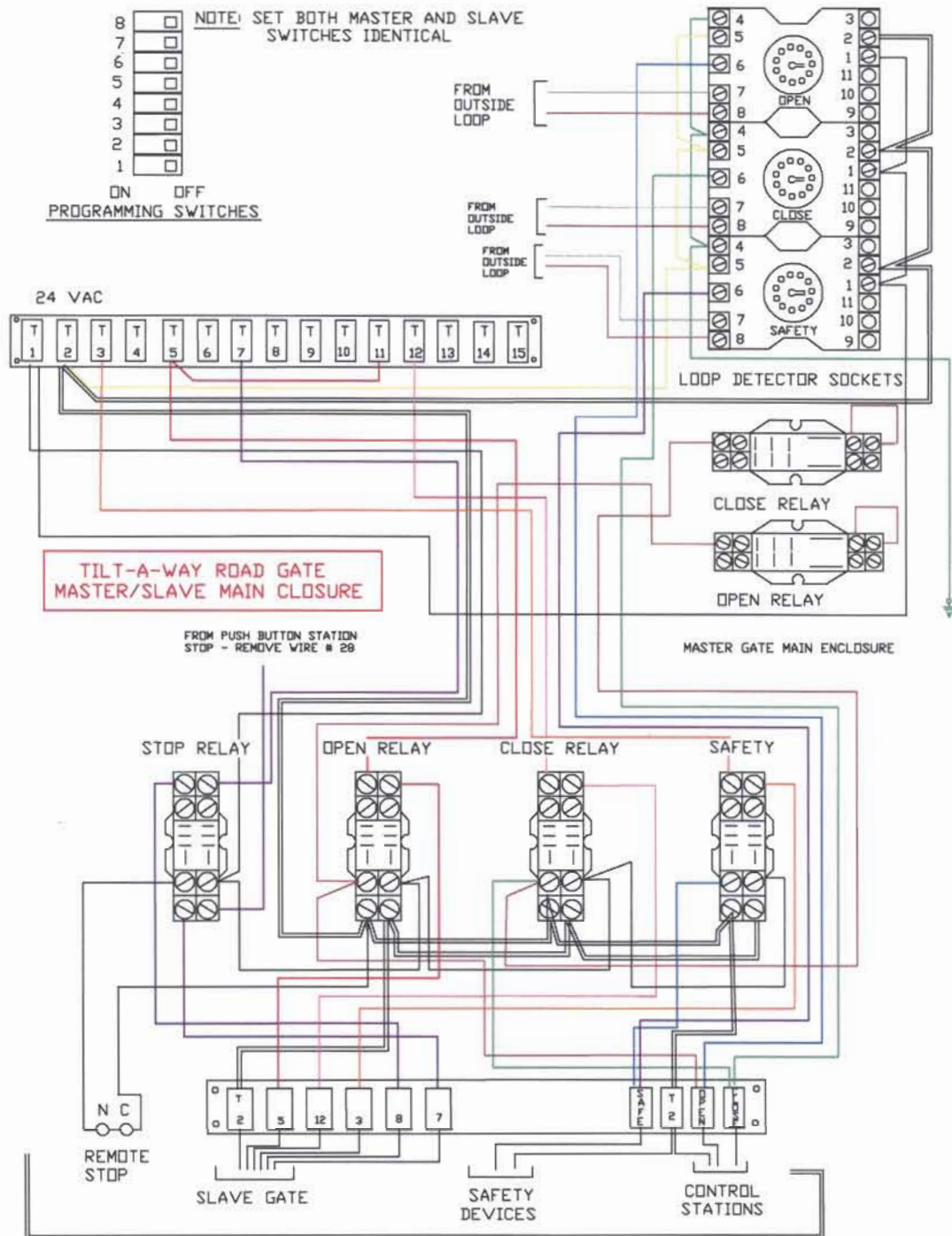


FOR GATES MANUFACTURED BEFORE
12-1-95

SEE DRAWING RGH-2103-A & RGH-2104
FOR GATES MANUFACTURED AFTER
12-1-95

TILT-A-WAY GATE
ELECTRICAL-OPPOSITE
GATES-SYNCHRONIZING

DATE 9-20-93 DRAWING RGH-2030-C



EXTERNAL WIRING BY PURCHASER

MASTER GATE AUXILIARY ENCLOSURE

IDEAL MANUFACTURING INC.

MASTER/SLAVE DIAGRAM

DWG # RGH-E114

TILT-A-WAY

HYDRAULIC OPERATOR BASIC ELECTRICAL HARDWARE

DRAWING RGH-2030-D

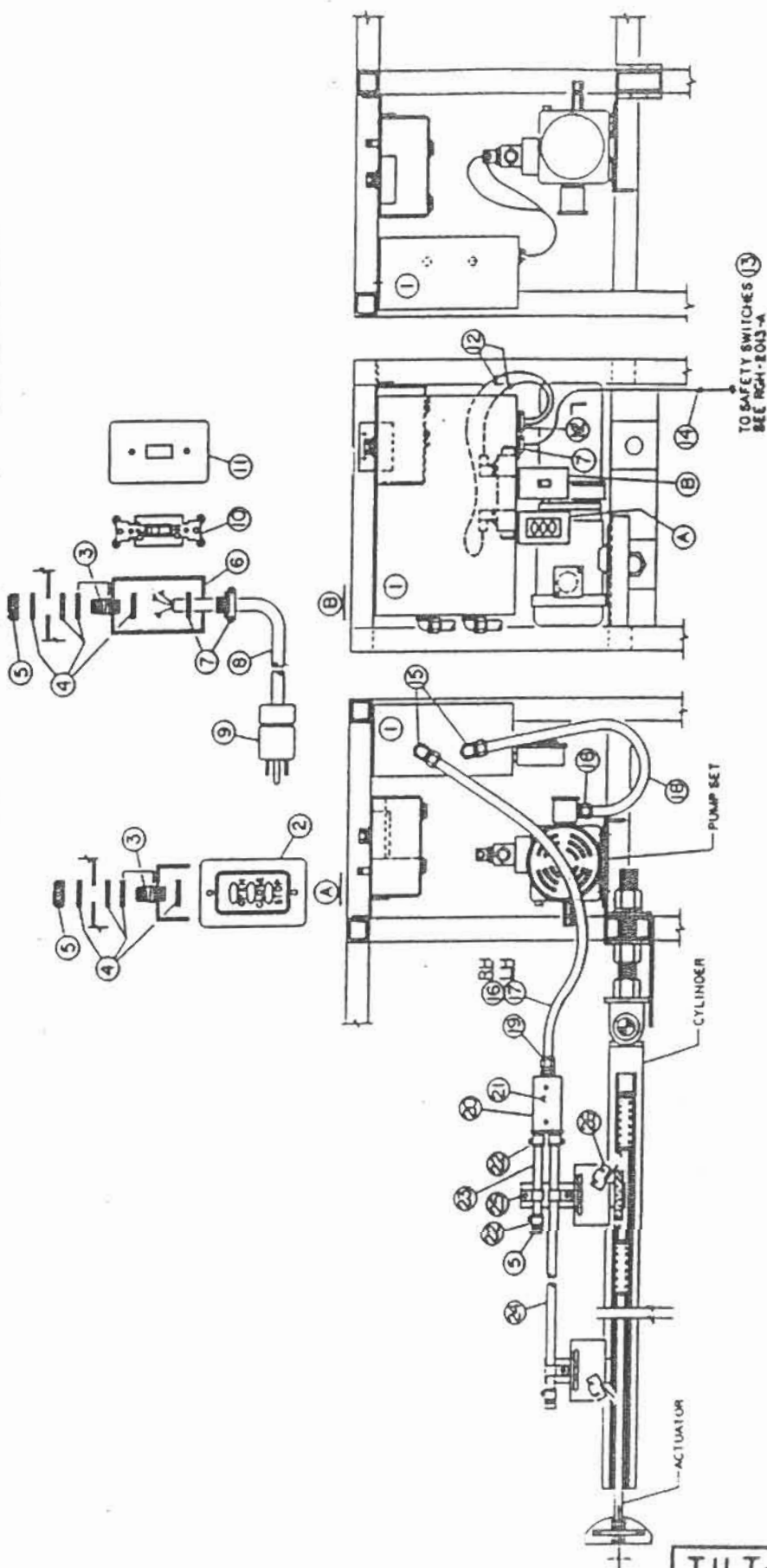
REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PE0201	Main Enclosure	1
2	PE0218	Pushbutton Station	1
3	PE0219	Conduit Nipple	2
4	PE0220	Steel Lock Nut	8
5	PE0221	Insulating Bushing	4
6	PE0222	Handy Box	1
7	PE0223	Romex Connector	2
8	PE0224	Service Cord	24"
9	PE0225	Cord Plug	1
10	PE0226	Quiet Switch	1
11	PE0227	Box Cover	1
12	PE0228	Service Cord	2 at 29"
13	PE0113	Momentary Switch	2
14	PE0230	Service Cord	72"
15	PE0231	90-Degree Elbow Fitting	2
16	PE0232	Liquid Tight Conduit	R.H. 28"
17	PE0233	Liquid Tight Conduit	L.H. 38"
18	PE0234	Liquid Tight Conduit	26"
19	PE0235	Straight Fitting	2
20	PE0236	Junction Box	1

TILT-A-WAY

HYDRAULIC OPERATOR BASIC ELECTRICAL HARDWARE (CONT)

DRAWING RGH-2030-D

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
21	PE0237	Junction Box Cover	1
22	PE0238	Conduit Connector	4
23	PE0239	Thin Wall Conduit	12"
24	PE0240	Thin Wall Conduit	48"
25	PE0241	Conduit Strap	3
26	PE0242	Limit Switch	2
27	ID1060	Ground Cable	1
28	ID1046	Brass Bolt	1
29	ID1047	Brass Nut	1



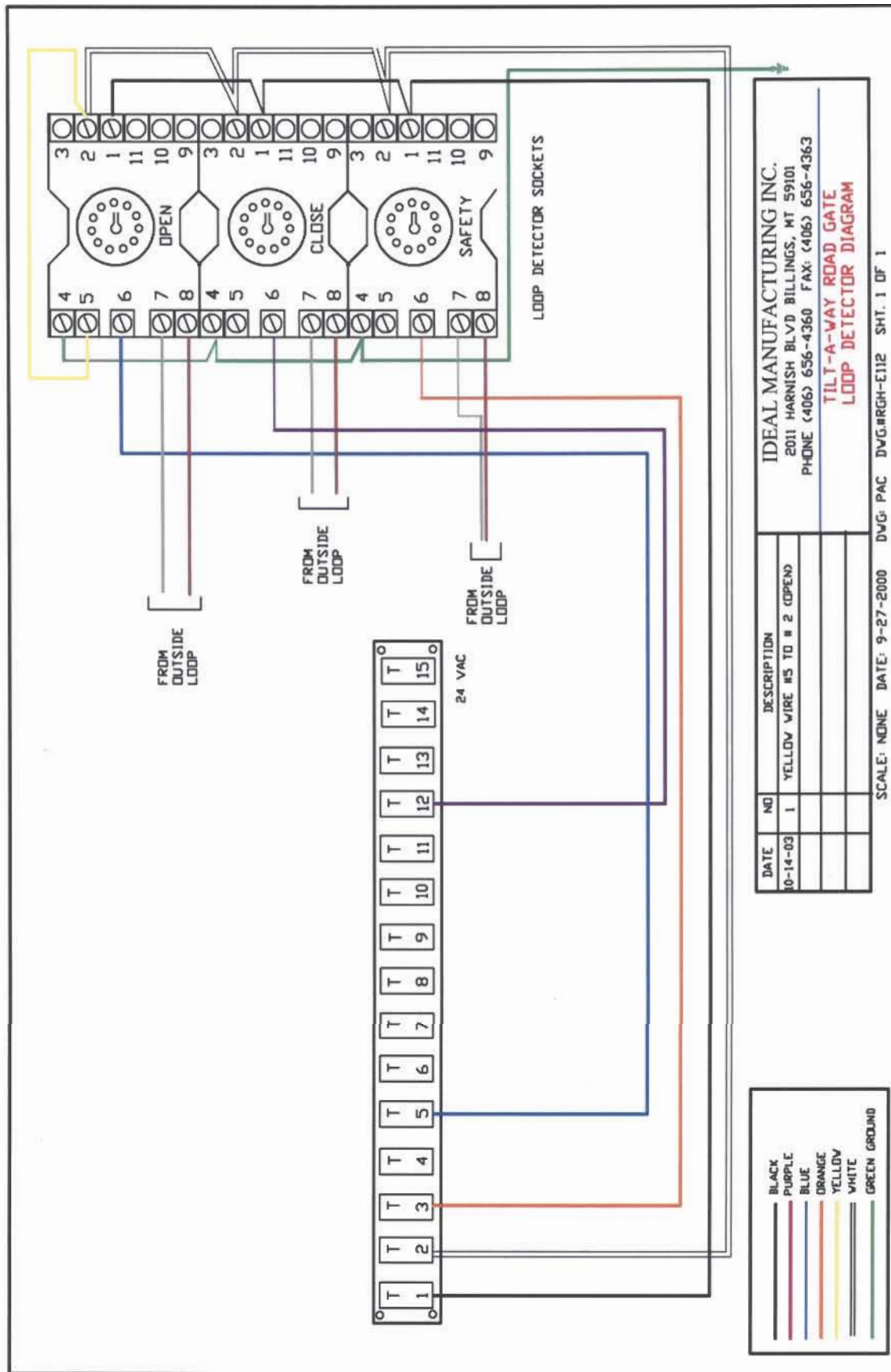
TILT-A-WAY GATE ELECTRICAL BASIC HARDWARE

DATE

DRAWING

5-27-93

RGH-2030-D



GENERAL INFORMATION

The 11622 logic timer board allows numerous programmable functions in various combinations (see Universal Commercial Logic function chart). This logic board contains an adjustable time for automatic closing which is adjustable from 1 second to 16 minutes.

When the time function is selected (switch #3 ON), the timing sequence starts when the gate activates the open limit switch. (At this time the TIMER ACTIVE LIGHT comes ON.) The gate will automatically close after a predetermined time. The timing range is adjustable from 1 second to 8 minutes and can be increased from 8 minutes to 16 minutes by cutting the RED jumper wire on the 116220 circuit board. The timer is reset by activating any input which is selected to set the timer. Any combination of inputs will allow you to have more switches ON than are shown for any one input. For example: input #2 SAFETY (stop and reverse) plus input #8 TIMER (open and always set timer) -- Switch #3 and switch #5 will both be ON.

GENERAL CIRCUIT BOARD CONNECTIONS

THE NUMBERS BELOW REFER TO THE TERMINAL STRIP (#1 - #15) IN THE GATE OPERATOR. ALL INPUTS ARE NORMALLY OPEN.

SAFETY

Terminals 2 and 3 In the open position, this input will prevent the gate from closing, or if the timer is used, hold the timer until the input is cleared. In the closing cycle, activation of this input will reverse the gate to full open position, and if the timer is used, set and hold the timer until the input is cleared.

AUX TIMER

Terminals 2 and 4 This input is active only when the timer circuit is used. In the open position, activation of this input will hold the timer until the input is cleared. In the closing cycle, activation of this input will reverse the gate to full open position, set the timer and hold the time until the input is cleared.

TIMER

Terminal 2 and 5 This input is active only when the timer circuit is used. When the gate is in the closed position activation of this input will open the gate and set the time. In the open position, this input will hold the timer until the input is cleared. In the closing cycle, activation of this input will reverse the gate to full open position, set the timer and hold the timer until the input is cleared.

TILT-A-WAY

ELECTRICAL LOGIC TIMER BOARD
GENERAL CAPABILITY

TIMER HOLD

Terminal 2 and 6 This input is active only when the timer circuit is used. Then the operator is in the full open position, activation of this input will hold the timer until the input is cleared. This input will NOT reverse the gate when the operator is in the closing cycle.

SINGLE BUTTON

Terminal 2 and 11 When in the closed position, activation of this input will open the gate. When in the opening cycle, activation of this input will stop the gate. If gate is stopped in mid travel, this input will open the gate when activated. In the full open position, activation of this input will close the gate. In the closing cycle, this input will reverse the gate to the full open position.

CLOSE

Terminal 2 and 12 When the gate is in the full open position or stopped in mid travel, activation of this input will close the gate.

OPEN

Terminal 2 and 13 When the gate is in the full closed position or stopped in mid travel, activation of this input will open the gate.

STOP

Terminal 7 and 8 This is a NORMALLY CLOSED circuit. Anytime the stop circuit is opened, all functions of the logic board will cease. Then the circuit is once again closed, the desired input will have to be reactivated to start the function once again.

TILT-A-WAY
ELECTRICAL LOGIC TIMER BOARD
GENERAL CAPABILITY

INPUT	FUNCTION	SWITCH POSITION							
		1	2	3	4	5	6	7	8
SAFETY	WHEN GATE IS OFF DOWN LIMIT INSTANT REVERSE	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
SAFETY	WHEN GATE IS OFF DOWN LIMIT INSTANT REVERSE - SET TIMER	OFF	ON	ON	OFF	ON	ON	OFF	OFF
TIMER	OPEN GATE AND ALWAYS SET TIMER INSTANT REVERSE - SET TIMER	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
SINGLE BUTTON	OPEN CYCLE - OPEN PARK OPEN CLOSE CYCLE - CLOSE INSTANT REV	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
SINGLE BUTTON	OPEN CYCLE - OPEN PARK OPEN SET TIMER ON OPEN LIMIT CLOSE CYCLE - INSTANT REVERSE	ON	OFF	ON	ON	OFF	ON	ON	ON

TILT-A-WAY
ELECTRICAL LOGIC TIMER BOARD
GENERAL CAPABILITY

9-26-90

GENERAL
SHEET 3 OF 4

TIMER ADJUST

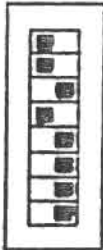


MIN. MAX.



