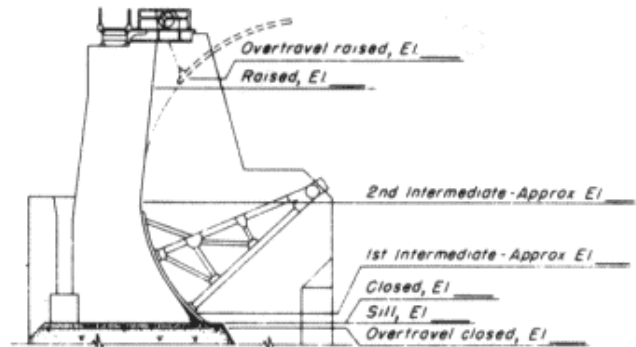
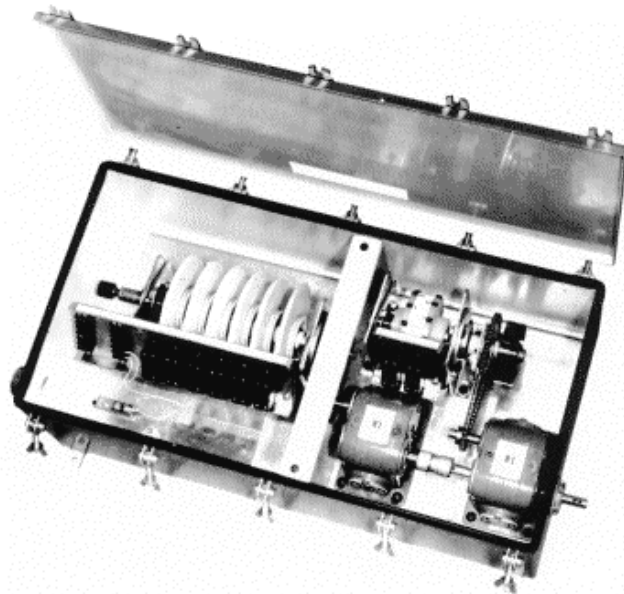


# Gemco 1997 Gate Hoist Rotating Cam Limit Switch

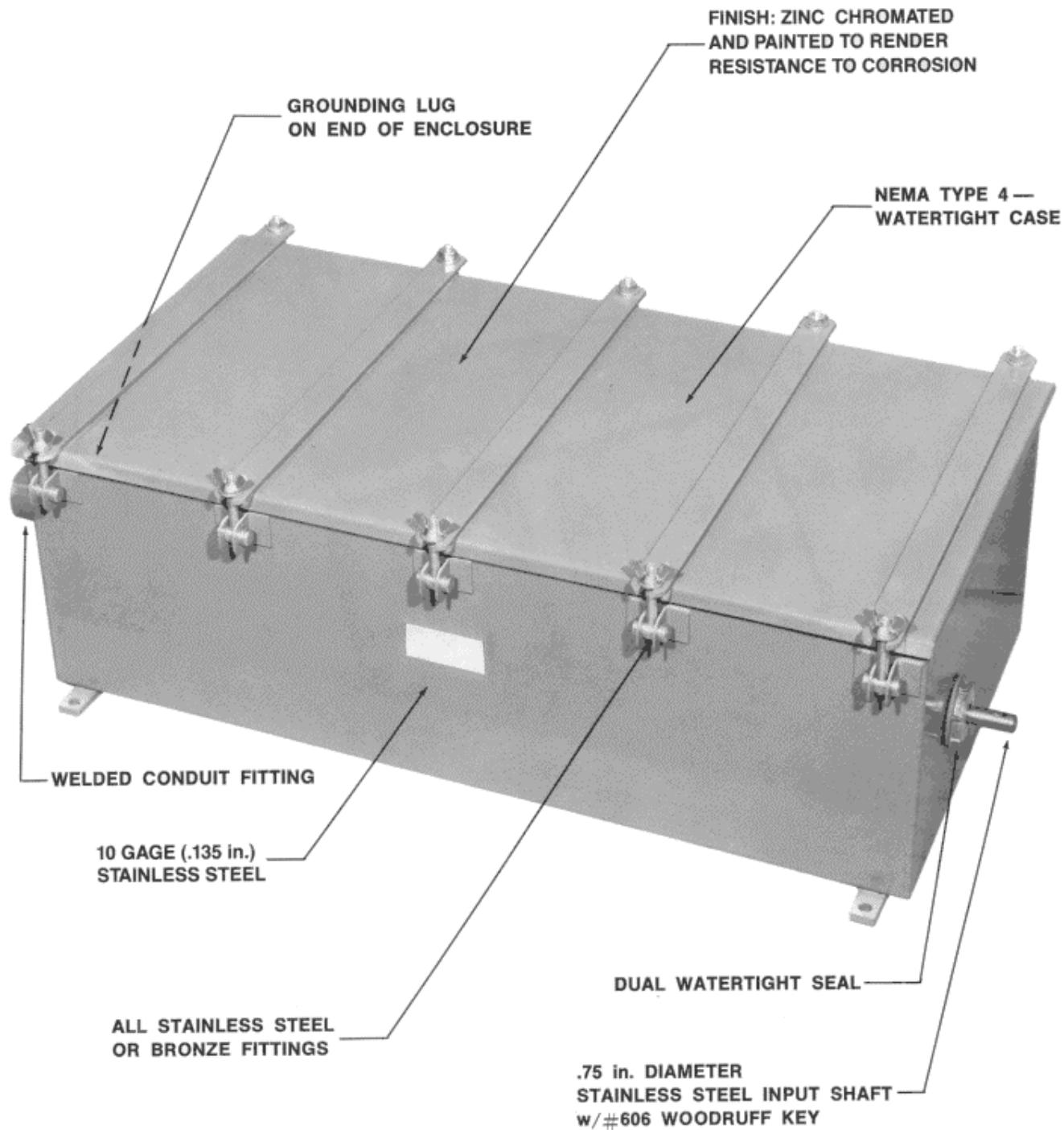
Specifically Designed  
to Meet Specifications of  
The Corps of Engineers

