G.A.L. Manufacturing Corporation
50 East 153rd Street, Bronx, N.Y. 10451
Phone 718-292-9000
Toll Free 877-425-3538
877-425-7763
Fax 718-292-2034
Web www.gal.com
E-mail info@gal.com

ISO 9001 : 2000 REGISTERED FIRM

MOVFR

DOOR OPERATOR INSTALLATION AND ADJUSTING MANUAL

i

COMMENTS

All G.A.L. door operators are factory adjusted and tested for the actual job requirements. When installed correctly, they may require minor adjustments to suit actual job conditions.

IMPORTANT:

All equipment must be installed, adjusted, tested and maintained to comply with all Federal, State, and Local codes.

See section 7.6, page 28 in this manual for Kinetic Energy and closing force requirements.

Before mounting the operator, check that the car door is plumb, free and moves easily without bind. Check the attached standard measurements sheets. Install the operator according to the measurements supplied.

FOREWORD

It is the intent of this manual to give the reader certain key points of information critical to the proper installation of the door operator. It is not intended to give comprehensive installation procedures nor does it cover the installation of door headers, tracks, hangers, etc.

It is hoped that the procedures presented in this manual will reduce the installation and adjustment time and result in a smooth, long lasting door operation.

When properly installed, G.A.L. operators will give many years of trouble free service.

TABLE OF CONTENTS

SECTION PAGE

i Comments....2
ii Foreword....3
iii Table of Contents....4

MECHANICAL SECTION:

1 Illustrations of the MOVFR operators....5
2 Determining the hand of the door....6
3 Mounting the operator....7
4 Pre-adjustment tip....9
5 Adjusting single speed and two speed slide doors....10
6 Adjusting center parting doors....13
Single speed 22-48 D.O. operator data table dwg. DATA 21....16
Two speed 30-48 D.O. operator data table dwg. DATA 22....17
Center opening 30-59 D.O. operator data table dwg. DATA 23....18

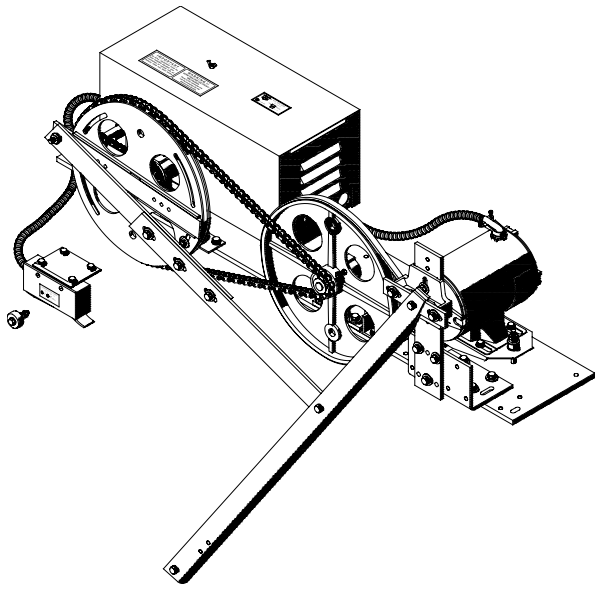
ELECTRICAL SECTION:

7 Electrical adjustments....19
7.1- Overview....20
7.2- Adjustment aids....20
7.3- Preliminary Checks....23
7.4- The parameter unit....24
7.5- Parameter unit navigation....24
7.6- Parameter adjustments....28
7.7- Speed profiles of the MOVFR....31
7.8- Cam setting versus distance....32
7.9- Rotational cam setting....33
7.10- Interfacing between G.A.L. certified light curtain and the MOVFR....34
7.11- MOVFR connection diagram....36
7.12- Fault description and Fault reset....37
7.13- Applications for the heavy input....39
7.14- Parameters list....43
7.15- How to replace the drive....50

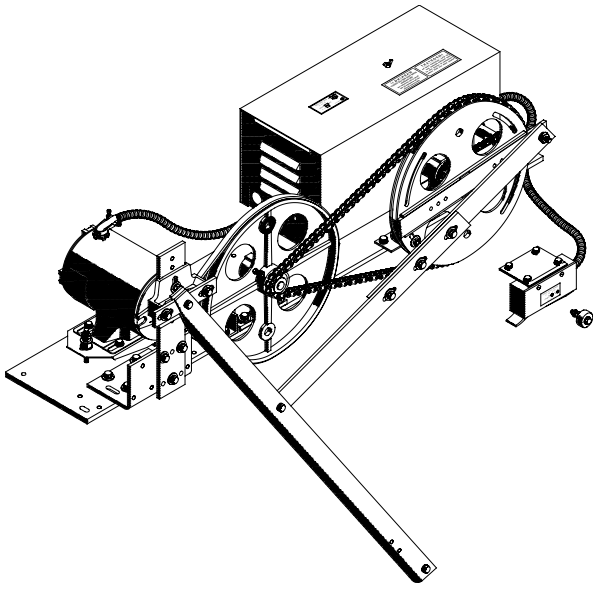
1
MOVFR OPERATORS

The MOVFR door operator is our newest model. It utilizes a 1/2 HP AC motor. the controls include the AC motor, a VVVF drive and a PC board.

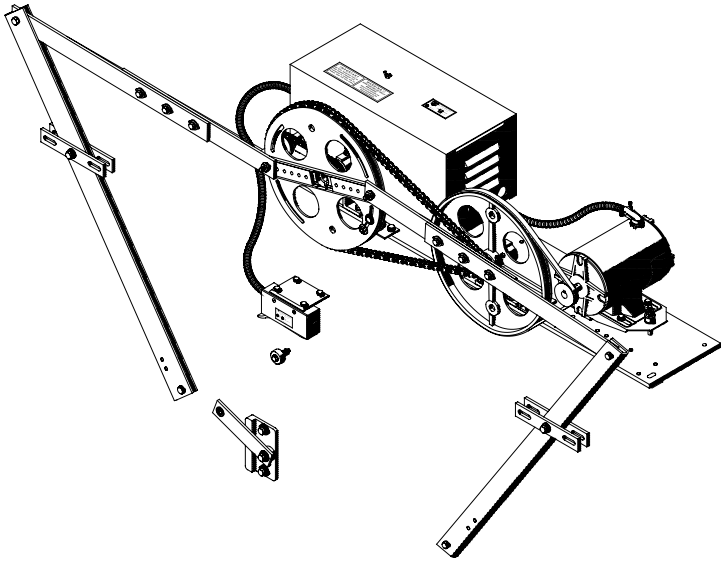
The illustrations on this page show the three different versions available; Left Hand, Right Hand and Center Parting.



LEFT HAND SIDE OPENING



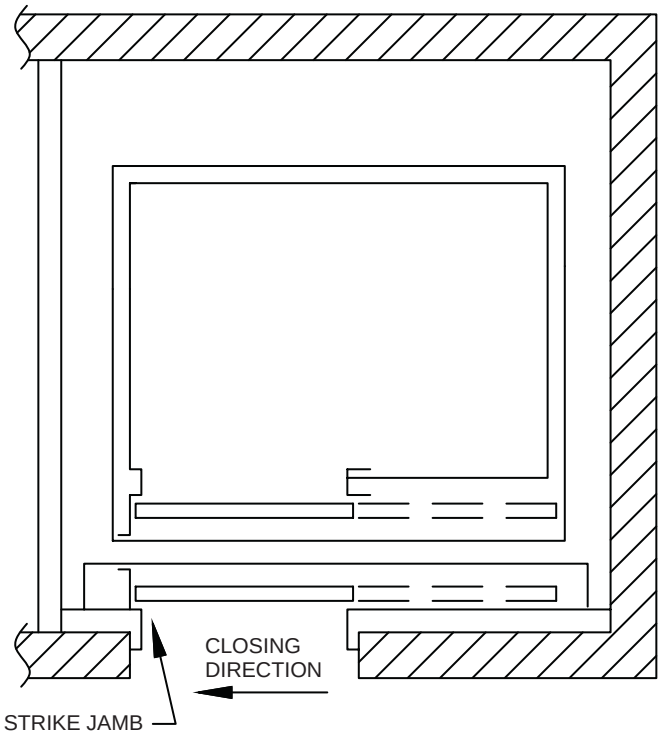
RIGHT HAND SIDE OPENING



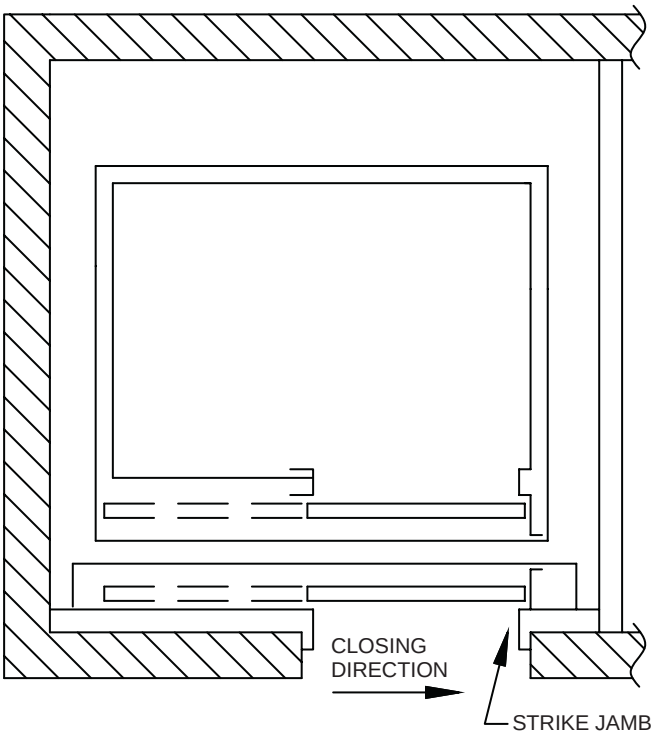
CENTER PARTING

2
DETERMINING THE HAND OF THE DOOR

G.A.L. door operators are available for right hand doors and for left hand doors. (Center parting doors use a variation of the left hand operator). to determine the hand of the door, stand in the lobby facing the elevator doors. If the doors close to the left, it is a left hand door. If the door closes to the right it is a right hand door. The left hand, center parting and right hand operators are not interchangeable. The figures below illustrate the door hand.



LEFT HAND DOOR



RIGHT HAND DOOR

3
MOUNTING THE OPERATOR

As with all G.A.L. operators it is important to have the proper mechanical set up. Before continuing, check that doors are hung properly and glide freely with no binding. The spring closer should also be set so that the hoistway door will close fully. The door operator should be mounted in the proper position with the drive arm plumb and the operator arm and pivots set according to the DATA sheets (DATA21 for single speed, DATA22 for two speed). Slight differences are acceptable.

Install the isolation pads.
Isolation pads for the operator base are provided to minimize noise and vibration transmission into the cab. These pads must be glued to the operator base before mounting it to the car top.

Set the header plumb.
Place the operator over the pre-tapped holes in the header assembly. Set the base flush with the face of the header assembly and tighten the front bolts only. Move the operator base and header until the header is perfectly plumb. Temporarily clamp the rear of the base to the operator support to prevent any further movement of the header.

Side opening Doors:
With the header assembly correctly installed, the vertical centerline of the operator drive pulley should be 9 3/4” form daylite for a door opening of 22” to 44” and 14 3/4” for a door opening of 45” to 48” (see figure 3 and Appendix drawings No. DATA21 and DATA22).

Center parting Doors:
With the header assembly correctly installed, the center of the door opening lines up with the center of the header track. the center of the operator drive pulley should also line up with center of the opening (see figure 6 and Appendix drawings No. DATA23).

Determining the position of the front edge of the door operator base:
Mount the drive arms to the drive arm support brackets on the header assembly for center parting doors and to the drive arm support bracket for slide doors. The mounting brackets are slotted for fine adjustment later, if needed. At this time, position the arms in the center of the bracket and tighten it.

Attach the connecting linkage(s) to the drive pulley, making sure that when the word “CLOSED” is on top the doors will be closed. Tighten the linkage(s) to drive pulley.

Attach the clutch assembly to the drive door linkage, then attach the clutch to the drive door using the pre-tapped holes on the door panel. Tighten the clutch assembly to the drive door. Attach the other door (for center parting doors) to its linkage and tighten the door bracket to the center of the slots.

Raise or lower the rear operator support bracket mounted to the cab to vertically level the operator drive pulley. This helps to prevent binds in the opening and closing.

Check that the operator arms hang free and are not forced to or away from the operator drive pulley. Slide the operator forward or backward, if necessary. Turn the drive pulley by hand making sure that the

drive arms and connecting links are perpendicular and clear of door and track. If necessary, slide the operator base forward or backward.

Proper positioning of the operator is critical to the life of the arm bearings. Bending of the drive arms will place stress on the bearings reducing their operating life.

Once the operator base is in correct position, drill the holes to permanently fasten the rear of the operator and tighten all mounting bolts.