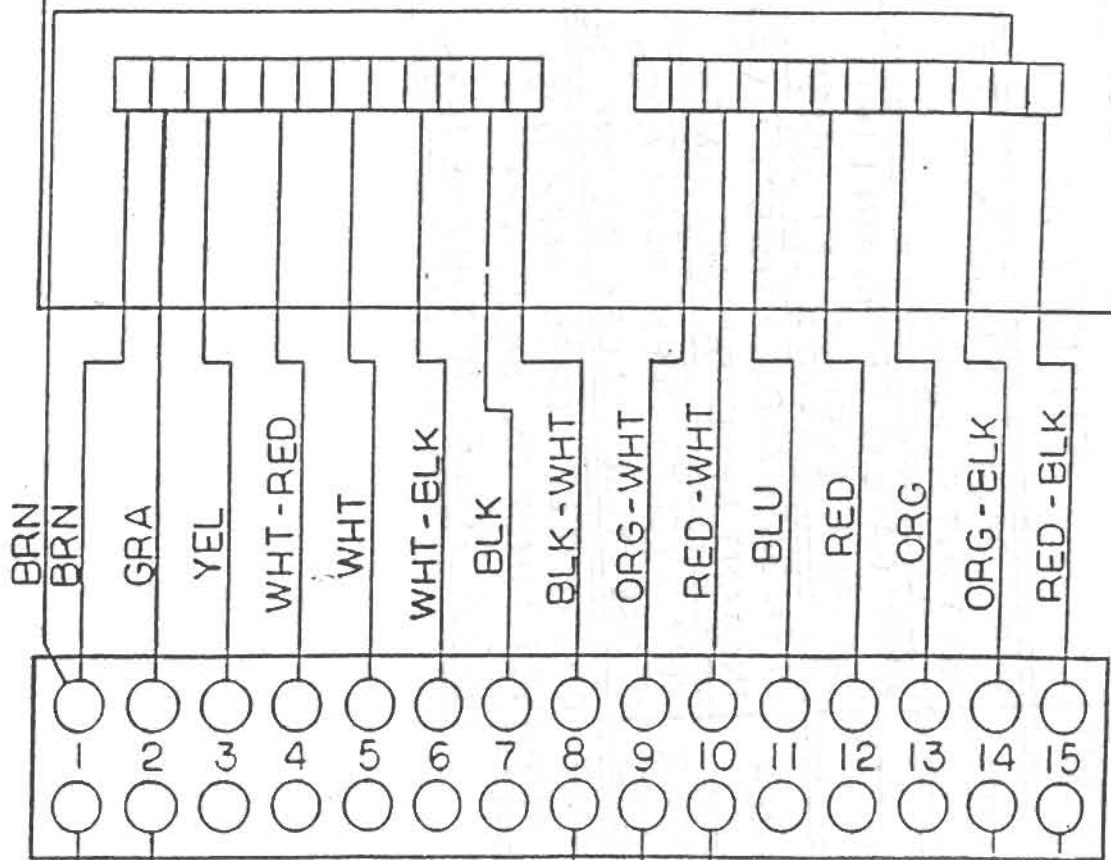
RED

MINUTE RANGE
JUMPER



PROGRAMMING
SWITCHES

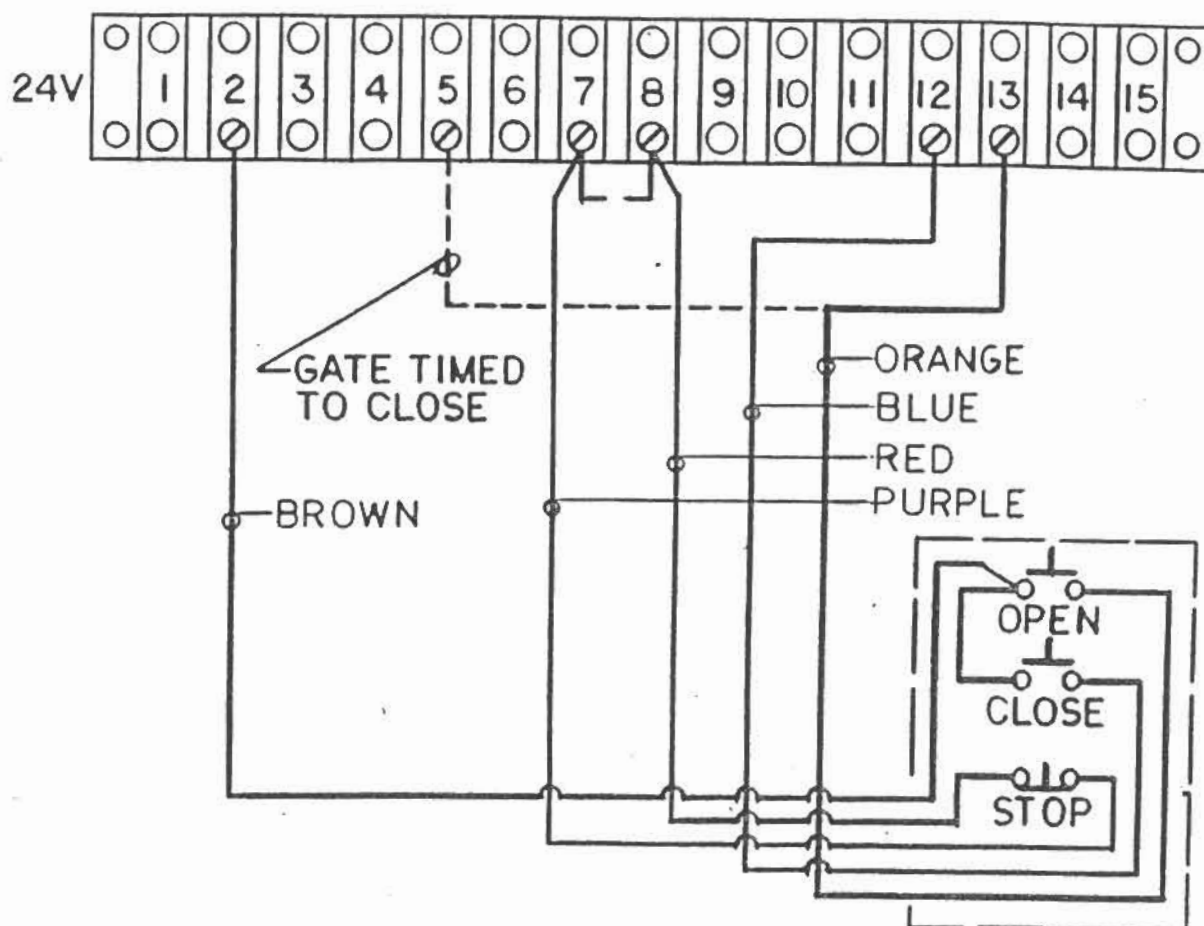
TIMER BOARD
116220-REV.2



TILT-A-WAY
ELECTRICAL LOGIC TIMER BOARD
GENERAL CAPABILITY

9-26-90

GENERAL
SHEET 4 OF 4



IF STOP BUTTON IS NOT USED ADD JUMPER AT 7 TO 8

FOR ADDITIONAL STATIONS

CONNECT OPEN CONTACTS IN PARALLEL

CONNECT CLOSE CONTACT IN PARALLEL

CONNECT STOP CONTACTS IN SERIES

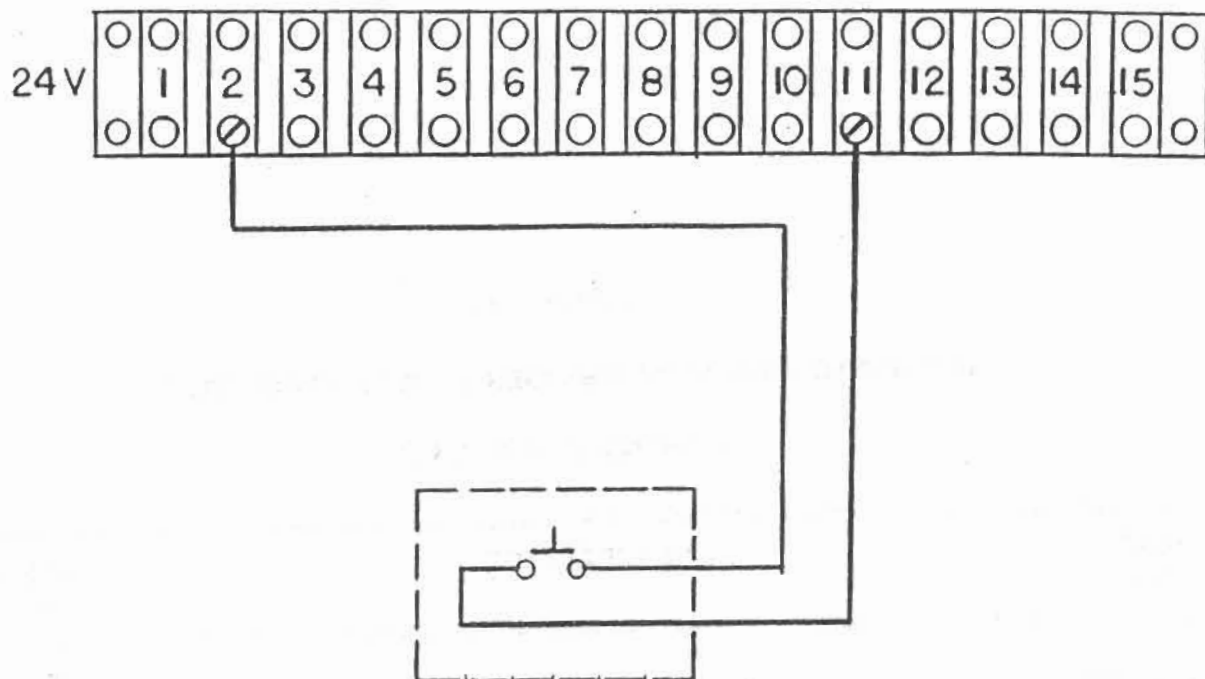
TILT-A-WAY GATE
ELECTRICAL DIAGRAM
PUSHBUTTON STATION

DATE

9-9-92

DRAWING

RGH-2032-A



TILT-A-WAY GATE
ELECTRICAL - SINGLE
PUSHBUTTON STATION

DATE
11-04-92

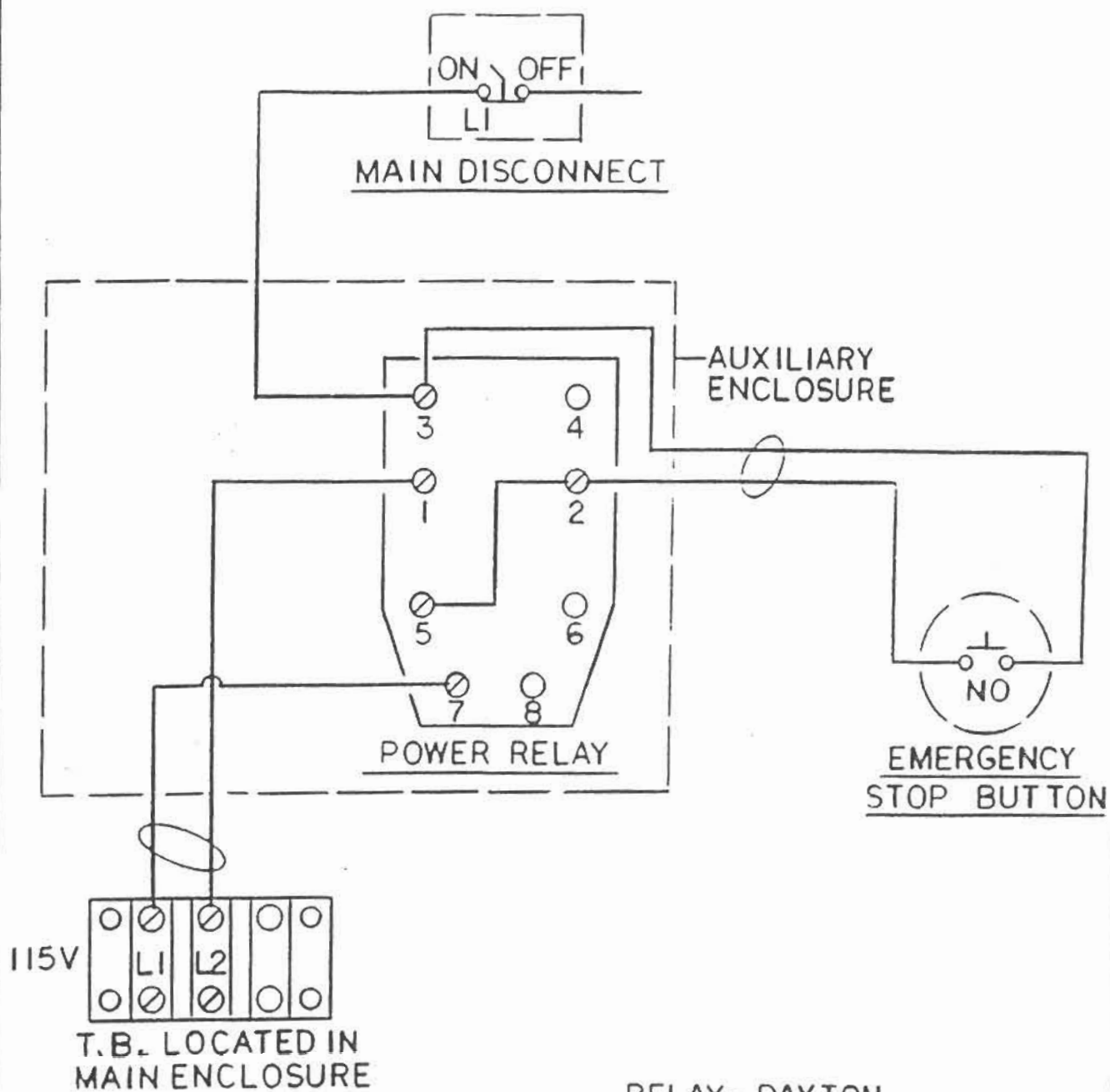
DRAWING
RGH-2032-B

TILT-A-WAY

HYDRAULIC OPERATOR EMERGENCY STOP COMPONENTS

DRAWING RGH-2033-A

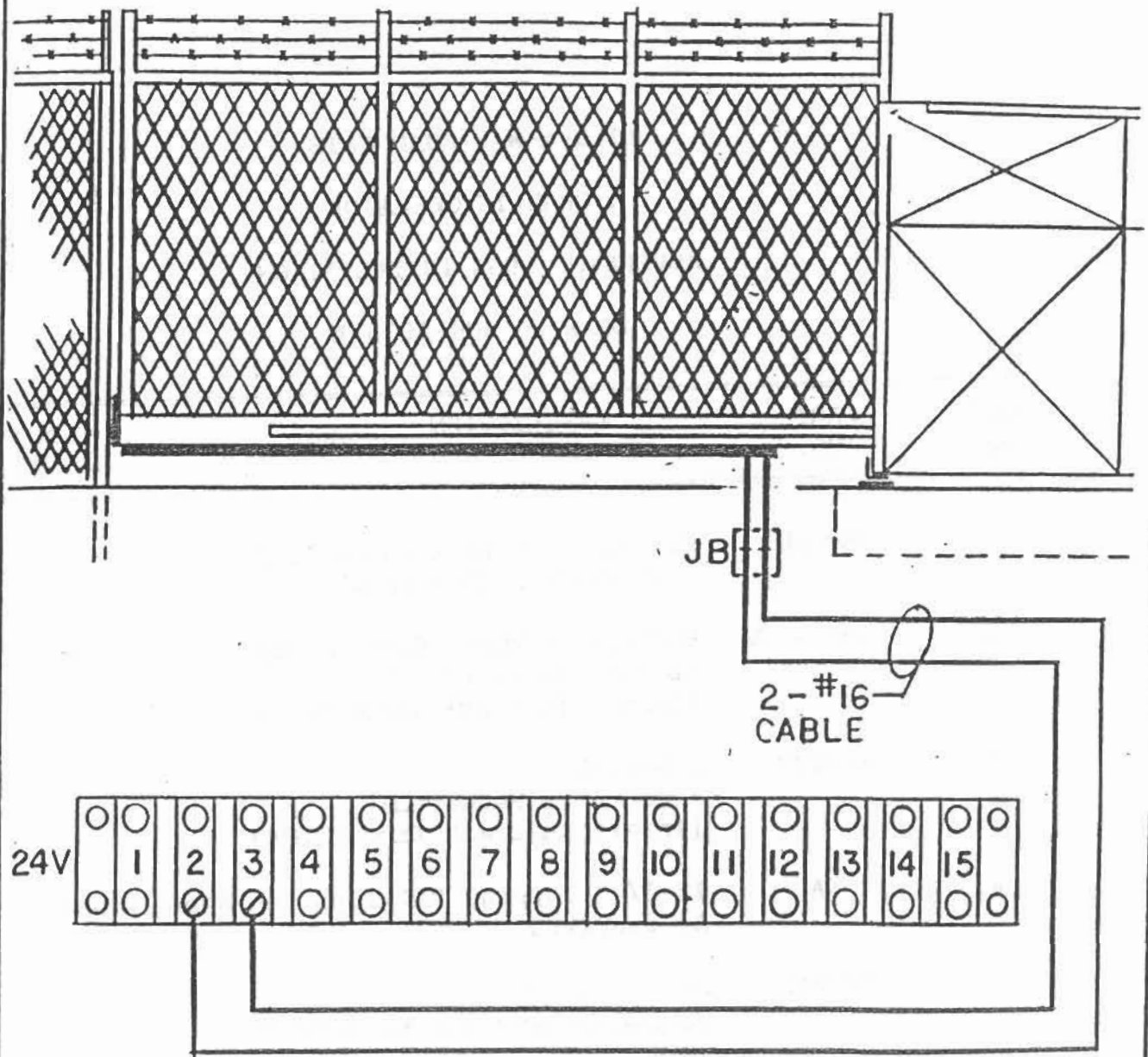
PART NO.	DESCRIPTION	REQ'D NO.
PE0256	Power Relay	1
PE0257	Emergency Stop Button	1



RELAY - DAYTON
DPDT NO 1 5X847E

TILT-A-WAY GATE
ELECTRICAL
EMERGENCY STOP

DATE	DRAWING
9-2-92	RGH-2033-A

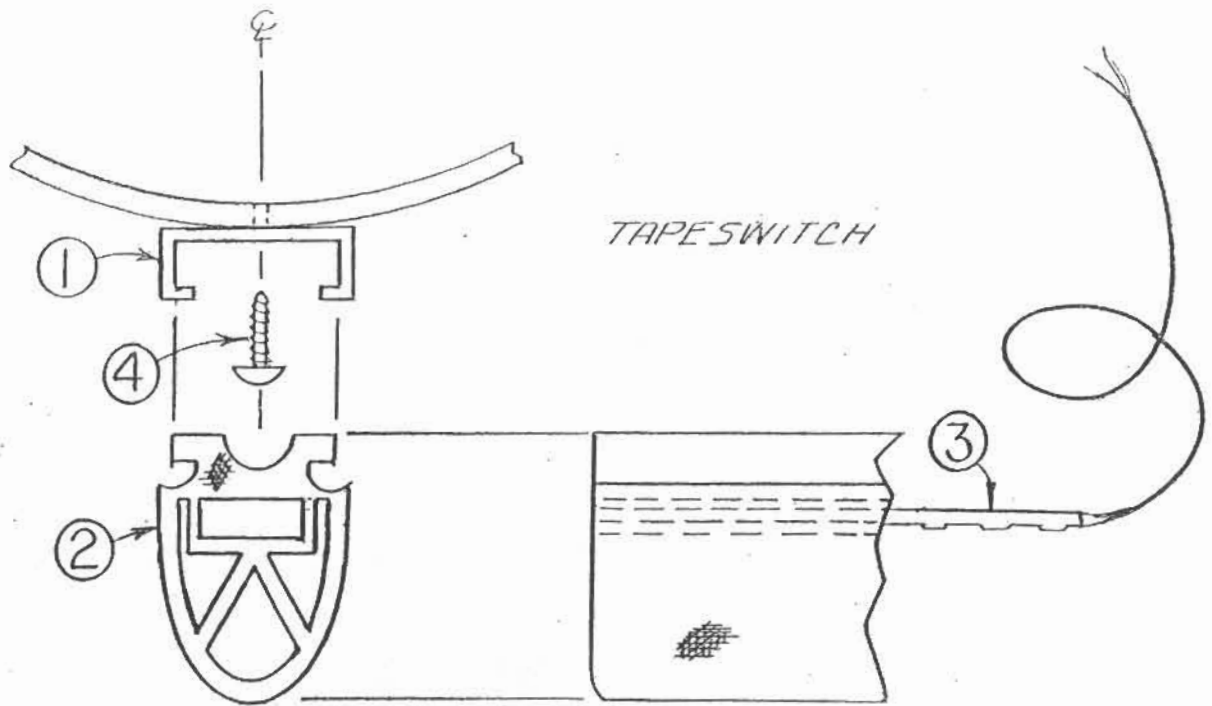


TILT-A-WAY GATE
ELECTRICAL DIAGRAM
REVERSING EDGE

DATE	DRAWING
9-10-92	RGH-2034-A

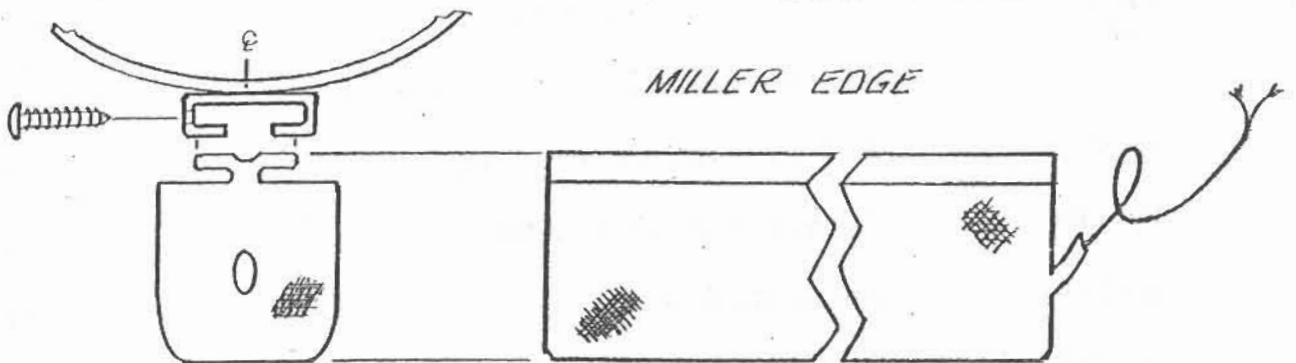
TILT-A-WAY ROAD GATE
HYDRAULIC OPERATOR
REVERSING EDGE INSTALLATION
DRAWING RGH-2035-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PE0243	Reversing Edge Holding Track (Length as Required)	1
2	PE0243A	Reversing Edge Rubber Strip (Length as required) [Insert in track from front]	
3	PE0244	C Switch (Length as Required) [Insert in track from front]	1
4	NA	#8 3/4" Tapping Phillips Pan Head screw As required	
	PE0245	Junction Box (Shown on Drawing RG-2034-A)	1
	PE0246	1/2" Strain Relief Fitting	2
	PE0237	Junction Box Cover	1