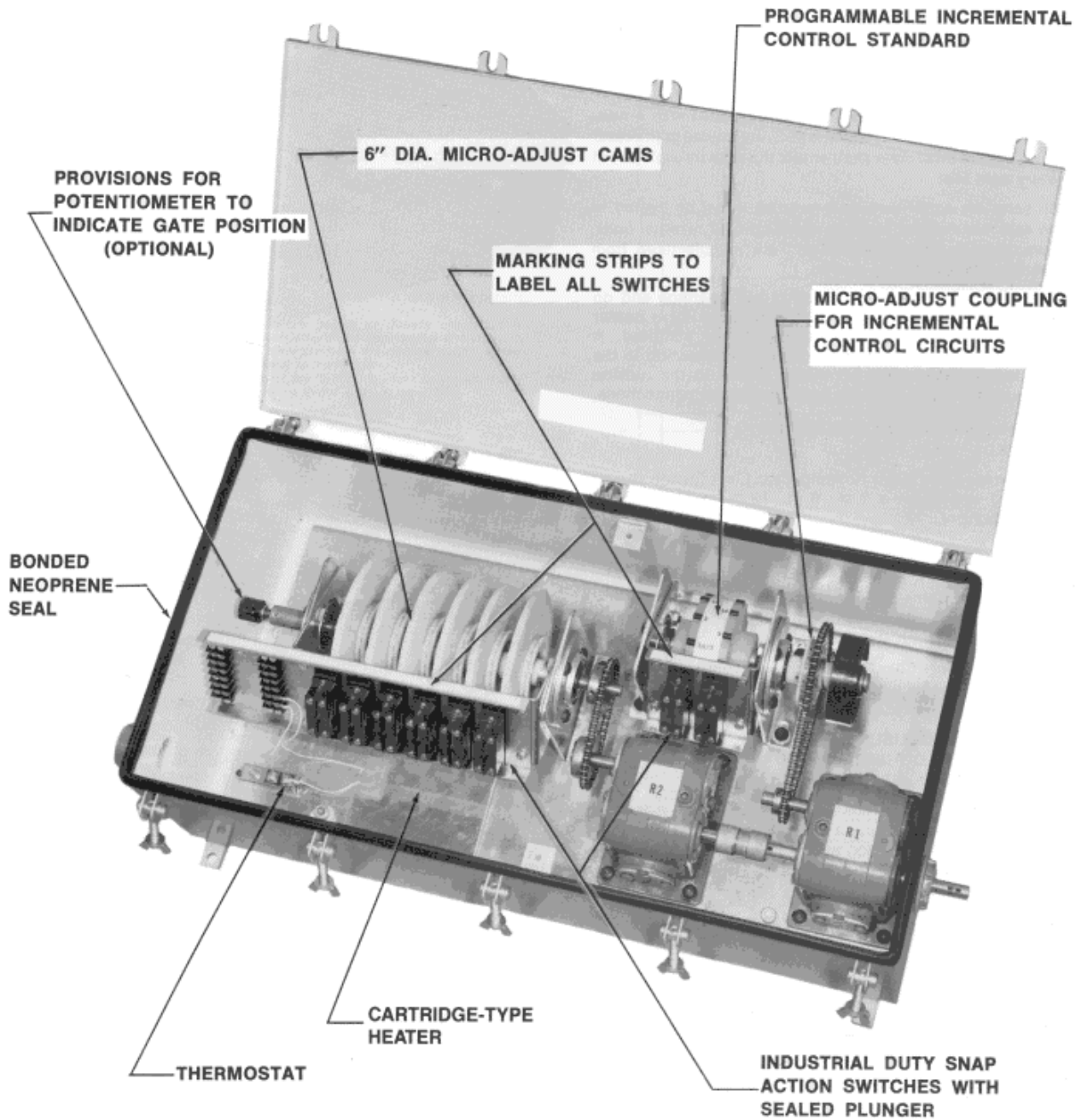


GATE POSITIONS

## SEQUENCE OF LIMIT SWITCH ELEMENT OPERATION

CONTACT SYMBOL	CIRCUIT DUTY	GATE POSITION					DIRECTION OF TRAVEL TO OPERATE SWITCH
		OVERTRAVEL CLOSED	CLOSED	INTERMED.	RAISED	OVERTRAVEL RAISED	
LSA	STOP MOTOR OVERTRAVEL CLOSED	[Timing diagram showing contact closure during down travel]					DOWN
LSB	STOP MOTOR GATE CLOSED	[Timing diagram showing contact closure during down travel]					DOWN
LSC	BY-PASS INCREMENTAL CONTROL	[Timing diagram showing contact closure during up travel]					UP
LSD	STOP MOTOR GATE RAISED	[Timing diagram showing contact closure during up travel]					UP
LSE	STOP MOTOR OVERTRAVEL RAISED	[Timing diagram showing contact closure during up travel]					UP
LSF <sup>1</sup> 2	INCREMENTAL MOTION CONTROL	[Timing diagram showing contact closure during down and up travel, with Trip and Reset operations indicated]					DOWN AND UP
INCREMENTAL TRAVEL FEET		Gate closed → 0    ½    1    1½    2					





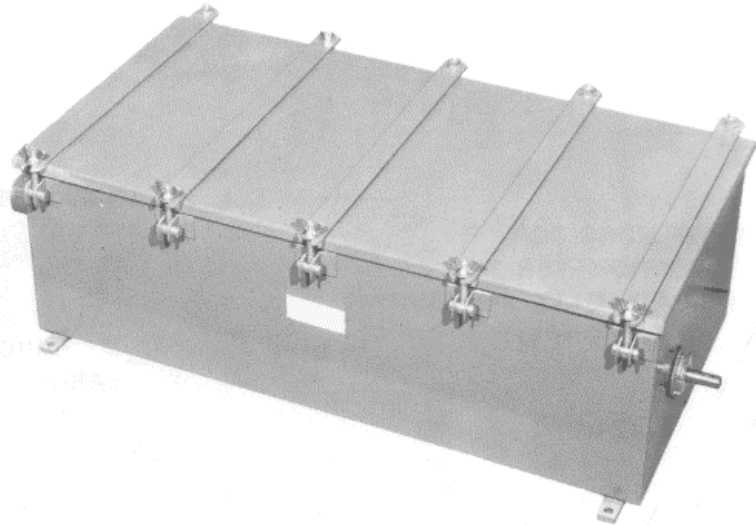