4
PRE-ADJUSTMENT TIP

BEFORE PROCEEDING TO THE ADJUSTMENT SECTIONS, READ THE FOLLOWING TIP (REFER TO FIGURE 1)

Think of the drive pulley crank arm(s) and the connecting link(s) as each having its own independent role **The crank arm determines the total door travel.** The further the arm is away from the drive pulley, the longer the door travels.

The connecting link determines the door position. The longer the arm, the further the door moves from the jamb.

Example:

If the door opening is 42” but the door travels only 40” as stopped by the open and close limit cams, do not alter the cams. The cams have been factory pre-set. Correct the under travel by extending the crank arm outward from the drive pulley until the door travels 42” from fully open to fully closed (as determined by the limit cams), then fasten the crank arm in place.

Now, loosen the connecting link bolts, close the door against the stop roller and tighten one of the link bolts. Open the door until the open limit is activated and check the door position. If the door is not in the proper open position, close the door and readjust the connecting link. Repeat the above steps until the operation is complete and the fasten the two link bolts. Make sure that the closing door is stopped against the stop roller and not the strike post.

Remembering the above two points will facilitate door adjustments.

Bear in mind, that the drive pulley crank arm position and the cams are pre-set by our factory as indicated on the installation drawings.

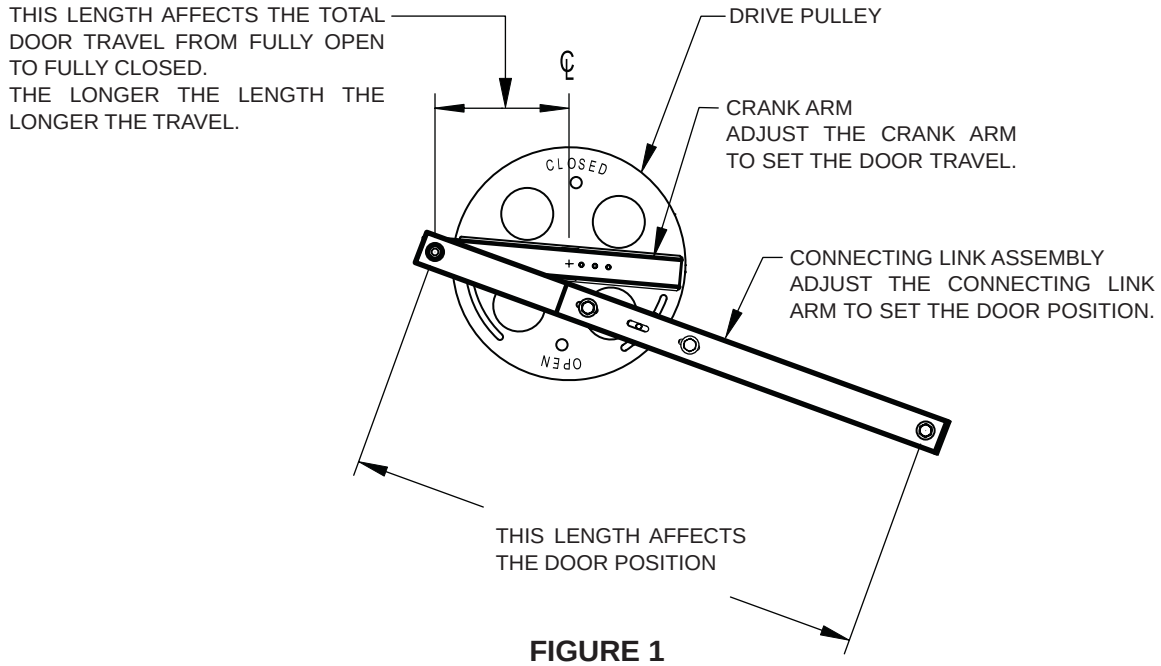


FIGURE 1

5
ADJUSTING THE SINGLE SPEED AND TWO SPEED SLIDE DOORS

5.1 Removing the zone locking device and the bumpers:

Before adjusting the operator, remove the car door bumpers and the locking cam from the zone locking device, (see document LWZ-1). Removing the locking cam from the zone locking device, allows unimpeded movement of the doors.

Removing the bumpers - Because the car door moves to unlock the hoistway door, it must move approximately 7/16" further than the hoistway door. Removing the car door bumpers makes up some of this difference and allows better door alignment at full open.

5.2 Adjusting the release roller and clutch:

Referring to figure 2A, adjust the lock release rollers so that they will clear the clutch by about 3/16" when the car door is in its final closed position and the drive pulley stop roller is against the stop plate. Adjust the clutch cam and roller depth as per figures 2C and 2D. The clutch should retract as late as possible in the closing cycle.

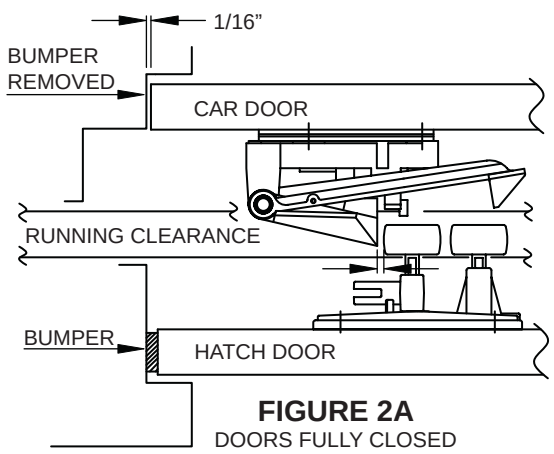


FIGURE 2A
DOORS FULLY CLOSED

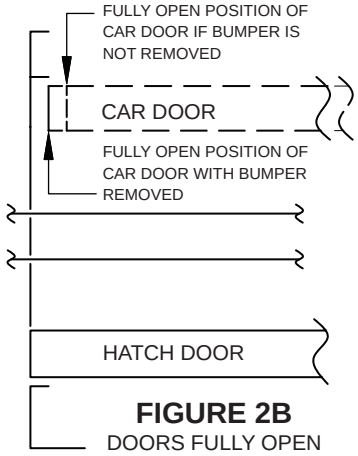


FIGURE 2B
DOORS FULLY OPEN

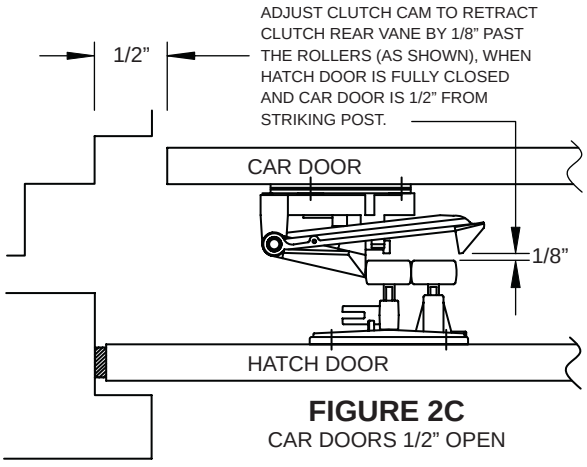


FIGURE 2C
CAR DOORS 1/2" OPEN

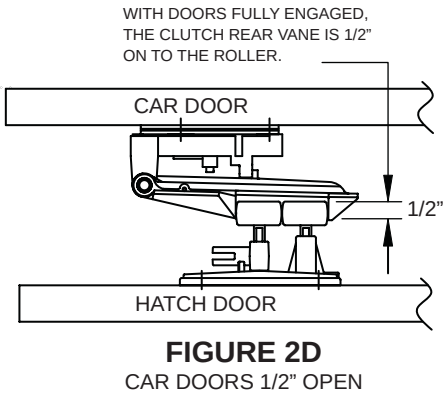


FIGURE 2D
CAR DOORS 1/2" OPEN

5.3 Crank arm and clutch link positions with door closed:

Referring to figure 3, with the door fully closed, the crank arm should be just a few degrees above the horizontal and the clutch link about 20 degrees above the horizontal. This setting will help prevent slamming and roll back, yet still allow manual opening of the doors when the car is stopped at a landing during a power failure.

If adjustments are necessary, close the car door. Loosen the two connecting link bolts and the two crank arm bolts. Keeping the door fully closed, adjust the link and arms to the proper positions. If necessary move the bolts to new holes. Re-tighten all four bolts when finished.

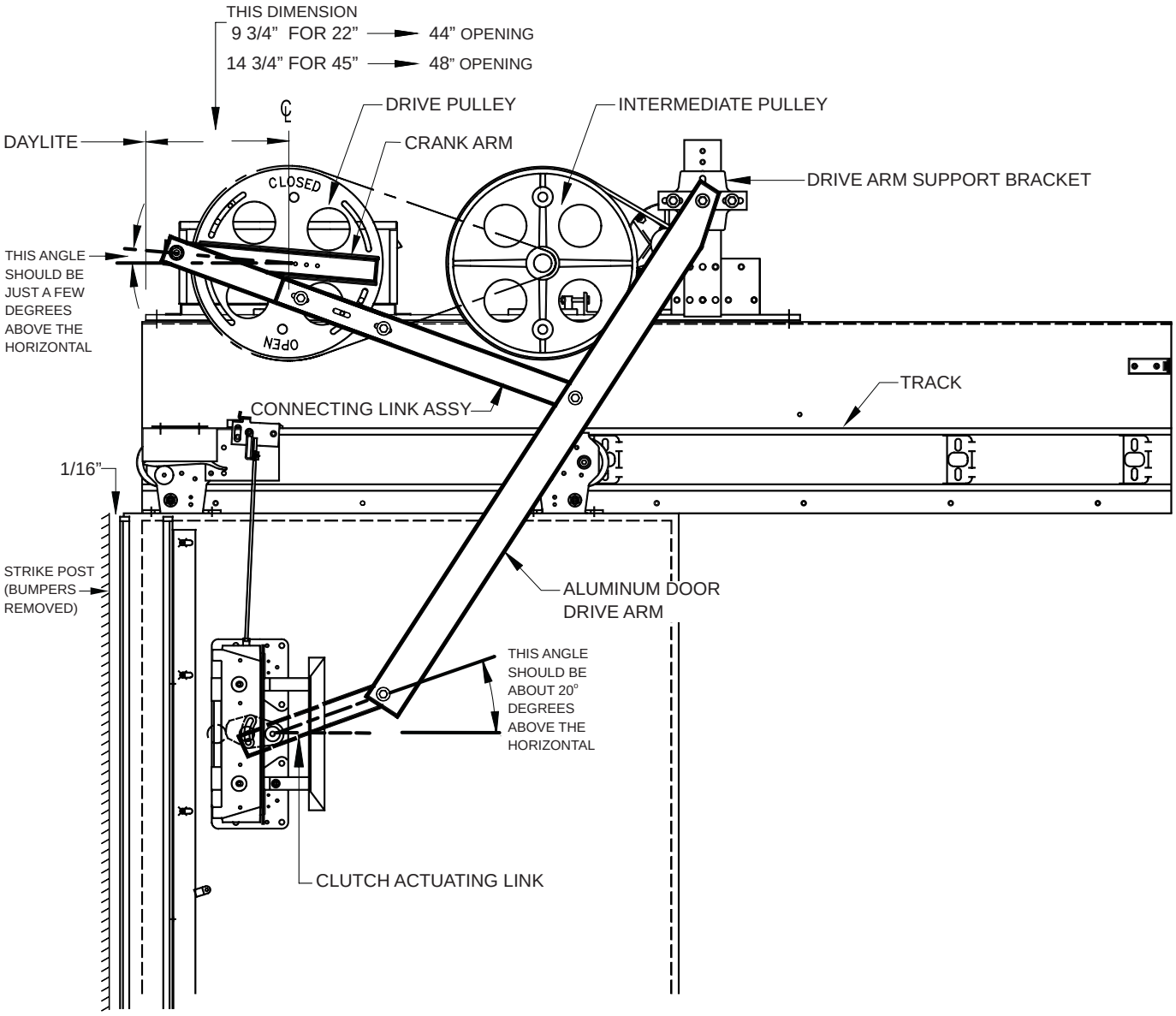


FIGURE 3
DOOR FULLY CLOSED

5.4 Crank arm and clutch link positions with door open:

Referring to figure 4, the best door opening operation occurs when the crank arm and the connecting link are in a straight line, the clutch link is about horizontal and the car door is approximately 1/2” past the return jamb. To make this adjustment, turn the drive pulley toward the open direction by hand until the crank arm and the connecting link are in line. Adjust the crank arm to bring the car door to 1/2” into the return jamb, then re-adjust the door open limit to stop the door electrically at this position.