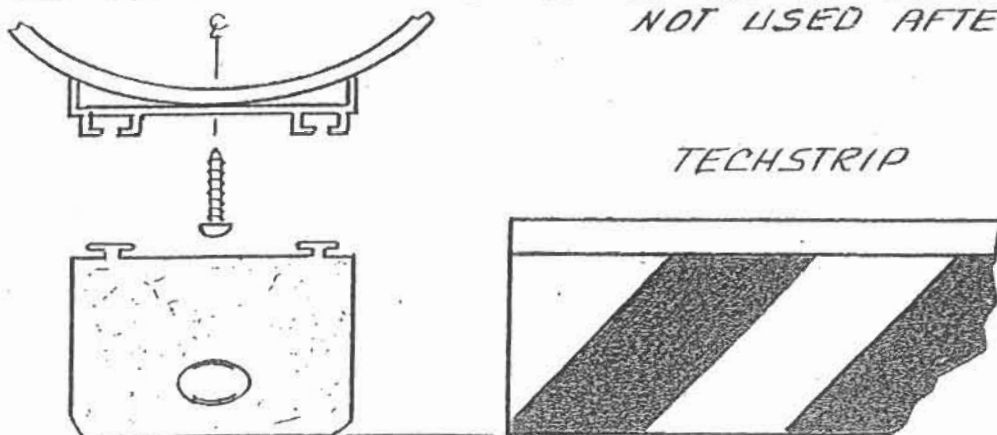
TAPESWITCH

NOT USED AFTER 6-97



MILLER EDGE

NOT USED AFTER 6-97



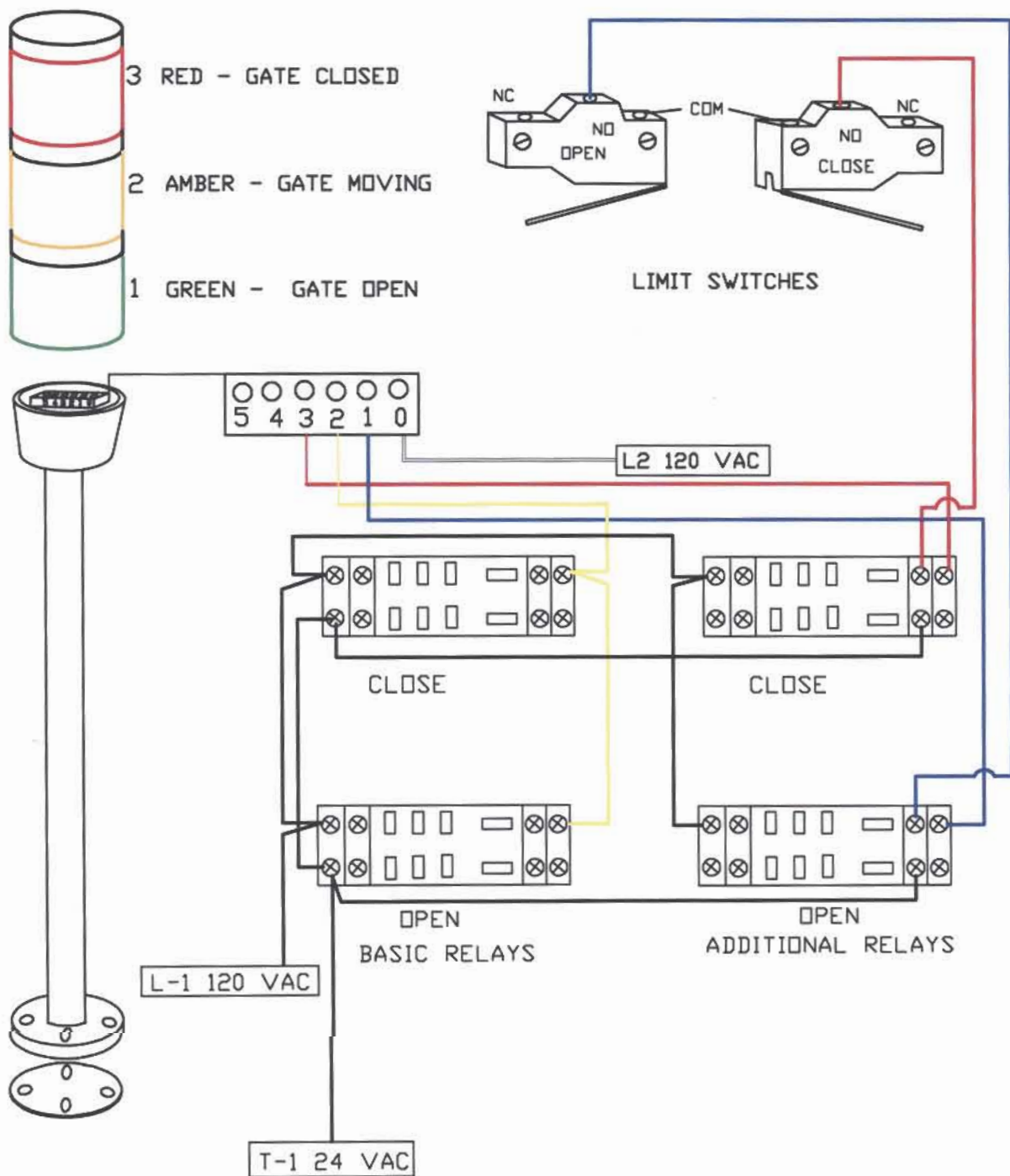
TECHSTRIP

TILT-A-WAY GATE
REVERSING EDGE
INSTALLATION
3 STYLES RGH2035

1-18-2000 IDEAL LTD INC

TILT-A-WAY
HYDRAULIC OPERATOR SAFETY WARNING LIGHT
DRAWING RGH-2036-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0258	Exterior Light Fixture	1
PE0269	Interior Junction Box	1
PE0210	Relay Socket	2
PE0211	Relay (Not Shown)	2



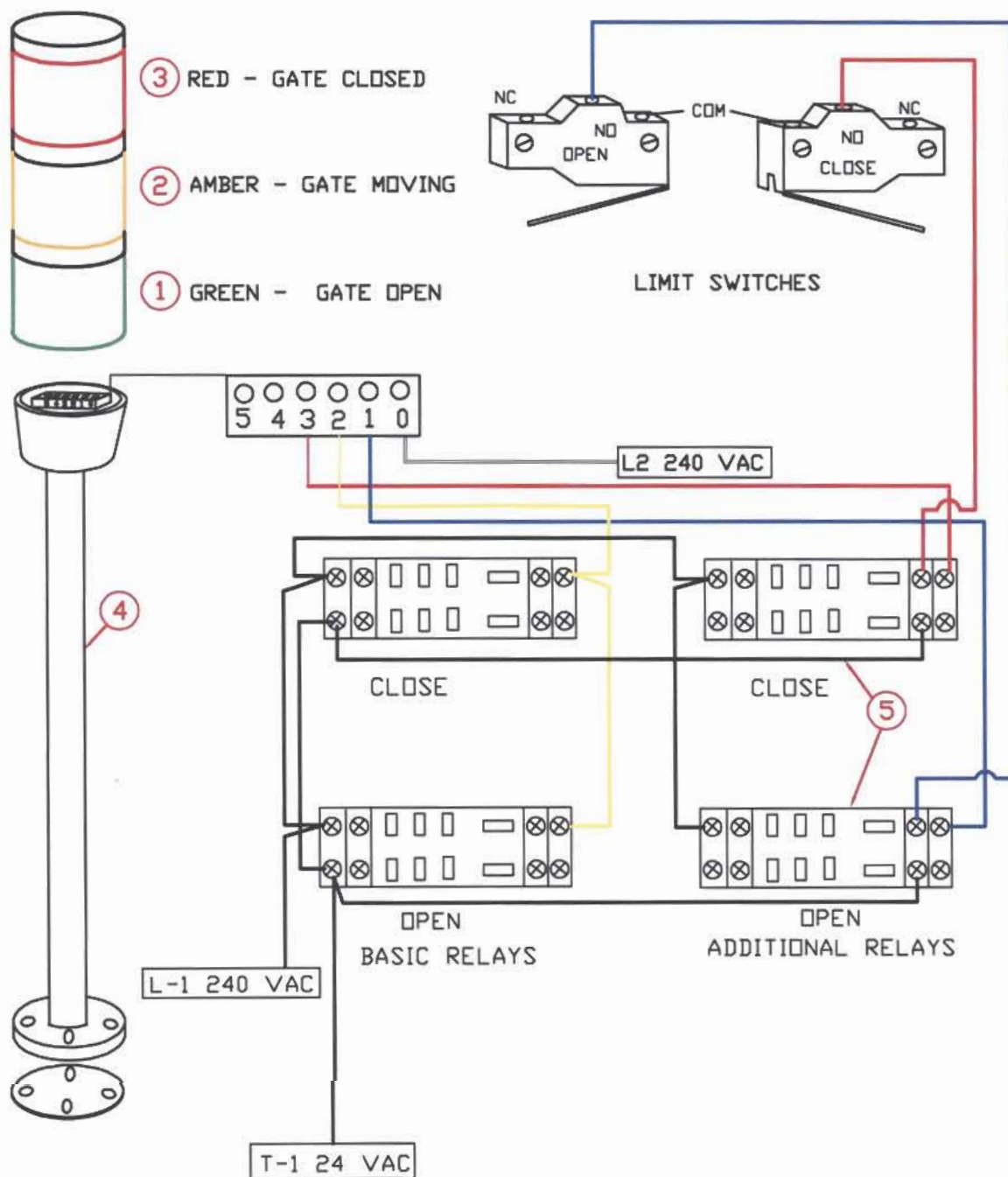
TLILT-A-WAY ROAD GATE
ELECTRICAL DIAGRAM
ALLEN BRADLEY STOCK LIGHT

TILT-A-WAY

HYDRAULIC OPERATOR SAFETY WARNING LIGHT

DRAWING RGH-2036-B

=====		
PART NO.	DESCRIPTION	REQ'D NO.
=====		
	PE0211 Relay (Not shown)	2
1	PE0361 Light Module- Green-Steady 240 VAC	1
2	PE0362 Light Module-Amber-Flashing 240 VAC	1
3	PE0363 Light Module-Red-Steady 240 VAC	1
4	PE0360 Pole Mount Base	
5	PE0210 Relay Socket	2
	PE0364 Single Tone Sound Module (Not shown) (optional) 240 VAC	
	PE0365 Incandescent Lamp (Not shown) (Replacement) 240 VAC	



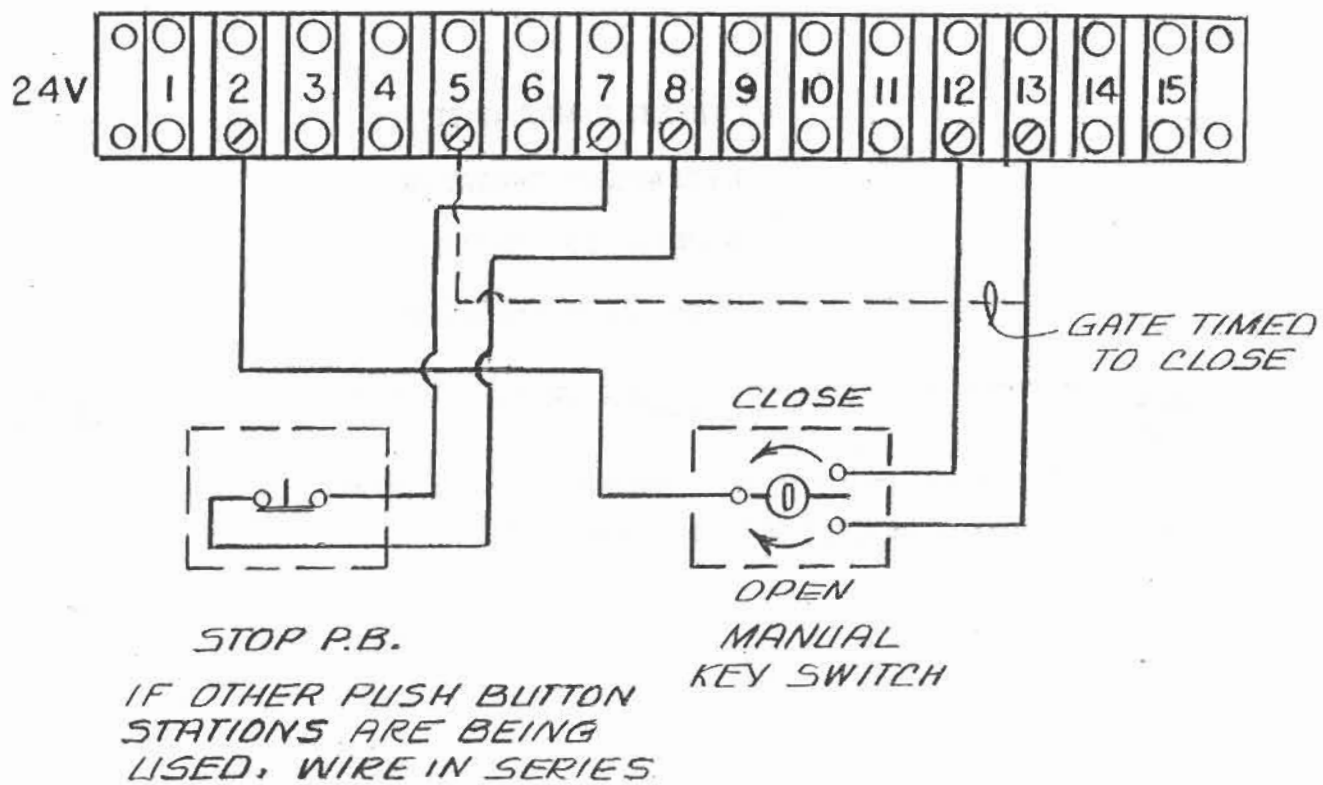
TLILT-A-WAY ROAD GATE
ELECTRICAL DIAGRAM
CONTROL TOWER STACK LIGHTS

TILT-A-WAY GATE
HYDRAULIC OPERATOR
DIGITAL KEY SWITCH
DRAWING RGH-2037-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0264	Digital Key Switch	As Req'd
PE0265	Programmable Card Reader	As Req'd

TILT-A-WAY GATE
HYDRAULIC OPERATOR
DIGITAL KEY SWITCH
DRAWING RGH-2037-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0264	Digital Key Switch	As Req'd
PE0265	Programmable Card Reader	As Req'd



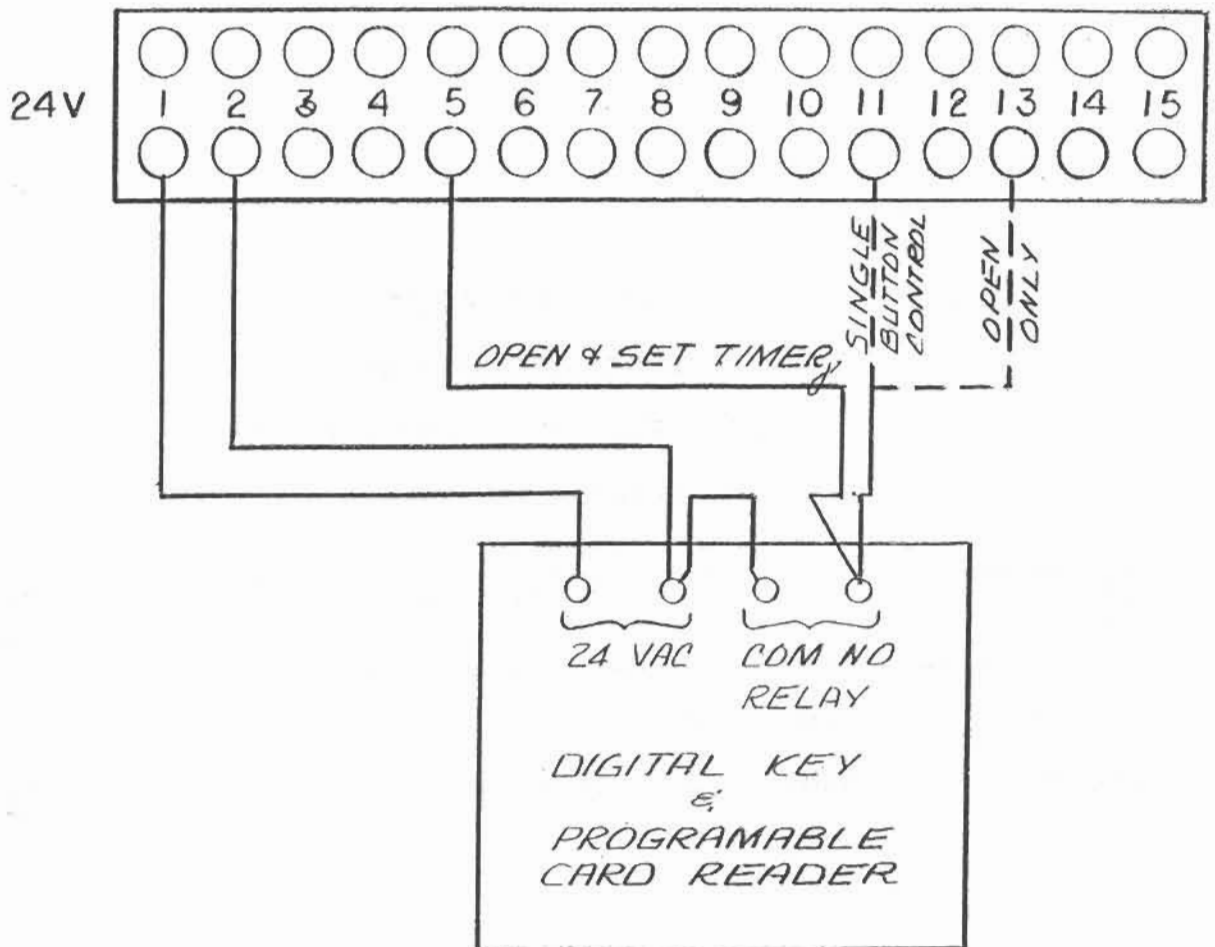
TILT-A-WAY GATE
MANUAL KEY SWITCH
ELECTRICAL
DWG RGH- 2038A

1-18-2000

IDEAL

TILT-A-WAY GATE
HYDRAULIC OPERATOR
MANUAL KEY SWITCH
DRAWING RGH-2038-A

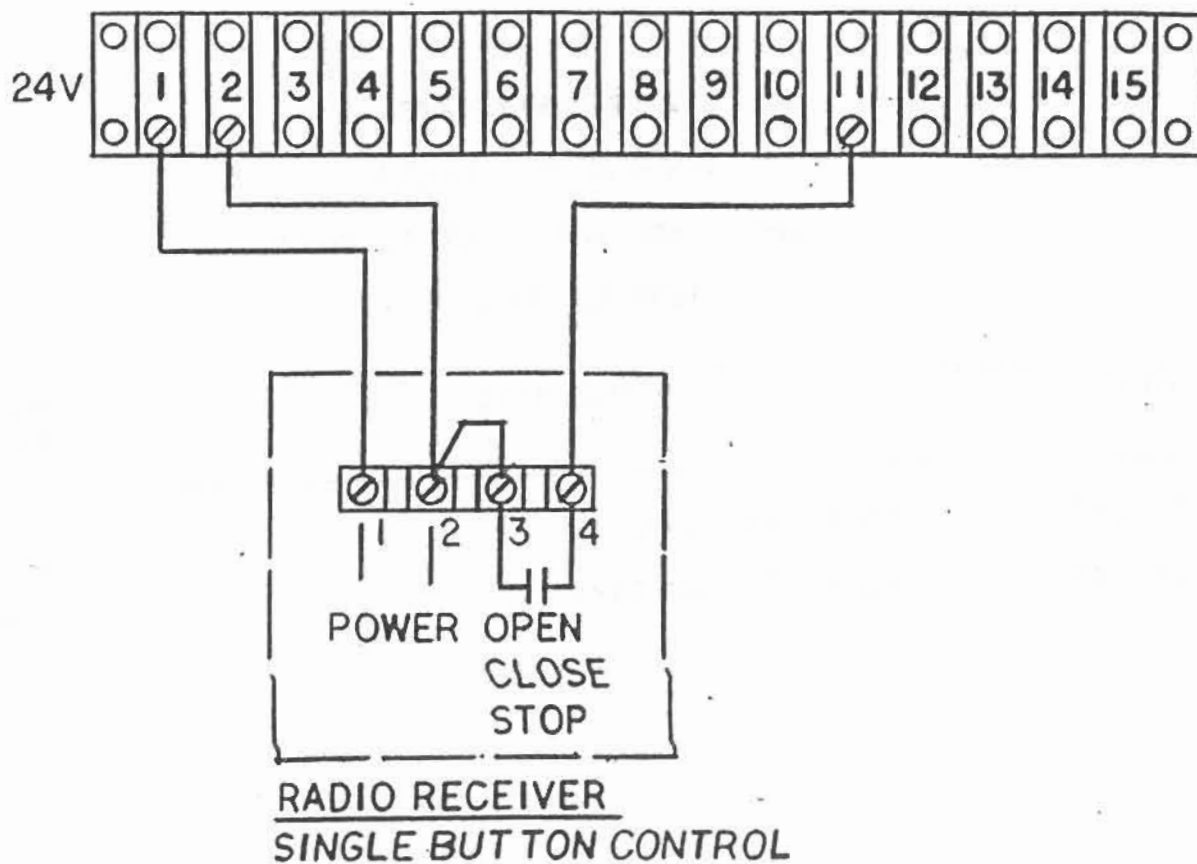
PART NO.	DESCRIPTION	REQ'D NO.
PE0263	Manual Key Switch	As Req'd



TILT-A-WAY GATE
DIGITAL KEY &
PROGRAMMABLE
CARD READER
DWG RGH-2039A
1-18-2000 IDEAL

TILT-A-WAY GATE
HYDRAULIC OPERATOR
RADIO RECEIVER - SINGLE BUTTON
DRAWING RGH-2040-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0259	Radio Receiver	1
PE0260	Radio Transmitter	As Req'd