## ENCLOSURE CONSTRUCTION

The NEMA Type 4 Water Tight Gate Hoist enclosure is constructed of 10 gauge (.135") welded stainless steel plates with an easily removable cover held in place by hinged wing bolts.

The joint between the case and cover is sealed with a non-sticking neoprene gasket which is securely bonded to the case. The stainless steel drive shaft enters the case through a dual watertight seal.

All parts are either corrosion resisting metal or treated in an approved manner to resist corrosion. All external bolts, nuts, screws, pins, washers, etc., are manufactured from stainless steel, brass, or bronze.

The cam shaft bearings are sealed ball bearings and do not require additional lubrication. Provisions for a heater and thermostat inside the enclosure are standard. A tapped boss is provided for the conduit connection to the switches. A clamp type connector bolted to the outside of the case is provided for making ground connections.



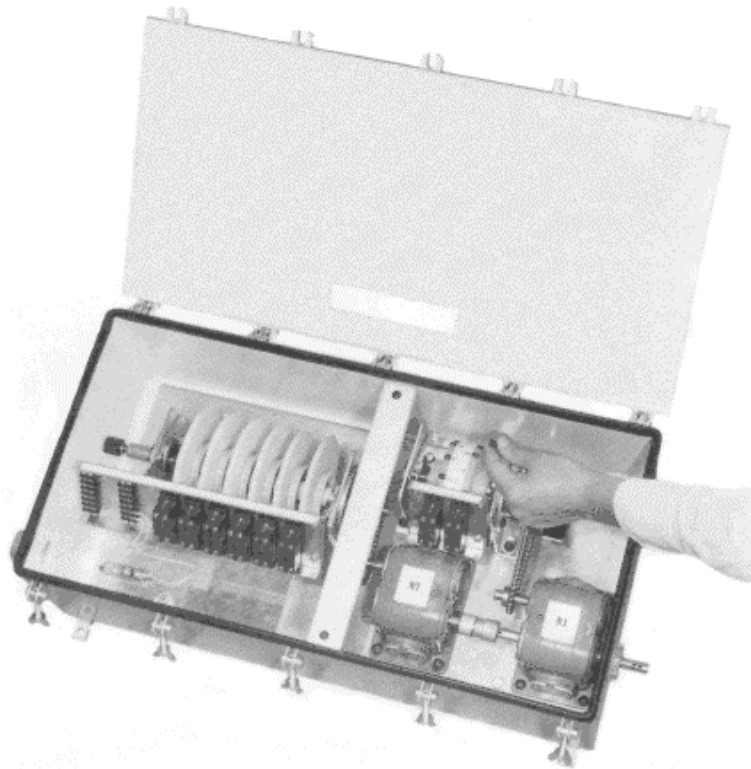
## PROGRAMMABLE INCREMENTAL CONTROL

The **Gemco** Gate Hoist Rotating Cam Limit Switch can be supplied with either a 3 in., 6 in., 12 in. or 18 in. incremental control.