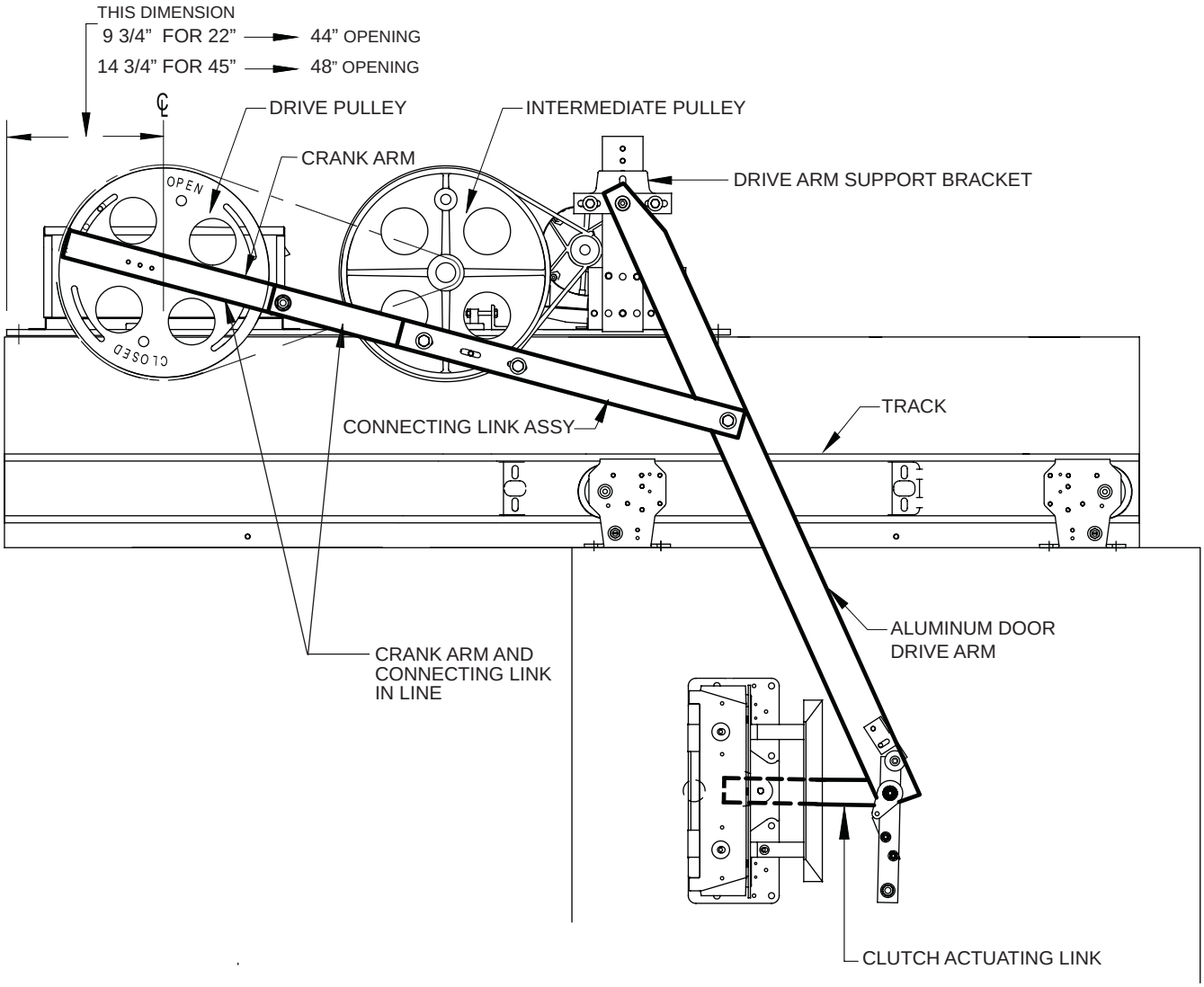


FIGURE 4
DOOR FULLY OPEN

6
ADJUSTING CENTER PARTING CAR DOORS

6.1 Adjusting the stop roller:

Referring to figure 5A, we recommend adjusting the driven car door so that it leads the hoistway door by 1/4". This will make the car door more closely match the hoistway door when fully open. Adjust the stop roller on the drive pulley so that the closing doors will be stopped by the roller as they meet. Do not have pressure on the meeting car doors, otherwise it will place unwanted stress on the arms.

6.2 Adjusting the release roller and clutch:

Referring to figure 5A, adjust the lock release rollers so that they will clear the clutch by about 3/16" when the car doors are in their final closed position and the operator stop roller is against the stop plate. Adjust the clutch cam as per figures 5B and 5C. The clutch should retract as late as possible in the closing cycle.

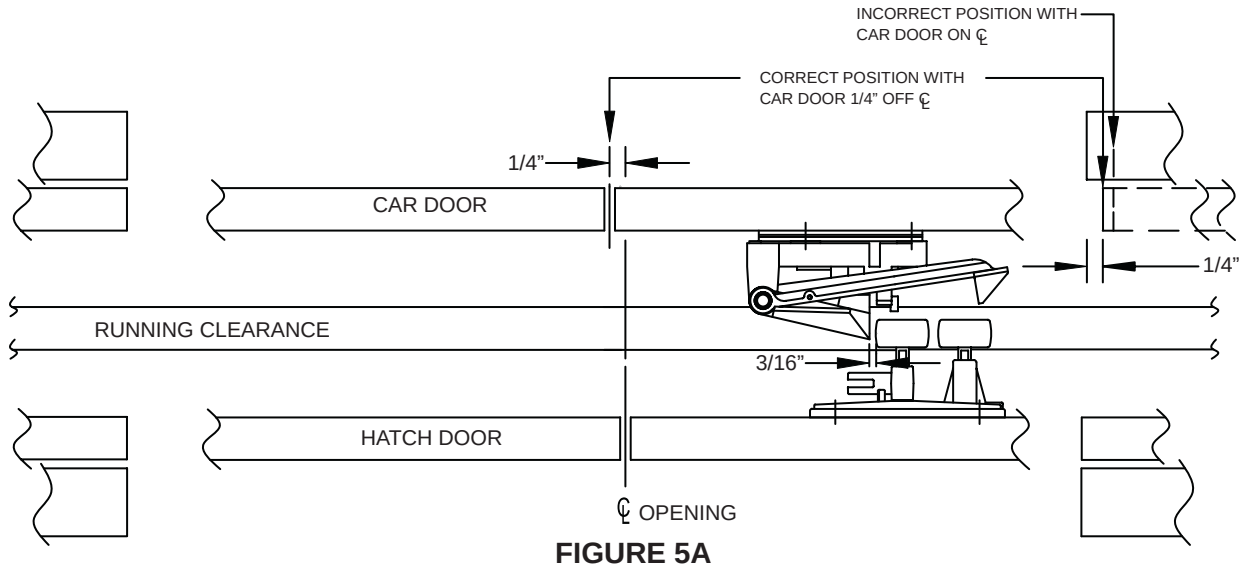


FIGURE 5A
DOORS FULLY CLOSED

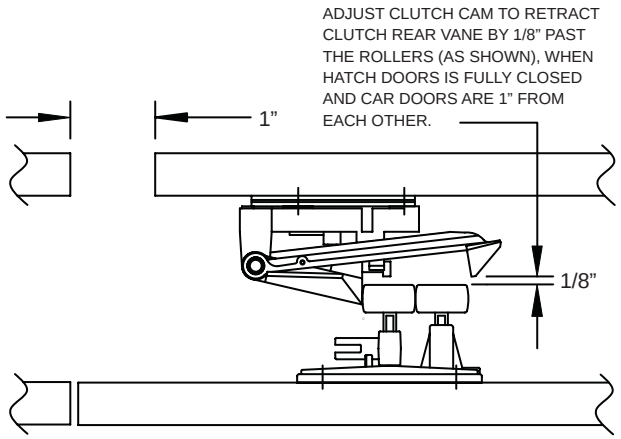


FIGURE 5B
CAR DOORS 1" OPEN

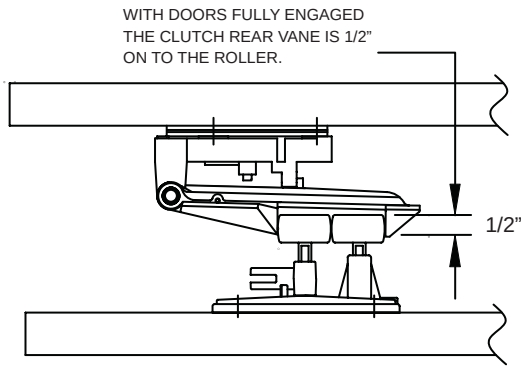


FIGURE 5C
DOORS FULLY ENGAGED

6.3 Crank arm and clutch link positions with doors closed:

Referring to figure 6, with the doors fully closed, the connecting links should be about 1 1/2” from the horizontal centerline of the pulley. the clutch link should be at about 20 degrees above the horizontal. as shown.

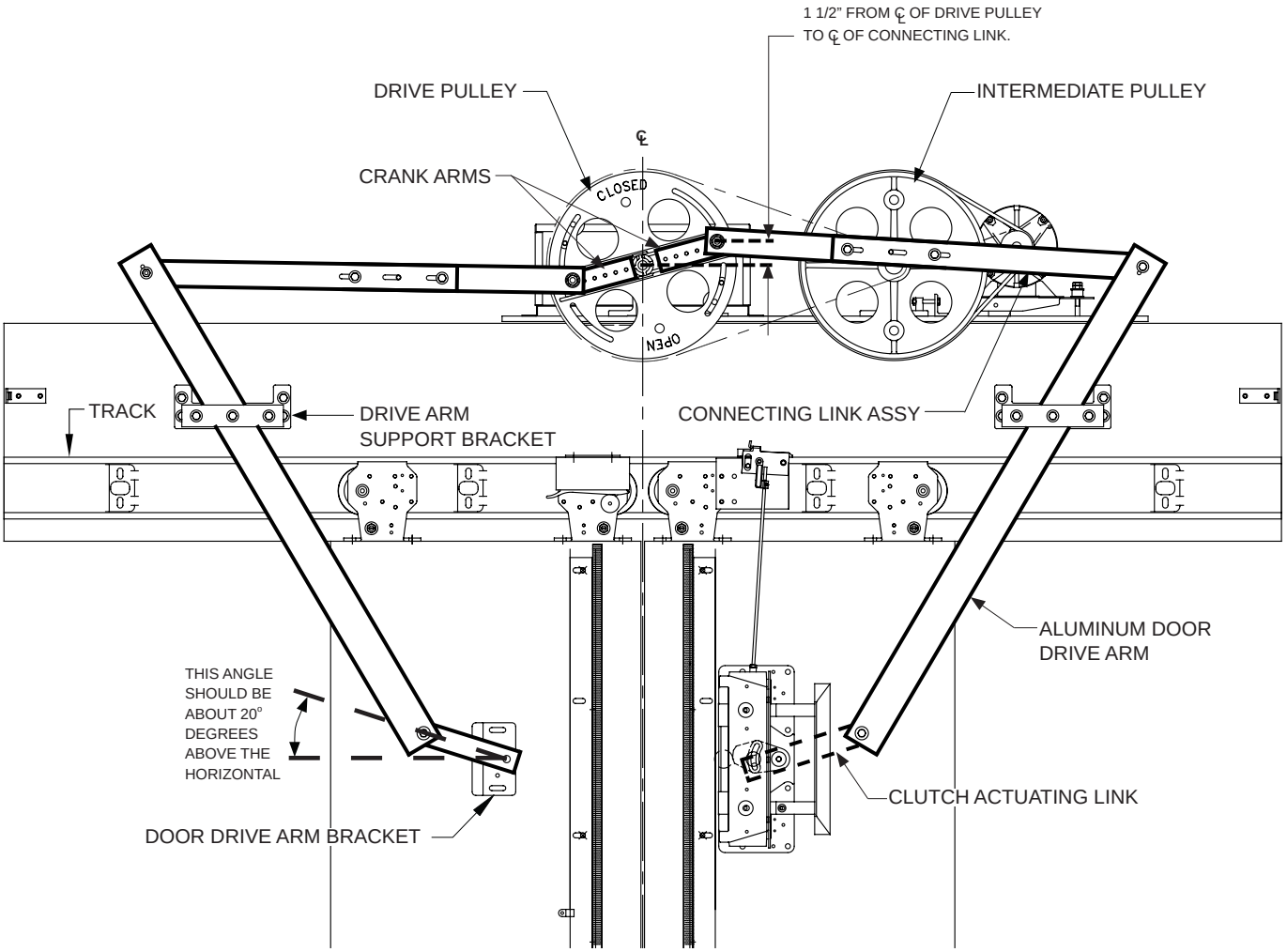


FIGURE 6
DOOR FULLY CLOSED

6.4 Crank arm and clutch link positions with doors open:

Referring to figure 7, with the doors fully open, the connecting links should be about 1 1/2" apart. the clutch link should be at about 20 degrees above the horizontal.