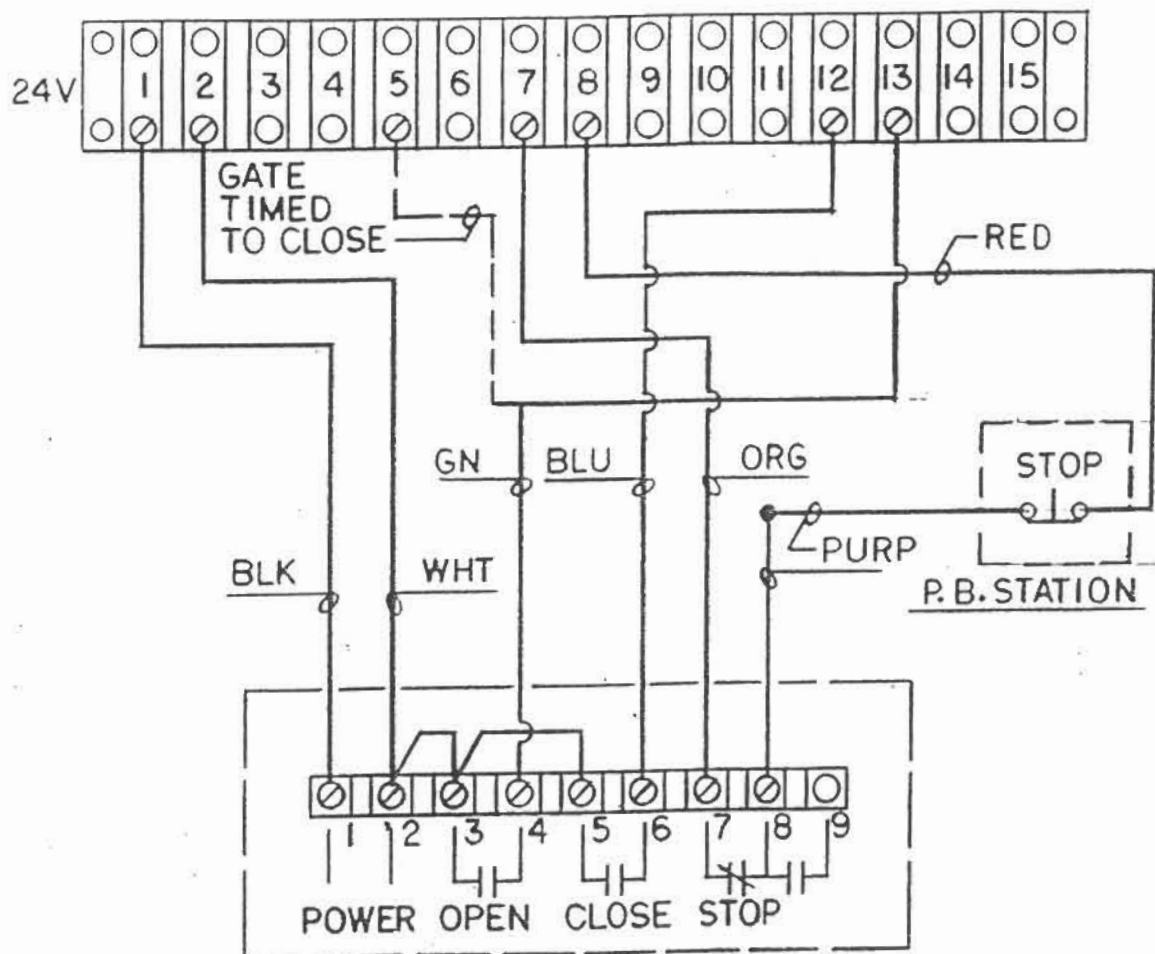


TILT-A-WAY GATE
ELECTRICAL DIAGRAM
RADIO CONTROL

DATE	DRAWING
9-10-92	RGH-2040-A

TILT-A-WAY GATE
HYDRAULIC OPERATOR
RADIO RECEIVER - THREE BUTTON
DRAWING RGH-2040-B

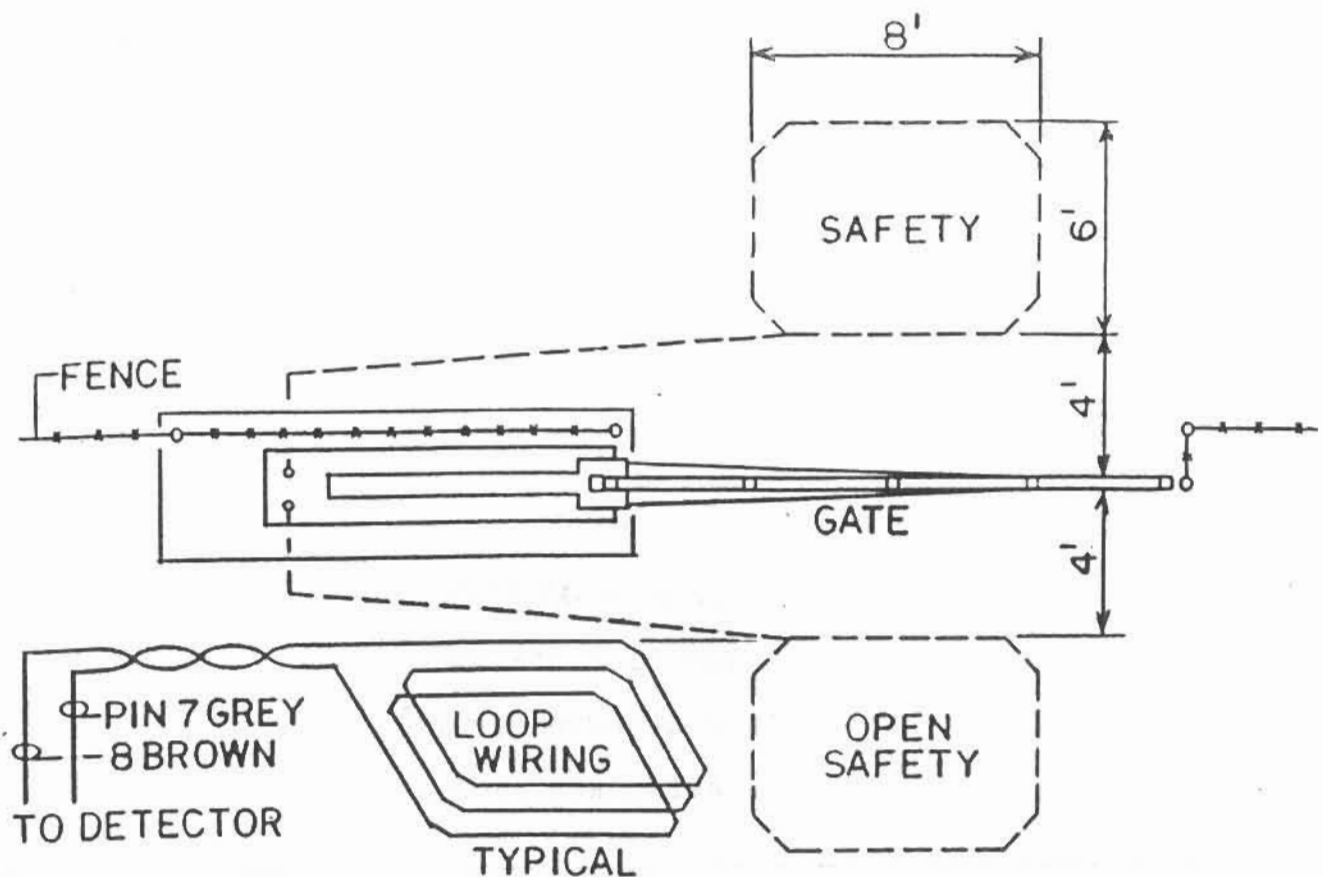
PART NO.	DESCRIPTION	REQ'D NO.
PE0261	Radio Receiver	1
PE0262	Radio Transmitter	As Req'd



RADIO RECEIVER
THREE BUTTON CONTROL

NOTE
ALL STOP CONNECTIONS
IN SERIES

TILT-A-WAY GATE ELECTRICAL DIAGRAM RADIO CONTROL	
DATE 11-05-92	DRAWING RGH-2040-B



OPEN-SAFETY

LOOP DETECTOR	PIN 1 BLACK	2 WHITE	4 GREEN	5 YELLOW	6 BLUE
TERMINAL BLOCK	1	2	BOX GROUND	2	5

SAFETY

LOOP DETECTOR	PIN 1 BLACK	2 WHITE	4 GREEN	5 YELLOW	6 BLUE
TERMINAL BLOCK	1	2	BOX GROUND	2	3

NOTE: Lead wires from more than one loop installation maybe routed in same conduit if wires from each individual loop are twisted at least 6 turns per 12 inches.

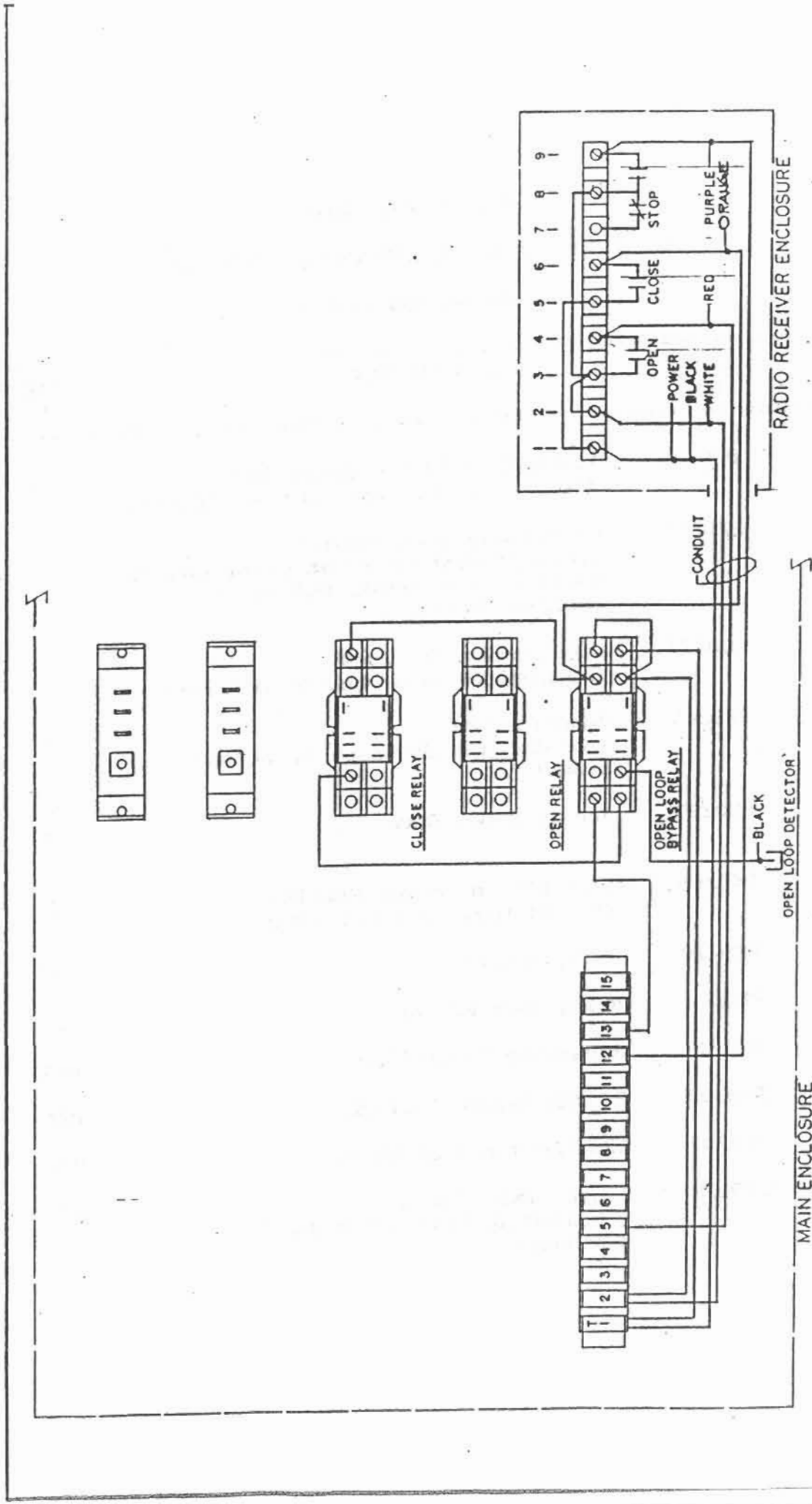
NOTE : Loop to open gate, pin-6-Blue
Terminal - 13
Loop to close gate, pin-6-Blue
Terminal - 12

TILT-A-WAY GATE
ELECTRICAL
LOOP WIRING

DATE 10-6-92	DRAWING RGH-2041-A
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TILT-A-WAY GATE
HYDRAULIC OPERATOR
LOOP DETECTOR BYPASS
DRAWING RGH-2042-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0210	Bypass Relay Socket	1
PE0211	Relay (Not Shown)	1



TILT-A-WAY GATE ELECTRICAL LOOP BYPASS CIRCUIT	
DATE	DRAWING
10-16-92	RGH-2042-A

TILT-A-WAY GATE
HYDRAULIC OPERATOR ELECTROMAGNETIC LOCK
DRAWING RGH-2042-B

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PE0276	120 VAC to 12 VDC Converter (Located in or near main enclosure)	1
2	PE0277	Electromagnetic Armature (Located stationary at outer end of barrier or at outer end of an opposite barrier)	1
3	PE0277	Electromagnetic Lock (Located at outer end of Barrier)	1
4	PE0245	Junction Box (Located inside front of pedestal frame)	1
5	PE0237	Junction Box Cover	1
6	PE0246	1/2" Strain Relief Fitting (1 - at barrier lower pipe)	4
7	PE0210	Relay Socket	1
8	PE0211	Relay (Not Shown)	1
9	PE0208	Reversing Controller	N/A
10	PE0205	24 VAC Terminal Block	N/A
11	PE0207	120 VAC Terminal Block	N/A
12	PE0112	Close Limit Switch (Located at front of Hydraulic cylinder)	N/A



THEORY OF OPERATION

A loop detector is an electronic device that is capable of detecting the presence of a moving or motionless vehicle. Detection is accomplished by passage of the vehicle over wire loops imbedded in the roadway. Loop detectors are widely used in the gate operator industry as safety and exit devices.

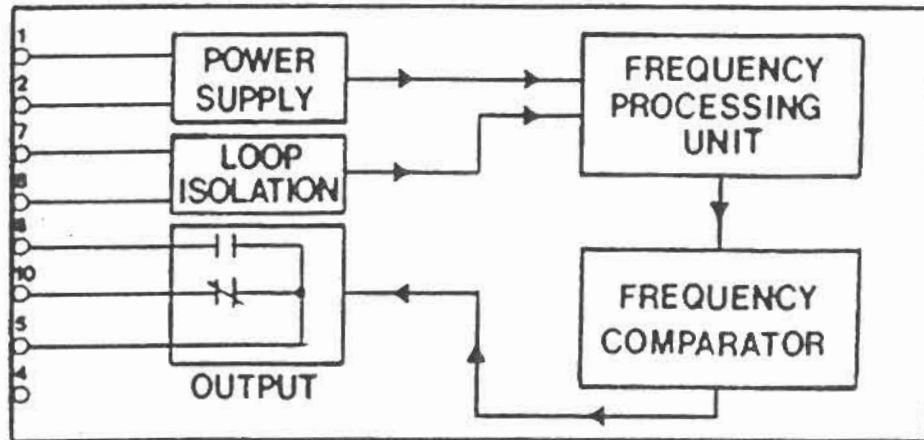


FIGURE 1

The detector consists of two oscillator circuits (fig. 1). The loop is part of the first circuit so its size (inductance) and other factors combine to determine the frequency at which it oscillates. The second oscillator circuit is tuned so that it oscillates at the same frequency as the loop circuit. Digital loop detectors are self-tuned the moment power is applied. The detector will tune itself to the loop circuit. The detector will constantly monitor the frequency of the loop several times per second. When a vehicle drives into the loop area, the frequency of the loop circuit changes. This imbalance with the second circuit causes the detector relay contacts to close. A frequency selection switch permits the loop circuit to be tuned to three different ranges so that two or more loops in close proximity are not on the same frequency.

TILT-A-WAY GATE ELECTRICAL LOOP DETECTOR	
DATE 8-1-90	GENERAL SHEET 1 OF 7

LOOP INFORMATION

The loop and lead-in wires must be installed in solid material such as asphalt or concrete. It is suggested that 14 gauge type R.H.W.-U.S.E. stranded wire be used for loops. The wire must have adequate insulation to withstand an underground environment. Loops should be installed with as much space between them and metal reinforcements as possible. If the loops are installed in series, it is best to keep all loops the same size. The loop and lead-in wire must be installed in one continuous length; no splices. The lead-in wire from the loop to the detector should have at least six twist per foot.

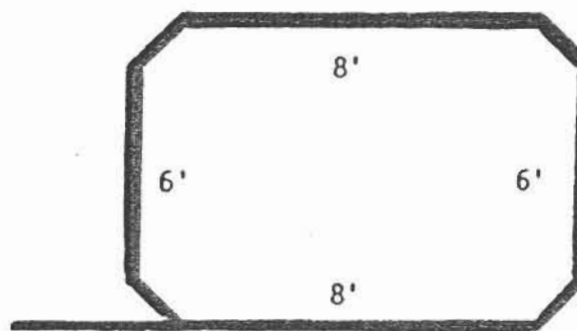


FIGURE 2

The loop inductance must fall between 30 and 1000 microhenries, the range of the loop detector. (Consult the detector specifications for different models.) Typically the ideal loop contains from 100 to 120 feet of wire. This will usually allow the inductance to fall within the range of the loop detector. The example in figure 2 shows that a loop 6 feet by 8 feet has 28 feet around the perimeter. ($6 + 8 + 6 + 8 = 28$) A five turn loop would have a total of 140 feet of wire in the loop. ($5 \times 28 = 140$) A four turn loop would have a total of 112 feet of wire in the loop. ($4 \times 28 = 112$) The five turn loop would be more sensitive. The corners of the loop are cut at 45 degree angles to reduce strain on the wires.

TILT-A-WAY GATE
ELECTRICAL
LOOP DETECTOR

DATE	GENERAL
8-2-90	SHEET 2 OF 7

To calculate the inductance of the loop in figure 2, use the formula:

$$\frac{(S_1 + S_2 + S_3 + S_4) T^2}{2} = \text{INDUCTANCE (in microhenries)}$$

where S = side of the loop

T = number of turns of wire

5 turn loop:

$$\frac{(6 + 8 + 6 + 8) 5^2}{2} = 350 \text{ microhenries}$$

4 turn loop:

$$\frac{(6 + 8 + 6 + 8) 4^2}{2} = 224 \text{ microhenries}$$

In both cases, we are within the range of the loop detector.

TILT-A-WAY GATE ELECTRICAL LOOP DETECTOR	
DATE	GENERAL
8-2-90	SHEET 3 OF 7

INSTALLATION PROCEDURE - SAWCUT

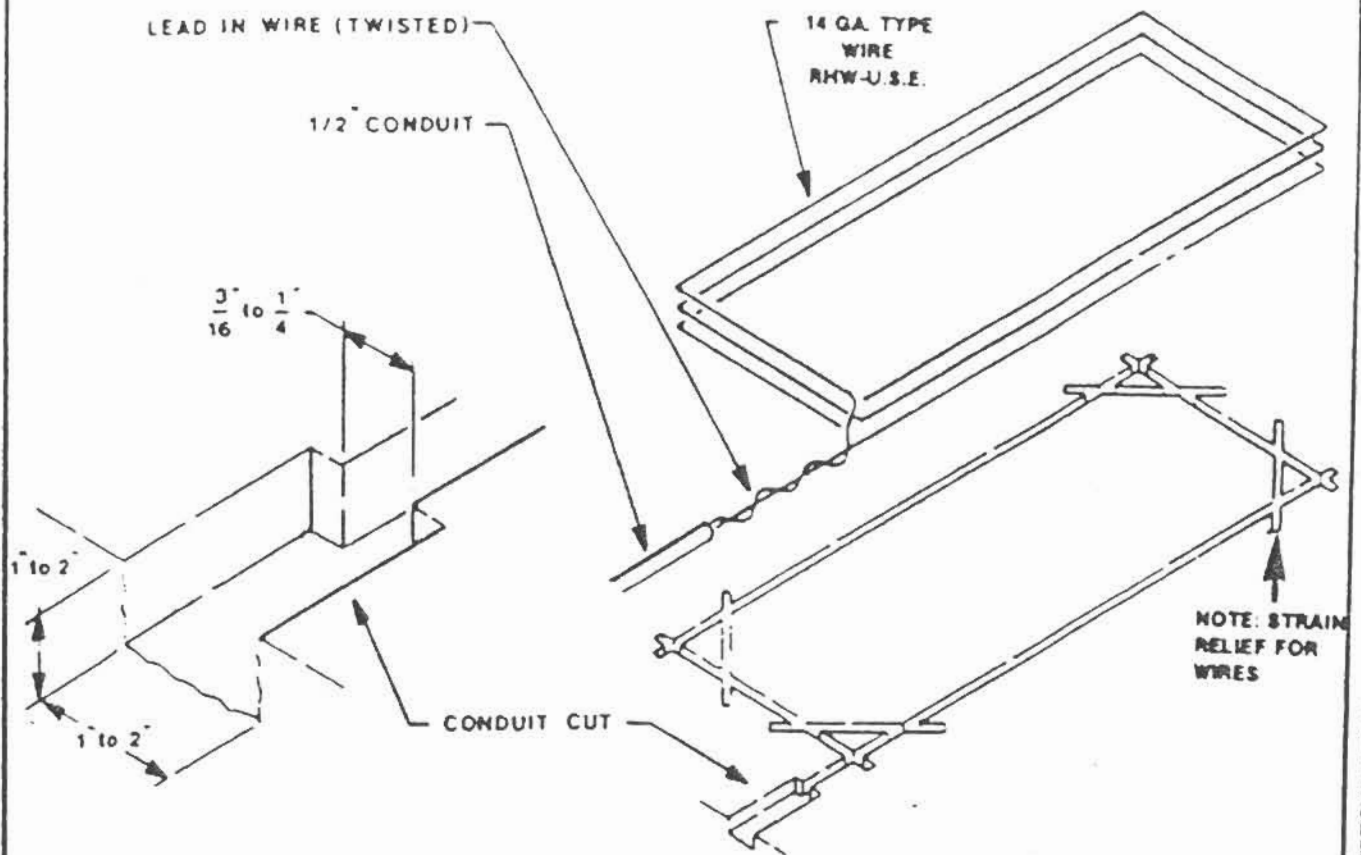


FIGURE 3

Cut a groove $\frac{3}{16}$ inch to $\frac{1}{4}$ inch wide by 1 to 2 inches deep, as shown in figure 3. Make a conduit trench to the operator. Using a spool of wire, take the loose end of the wire and start at the detector unit laying the wire down along the side of the conduit trench. Carefully unwind the wire into the groove to the proper number of turns. Once the proper number of turns are in the loop, again unwind the wire along side the conduit trench to the detector unit. Make sure there is enough wire on both leads to reach the detector unit, the wires will be shorter after they are twisted. Twist the two lead in wires at least six twist per foot from the loop to the detector. Place the lead in wire into the conduit (use only plastic PVC) and seal both ends to prevent moisture from seeping into the conduit.