A Micro-Adjust Coupling provides precision setting of the switches at the "gate closed" position.

Micro-Adjust Cams provides precision cam settings without special tools. Any dwell setting from 6° to 354° can be easily obtained with standard cams.

The Micro-Adjust Cam Block Assembly consists of molded plastic components which give excellent resistance to corrosive atmospheres.

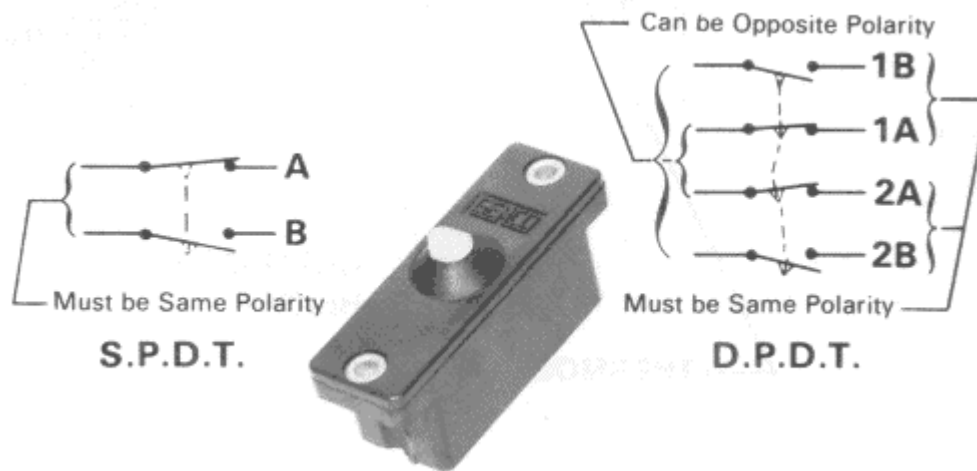


## **SINGLE POLE DOUBLE THROW DOUBLE POLE DOUBLE THROW SNAP ACTION SWITCHES**

The Gemco precision limit switches are quick make and quick break type, and have a pilot and control circuit contact rating designation of A600 at 600 Volts, A.C. in accordance with IC 1-2.26 of NEMA Pub. No. IC 1.

All switches are provided with suitable terminals for connecting external conductors and with a marking strip for conveniently tagging the wire numbers shown on the Contractor's drawing.

The tripping mechanism is designed to pass the switch elements without harm if the element cam is not in the proper operating position and shall reset the contacts when moving in the reverse direction.



## TYPICAL GATE HOIST CONTROL CIRCUIT

### DESCRIPTION OF CONTROL SYSTEM

#### 1. SCHEME OF OPERATION

**a. General.** The control system for the gate shall be as indicated by the schematic control wiring diagram, and as specified below.