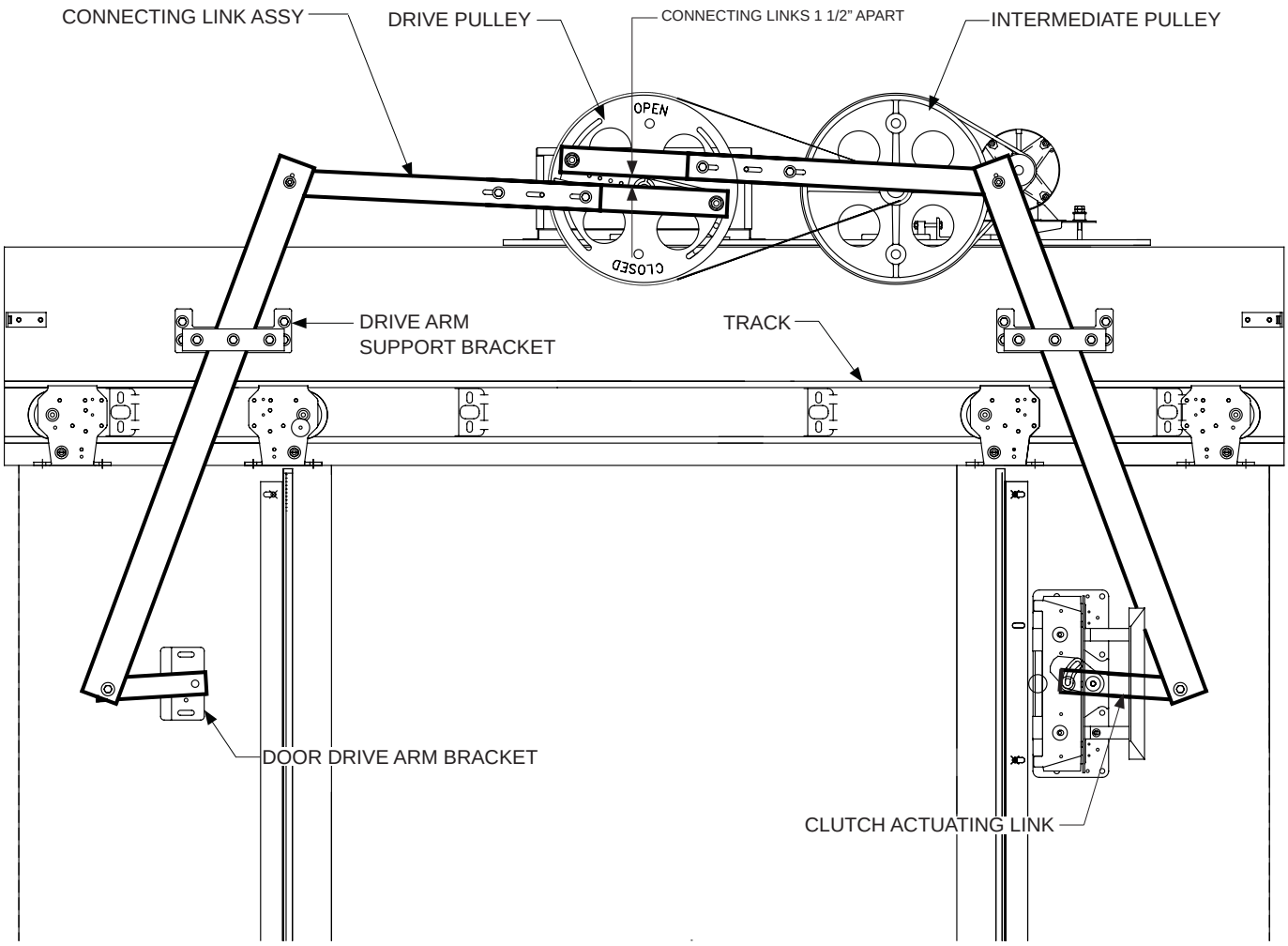
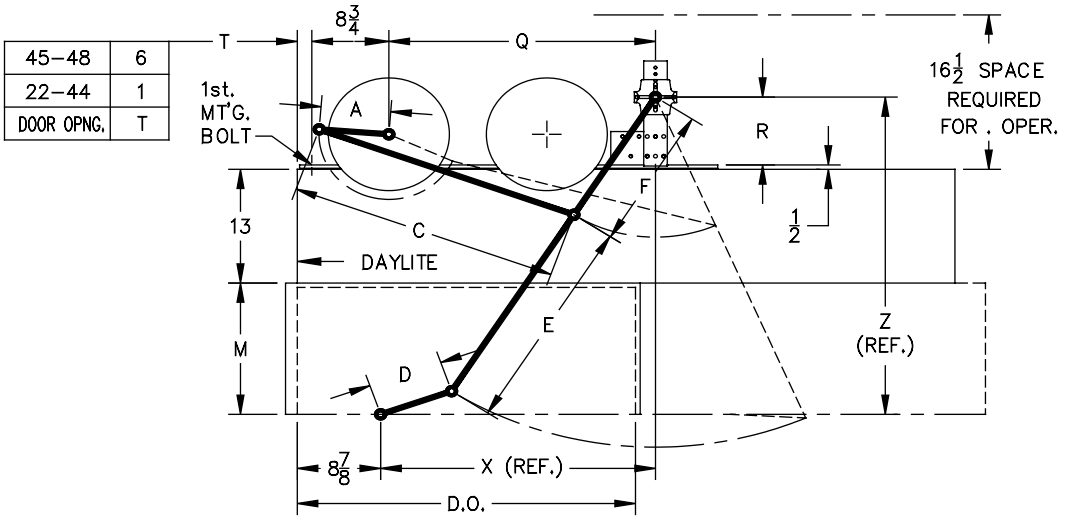
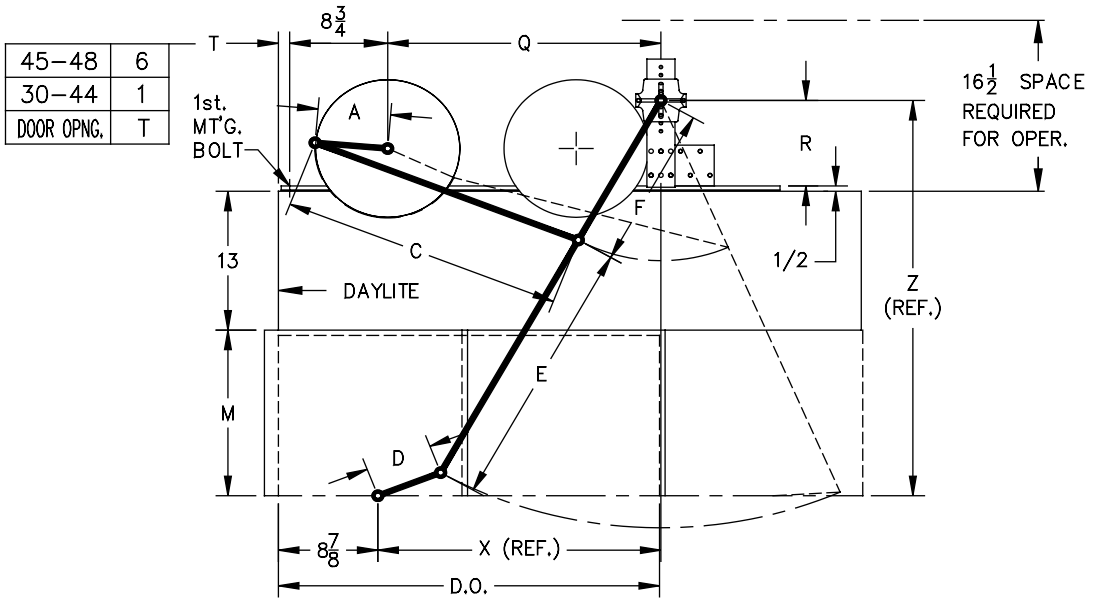


FIGURE 7
DOOR FULLY OPEN



48	10 1/16	34 5/16	12	31	21	23	39 5/8	47 1/2	33 3/4	11
47	9 7/8	34 1/8	12	31	21	23	39 5/8	47 1/2	33 3/4	11
46	9 11/16	33 15/16	12	31	21	23	39 5/8	47 1/2	33 3/4	11
45	9 1/2	33 3/4	12	31	21	23	39 5/8	47 1/2	33 3/4	11
44	9 7/8	34 3/4	10	26	20	19	34 5/8	42	33 3/4	9 1/2
43	9 11/16	34 9/16	10	26	20	19	34 5/8	42	33 3/4	9 1/2
42	9 7/16	34 3/8	10	26	20	19	34 5/8	42	33 3/4	9 1/2
41	9 3/16	34 3/16	10	26	20	19	34 5/8	42	33 3/4	9 1/2
40	9	34	10	26	20	19	34 5/8	42	33 3/4	9 1/2
39	8	29 3/8	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
38	7 13/16	29 3/16	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
37	7 5/8	29	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
36	7 7/16	28 13/16	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
35	7 1/4	28 5/8	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
34	6 1/2	25 3/16	6	25	15	15	25 1/4	37	24 3/8	8 1/2
33	6 3/8	25	6	25	15	15	25 1/4	37	24 3/8	8 1/2
32	6 1/8	24 1/4	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
31	5 15/16	24 1/16	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
30	5 3/4	23 7/8	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
29	6 3/4	27 1/8	10	19	15	11	27 3/4	32	26 7/8	7 1/2
28	6 9/16	26 15/16	10	19	15	11	27 3/4	32	26 7/8	7 1/2
27	6 3/8	26 3/4	10	19	15	11	27 3/4	32	26 7/8	7 1/2
26	6 3/16	26 9/16	10	19	15	11	27 3/4	32	26 7/8	7 1/2
25	6	26 3/8	10	19	15	11	27 3/4	32	26 7/8	7 1/2
24	5 1/2	25 3/8	10	18	14	11	25 7/8	30 3/4	25	6 1/4
23	5 5/16	25 3/16	10	18	14	11	25 7/8	30 3/4	25	6 1/4
22	5 1/8	25	10	18	14	11	25 7/8	30 3/4	25	6 1/4
INCHES	A	C	D	E	F	M	X	Z	Q	R
DOOR OPENING	OPERATOR ARMS		DOOR ARMS			CLUTCH	PIVOT		OPERATOR	
GAL ELEVATOR DEVICES	SINGLE SPEED 22-48 D.O. OPERATOR DATA TABLE								NOV. 11, 1994	DATA21



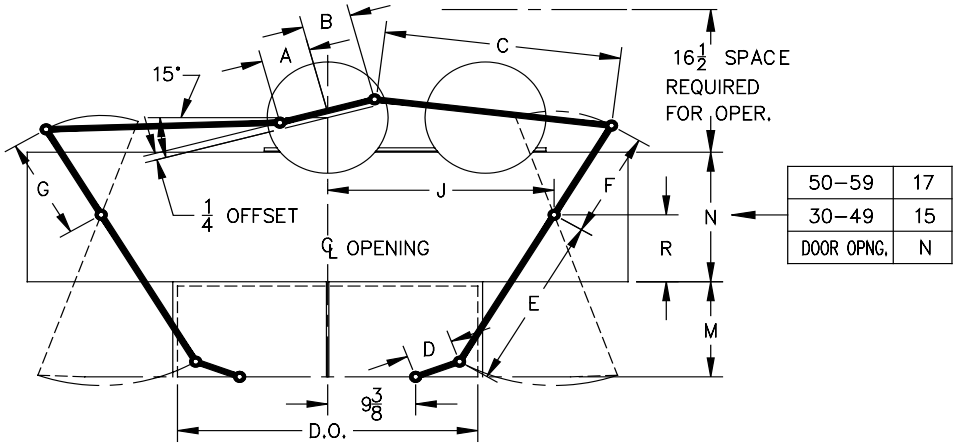
48	10 1/16	34 5/16	12	31	21	23	39 5/8	47 1/2	33 3/4	11
47	9 7/8	34 1/8	12	31	21	23	39 5/8	47 1/2	33 3/4	11
46	9 11/16	33 15/16	12	31	21	23	39 5/8	47 1/2	33 3/4	11
45	9 1/2	33 3/4	12	31	21	23	39 5/8	47 1/2	33 3/4	11
44	9 7/8	34 3/4	10	26	20	19	34 5/8	42	33 3/4	9 1/2
43	9 11/16	34 9/16	10	26	20	19	34 5/8	42	33 3/4	9 1/2
42	9 7/16	34 3/8	10	26	20	19	34 5/8	42	33 3/4	9 1/2
41	9 3/16	34 3/16	10	26	20	19	34 5/8	42	33 3/4	9 1/2
40	9	34	10	26	20	19	34 5/8	42	33 3/4	9 1/2
39	8	29 3/8	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
38	7 13/16	29 3/16	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
37	7 5/8	29	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
36	7 7/16	28 13/16	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
35	7 1/4	28 5/8	8	24	16	15	29 1/4	36 1/4	28 3/8	7 3/4
34	6 1/2	25 3/16	6	25	15	15	25 1/4	37	23 7/8	8 1/2
33	6 3/8	25	6	25	15	15	25 1/4	37	23 7/8	8 1/2
32	6 1/8	24 1/4	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
31	5 15/16	24 1/16	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
30	5 3/4	23 7/8	6	25	15	15	24 1/2	37 3/8	23 1/2	8 7/8
INCHES	A	C	D	E	F	M	X	Z	Q	R
DOOR OPENING	OPERATOR ARMS		DOOR ARMS			CLUTCH	PIVOT		OPERATOR	