TILT-A-WAY GATE
ELECTRICAL
LOOP DETECTOR

DATE	GENERAL
8-2-90	SHEET 4 OF 7

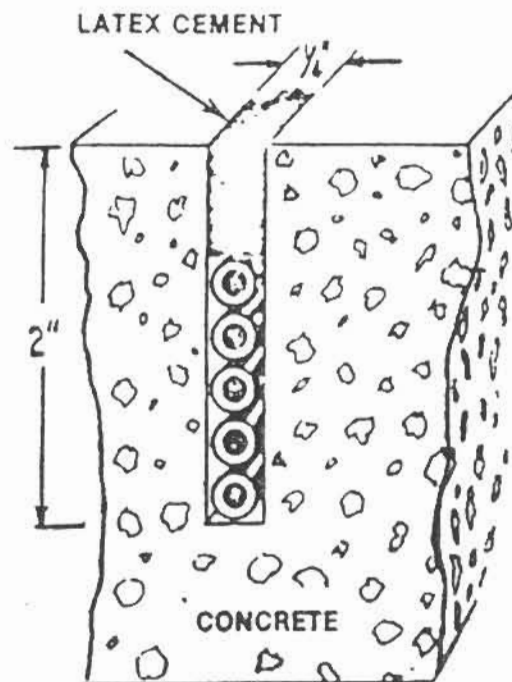


FIGURE 4

After the loop wires have been placed into the groove and the loop detector has been tested satisfactorily, seal the groove in the roadway with asphalt or other suitable filler as shown in figure 4. The loop wires must be kept to a minimum of 3/8 inch below the grade level to allow space required for fill material.

TILT-A-WAY GATE ELECTRICAL LOOP DETECTOR	
DATE	GENERAL
8-2-90 SHEET 5 OF 7	

LOOP INSTALLATION NOTES

When connecting more than one loop to a detector, always connect the loops in series. If the loops are in close proximity, wind the loops in opposite directions. (i.e. #1 CW, #2 CCW) If loops are located physically near each other and are wound in the same direction, field cancellation effects will occur.

If a single loop is used with a long lead in cable (500 ft. or greater) it is advisable to add an additional turn in the loop. This increases the ratio of the loop inductance to the total inductance, thereby improving loop sensitivity and overall system stability.

Loop wire should be no smaller than 18AWG and no larger than 12AWG. The wire should be stranded type with a polyethylene insulation.

Diagonal corner slots should be utilized to avoid puncturing the wire insulation at the corners.

The two wires exiting the corner of the loop (lead in wires) should be twisted and carefully placed in the saw slot leading to the gate operator.

All connections associated with the loop circuit should either be soldered or crimped with a tool which insures a good connection.

TILT-A-WAY GATE ELECTRICAL LOOP DETECTOR	
DATE 8-2-90	GENERAL SHEET 6 OF 7

TROUBLE SHOOTING

If trouble should occur, make sure that the operator is functioning properly and that all field wiring is correct. If trouble still exist, proceed with detector and loop check list.

- Check fuse on front panel.
- Check for proper loop size.
- Check for high power lines in immediate area.
- Check for proper twisting of lead in wires.
- Check for disconnected loop wires at loop terminal strip. Verify that all loop splices and terminations are soldered.
- Check for improper operator power lead wire size.
- Re-tune detector by turning off power to detector then turning back on. (Remove and replace fuse).
- Re-set frequency switch to new position. If re-set, momentarily remove power then on again. (Remove and replace fuse).
- If there are two separate loops for the same function, disconnect one and test for proper operation. Repeat for the second loop. If neither works continue through check list. If one works and the other doesn't, the problem is with the loop and not the detector.
- If there are two detectors for different functions, reverse the sockets between the detectors and test for operation.
- Test for loop continuity. Remove loop wires from terminal strip and using a V.O.M. place one probe on each wire. V.O.M. reading should be "0" ohms. If reading is 5 ohms or more there is trouble in the loops and they should be replaced.
- If detector seems to be too sensitive, or not enough, open detector enclosure and locate sensitivity switch. Re-set switch to either high or low position. NOTE: Switch is factory set at the medium position. Hi sensitivity is obtained when switch is moved toward indicator light.

TILT-A-WAY GATE
ELECTRICAL
LOOP DETECTOR

DATE	GENERAL
8-2-90	SHEET 1 OF 7

4 Ft. Loop Width					6 Ft. Loop Width				
LOOP SIZE (ft.)	INDUCTANCE (microhenries)				LOOP SIZE (ft.)	INDUCTANCE (microhenries)			
	1 Turn	2 Turn	3 Turn	4 Turn		1 Turn	2 Turn	3 Turn	4 Turn
4x4	7	20	44	78	6x4	8	25	56	100
4x6	8	25	56	100	6x6	10	31	70	124
4x10	12	36	81	144	6x10	14	43	96	171
4x15	17	50	112	199	6x15	19	58	129	229
4x20	21	64	143	253	6x20	24	72	161	286
4x25	26	78	174		6x25	29	87	194	
4x30	30	91	204		6x30	34	101	226	
4x35	35	105	235		6x35	38	116	259	
4x40	39	119	266		6x40	43	130		
4x45	44	132			6x45	48	145		
4x50	49	146			6x50	53	159		
4x55	53	160			6x55	58	173		
4x60	58	174			6x60	63	188		
4x65	62	187			6x65	67	202		
4x70	67	201			6x70	72	217		
4x75	71	215			6x75	77	231		
4x80	76	228			6x80	82	246		
4x85	81	242			6x85	87	260		
4x90	85	256			6x90	91	275		
4x95	90	270			6x95	96	289		
4x100	94	283			6x100	101	303		
OPTIMUM 115									

CHART BASED-12 GA. WIRE
PROVIDED BY SARASOTA AUTOMATION INC.

TILT-A-WAY GATE
ELECTRICAL
LOOP WIRING

DATE
10-6-9

DRAWING
RGH-2043-A

D-TEK Vehicle Loop Detector - Operating Instructions

We at EMX have designed the new D-TEK vehicle loop detector with the following objectives in mind:

1. Compact package to allow easy installation into small operator housings.
2. All the controls are accessible from the outside for easy installation and operation.
3. Integral loop conditioner is provided, to enable detector operation with marginal loops.
4. Provide all the features and controls necessary for a variety of applications.
5. Use metal housing for maximum durability and RF blocking.
6. Provide maximum surge protection on all inputs and outputs of the detector.

We took extra care to achieve and exceed these objectives. For example the controls are divided into two groups. The group on the front of the detector is for basic operation and the group on the back of the detector is for advanced settings. This way the more advanced settings are not visible to the casual user.

There is no skimping on the quality in the D-TEK detector. The housing is made from aircraft quality anodized aluminum. All the switches have gold plated contacts and are sealed for protection. The detector is protected by easily replaceable fuse, snubbing circuitry on the relay contacts, metal oxide varistor on the power input and triple protection on the loop input.

The D-TEK features are extensive and they include full loop diagnostics with frequency counter, 10 sensitivity settings, delay and extend features, "fail safe" and "fail secure" operation, automatic sensitivity boost, pulse or two presence relay operation and more.

Technical Information

Detector Connections

Pin	Function	Harness
1	Power	White
2	Power	Black
3	Relay 2 N.O	Orange
4	Ground	Green
5	Presence Relay Comm..	Yellow
6	Presence Relay N.O.	Blue
7	Loop	Gray
8	Loop	Brown
9	Relay 2 Comm..	Red
10	Presence Relay N.C.	White/Blk or Pink
11	Relay 2 N.C.	White/Red or Violet

Note: Functions on pins 6 and 10 are reversed if DIP 4 is set to **OFF** "Fail Secure" operation

Front Indicators

1. Green Led is ON - the detector is powered.
2. Red Led is ON - the detector detected a vehicle
3. Green Led is Blinking - the loop failed and is shorted or disconnected
4. Green Led is Blinking with two consecutive fast blinks - the loop failed in the past and now is working correctly.
5. Red Led is Blinking at the start of a vehicle detection - the Filter function is ON
6. Red Led is Blinking at the end of a vehicle detection - the Extend function is ON
7. Red Led is Blinking during a vehicle detection - 4 minute limited presence time has expired.

Note: Functions on pins 6 and 10 are reversed if DIP 4 is set to OFF

Front Controls

- Reset** this toggle switch when pushed momentarily down will reset the detector
- Frequency Counter** this toggle switch when pushed momentarily up will count the frequency on the loop. This count is displayed by the Red Led blinks, each blink represents frequency of 10K Hz. Count between 3 to 13 blinks confirms that the loop detector is tuned to the loop.
- Frequency** This toggle switch controls the loop frequency. Set different frequencies on adjacent loops. Verify frequencies with the frequency counter by counting the Red Led blinks.

Back Controls

- Sensitivity** this rotary switch controls the detector sensitivity. During normal operation the sensitivity level is set to 3 or 4.

DIP Switch Functions

DIP	OFF	ON
1	Pulse on Relay II	Presence on Relay II
2	Pulse on detect	Pulse on Un-detect
3	Constant presence	4 minute limited presence time
4	"Fail Secure"	"Fail Safe"
5	Filter Off	Filter On
6	ASB Off	Automatic Sensitivity Boost On
7	Extend detect	6 seconds
8	Extend detect	3 seconds

When Dip 7 and 8 are in ON position the extend time is 9 seconds.

Warning: Do not use limited presence setting and / or "Fail Secure" setting for reversing gates, doors or barriers.

DIP - Detector Functions

1. Presence function is provided always by the presence relay output on pins 5, 6, and 10. These outputs are active when the detector detects a car. If there is a need for an additional presence output the Relay 2 can be configured as a second presence output by setting DIP 1 to ON position.
2. Pulse function is provided by the Relay 2 output on pins 3, 9, and 11. To obtain pulse on Relay 2 set DIP 1 to OFF position. The pulse of about 0.5 second can be generated when the car enters the loop or when it exits. To generate pulse on vehicle entry to the loop set DIP 2 to OFF position. To generate pulse on vehicle exit from the loop set DIP 2 to ON position.
3. The presence relay provides constant output as long as the car is detected on the loop. To obtain constant presence time set DIP 3 to OFF position. In some applications limited presence time is required. To obtain limited presence time of approximately 4 minutes set DIP 3 to ON position. Be aware that the detector relay will be released after 4 minutes even if the vehicle is still detected by the detector. This may be a serious hazard in applications where gates, doors or barriers are reversed, therefore never use this option in these applications.
4. When DIP 4 is set to ON position the detector works in "Fail Safe" mode of operation the detector will issue a detect signal when a car is detected, loop is disconnected or shorted, or when the power to the detector is interrupted. It is strongly recommended to use the detector in this mode.

In some application there is a need to ignore the loop or power failures and only to provide the detect signal when a car is detected on the loop. To ignore loop or power failures set the detector to "Fail Secure" by setting DIP 4 to OFF position. Do not use this setting for application where gates, doors or barriers have to be reversed.

Note: Functions on pins 6 and 10 are reversed if DIP 4 is set to OFF

5. In some applications it is necessary to filter out short detections such as cross traffic or short burst of radio frequency such as keying of a CB transmitter. To ignore these short detections set DIP 5 to ON position. This will cause any detection that is shorter than 2 seconds to be ignored.
6. To increase detection height when detecting high bed vehicles set DIP 6 to ON position. This setting will cause the sensitivity to automatically increase once the front axle of the truck is detected. The sensitivity will go back to the normal level once the truck left the loop.

7. To extend the presence output for 6 seconds after the vehicle left the loop set DIP 7 to ON position.
8. To extend the presence output for 3 seconds after the vehicle left the loop set DIP 8 to ON position.

Note: If DIP 7 and DIP 8 are set to ON position the presence output will be extended 9 seconds after the vehicle left the loop.

Troubleshooting

Symptom	Possible Cause	Correction
Green indicator is not ON	No input voltage	1. Check voltage on pins 1 and 2. 2. Replace internal fuse 3. Check wiring to detector
Green indicator flashes	Loop wire shorted or disconnected	1. Check loop resistance on pins 7 and 8 it should be less than 5 ohms and more than 0.5 ohms.
Green indicator flashes with two consecutive fast blinks	Loop wire was temporarily shorted or disconnected	1. Check loop resistance on pins 7 and 8 while driving over the loop it should be less than 5 ohms and more than 0.5 ohms. The reading should be steady.
Detector stays in detect mode after the car left the loop and fails to undetect.	1. Faulty loop 2. Poorly crimped terminals 3. Loose connections	1. Perform megger test between loop lead and ground the reading should be larger than 100 megaohms. 2. Check that loop is tightly connected to proper terminals 3. Check that splices are tightly soldered and sealed against moisture.
Detector detects intermittently even when there is no car on the loop.	1. Faulty loop 2. Poorly crimped terminals 3. Loose connections 4. ~ Cross-talk between adjacent loop detectors	1. Perform megger test between loop lead and ground the reading should be larger than 100 megaohms. 2. Check that loop is tightly connected to proper terminals 3. Check that splices are tightly soldered and sealed against moisture. 4. Set adjacent loops on different frequencies.

Technical Specifications

Power: the detector is available in the following voltages, 12V AC/DC, 24V AC, 24V DC, 110V AC, 220V AC. maximum current draw 100mA.

Low power detector is available with maximum current draw of 60mA

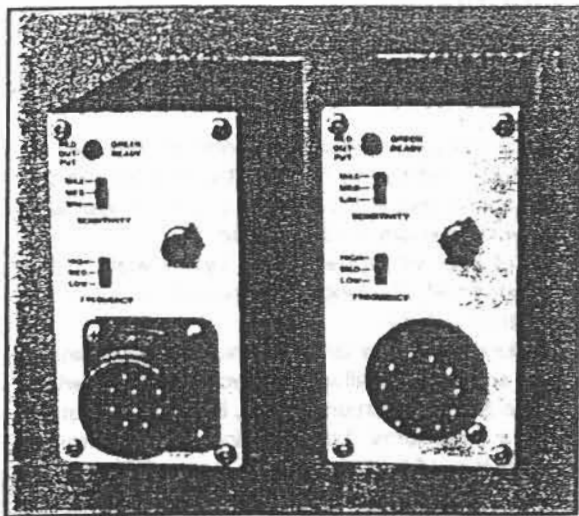
Temperature: -40F to + 180F

Environmental Protection: Circuit board is conformally coated

Enclosure: Extruded anodized aluminum, Height = 3.25 inches 83 mm
 Width = 2.56 inches 40 mm
 Depth = 3.65 inches 90 mm

Output Relays:	5A/125 V AC standard version, 1A/125 V AC low current version
Connector:	86CP11 compatible with 11pin Octal DIN rail mountable socket or wire harness
Surge Protection:	The detector is protected with neon discharge lamps, zenner diodes and surge arrestors.
Loop Input:	Transformer isolated
Grounded Loop:	The loop isolation transformer allows operation with poor quality loops.
Loop Inductance Range:	20 to 2000 microhenries with Q factor of 5 or higher.
Tuning:	Detector automatically tunes to the loop after power application or reset.
Tracking:	Detector automatically tracks and compensates for environmental changes
Power Indicator:	Green LED solid light indicates power
Loop Failure Indicator:	Green LED blinks indicates loop problem
Loop Failure Memory:	Green LED blinks with fast consecutive blinks indicates past loop problem that healed.
Detect Indicator:	Red LED solid light indicates detection
Extend Indicator:	Red LED blinks after a car left the loop indicates time extend feature
Sensitivity:	is set by 10 position rotary switch
Frequency:	is set three position toggle switch
Infinite Presence Mode:	DIP switch selectable presence
Limited 4 Minutes	
Presence Time:	DIP switch selectable
Second Presence Relay:	DIP switch selectable
Pulse On Exit / Entry:	DIP switch selectable
Fail Safe / Secure :	DIP switch selectable
Filter:	DIP switch selectable 2 seconds
Extended Detection:	DIP switch selectable 3, 6 and 9 seconds

SENTINEL D VEHICLE DETECTOR —TYPE SMD



FEATURES

- ☐ SELF TUNING
- ☐ AUTOMATIC SENSITIVITY BOOST - ON BOARD SELECTABLE
- ☐ AUTOMATIC ENVIRONMENTAL TRACKING
- ☐ FAIL SAFE PRESENCE OUTPUT
- ☐ PULSE OUTPUT ON VEHICLE ENTRY OR EXIT
- ON BOARD SELECTABLE
- ☐ RESET SWITCH
- ☐ NO OUTPUT ON POWER UP - ON BOARD SELECTABLE
- ☐ LONG PRESENCE TIME

SENTINEL D MODEL SMD - LOOP DETECTORS

The Sentinel D Detectors utilize digital and surface mount technology. The use of these technologies allowed us to design a reliable and compact loop detector.

SPECIFICATIONS

Self Tuning: The detector is tuning automatically on power up to loop inductance range of 20 to 1000 uH with a Q factor of five or greater. No manual tuning or maintenance is required.

Automatic Environmental Tracking (AET): The detector is designed to track automatically environmental changes which influence the loop inductance. The detector will track up to 1% drift per hour. No manual tuning or maintenance is required.

Automatic Sensitivity Boost (ASB): The sensitivity is optimized for vehicle access control. As soon as detection occurs, the sensitivity is automatically boosted. This holds detection of a high bed vehicle or truck-trailer combination. This feature is on board selectable with ASB jumper.

Sensitivity: Sensitivity is selectable with a three way external switch (maximum, normal, minimum). For standard application use normal setting.

Frequency Selection: Frequency is selectable with a three way external switch to provide frequency separation between adjacent loop detectors and to eliminate crosstalk.

Presence Output: Presence time is designed for access control applications with minimum 1 hour hold time for 3% inductance change. The presence relay operates in failsafe mode so its coil is normally energized for the "no call" state. When detector has two presence relays the second relay is operating in the "non failsafe mode" with the coil de-energized for the "no call" state.

Pulse Output: Momentary closure of relay contact for 125 milliseconds per vehicle. Pulse is normally generated on vehicle entry. The detector has an on board selector to provide for pulse on vehicle exit or entry, or pulse off selection.

Reset: Reset of the detector is achieved during power up or via the external momentary switch. No output is generated during reset via the external switch.

Power Up: The "No False Output" (NFO) feature ensures that no output is generated on the failsafe relay during power up. This feature is on board selectable via the (PWR) jumper.

Loop Monitor: If the loop and/or lead in exceed the inductance range the detector will generate a continuous failsafe output for the presence relay; the pulse relay will remain open.

Indicator: Two color LED, green designating power on and red designating detect call or loop failure.

Power: 110v AC or 24v AC $\pm 10\%$ (24vDC optional.)

Temperature: -40F° to +170F°

Output Relay Contact Rating: 3 amp 120v AC or 28v DC

Enclosure: The enclosure is made out of non-corrosive extruded aluminum. The dimensions are width - 1.9", height - 3.6", depth - 3.9".

Surface Mount Technology: All digital circuitry is utilizing the advanced SMD technology to achieve compact size and high quality by using automatic pick and place manufacturing process.

RGH-2043-B

FOREWORD

Optimum functioning of the detector module is largely dependent on factors associated with the inductive sensor loop connected to it. These factors include choice of material, loop configuration and correct installation practice. A successful inductive loop vehicle detection system can be achieved by bearing the following operational constraints in mind, and strictly following the installation instructions.

1. OPERATIONAL CONSTRAINTS

1.1 Crosstalk

When two loop configurations are in close proximity, the magnetic field of one can overlap and disturb the field of the other. This phenomena, known as crosstalk, can cause false detects and detector lock-up. Crosstalk can be eliminated by:

1. Careful choice of operating frequency. The closer together the two loops, the further apart the frequencies of operation must be.
2. Separation between adjacent loops. Where possible a minimum spacing of 6 feet between loops should be adhered to.
3. Careful screening of lead-in cables if they are routed together with other electrical cables. The screen must be earthed at the detector end only.

1.2 Reinforcing

The existence of reinforced steel below the road surface has the effect of reducing the inductance, and therefore the sensitivity, of the loop detection system.

The ideal spacing between the loop cable and steel reinforcing is 6 inches, although this is not always practically possible. The slot depth should be kept as shallow as possible, taking care that no part of the loop or lead-in remains exposed after the sealing compound has been applied.

2. INSTALLATION INFORMATION

2.1 Loop and Feeder Specification

The loop and feeder should preferably constitute a single unjoined length of insulated copper conductor, with a minimum rating of 15 Ampere.

Joints in the loop or feeder are not recommended. Where this is not possible, joints are to be soldered and terminated in a waterproof junction box. This is extremely important for reliable detector performance.

2.2 Sensing Loop Geometry

Sensing loops should, unless site conditions prohibit, be rectangular in shape and should normally be installed with the longest sides at right angles to the direction of traffic movement. These sides should be ideally 3 feet apart.

The length of loop will be determined by the width of the roadway to be monitored. The loop should reach to within 1 foot of each edge of the roadway.

In general, loops having a circumference measurement in excess of 30 feet should be installed using two turns of wire, while loops of less than 30 feet in circumference, but greater than 18 feet, should have three turns. Loops having a circumference measurement less than 18 feet should have four turns. It is good practice at time of installation to construct adjacent loops with alternate three and four turn windings.

2.3 Loop Installation

All permanent loop installations should be installed in the roadway by cutting slots with a masonry cutting disc or similar device. A 45° crosscut should be made across the loop corners to reduce the chance of damage that can be caused to the loop cable at right angle corners.