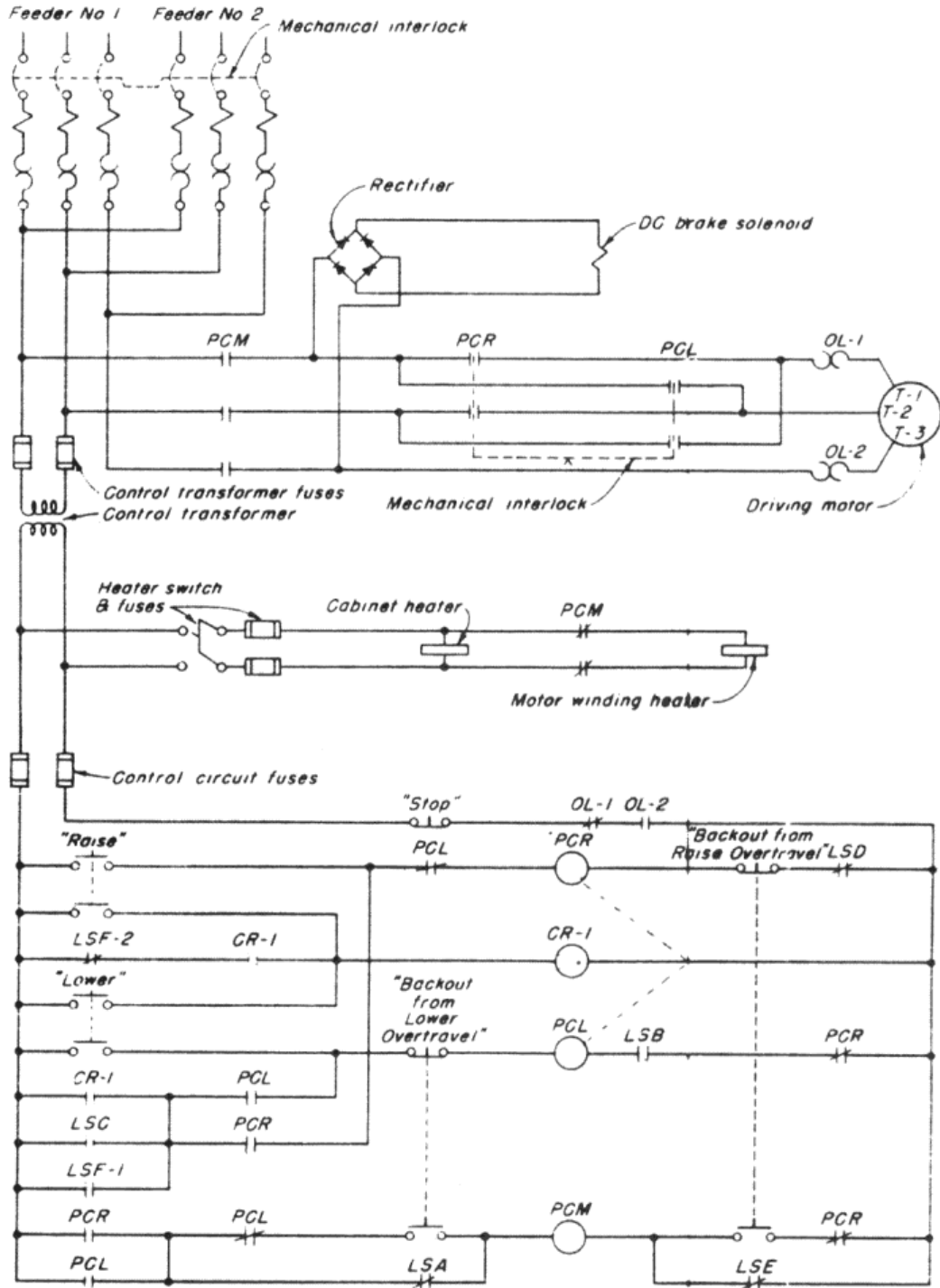
**b. Control Points.** The operation of the hoist motor shall be controlled by:

- (1) A pushbutton station located on the gate hoist with momentary contacts designated "RAISE", "LOWER", and "STOP".
- (2) A pushbutton station located on the door of the controller cabinet with momentary contacts designated "BACKOUT FROM RAISE OVERTRAVEL" and "BACKOUT FROM POWER OVERTRAVEL".

**c. Operating Features.**

- (1) Actuation of the "RAISE" and "LOWER" contacts shall provide seal-in operation.
- (2) **A limit switch geared or directly connected to the hoist machine, shall control the incremental and stopping operations initiated manually from the control station as described under sequence of operation.**
- (3) Actuation of the "STOP" contact during any operation shall stop the hoist motor and set the brake.

# SCHEMATIC CONTROL WIRING DIAGRAM



## 2. SEQUENCE OF OPERATION

### a. Raising.

- (1) When the gate is between the closed position and the intermediate position, each actuation of the "RAISE" contact will cause the gate to raise approximately one foot and stop. \*
- (2) When the gate is at or above the intermediate position, actuation of the "RAISE" contact will cause the gate to raise continuously to the raised position.

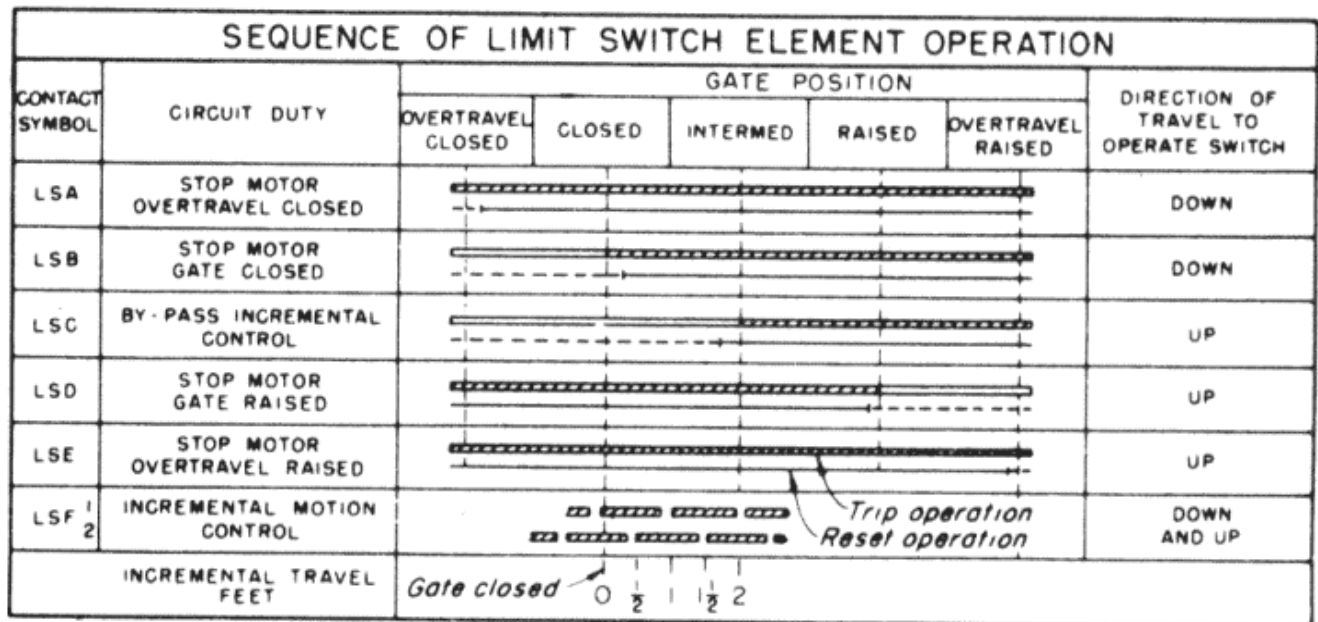
### b. Lowering.