GAL ELEVATOR DEVICES

TWO SPEED 30–48 D.O. OPERATOR DATA TABLE

AUG. 23 1994

DATA22



59	7¾	8 3/16	35	8	29½	15	14½	19	7¾	34
58	7⅝	8 1/16	35 1/8	8	29½	15	14½	19	7¾	34
57	7½	7 15/16	35¼	8	29½	15	14½	19	7¾	34
56	7⅜	7 13/16	35⅜	8	29½	15	14½	19	7¾	34
55	7¼	7 11/16	35½	8	29½	15	14½	19	7¾	34
54	6 7/16	7½	34	8	29½	15	13	19	8½	33
53	6 5/16	7⅜	34 3/16	8	29½	15	13	19	8½	33
52	6 3/16	7¼	34 5/16	8	29½	15	13	19	8½	33
51	6 1/16	7⅛	34 7/16	8	29½	15	13	19	8½	33
50	5 15/16	7	34 9/16	8	29½	15	13	19	8½	33
49	5 15/16	6¼	29⅝	6	25½	12	11½	15	8¼	29
48	5 13/16	6⅛	29¾	6	25½	12	11½	15	8¼	29
47	5 11/16	6	29⅞	6	25½	12	11½	15	8¼	29
46	5 9/16	5⅞	30	6	25½	12	11½	15	8¼	29
45	5 7/16	5¾	30 1/8	6	25½	12	11½	15	8¼	29
44	5 5/16	5⅝	29⅛	6	25½	12	11½	15	8⅝	28¼
43	5 3/16	5½	29¼	6	25½	12	11½	15	8⅝	28¼
42	5 1/16	5⅜	29⅜	6	25½	12	11½	15	8⅝	28¼
41	4 15/16	5¼	29½	6	25½	12	11½	15	8⅝	28¼
40	4 13/16	5⅛	29⅝	6	25½	12	11½	15	8⅝	28¼
39	5⅞	6⅛	27½	6	21	12	11½	11	8½	26⅝
38	5⅝	5 15/16	27⅝	6	21	12	11½	11	8½	26⅝
37	5½	5 13/16	27¾	6	21	12	11½	11	8½	26⅝
36	5 5/16	5⅝	27⅞	6	21	12	11½	11	8½	26⅝
35	5⅛	5½	28	6	21	12	11½	11	8½	26⅝
34	5	5 5/16	28⅛	6	21	12	11½	11	8½	26⅝
33	5 3/16	5 9/16	25 1/16	5	19¾	12	11½	11	7¾	24⅛
32	5 1/16	5⅜	25 3/16	5	19¾	12	11½	11	7¾	24⅛
31	4 15/16	5¼	25⅜	5	19¾	12	11½	11	7¾	24⅛
30	4 13/16	5⅛	25½	5	19¾	12	11½	11	7¾	24⅛
INCHES	A	B	C	D	E	F	G	M	R	J
DOOR OPENING	OPERATOR ARMS		DOOR ARMS					CLUTCH	PIVOT	

	CENTER OPENING 30–59 D.O. OPERATOR DATA TABLE	NOV. 11, 1994
		DATA23

G.A.L. Manufacturing Corporation
50 East 153rd Street, Bronx, N.Y. 10451
Phone 718-292-9000
Toll Free 877-425-3538
877-425-7763
Fax 718-292-2034
Web www.gal.com
E-mail info@gal.com

ISO 9001 : 2000 REGISTERED FIRM

MOVFR
ELECTRICAL ADJUSTMENTS

ELECTRICAL ADJUSTMENTS

ADJUSTING INSTRUCTIONS FOR THE G.A.L. VARIABLE FREQUENCY CLOSED LOOP DOOR OPERATOR TYPE MOVFR

7.1 Overview:

The MOVFR is a 230VAC door operator. It is controlled by a variable voltage, variable frequency (VVVF) closed loop drive. The control includes an AC ½ HP Motor, a VVVF Drive, and a PC board. It features keypad programming with digital display, door position optical cams, sequential Light Emitting Diodes (LED) for door speed positions, obstruction detection signal, and DPM Fault Monitor* signal. A Heavy Door Input, and an Auxiliary Cam are also available, when needed. MOVFR accepts universal input control signals from dry contacts to signal voltages, from 24 to 230V AC or DC**. The output contacts rated at 10Amp, 230VAC, and they are: Door Close Limit (DCL), Door Open Limit (DOL), Re-Open (REOPEN), Door Protection Monitor (DPM), and Auxiliary (AUX).

*: The Fault Monitor is a G.A.L. patented door lock and gate switch protection device. Its purpose is to meet the ASME A17.1 RULE 210.15 and CAN/CSA-B44-M90 RULE 3.12.1.5.
**: If the input signal voltage is 60 volts or less, the input board resistor must be cut (see connection diagram Dwg. No. 8032).

7.2 Adjustment aids:

Switches, LED pilot lights and a Parameter Unit are available to aid the adjustment of the operator (see Figure 7.2.A).

A. Five toggle switches are provided to facilitate the adjusting procedure as describe below:

1. RUN/CAM SETUP switch. The RUN position is for normal operation. The CAM SETUP position allows adjusting the cams and turning on the appropriate pilot lights without applying power to the motor.

2. AUTO/MAN. switch. The AUTO position is for normal operation. The MAN. position allows opening and closing the door by means of the OPEN/CLOSE switch.

3. OPEN/CLOSE switch allows constant pressure opening and closing when the AUTO/MAN. switch is in the MAN. position.

4. NUDG. switch allows closing the door at a reduced speed (nudging speed) when the AUTO/MAN. is in the MAN. position and constant pressure is applied to CLOSE position and NUDG position of the OPEN/CLOSE and NUDG switches respectively.

5. HEAVY/RESET switch. When the AUTO/MAN. switch is in the MAN. position, if a constant pressure is applied to the HEAVY position, it will work in conjunction with OPEN/CLOSE, NUDG. switches to open, close, or nudge the door. The RESET position allows manual reset of faults of the drive. On the drive, the Green LED indicates drive has power, the Red LED indicates an alarm has occurred and shutdown the drive. If this occurs, make a visual inspection of the door, and if there are no visible problems, place the AUTO/MAN. switch in the MAN. position, apply pressure to the RESET position of the HEAVY/RESET switch then release. Operate the door with the OPEN/CLOSE switch.

Making sure that all is clear before returning to AUTO mode. Use the Parameter unit to view the Alarm history.

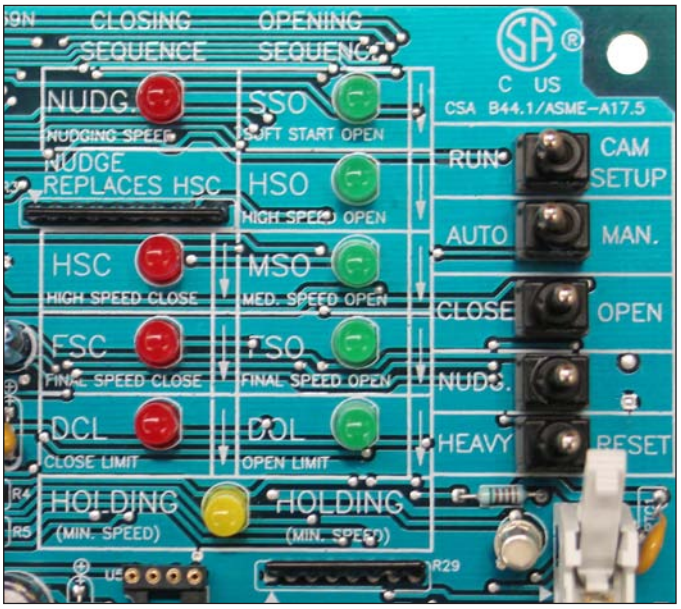


FIGURE 7.2.A

B. LED pilot lights:

A Red LED is provided on each of the four input boards (open, close, nudg., heavy). Heavy input is optional. As mentioned earlier, the input board resistor must be cut if the inputs signal voltage is 60 volts or less (see Figure 7.2.B.1).

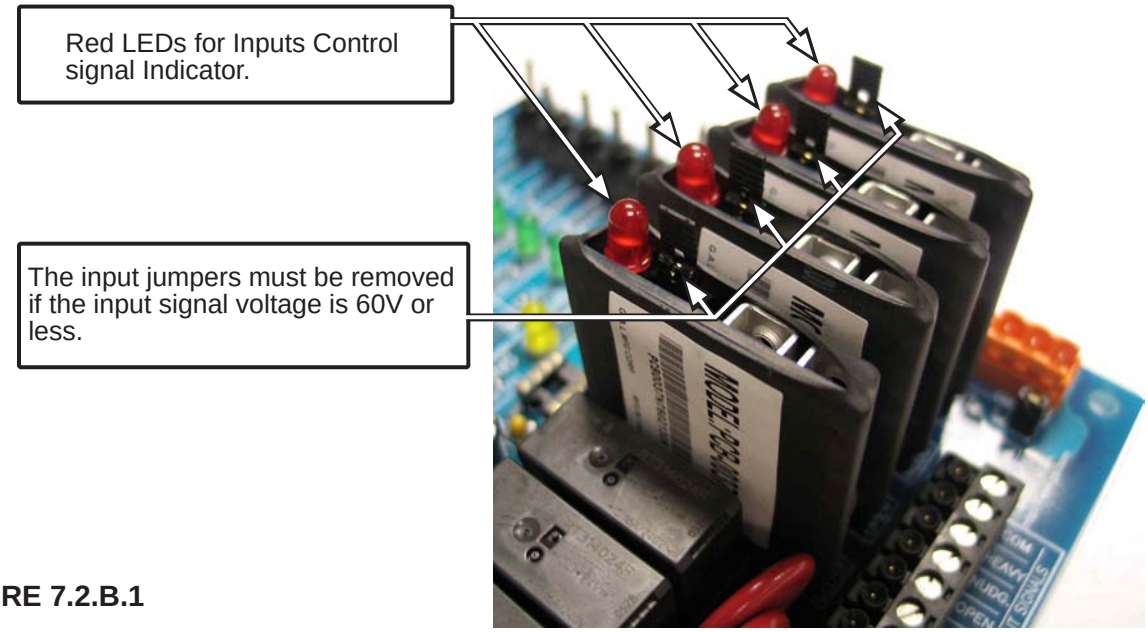


FIGURE 7.2.B.1

There are 16 more LED lights are provided to indicate the position of the speed cams, limit cams and modes of operation. When a cam blocks an optical sensor, the function is activated and the corresponding LED light turns on (see Figure 7.2.B.2). The 16 LED lights are:

1. HSC: High Speed Close.
2. FSC: Final Speed Close.
3. DCL: Door Close Limit (DCL output relay is energized when the DCL LED light turns on).
4. SSO: Slow Start Open.
5. HSO: High Speed Open.
6. MSO: Medium Speed Open.
7. FSO: Final Speed Open.

Note: The combination of Cam#1(SSO/FSO) and Cam#2(MSO) produces SSO, HSO, MSO, and FSO. See 7.7 CAM SETTINGS VS. DISTANCE for appropriate settings.

8. DOL: Door Open Limit (DOL output relay is energized when the DOL LED light turns on).
9. HOLDING: Door is in its full open or full close position. (When the door is fully open or fully closed, a minimal amount of power is applied to the motor to prevent drifting).
10. NUDG. Door is closing at reduced speed (nudging).
11. RE-OPEN: Door re-opening features have activated. (RE-OPEN output relay is energized when the RE-OPEN LED light turns on).
12. STALL REVERSE: In the close direction, if the door exceeds the Torque Limit set by Par. 9, the STALL REVERSE LED will turn on and the RE-OPEN relay will be energized).
13. FREQ. FAILURE: In the close direction, if the door exceeds the Speed Limit set by Par. 0, the FREQ. FAILURE LED will turn on and the RE-OPEN relay will be energized).
14. DPM: A car door closed contact for safety features such as G.A.L. Fault monitor. (DPM relay is energized when the DPM LED light turns on).
15. FAULT: The FAULT LED on indicates that there is a Fault in the drive.
16. AUX.: The AUX. LED and the AUX. relay will turn on when AUX cam is activated. AUX. cam and AUX. cam are optional and available upon request.