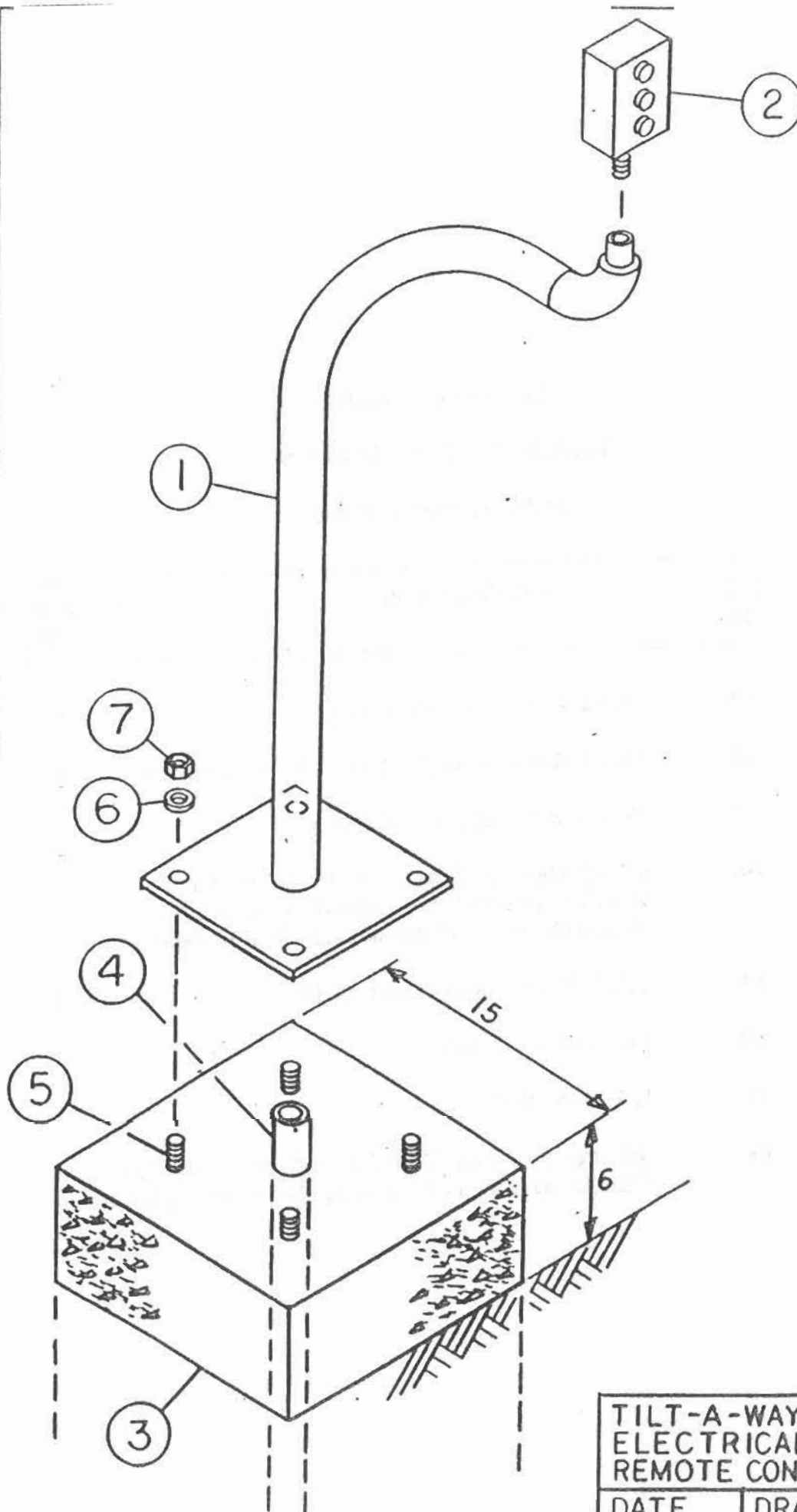
A slot must also be cut from the loop circumference at one corner of the loop to the roadway edge to accommodate the feeder.

A continuous loop and feeder is obtained by leaving a tail long enough to reach the detector before inserting the cable into the loop slot. Once the required number of turns of wire are wound into the slot around the loop circumference, the wire is routed again via the feeder slot to the roadway edge. A similar length is allowed to reach the detector and these two free ends are twisted together to ensure they remain in close proximity to one another. (Minimum 7 turns per foot.) Maximum recommended loop feeder length is 300 feet. It should be noted that the loop sensitivity decreases as the feeder length increases, so ideally the feeder cable should be kept as short as possible.

The loops are sealed using a "quick-set" black epoxy compound or hot bitumen mastic to blend with the roadway surface.

TILT-A-WAY GATE
REMOTE CONTROL STATION
DRAWING RGH-2044-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	FG0123	Control Station Support Unit	1
2	NA	Control Station Enclosure "As required for type of operator"	
3	NA	Concrete Support Pier	
4	NA	1" dia Electrical Conduit with 2 1/2" projection above concrete. Conduit routed from barrier pedestal	
5	NA	1/2" X 8" Expansion Bolt	4
6	NA	1/2 Lock Washer	4
7	NA	1/2 Hex Nut	4



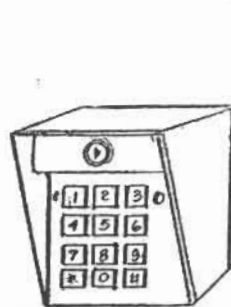
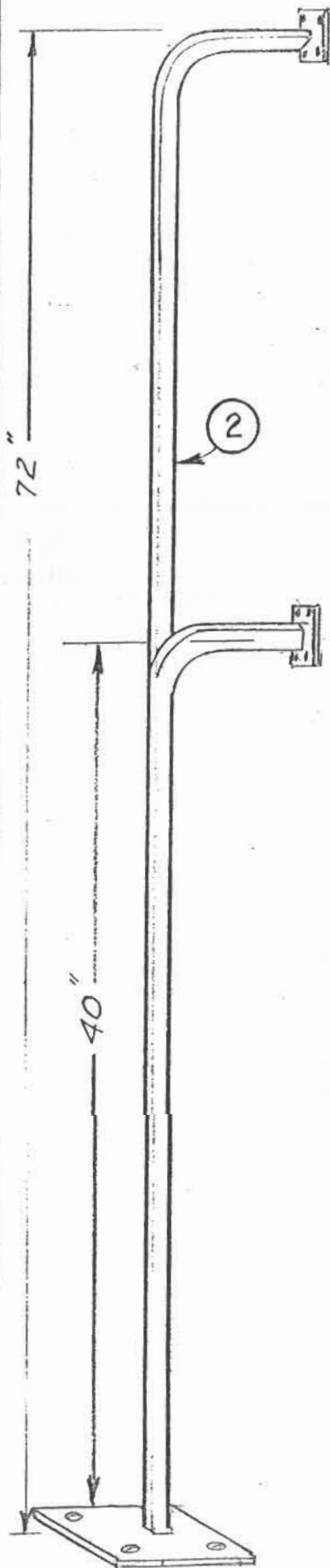
TILT-A-WAY GATE
ELECTRICAL
REMOTE CONTROL STATION

DATE	DRAWING
11-04-92	RGH-2044-A

TILT-A-WAY GATE
REMOTE CONTROL STATION
DRAWING RGH-2044-B

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	NA	Single Height Pedestal	1
2	NA	Dual Height Pedestal 72" in height	1
3	NA	Concrete Support Pier	
4	NA	1" diameter Electric Conduit with 2 1/2" projection above concrete. Conduit routed from barrier pedestal.	
5	NA	1/2" X 8" Expansion Bolt	4
6	NA	1/2 Lock Washer	4
7	NA	1/2 Hex Nut	4
8	NA	Remote control Station of choice, in- cluded are bolts, nuts, keys and plate	

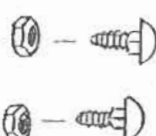
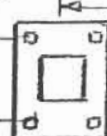
DUAL HEIGHT PEDESTAL



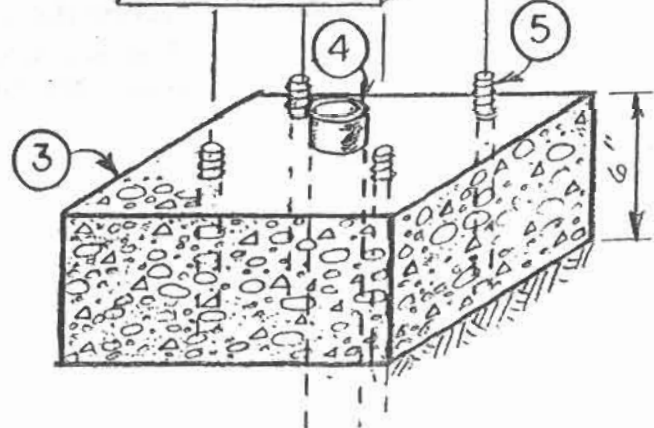
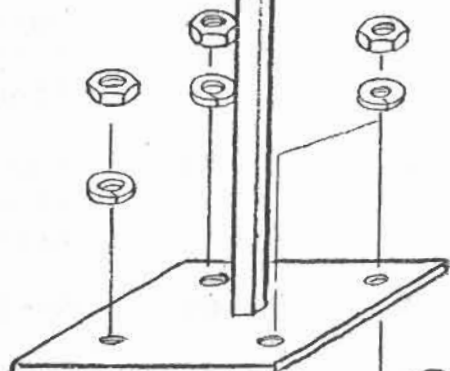
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SINGLE HEIGHT PEDESTAL

10 1/2"



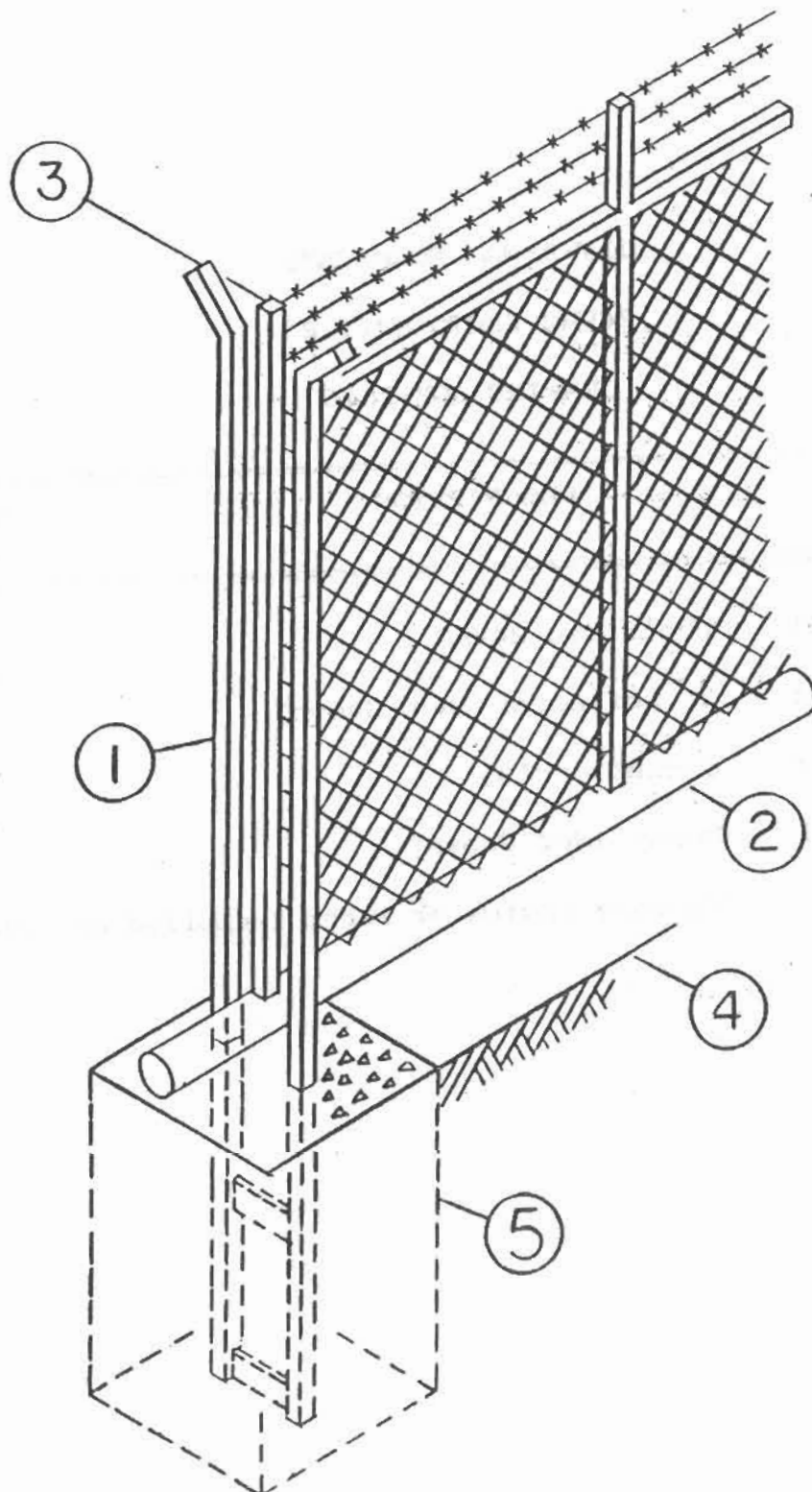
1



TILT-A-WAY GATE
REMOTE CONTROL STATION
PEDESTAL & GATELOCK
DWG 2044-B
1-20-200 IDEAL

TILT-A-WAY GATE
BARRIER END STANCHION
DRAWING RGH-2045-A

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	FG0172	Stanchion Unit	1
2	NA	Barrier Main Tube 3 3/4" Clearance to grade line	
3	NA	Top of Barrier Post Flush with top of stanchion.	
4	NA	Grade line	
5	NA	Concrete embedment block. Top at grade line or below size to suit conditions.	



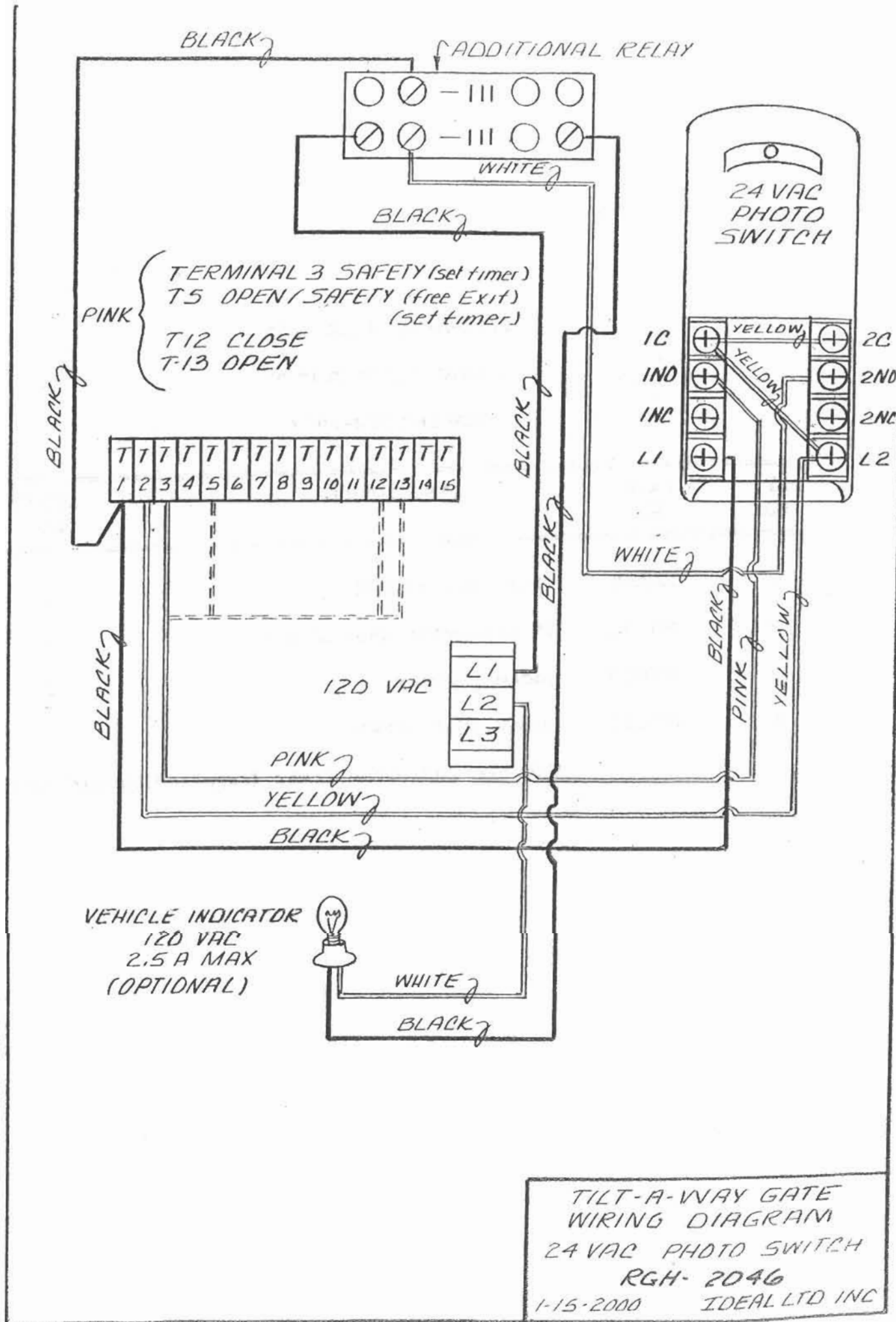
TILT-A-WAY GATE BARRIER OUTER END STANCHION	
DATE 10-2-95	DRAWING RGH-2045-A

TILT-A-WAY ROAD GATE

24VAC PHOTO SWITCH

DRAWING RGH-2046

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PEO281	Photo Eye 24VAC	1
2	PEO283	3" Reflector (Not Shown)	1
3	PEO210	Socket, relay	1
4	PEO211	Relay (Not Shown)	1
Vehicle indicator light (supplied by customer)			



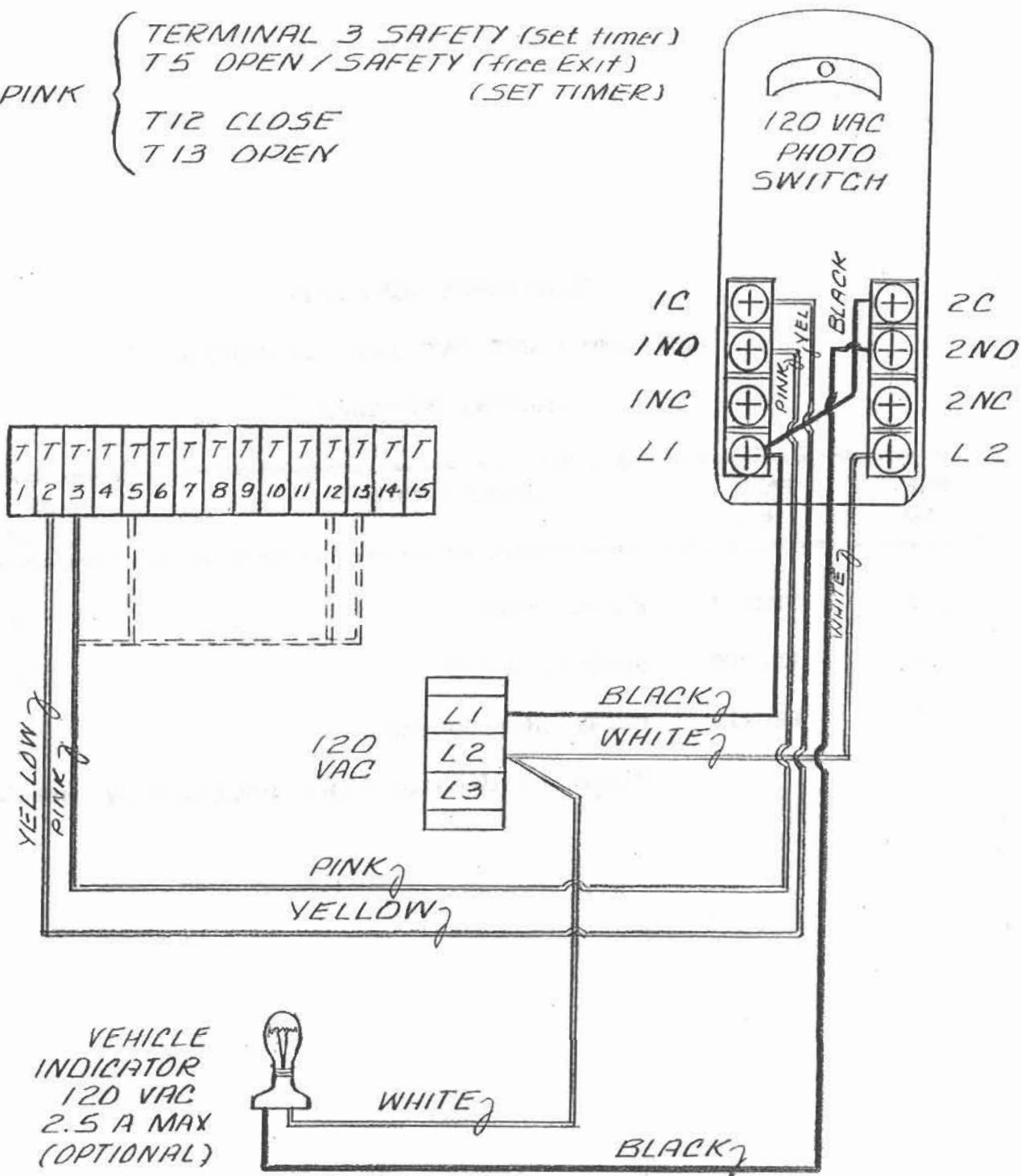
TILT-A-WAY ROAD GATE

120VAC PHOTO SWITCH

DRAWING RGH-2047

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PEO282	Photo Eye 120VAC	1
2	PEO283	3" Reflector (Not Shown)	1
3	PEO210	Socket, relay	1
4	PEO211	Relay (Not Shown)	1
Vehicle indicator light (supplied by customer)			