- (1) When the gate is between the overtravel raised position and the intermediate position, actuation of the "LOWER" contact will cause the gate to lower continuously to the intermediate position and stop.
- (2) When the gate is at or below the intermediate position and is above the closed position, each actuation of the "LOWER" contact will cause the gate to lower approximately one foot and stop. \*

### c. Overtravel.

If during normal operation, the gate motor should fail to stop when the gate reaches the raised or closed positions, the overtravel limit switch contacts shall stop the hoist motor after overtravel by de-energizing the "main" or "line" contactor of the controller. To operate the gate after an overtravel, the appropriate backout switch contact shall be held closed to permit operation of the gate only in the direction away from the overtravel position after operation of either the "RAISE" or "LOWER" contact on the master control station.


\* INCREMENTAL MOTION CONTROL





## SYMBOLS

 Limit switch contact closed

 Limit switch contact open

ACB Air circuit breaker

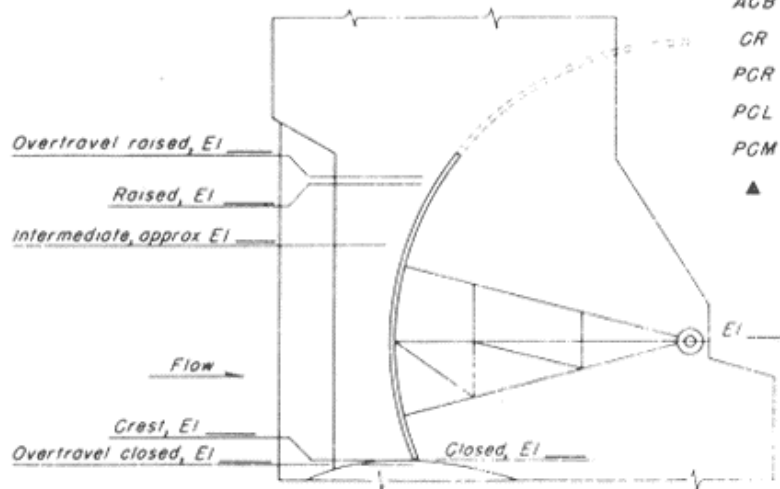
CR Control relay

PCR Power contactor, raise

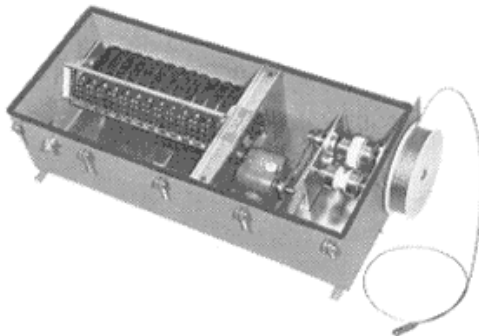
PCL Power contactor, lower

PCM Power contactor, main

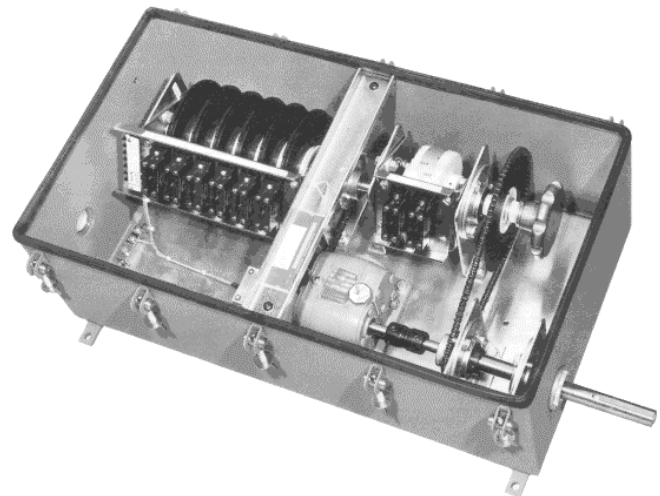
▲ Provide space only for future remote control equipment