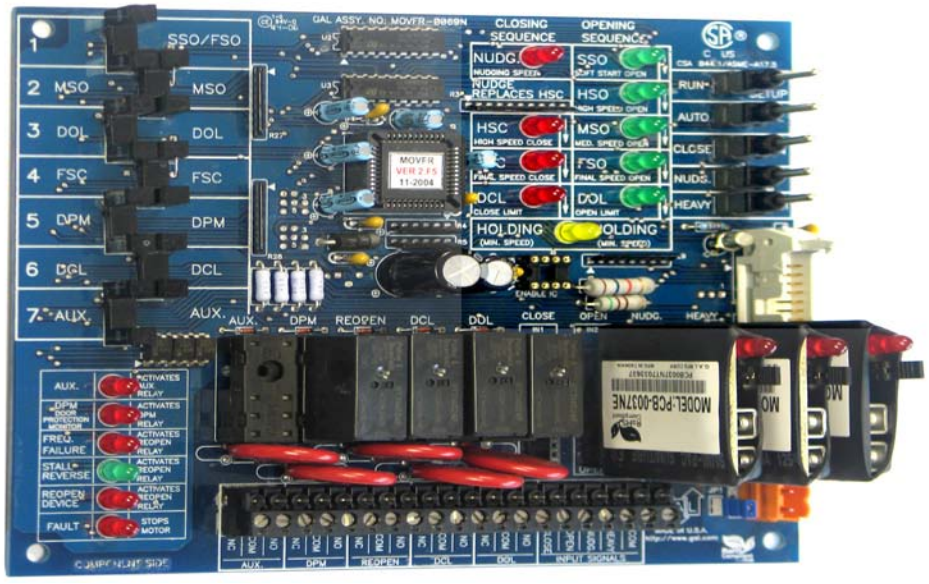


FIGURE 7.2.B.2

C. Parameter unit:

The Parameter unit plugs into the drive and permits changing values of pertinent parameters (see Figure 7.4).

7.3 Preliminary checks:

This procedure is to assure that the motor turns in the correct direction, and all speed signals are in the working order.

A. Place the RUN/CAM SETUP switch in the RUN position and place the AUTO/MAN switch in the MAN. Position.

B. With the door fully closed, hold the OPEN/CLOSE switch in the OPEN position while observing the door movement. If the motor turns in the wrong direction, turn Power OFF, swap any two of the three motor leads. The door should change speed as the various cams operate the speed controlling speed sensors.

The door should start moving at low speed with the SSO sensor blocked and then accelerate to high Speed (HSO) as the SSO sensor is unblocked. Deceleration takes place when the MSO sensor is blocked, then more deceleration with the FSO sensor is blocked, and finally the DOL sensor is blocked and the HOLDING LED turns on. A little power will apply to the motor to hold doors open.

When the door is fully open, hold the switch in the CLOSE position, the door should start accelerating To high speed (HSC) and then decelerating as the FSC sensor is blocked. Finally the DCL sensor is blocked and the HOLDING LED turns on. Again, a little power will apply to the motor to hold doors open. (See 7.7 CAM SETTING VS. DISTANCE).

7.4 The parameter unit:

The Parameter unit is a tool to assist users in the following tasks:

- Changing speed values, acceleration, deceleration, torque, maximum closing speed, carrier frequency, and stall reverse limit.

- Downloading, and Uploading Programs to and from the Drives.

- Monitoring Currents, Voltages, Speeds, Inputs, Outputs, and Faults.

- Resetting the Drive.

FIGURE 7.4

7.5 Parameter unit navigation:

A. How to change parameters:

Press SET. Enter a Parameter Number.

Press READ. Enter a new Value. Press WRITE.

Wait for the Completed Signal from the Display.

B. How to read (COPY) from the drive:

*Note 1 : The Parameter Unit is capable to store 4 Sets of Default Parameters and 1 Set of Working Parameters. To Copy a Default Set of Parameters into the Working Set Parameters, see item 8th of Section **F**.*

Note 2 : To Transfer data from one drive to another, users must, First, READ(COPY) from the First Drive.

Press SET. Press ▲.

Press READ. Wait for the Completed Signal from the Display.

C. How to write (DOWNLOAD) to the drive:

Set RUN/CAM setup switch to CAM setup.

Press SET. Press ▲.

Press WRITE. Wait for the Completed Signal from the Display.

D. Default settings for the MOVFR drive:

CLOSING	PARAMETER #		RANGE	DEFAULT VALUE							
				STANDARD				WATERPROOF			
				C/P		S/O		C/P		S/O	
	REG.	HVY.		REG.	HVY.	REG.	HVY.	REG.	HVY.	REG.	HVY.
MAX. CLOSE SPEED	0	0	0-30	30	30	30	30	30	30	30	30
HOLDING TORQUE	1	11	0-30	5	5	5	5	5	5	5	5
HOLDING SPEED	2	12	0-400	2	2	2	2	1.5	1.5	1.5	1.5
CLOSE TORQUE ■	3	13	0-400	225	225	173	173	173	173	135	135
HIGH SPEED HSC	4	14	0-400	23	12	19	10	14	7	12	6
FINAL SPEED FSC	5	15	0-400	4	4	5	5	3	3	4	4
NUDGING SPD	6	16	0-400	8	8	9	9	5	5	6	6
ACCELERATION TIME	7	17	0-320	9	9	6	6	7	7	10	10
DECELERATION TIME	8	18	0-320	6	6	10	10	17	17	25	25
STALL REV. FORCE	9	19	0-2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
OVERLOAD	99	99	0-5	3	3	3	3	3	3	3	3

OPENING	PARAMETER #		RANGE	DEFAULT VALUE							
				STANDARD				WATERPROOF			
				C/P		S/O		C/P		S/O	
	REG.	HVY.		REG.	HVY.	REG.	HVY.	REG.	HVY.	REG.	HVY.
QUICK STOP ON REV.	21	31	0-6	0.8	1.0	1.4	1.6	0.8	1.0	1.4	1.6
SLOW START SSO	22	32	0-400	5	5	5	5	5	5	5	5
HIGH SPEED HSO	23	33	0-400	31	16	45	23	24	12	35	18
MEDIUM SPEED MSO	24	34	0-400	14	14	20	20	10	10	15	15
FINAL SPEED FSO	25	35	0-400	3	3	5	5	2	2	3	3
ACCELERATION TIME	26	36	0-320	6	6	4	4	6	6	6	6
DECELERATION TIME	27	37	0-320	6	6	10	10	9	9	10	10
SLOW SPD TORQUE	28	38	0-30	4	4	4	4	4	4	4	4
OPEN TORQUE ■	29	39	0-400	120	100	120	100	100	80	100	80

■To lower torque, increase the torque parameter value

OPENING AND CLOSING	PARAMETER #	RANGE	DEFAULT VALUE			
			STANDARD		WATERPROOF	
			C/P	S/O	C/P	S/O
CARRIER FREQUENCY	51	2-15	10	10	10	10

C/P = Center Parting Door S/O = Side Opening Door
REG. = Regular Doors HVY. = Heavy Doors

E. Convenient keys:

Press SPEED to check the Speed in Hz

Example:

Output	Frequency
HSC	19Hz

Press I/O to check Input & Output Signals.

Inputs:

Z: (Reserved) **C:** Door Close **O:** Door Open
R: Reset **V:** Heavy Door **L:** Control Bit L
M: Control Bit M **H:** Control Bit H

Outputs:

S: Over Speed **T:** Over Torque **F:** Fault

Example:

ZCORVLMH	STF
0 1 0 0 0 1 0 0 0 0 0 0	

Press FAULT to check the recent Faults.

Press ▼ or ▲ to view all the Faults

Example:

Present	Fault
Under	Voltage

Press V to check the Output Voltage.

Example:

Output	Voltage
132.00V	

Press A to check the Output Current.

Example:

Output	Current
0.78A	

Press RESET to Reset the Drive.

F. The VIEW keys:

Press the VIEW key will allow users to view, change, and reset to G.A.L. Default parameters.

Press ▲ or ▼ to navigate through all the items in the VIEW section.

Press READ to view an item. At any time, Press ESC to get back to the Previous Display.

1st. **V/I/H** Displays the Output Voltage, Output Current, Command Speed, and Actual Speed.

2nd. **I/O** Displays the Input and Output Signals

ZCORVLMH STF 1= Activate 0= Deactivate
(See the **Convenient keys** in part E)

3rd. **Faults**. (See the **Convenient keys** in part E)

Press or to View all the Faults.

4th. **Counters**. There are 2 Counters.
Counter 1 will count up to 9,999 times.
Counter 2 will count up to 60,000 times.
When Counter 1 reaches 9999,Counter 2 will increase 1
The total count will be 600,000,000 times.

Press or to View Counter 1 or Counter 2.

5th. **User List.**

The User List includes all the **Default settings for the MOVFR drive** in part D.

Press , Press or to view all the Parameters in the User List.

NOTE: Users can also change the Value of Parameters in this stage by doing the following:

Press , Enter the new value, then Press .

Press to get back to the Previous Display.

6th. **Max. cl. Speed**

Press to view the Maximum Closing Speed.

Press to get back to the Previous Display.

7th. **Max. cl. Force**

Press to view the Maximum Closing Force.

Press to get back to the Previous Display.

8th. **GAL Defaults**

Press , Press or to pick one of the four sets of Parameters

Standard C/P
Standard S/O
Waterproof C/P
Waterproof S/O

Set RUN/CAM SETUP switch to CAM SETUP

Press to copy the chosen set of Parameters to the Working Set of Parameters.

G. LED indicators:

There are 7 LEDs on the Parameter Unit. DO, DC, NUD, HLD, PRG, FLT, OVT. DO=Door Open, DC=Door Close, NUD=Nudging, HLD=Holding, PRG=Programming Mode, FLT=Fault, OVT=Over Torque. These LEDs indicate the present status of the MOVFR.

7.6 Parameter adjustments:

CAUTION! All equipment must be installed and adjusted to meet Federal, State, and Local Codes.

NOTE 1: The closing Kinetic Energy is affected by the speed and the mass of the door. The closing Kinetic Energy must not exceed Code Limits. For more details about the Kinetic Energy of the G.A.L door operators, go to http://www.gal.com

NOTE 2: The closing Torque is affected by the Torque adjustment. The closing Torque must not exceed Code Limits.

NOTE 3: Whenever changing any value in the Closing Direction Parameters, the door should be rechecked to meet the Code requirement.

A. Closing sequence:

MAXIMUM CLOSE SPEED (Par. 0):
This Parameter is the Limit of the Closing speed. The Default value of this Parameter is 30Hz. If the Closing speed is higher than 30Hz, the Drive will turn on the Frequency Failure (FF) output and activate the Reopen Relay. Users should bear in mind that the Reopen Relay Contact, once activated, will send the re-open signal to the Main Controller ONLY and will wait for the OPEN signal from the Main Controller to Reopen the door. The Reopen Relay will NOT reopen the door by itself.

HOLDING TORQUE (Par. 1):
The Holding Torque is activated when the door reaches DOL or DCL.

HOLDING SPEED (Par. 2):
The Holding Speed is activated when the door reaches DOL or DCL.

NOTE: The reason to apply the Holding Power when the door is fully closed or fully open is to prevent the door from drifting or rolling back.
CAUTION! The Holding power should be less than 15W to prevent the motor from unnecessary heating, which would reduce its life.

HIGH SPEED CLOSE – HSC (Par. 4):
This is the highest speed for the overall Closing sequence. A higher value produces the faster speed.

FINAL SPEED CLOSE – FSC (Par. 5):
This is the Final Closing Speed. It should be set reasonably low so that when the DCL (Door Close Limit) and the Close Stop Roller are reached without slamming or bouncing.

NUDGING SPEED (Par. 6):
The Nudging Speed is the reduced speed that is equal or less than 60% of the max. HSC. This Nudging Speed is only occurred when DC (Door Close) and NUDG. (Nudging) input signals take place simultaneously

CLOSE ACCELERATION TIME (Par. 7):
The higher value produces a slower acceleration rate for smoother operation. The lower value produces a faster acceleration rate for faster opening times.

CLOSE DECELERATION TIME (Par. 8):
The Deceleration should be set so that the FSC is reached prior to the DCL and the Close Stop Roller position without bouncing.

STALL REVERSE FORCE (Par. 9):
The Default value of this Parameter is 1.5Amp. Whenever the current is above this value, the Drive will send a signal to turn on the STALL REVERSE LED and activate the REOPEN Relay. The range for this Parameter is 0-2Amp. If nuisance activation takes place, the value of this Parameter should be increase slightly.

OVERLOAD (Par. 99)
This is the Maximum Limit of the Motor Current. If the Motor Current exceeds this Limit, the Drive will shutdown, generate the OVER CURRENT FAULT, and turn on the FAULT LED. Recycling the Power to MOVFR or using the Reset switch on the Main Board or the Parameter Unit will Reset the Fault. However, a thorough inspection should be done before Resetting the Fault.