PINK {
 TERMINAL 3 SAFETY (set timer)
 T5 OPEN / SAFETY (free Exit)
 (SET TIMER)
 T12 CLOSE
 T13 OPEN



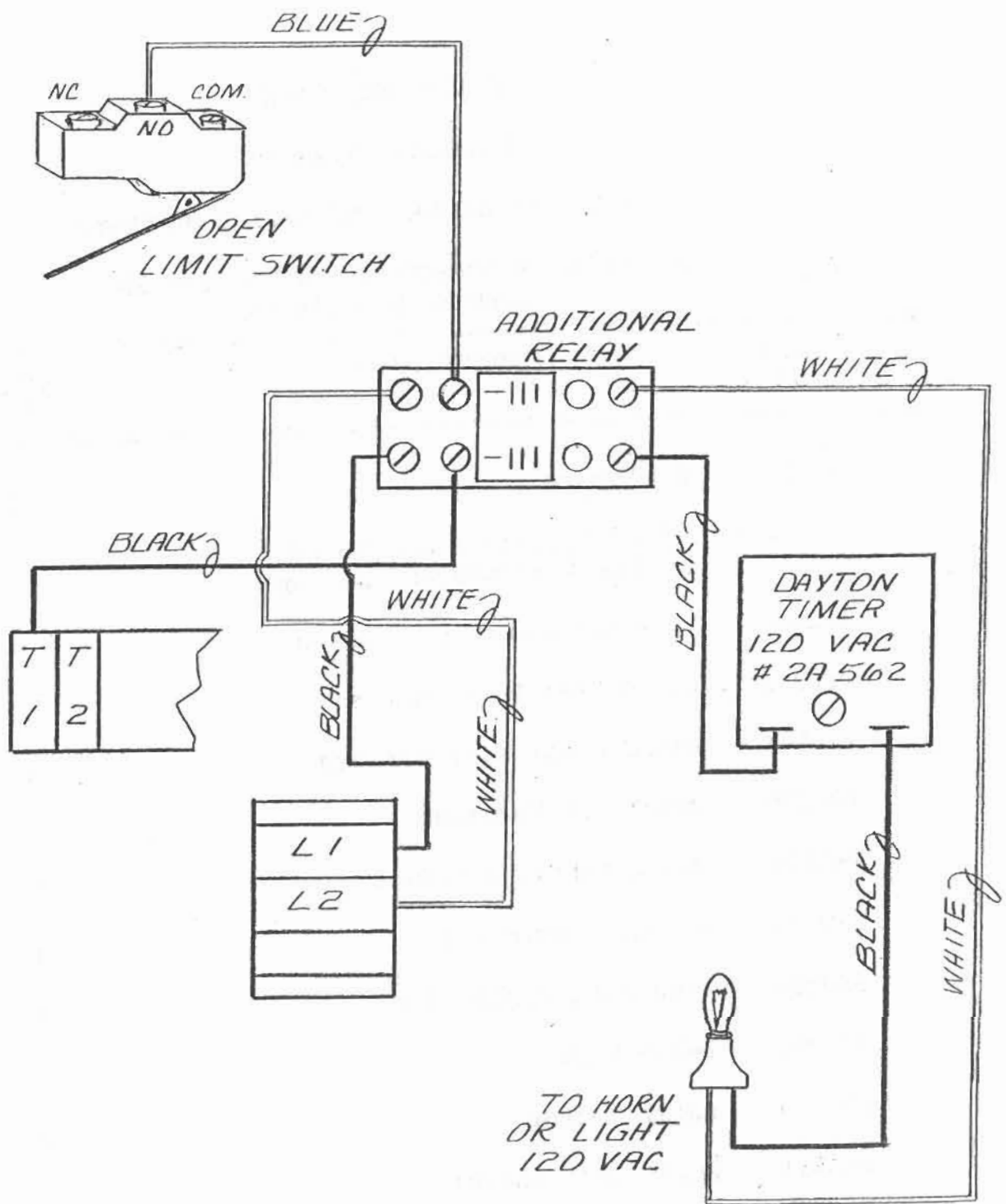
TILT-A-WAY GATE
 WIRING DIAGRAM
 120 VAC PHOTO SWITCH
 RGH-2047
 1-15-00 IDEAL LTD INC

TILT-A-WAY ROAD GATE

HORN AND LIGHT GATE OPEN INDICATOR

DRAWING RGH-2048

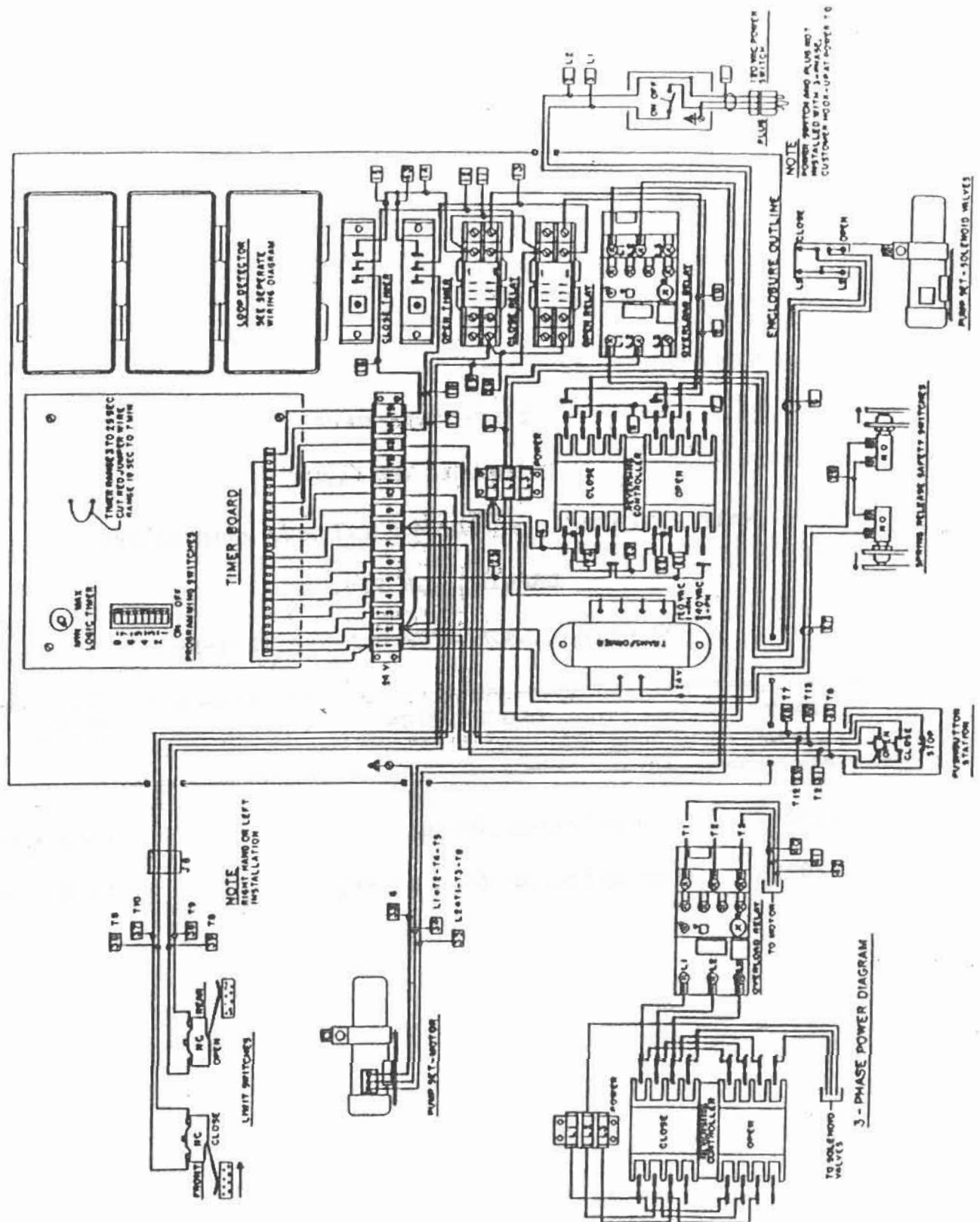
REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	PEO284	Delay Timer	1
2	PEO210	Socket, relay	1
3	PEO211	Relay (Not Shown)	1
		Vehicle indicator light (supplied by customer)	



TILT-A-WAY GATE
HORN OR LIGHT
GATE OPEN INDICATOR
RGH-2048
1-14-2000 IDEAL LTD INC

TILT-A-WAY GATE
HYDRAULIC OPERATOR
ELECTRICAL ENCLOSURE INTERNAL COMPONENTS
FOR GATES MANUFACTURED AFTER 12-1-95
DRAWING RGH-2101-A

PART NO.	DESCRIPTION	REQ'D NO.
PE0201	Enclosure	1
PE0202P	4" Electronic Timer Board Serial # B120499267 and up	1
PE0202	7" Electronic Timer Board	1
PE0203	Board Left Wire Harness	1
PE0204	Board Right Wire Harness	1
PE0205	Block, 15 Terminal	1
PE0206	Block Label, 1 thru 15	1
PE0207	Block, 3 Terminal	1
PE0208	Reversing Controller	1
PE0209	Delay Timer	2
PE0210	Relay Socket	2
PE0211	Relay (not shown)	2
PE0212	DIN Track (not shown)	2 at 7"
PE0213	Transformer	1
PE0267	Overload Relay Base	1
PE0268	Overload Relay (Specify Amperage)	1



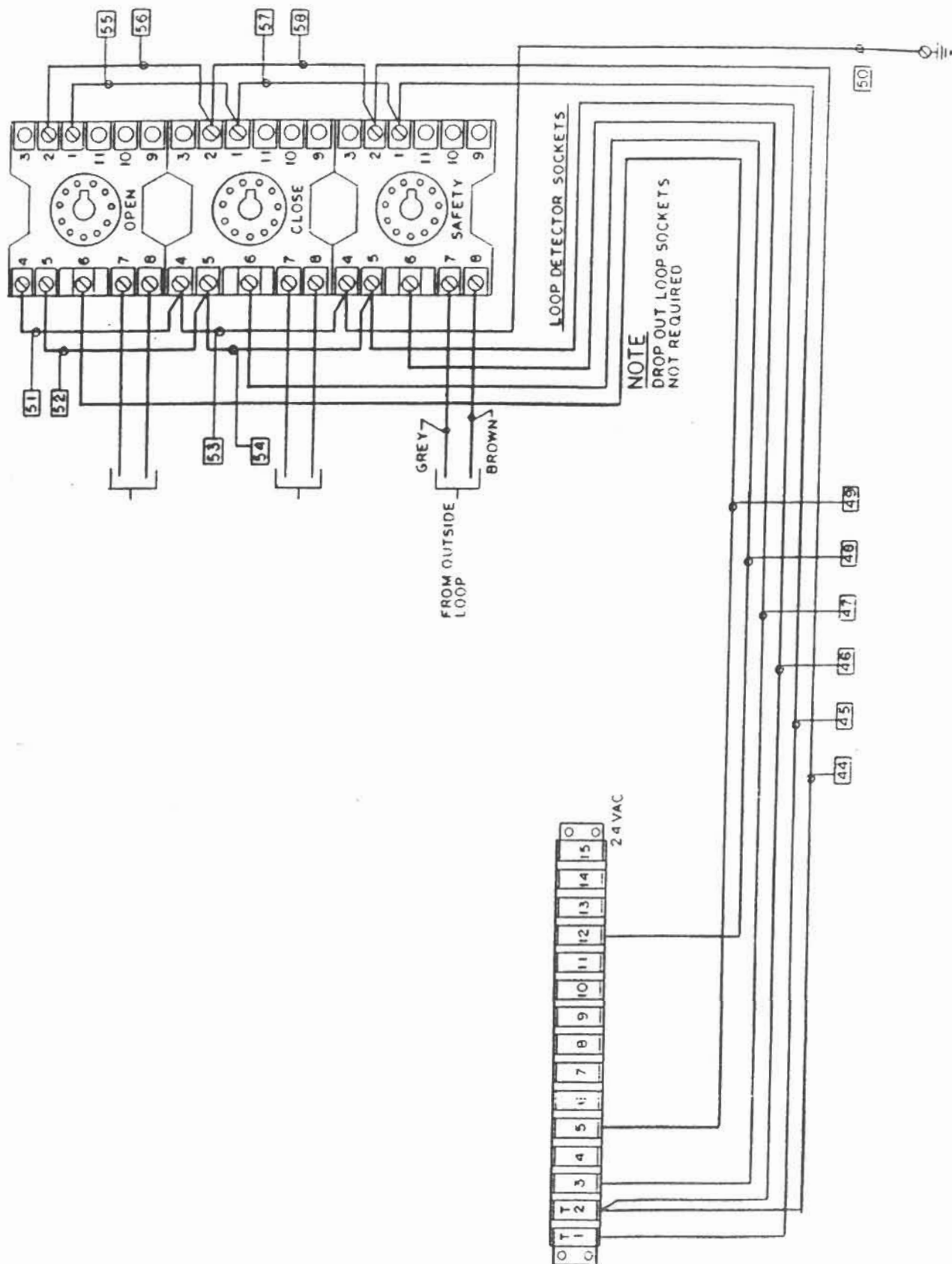
FOR GATES MFG. AFTER 12-1-95

TILT-A-WAY GATE ELECTRICAL BASIC DIAGRAM

DATE 12-1-95	DRAWING RGH-2101-A
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TILT-A-WAY GATE
HYDRAULIC OPERATOR
MAIN ELECTRICAL ENCLOSURE INTERNAL COMPONENTS
DRAWING RGH-2102-A
FOR GATES MANUFACTURED AFTER 12-1-95

PART NO.	DESCRIPTION	REQ'D NO.
PE0214	Loop Detector Socket	As Req'd
PE0215	Loop Detector (Not Shown)	As Req'd

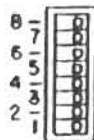


FOR GATES MFG. AFTER 12-1-95

TILT-A-WAY GATE
ELECTRICAL
LOOP DETECTORS

DATE
12-1-95

DRAWING
RGH-2102-A



ON OFF

PROGRAMMING SWITCHES

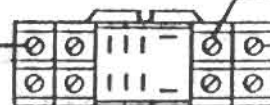
NOTE

SET BOTH MASTER AND SLAVE SWITCHES IDENTICAL



70

LOOP DETECTOR SOCKETS



CLOSE RELAY



OPEN RELAY

MASTER GATE MAIN ENCLOSURE

WIRING TO AUXILIARY ENCLOSURE

FOR GATES MFG. AFTER 12-1-95

TILT-A-WAY GATE
ELECTRICAL
MASTER AND SLAVE GATES

DATE
12-1-95

DRAWING
RGH-2103-A

TILT-A-WAY GATE

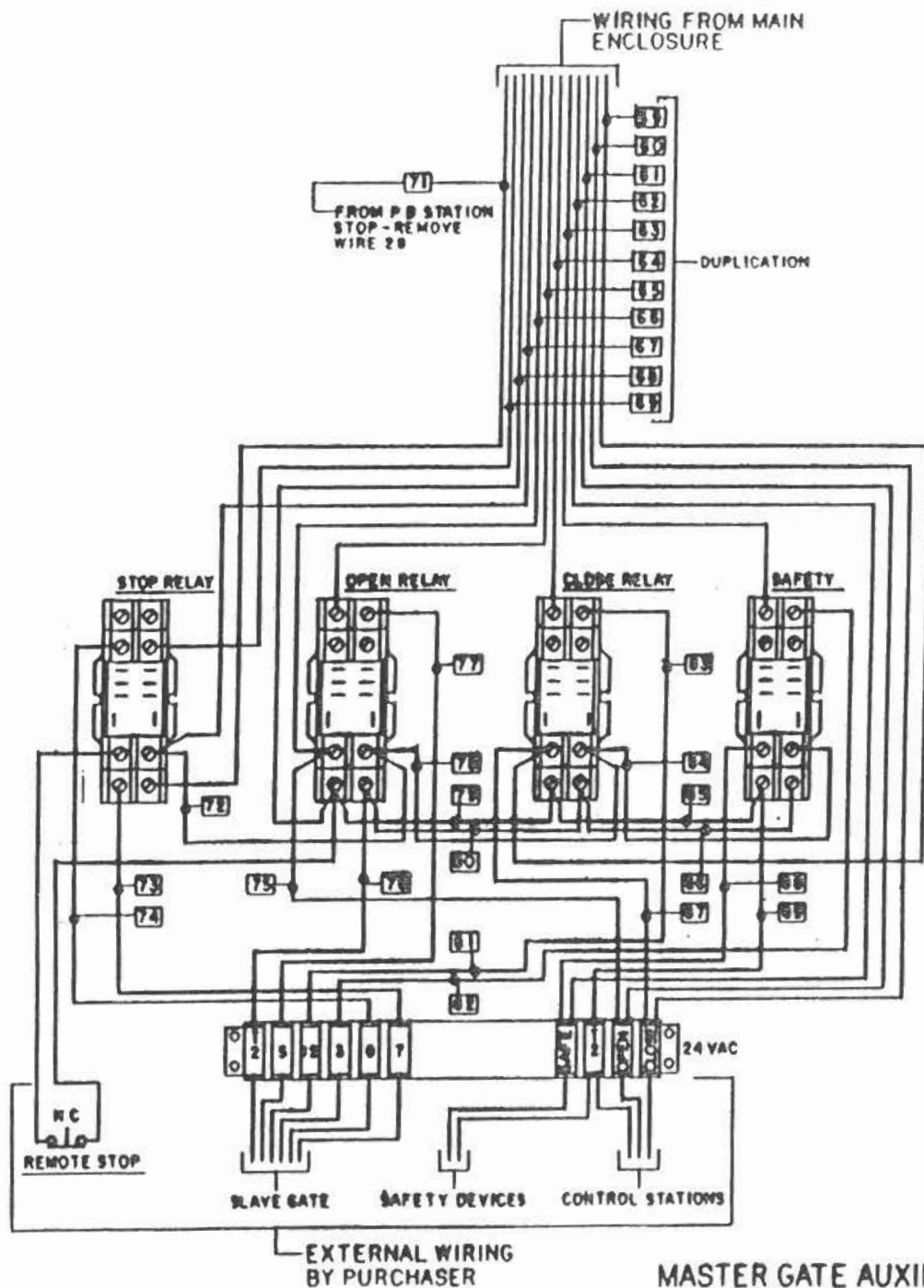
HYDRAULIC OPERATOR

AUXILIARY ELECTRICAL ENCLOSURE INTERNAL COMPONENTS

DRAWING RGH-2104-A

FOR GATES MANUFACTURED AFTER 12-1-95

PART NO.	DESCRIPTION	REQ'D NO.
PE0216	Enclosure	1
PE0205	Block, 15 Terminal, Modified	1
PE0210	Relay Socket	4
PE0211	Relay (not shown)	4
PE0217	DIN Track (not shown)	1 at 7"



FOR GATES MFG. AFTER 12-1-95

TILT-A-WAY GATE
ELECTRICAL
MASTER AND SLAVE GATES

DATE	DRAWING
12-1-95	RGH-2104-A

M-405

Ref. No.	Part No.	Description	No. Req.
1	00970	VALVE, 4 Way -3 Position, T.C., 110 VAC double solenoid (M-405 only)	1
	00969	VALVE, 4 Way-3 Position, "P" closed, "A & B" to "T", 110 VAC double solenoid (M-405 only)	1
	00968	VALVE, 4 Way - 3 Position, C.C., 110 VAC double solenoid (M-405 only)	1
	00967	VALVE, 4 Way - 3 Position, O.C., 110 VAC double solenoid (M-405 only)	1
2	*****	MOTOR, Electric, 5/8" shaft, AC (consult factory)	1
3	01139	COUPLING, 5/8" Bore 3/16" Keyway (motor side)	1
4	01141	COUPLING SPIDER	1
5	18001	COUPLING, 7/16" Bore	1
6	07745	SCREW, Socket Head Cap 1/4-20 x 2" (use with 01607 housing)	4
	07818	SCREW, Socket Head Cap 1/4-20 x 3" (use with 01617 housing)	4
7	07817	SCREW, Hex Head Cap 3/8-16 x 7/8"	4
8	01607	HOUSING, Pump/Motor Adapter (2-5/32" long)	1
	01617	HOUSING, Pump/Motor Adapter (3-11/32" long)	1
9	00117	O-RING, (3/8" x 1/2" x 1/16") -012	2
10	12466	BASE ASSEMBLY, Modular	1
11	07526	• PARTS KIT, Check Valve (main)	1
12	03276	• PLUG, #8 SAE (3/4-16)	1
13	03766	• PARTS KIT, Relief Valve	1
14	02352	• O-RING, Industrial (3-5/8" x 3-7/8" x 1/8")	1
15	00120	• O-RING, Industrial (1/2" x 5/8" x 1/16")	1
16	13058	TUBE, Valve Return (1/8 NPT)	1
17	13059	TUBE, Return (1/8 NPT)	1