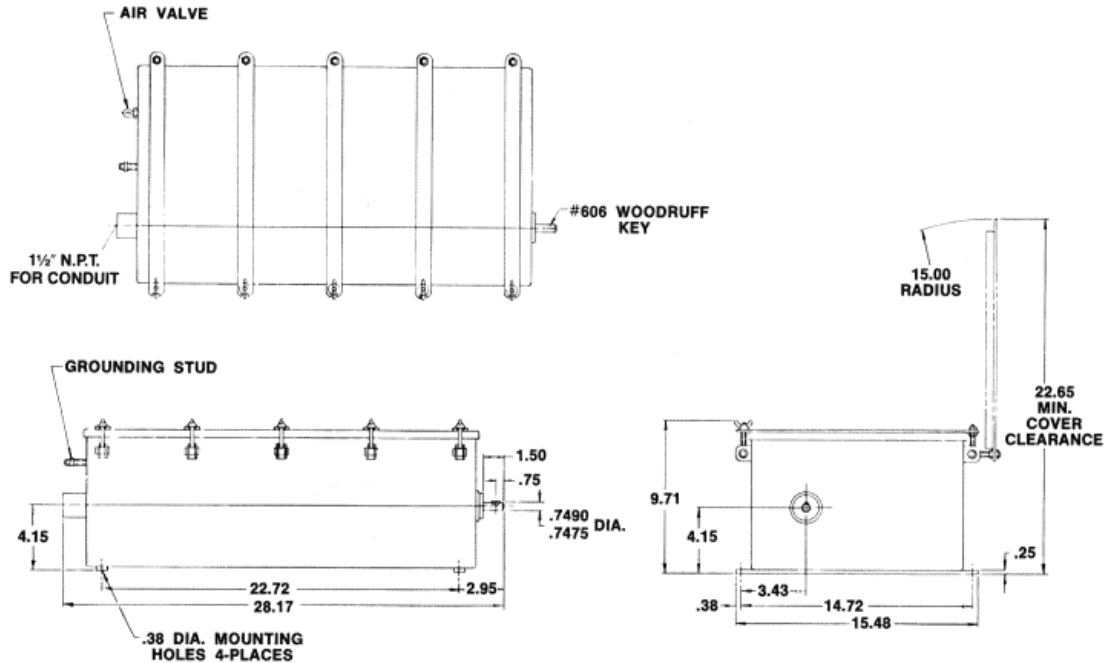
GATE POSITIONS



**GATE HOIST  
ROTATING CAM  
LIMIT SWITCH  
WITH CABLE  
DRIVE**



STANDARD GATE HOIST ROTATING CAM LIMIT SWITCH ASSEMBLY	LIST PRICES	ADDITIONS	LIST PRICES
Including the following equipment: <ul style="list-style-type: none"> <li>• 6 S.P.D.T. micro-adjust circuits</li> <li>• Cartridge heater</li> <li>• 2 S.P.D.T. incremental motion control circuits</li> <li>• 1600 watts thermostat</li> <li>• NEMA 4 watertight enclosure and all necessary stainless steel fitting and input shaft</li> </ul>	<b>Consult Factory For List Prices</b>	Add for double pole double throw switches per circuit Deduct for omission of incremental motion control Deduct for omission of heater and thermostat Deduct for each micro-adjust circuit less than 6 circuits Add for potentiometer (specify make and model)	<b>Consult Factory For List Prices</b>