B. Opening Sequence:

QUICK STOP ON REVERSE (Par. 21):
Parameter 21 determines how quick the closing door is stopped when a reopen signal is activated. The range of Parameter 21 is from 0 to 6Amp. The lower value setting will produce a longer time to stop before the door can reopen. When the reopen signal is applied, the door should not move more than 2 inches before it reopens. (Note: too quick of a stop will degrade the doors mechanicals)

SLOW START OPEN – SSO (Par. 22):
When the door starts to open, the value of Par. 22 is the speed at which the clutch engages the interlock rollers unlock the hoistway door. A slower speed produces a smoother and quieter unlocking noise.

HIGH SPEED OPEN – HSO (Par. 23):
This is the highest speed for the overall opening sequence. The higher value produces a faster speed.

MEDIUM SPEED OPEN – MSO (Par. 24):
This speed is used for a fast reopening in the final 1/3 to 1/4 of the opening. When properly adjusted, this speed has little or no effect during the full reopening cycle because the doors will decelerate through MSO zone. Virtually the doors will decelerate from HSO to FSO.

FINAL SPEED OPEN – FSO (Par. 25)
This is the Final Opening Speed. It should be set reasonably low so that the DOL (Door Open Limit) and the Open Stop Roller are reached without slamming or bouncing.

OPEN ACCELERATION TIME (Par. 26).
The higher value produces a slower acceleration rate for smoother operation. The lower value produces a faster acceleration rate for faster opening times.

OPEN DECELERATION TIME (Par. 27).
The Deceleration should be set so that the FSC is reached prior to the DCL and the Close Stop Roller position without bouncing.

SLOW SPEED TORQUE (Par. 28).
This Parameter is set at 0 as a default value. The range of this Parameter is from 0 to 30%. It is a torque boost Parameter at low speed. It is a useful Parameter for the heavy doors, if needed.

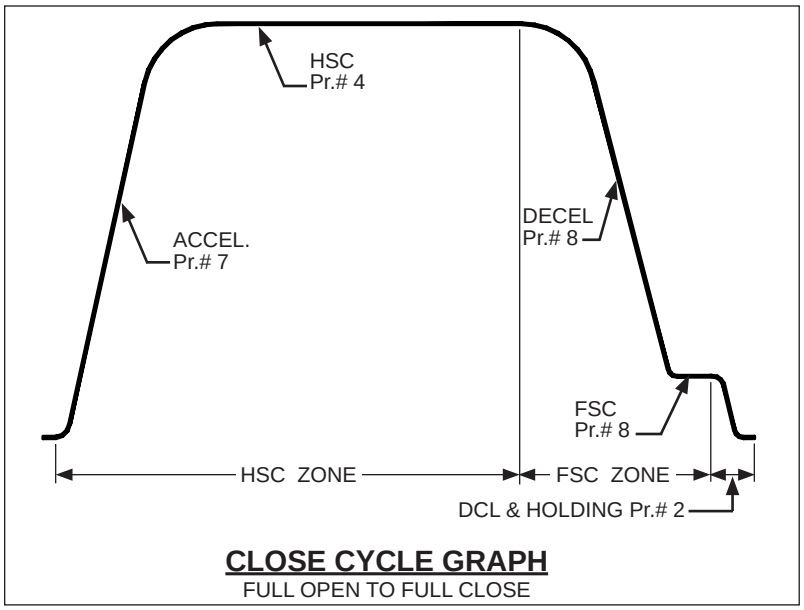
OPEN TORQUE (Par. 29)
The Default value of this Parameter should be suitable for most doors. Nevertheless, the rule for adjustment for this Parameter is: The higher value will produce less torque, and vice versa.

C. Carrier frequency:

CARRIER FREQUENCY (Par. 51)
The nominal frequency of the carrier wave is set by Parameter 51. The Default value is 10KHz. The MOVFR Drive is compliant with the CE regulation. However, if adjacent electronics, with poor EMI immunity, are affected by EMI of the MOVFR, users can lower the value of this Parameter to reduce the EMI level. The trade-off is the lower carrier frequency; the more audible noise will be produced by the motor.

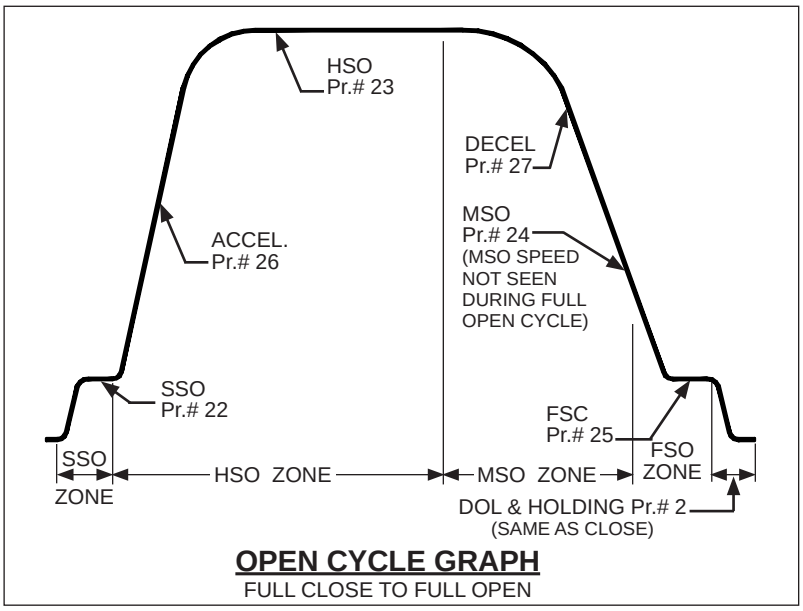
7.7 Speed profiles of the MOVFR:

A. Closing Cycle:



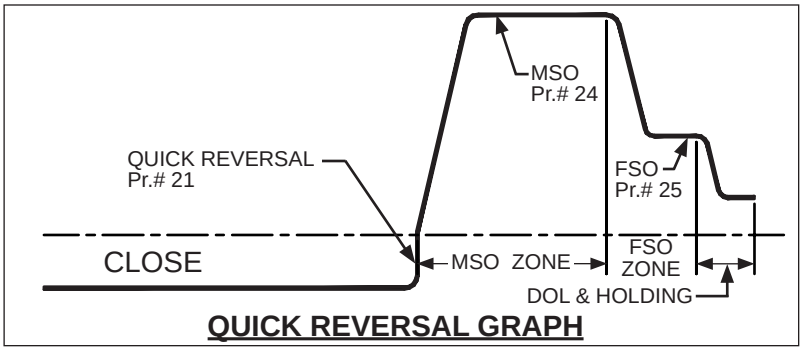
CLOSE CYCLE GRAPH
FULL OPEN TO FULL CLOSE

B. Opening Cycle:



OPEN CYCLE GRAPH
FULL CLOSE TO FULL OPEN

C. Quick Reversal:



QUICK REVERSAL GRAPH

7.8 Cam setting versus Distance:

CLOSING DIRECTION ←				
SPEED	**DCL**	**DPM**	**FSC**	**HSC**
DISTANCE	Last **1/4 inch**	1/2 inch before Gate Switch is activated	Last **4 inches**	Until the door reaches **4 inches from the final close**
CAM **4** FSC				
CAM **5** DPM				
CAM **6** DCL				

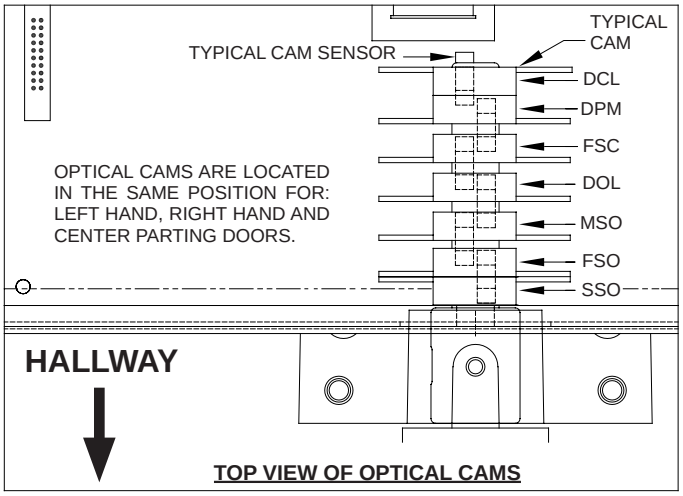
OPENING DIRECTION →					
SPEED	**SSO**	**HSO**	**MSO**	**FSO**	**DOL**
DISTANCE	Until the clutch makes up (first 1/2 inch	From the clutch made up (approx. 1/2) in to **3/4** of the total door width	Last **1/4** of the total door width	Last 4 inches	Last 1/4 inch
CAM **1** SSO/FSO					
CAM **2** MSO					
CAM **3** DOL					

CONVENIENT CAM ↔		
ACTION	**ACTIVATE AUX. RELAY**	**DEACTIVATE AUX. RELAY**
DISTANCE	Customer Setup	Customer Setup
CAM **7** AUX.		