Ref. No.	Part No.	Description	No. Req.
18	K12172-150	PUMP ASSEMBLY, Modular	1
	K12172-200	PUMP ASSEMBLY, Modular	1
	K12172-250	PUMP ASSEMBLY, Modular	1
	K12172-270	PUMP ASSEMBLY, Modular	1
	K12172-330	PUMP ASSEMBLY, Modular	1
	K12172-380	PUMP ASSEMBLY, Modular	1
	K12172-510	PUMP ASSEMBLY, Modular	1
19	07819	• SCREW, 1/4-20 x 2 3/4 Socket Head Cap (For Pump Assembly -150 & -200)	4
	07818	• SCREW, 1/4-20 x 3 Socket Head Cap (For Pump Assembly -250, -270, -330, -380)	4
	07837	• SCREW, 1/4-20 x 3 1/4 Socket Head Cap (For Pump Assembly -510)	4
20	01209	TUBE, Filter, suction 3/8 NPT 90 deg	1
21	01134	SCREEN, Filter (suction)	1
22	01143	PLUG, Vent (plastic)	1
23	06878	RESERVOIR, 6" Dia. x 9", 217 in ³ usable	1
	06879	RESERVOIR, 6" Dia. x 13-1/2", 301 in ³ usable	1
	06880	RESERVOIR, 6" Dia. x 18", 433 in ³ usable	1
24	01108	PLUG, Square Head, 1/4 NPT	1
25	07703	SCREW, Thread Forming 10-24 x 3/8"	6
30	07776	SCREW, Socket Head Cap, 10-24 x 1-1/4	4



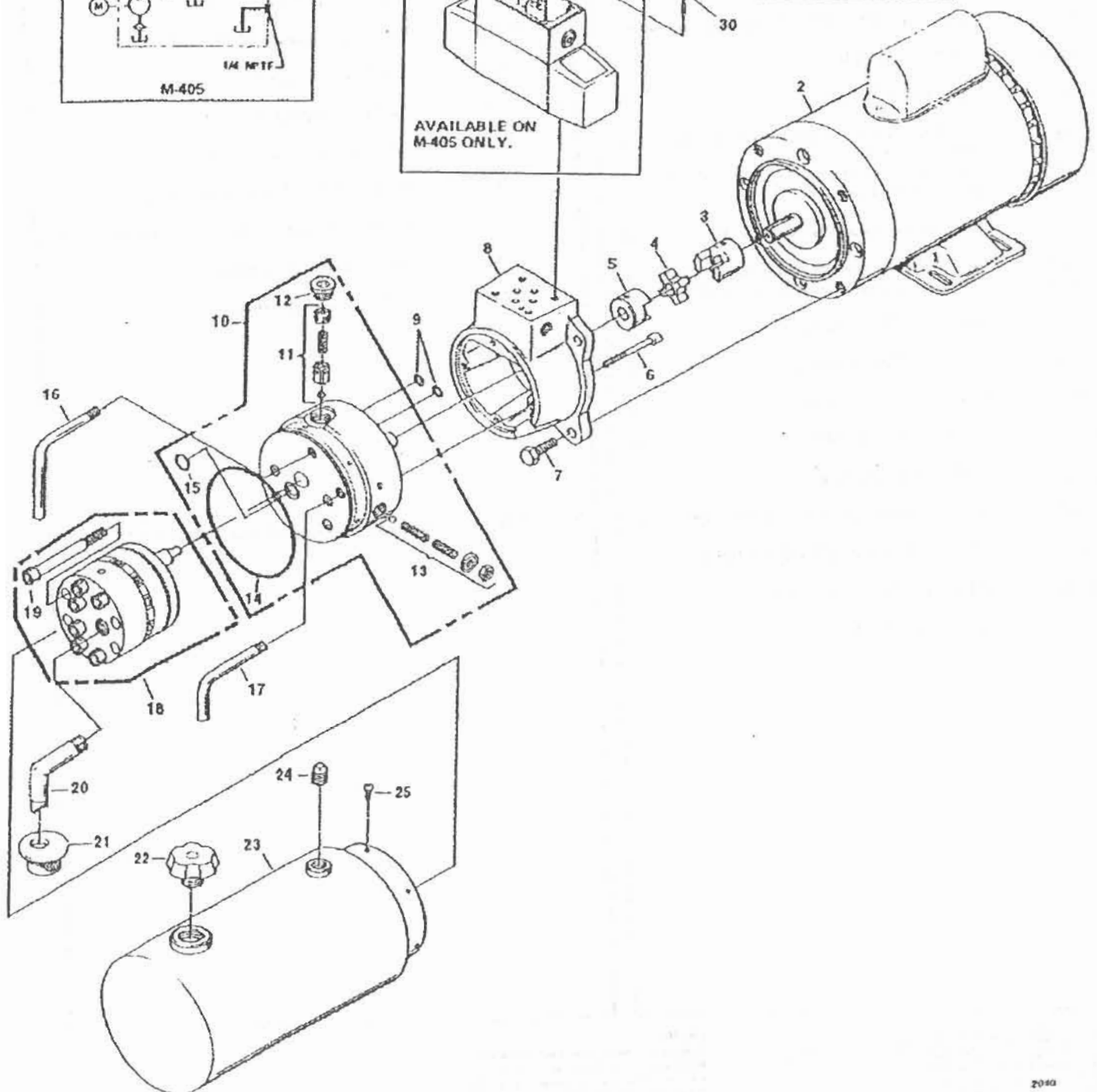
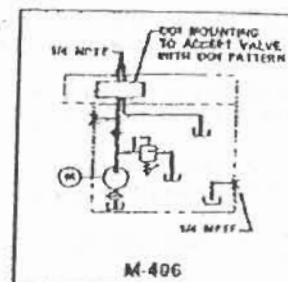
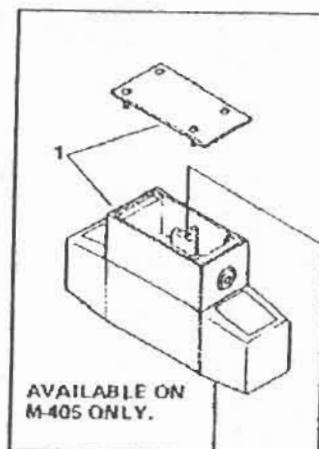
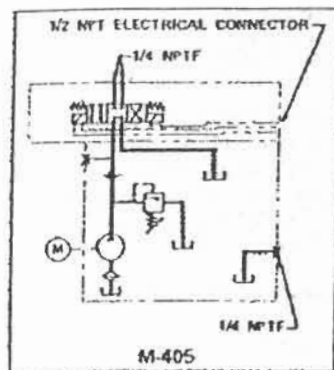
U.S.A.:
MONARCH HYDRAULICS, INC.
 P.O. Box 1764, Grand Rapids, Michigan 49501-1764, U.S.A.
 Telephone: (616) 458-1306
 Telefax: (616) 458-1616
<http://www.monarchhyd.com>
 Form No. 2240-01

CANADA:
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 A Part of the Monarch Hydraulics Group
 460 Newbold St., London, Ontario, Canada N6E 1K3
 Telephone: (519) 686-5900
 Telefax: (519) 686-8976

Litho in U.S.A.



Dyna-Pack® M-405



1. THE PURPOSE OF A RELIEF VALVE IS TO:

- * Limit the max pressure in the system to a safe level.
Keep the amp draw and battery drain at a minimum when the cylinder "dead heads" (reaches full stroke).

2. THE TWO STYLES OF RELIEF VALVES USED BY MONARCH ARE:

A. Internal style

An "internal" cavity is drilled into the pump base into which the following parts are inserted to make up the relief valve assembly.

1. Ball or cone
2. Heavy spring
3. Adjusting screw

B. External style

A relief valve mounted "outside" of the pump base in a housing of some kind is called an external style (inline). It is made up of the following parts:

1. Ball or cone
2. Heavy spring
3. Adjusting screw
4. Housing—usually hex-shaped

3. DIAGNOSING AND REPAIRING RELIEF VALVES.

E: When testing or making adjustments on the relief valve the system must be "dead headed" (cylinder at full stroke or in a position where cylinder movement is zero).

A. Relief valve pressure too high.

1. Symptoms:

- a. Amp draw and battery drain excessive when system is "dead headed." *ON DC SYSTEMS*
- b. Motor RPM is slow in comparison to full load system operation.

2. Repair procedure:

- a. Turn relief valve adjusting screw counterclockwise using a gauge, tee'd into the high pressure line, to record the proper pressure setting.

NOTE: On the "internal" relief valve the flush 1/4" pipe plug will have to be removed to reach the adjusting screw (see label). On the "inline" style relief valve the return lines, threaded into the back, will have to be removed in order to reach the adjusting screw. The "internal" relief valve is adjusted with a screw driver and the "inline" relief is adjusted with a 1/4" allen key.

B. Relief valve pressure too low.

1. Symptoms:

- a. Motor RPM is "faster" than normal.
- b. Cylinder will not extend.
- c. Excessive turbulence in the reservoir.

NOTE: On applications where the cylinder is being replaced or the mechanical mechanism is being modified, make sure the pressure capability of the pump is not being exceeded.

2. Repair procedure

- a. There are two possible causes for lack of pressure.

1. The adjusting screw has backed up.
2. Foreign matter or "dirt" is trapped between the seat and the ball or cone.

b. Repair as follows:

1. Using a gauge, tee'd into the pressure line, turn the adjusting screw clockwise a turn or two and watch the gauge; if it goes up, continue to turn the screw until the required setting is reached. If the screw does not remain in the correct position replace it with one that has a locking patch. (In an emergency the screw threads can be deformed slightly with a small prick punch and hammer to hold the setting).
2. If the pressure does not climb when the adjusting screw is tightened; turn the adjusting screw counterclockwise all the way out; energize the pump to "flush" the dirt past the seat; (Caution: use hand or a piece of hose to divert oil into a container. Do not look into the port).

Inspect the cone or ball for nicks and replace if necessary; reseal the ball or cone using a small drift punch and hammer with a light tap; reinstall spring and screw and reset the pressure.

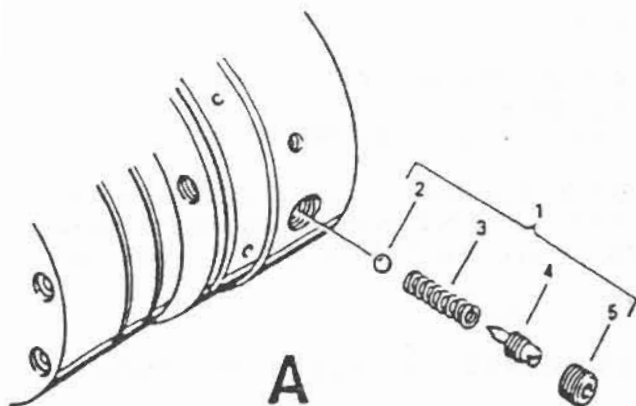
NOTE: In an emergency if a pressure gauge is not available turn the relief valve screw in until the cylinder moves under worst conditions and then tighten 1/2 to 3/4 additional turns.

3. If the above mentioned procedure fails to increase the relief valve setting; check for a worn pump (See Pump Section) or leaking cylinder (See Cylinder Section).

NOTE: Do not use teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system.



RELIEF VALVE ADJUSTMENT PROCEDURE



RELIEF VALVE ADJUSTMENT PROCEDURE "A" FOR UNITS MADE BEFORE APRIL 1, 1991.

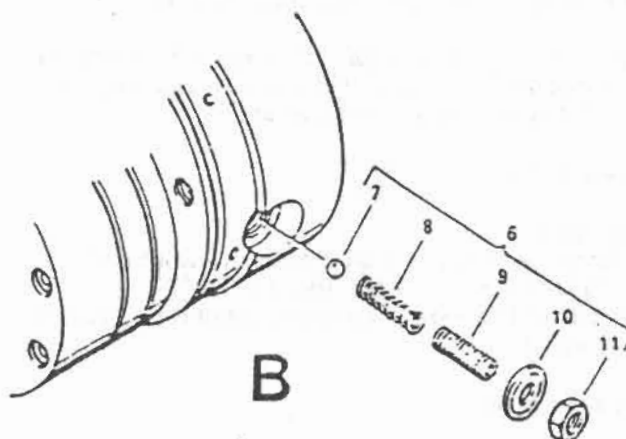
1. REMOVE FLUSH PLUG.
2. TURN SCREW CLOCKWISE TO INCREASE PRESSURE.
3. TURN SCREW COUNTER-CLOCKWISE TO DECREASE PRESSURE.

NOTE

OUTLET PORT FLOW MUST BE BLOCKED TO MAKE RELIEF VALVE OPERATE WHILE ADJUSTING.

4. REINSTALL FLUSH PLUG.

Ref. No.	Part No.	Description	No. Req.
1	02222	PARTS KIT, Relief Valve	1
2	00012	• BALL, 1/4" DIA., chrome, steel	1
3	02221	• SPRING, Relief Valve (Std.)	1
	00147	• SPRING, Relief Valve, 2,500 PSI & up (opt.)	1
4	07640	• SCREW, Adjusting Relief, 3/8-16	1
5	02350	• PLUG, Pipe, Flush 1/4 NPTF	1



RELIEF VALVE ADJUSTMENT PROCEDURE "B" FOR UNITS MADE AFTER APRIL 1, 1991.

1. LOOSEN JAM NUT.
2. TURN SCREW CLOCKWISE TO INCREASE PRESSURE.
3. TURN SCREW COUNTER-CLOCKWISE TO DECREASE PRESSURE.

NOTE

OUTLET PORT FLOW MUST BE BLOCKED TO MAKE RELIEF VALVE OPERATE WHILE ADJUSTING.

4. TIGHTEN JAM NUT.

3052

Ref. No.	Part No.	Description	No. Req.
6	03766	PARTS KIT, Relief Valve	1
7	00012	• BALL, 1/4" DIA., chrome, steel	1
8	02221	• SPRING, Relief Valve (Std.)	1
	00147	• SPRING, Relief Valve, 2,500 PSI & up (opt.)	1
9	00387	• SCREW, Socket Set, 3/8-16, oval point	1
10	03874	• SEAL, Washer	1
11	07891	• NUT, Hex, jam, 3/8-16	1

U.S.A.:
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Telephone: (616) 458-1306 / Telex: 226467 MONARCH GDR
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CANADA:
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EUROPE:
MONARCH HYDRAULICS B.V.
A Part of the Monarch Hydraulics Group
Postbus 96, 2810 AB Rijnhuizen, The Netherlands
Telephone: (08376) 17171 / Telex: 42275 MCCORD NL
Telefax: (08376) 14447

Line in U.S.A.



1. THE PURPOSE OF A RELIEF VALVE IS TO:

- * Limit the max pressure in the system to a safe level.
Keep the amp draw and battery drain at a minimum when the cylinder "dead heads" (reaches full stroke).

2. THE TWO STYLES OF RELIEF VALVES USED BY MONARCH ARE:

A. Internal style

An "internal" cavity is drilled into the pump base into which the following parts are inserted to make up the relief valve assembly.

1. Ball or cone
2. Heavy spring
3. Adjusting screw

B. External style

A relief valve mounted "outside" of the pump base in a housing of some kind is called an external style (inline). It is made up of the following parts:

1. Ball or cone
2. Heavy spring
3. Adjusting screw
4. Housing—usually hex-shaped

3. DIAGNOSING AND REPAIRING RELIEF VALVES.

E: When testing or making adjustments on the relief valve the system must be "dead headed" (cylinder at full stroke or in a position where cylinder movement is zero).

A. Relief valve pressure too high.

1. Symptoms:

- a. Amp draw and battery drain excessive when system is "dead headed." *ON DC SYSTEMS*
- b. Motor RPM is slow in comparison to full load system operation.

2. Repair procedure:

- a. Turn relief valve adjusting screw counterclockwise using a gauge, tee'd into the high pressure line, to record the proper pressure setting.

NOTE: On the "internal" relief valve the flush 1/4" pipe plug will have to be removed to reach the adjusting screw (see label). On the "inline" style relief valve the return lines, threaded into the back, will have to be removed in order to reach the adjusting screw. The "internal" relief valve is adjusted with a screw driver and the "inline" relief is adjusted with a 1/4" allen key.

B. Relief valve pressure too low.

1. Symptoms:

- a. Motor RPM is "faster" than normal.
- b. Cylinder will not extend.
- c. Excessive turbulence in the reservoir.

NOTE: On applications where the cylinder is being replaced or the mechanical mechanism is being modified, make sure the pressure capability of the pump is not being exceeded.

2. Repair procedure

- a. There are two possible causes for lack of pressure.

1. The adjusting screw has backed up.
2. Foreign matter or "dirt" is trapped between the seat and the ball or cone.

- b. Repair as follows:

1. Using a gauge, tee'd into the pressure line, turn the adjusting screw clockwise a turn or two and watch the gauge; if it goes up, continue to turn the screw until the required setting is reached. If the screw does not remain in the correct position replace it with one that has a locking patch. (In an emergency the screw threads can be deformed slightly with a small prick punch and hammer to hold the setting).

2. If the pressure does not climb when the adjusting screw is tightened; turn the adjusting screw counterclockwise all the way out; energize the pump to "flush" the dirt past the seat; (Caution: use hand or a piece of hose to divert oil into a container. Do not look into the port).

Inspect the cone or ball for nicks and replace if necessary; reseal the ball or cone using a small drift punch and hammer with a light tap; reinstall spring and screw and reset the pressure.

NOTE: In an emergency if a pressure gauge is not available turn the relief valve screw in until the cylinder moves under worst conditions and then tighten 1/2 to 3/4 additional turns.

3. If the above mentioned procedure fails to increase the relief valve setting; check for a worn pump (See Pump Section) or leaking cylinder (See Cylinder Section).

NOTE: Do not use teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system.

RESERVOIRS

1. USE RECOMMENDED FLUID

Fill reservoir with the approved fluid as specified on the label next to fill hole. (See Hydraulic Fluid Section.)

CORRECT FILLING AND OPERATING PROCEDURE

- A. Fill reservoir to within "1/2" from the top with all the cylinders required in the fully retracted position.
- B. Operate unit several times starting with short cylinder strokes and increasing length with each successive stroke.
- C. Recheck oil level often and add as necessary to keep pump from picking up air.
- D. After system is completely "bled" collapse all cylinders, check oil level in reservoir, and install the filter/breather plug provided.

NOTE: Do not use a solid plug or a fill cap without a filter/breather element or damage will be caused to pump and/or reservoir.

3. PROBLEMS ASSOCIATED WITH THE RESERVOIR

- A. Clear oil flowing out of fill hole usually points to either one of the following:
 1. Cylinders were not fully collapsed when reservoir was filled.
 2. Reservoir is too small for cylinders total stroke.
- B. Foamy oil flowing out of the fill hole points to the following:
 1. Air is present in the system; that is, cylinders and fluid lines. The response usually is "spongy" and the cylinder moves with "jerking" motion.
 2. There is no drop tube or "down spout" on the return line so that the oil is not returning to the bottom of the reservoir.

3. The return oil velocity is excessive; to correct, add a flow control valve to slow velocity, increase size of "down spout," add a diffuser, or use a larger reservoir to increase depth of oil above the end of the return tube.
4. The reservoir is too small to supply the volume of oil required by the cylinders and the pump picks up air when the oil level drops below the suction pick up tube.
5. Damage to pump seal (See Pump Section).

C. Water in the oil.

Water can enter the reservoir through the fill hole if the unit is left outdoors or washed with high pressure washers. Protect the unit, whenever possible, and change oil regularly to minimize problems. In cold weather the water will freeze and the pump will not work until the ice melts.

4. TIPS AND COMMENTS

- A. In most cases the reservoir is made to be mounted either vertically or horizontally and improper mounting will not allow it to be filled to capacity. (See Pump Priming Section)
- B. On units with a remote reservoir try to mount it above the pump whenever possible to "flood" the inlet.
- C. One of the functions of the reservoir is to keep the oil in the proper temperature range. If the reservoir cannot dissipate enough heat increase the size in order to bring the oil temperature down to the proper level. (See Hydraulic Fluid Section).

FILTERS

1. SUCTION FILTERS

All Monarch hydraulic controls have suction filters which must be cleaned periodically or whenever flow is slow or sluggish. Some filters can be washed in cleaning solvent and blown dry with compressed air, those which cannot be cleaned properly should be replaced. External high pressure filters may be added to the system for added protection and ease of cleaning.

2. ADDITIONAL SYSTEM FILTERS

A. Models M-303, M-503, M-603 and M-723

These specific models have filters in addition to the pump suction filter for protecting the valve. One is located inside the two-piece hex fitting just ahead of the DR (2-way, 2-position) lowering valve inside the reservoir. It can be taken apart for cleaning or replacing the filter element. The other filter is a "body" filter located in the cartridge of the DR lowering solenoid valve. It can be replaced by removing the cartridge from the square valve block.

B. Models in M-640 Series.

These models also are equipped with additional filters for protecting the solenoid valves. First, each port, O^1 and O^2 on the flat surface have a cone shaped filter in the valve body. They be reached as follows:
the ports, C^1 and C^2 , on the flat surface are not being used, remove the flush 1/4" pipe plugs.

2. If the ports, C^1 and C^2 on the flat surface are being used; remove the hoses.
3. Reach down into these ports with a 1/4" allen key and remove the filter retainer screws.
4. Remove the filters and clean or replace as necessary.
5. Reassemble in reverse order.

Second, each valve cartridge has a "body" filter to provide additional protection from dirt. To clean or replace these filters the valve body must be removed from the reservoir and the cartridge removed from the body. Clean with solvent and compressed air or replace as required.

C. Models in M-670 and M-680 series.

Like the M-640 series these models also have port and cartridge filters. The port filters are located just below the surface in each outlet (C^1 , C^2 , C^3). To clean or replace proceed as follows:

1. Remove the hoses from the valve body.
 2. Remove the filter retainer screws with a 1/4" allen key.
 3. Remove and clean or replace filters as required.
 4. Reassemble in reverse order.
- The cartridge "body" filters are removed and repaired in the same manner as described in the M-640 models above.

NOTE: Do not use teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system.