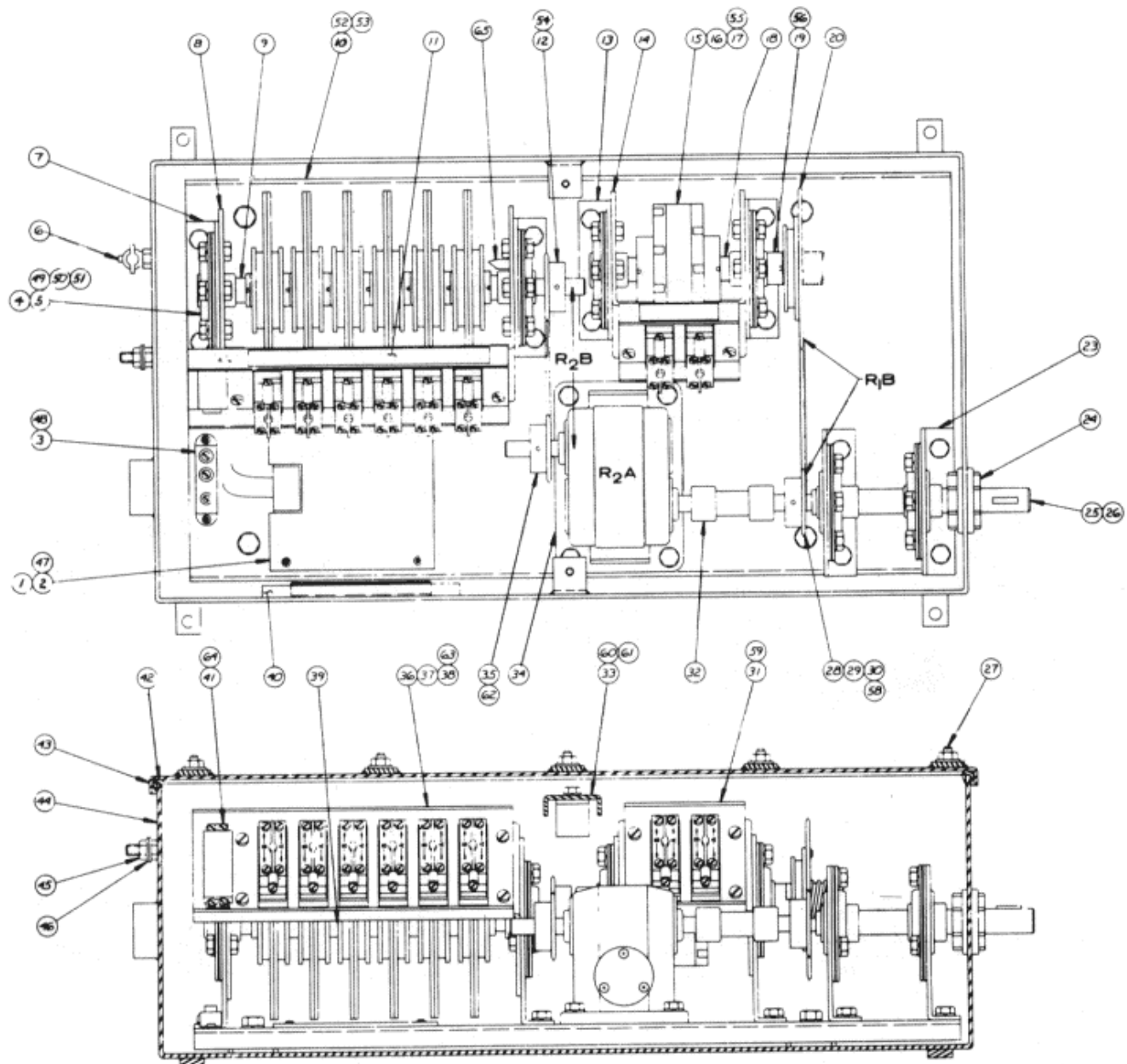


Design information required:

- Maximum input revolutions for the full stroke of the Gate (include overtravel).
- Required Incremental Control (i.e. 3 in., 6 in., 12 in. or 18 in., etc.)
- Angular displacement (degrees) of the input shaft relative to the gate travel (feet) during the incremental control mode. Note when using a mono spiral cable wrap, the relationship between the input rotation and the gate travel, is not necessarily linear.

When choosing the location of the drive to the Gate Hoist Rotating Cam Limit Switch, it is desirable to have the input rotational speed such that the input shaft rotates a minimum of one (1) revolution for two increments of the incremental control.

Example: If the incremental control of the gate is every six inches, it is desirable to have the input shaft rotate a minimum of 3600 for every 12 inches of gate travel.



ITEM NO.	DESCRIPTION
1	Heat Sink
2	Heater
3	Thermostat 1600 Watt
4	Bearing
5	Shim
6	Drain Cock
7	Bearing Support Bracket
8	Snap Sw. Support Brk't.
9	CamShaft
10	Baseplate
11	Terminal Marking Strip
12	Sprocket
13	Bearing Support Brkt.
14	Snap Sw. Support Brk't.
15	Gate Cam
16	Roller Cam Lobe
17	Scale
18	CamShaft
19	Locking Hub
20	Adjusting Sprocket Ass'y
23	Bearing Supportrt Brk't
24	Coupling Ass'y
25	Input Shaft
26	Woodruff Key
27	Latch Assy.
28	Sprocket
29	Chain
30	Connecting Link
31	Snap Switch Brk't
32	Coupling
33	Channel

ITEM NO.	DESCRIPTION
34	Gear Reducer
35	Sprocket
36	Snap Switch
37	Roller Followers
38	Snap Switch Brk't.
39	Cam Assembly
40	Adjusting Tool
41	Terminal Strip
42	Gasket
43	Cover
44	Enclosure
45	Washer
46	Hex Nut 5/16-18
47	Button Hd. Soc. Scr. 8-32 x 3/8
48	Button Hd. Soc. Scr. 6-32 x 3/8
49	Hex Hd. Bolt 5/16-18 x 3/4
50	Lockwasher 5/16
51	Hex Nut 5/16-18
52	Hex Hd. Bolt 3/8-16 x 1/2
53	Lockwasher 3/8
54	Roll Pin
55	Roll Pin 1/8 x 2.00
56	Roll Pin 1/8 x 1.00
58	Roll Pin
59	Pan Hd. Mach. Scr. 10-32 x 3/8
60	Hex Hd. Bolt 1/4-20 x 3/8
61	Lockwasher 1/4
62	Roll Pin
63	Pan Hd. Mach. Scr. 6-32 x 1.00
64	Pan.Hd. Mach. Screw 6-32 x 1/2
65	Pointer C-2583-A