= CAM BLOCKED

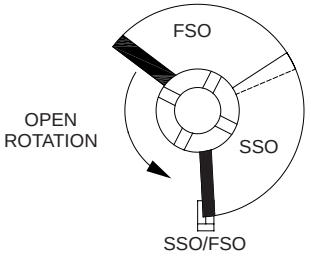
= CAM UNBLOCKED

7.9 Rotational cam setting:

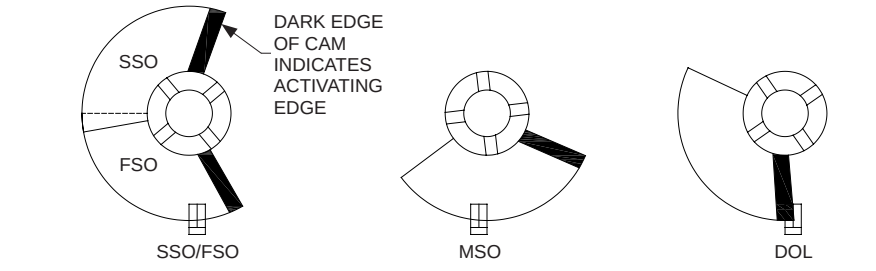


TOP VIEW OF OPTICAL CAMS

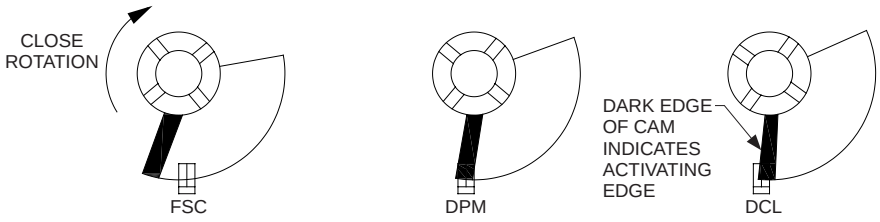
RIGHT HAND CAMS



FSO & SSO CAMS DOOR FULLY CLOSED

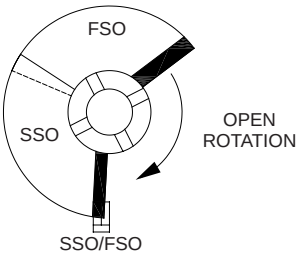


DOOR OPEN CAMS - DOOR FULLY OPEN

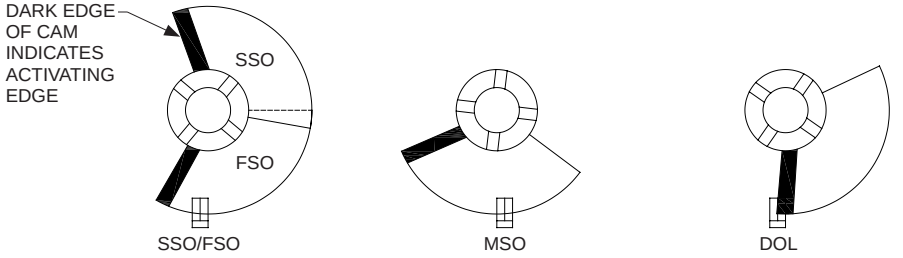


DOOR CLOSE CAMS - DOOR FULLY CLOSED

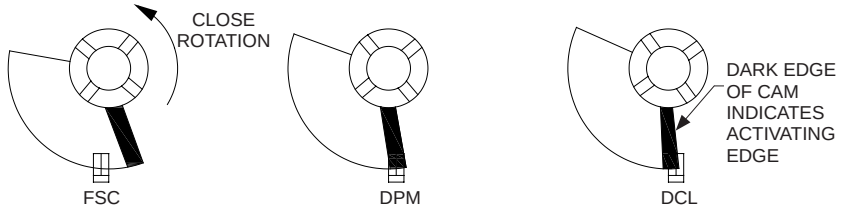
LEFT HAND AND CENTER PARTING CAMS



FSO & SSO CAMS DOOR FULLY CLOSED



DOOR OPEN CAMS - DOOR FULLY OPEN



DOOR CLOSE CAMS - DOOR FULLY CLOSED

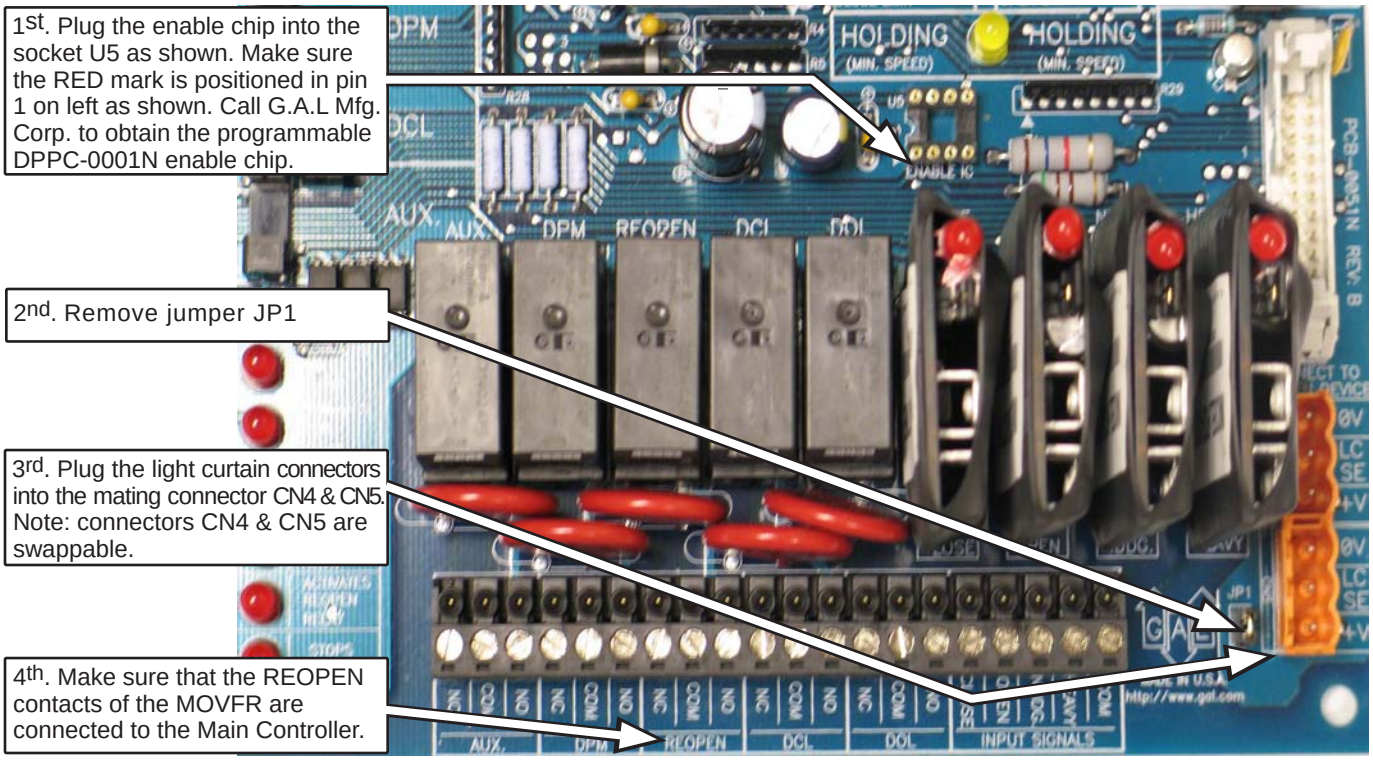
7.10 Interfacing between G.A.L. certified light curtain and MOVFR:

A. Procedure:

To take full advantage of the MOVFR and simplify the REOPENING circuits for the Door Operators, the REOPEN relay in the MOVFR board should be used to Reopen the doors in cases of:

- Exceeding the limit of the torque allowed.
- Exceeding the limit of the speed allowed.
- Obstructing the light curtain.

The exceeding Torque and exceeding Speed features have already been built in the MOVFR board. Additionally, for the obstruction of the Infrared Light Curtains, the following illustration shows the interfacing procedure of a **G.A.L. Certified Infra-Red Light Curtain** and the **G.A.L. MOVFR** board.



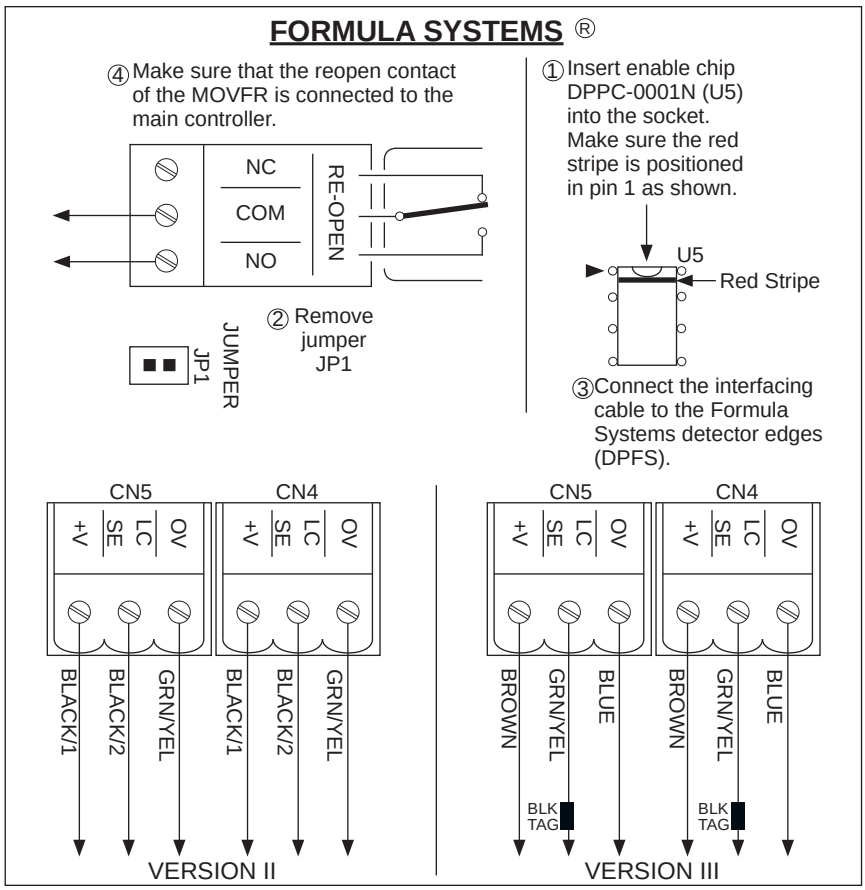
Followings are the G.A.L. Certified Infrared Light Curtain Detectors, in alphabetical order, that are available from G.A.L Mfg. Corp (http://www.gal.com).
Toll Free Phone: **1-877-425-3538 (877-GAL-ELEV)**

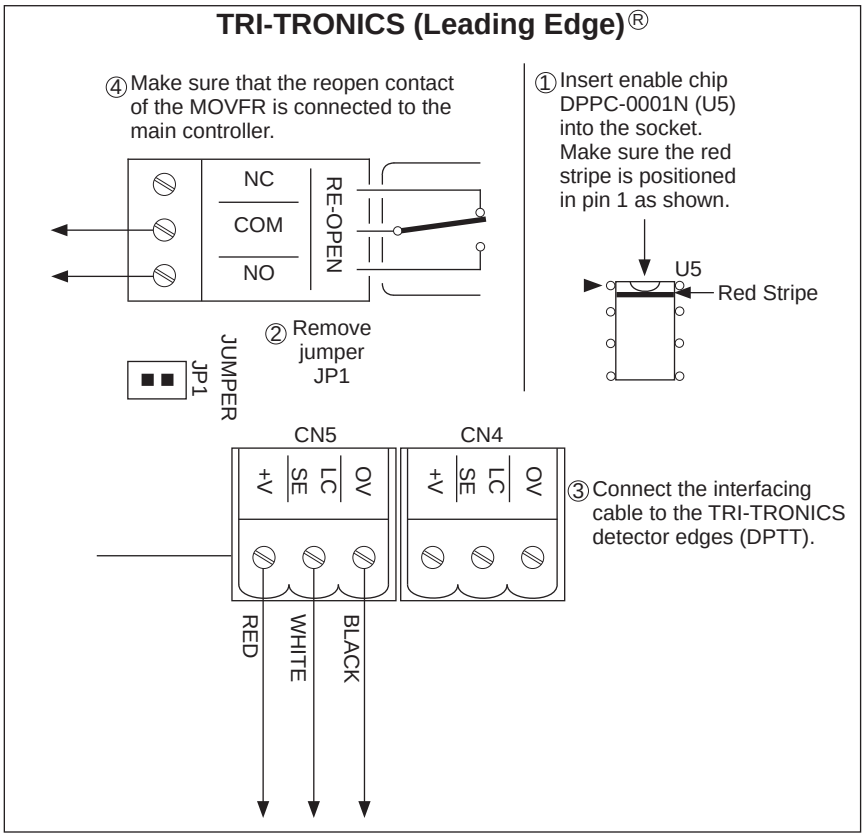
- Formula Systems
- Tri-Tronics

B. Operation:

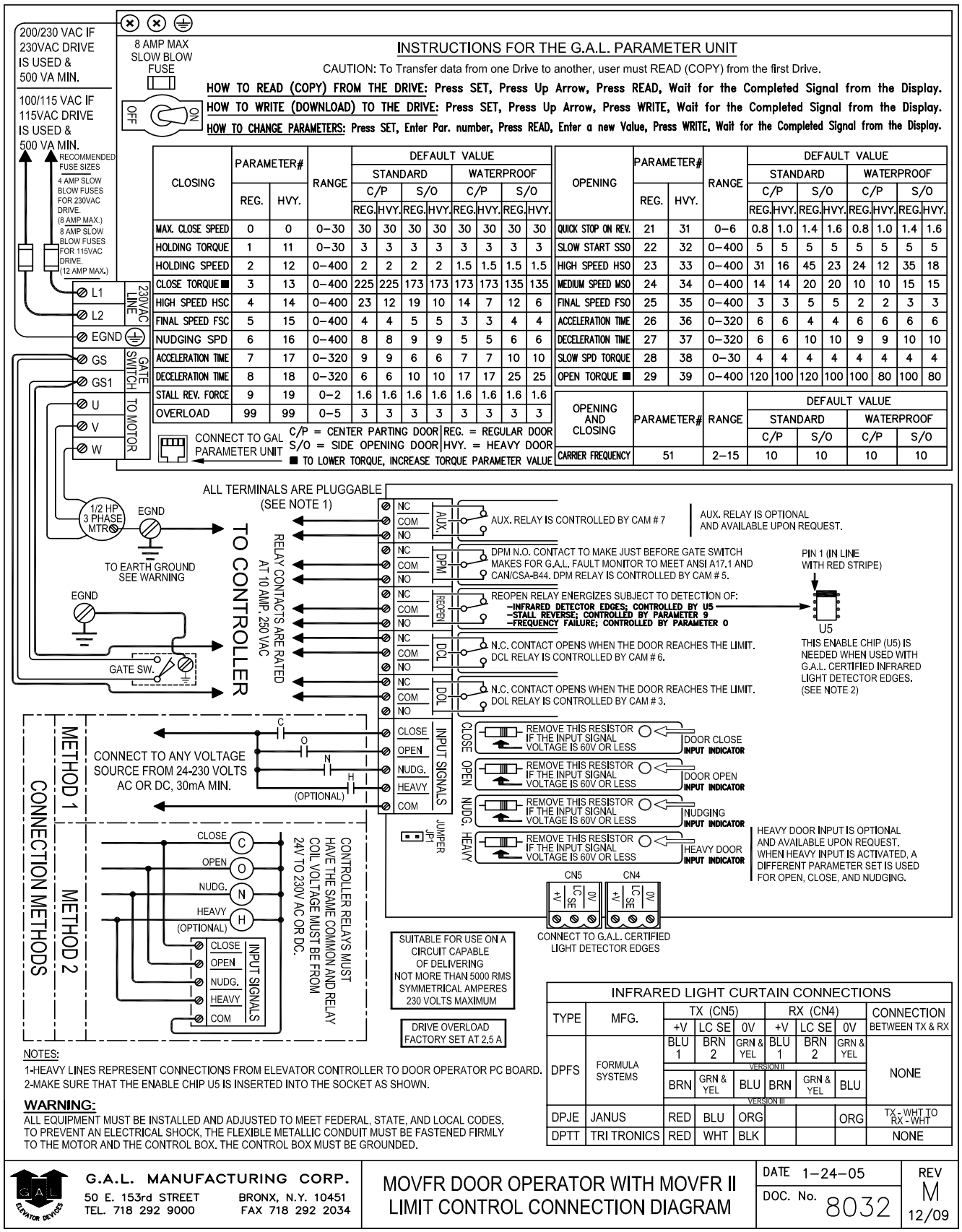
When obstruction on the edges occurs, the reopen LED on the MOVFR will turn on and the reopen relay will be activated. The reopen contacts will send reopen signal to the main controller and wait for the DO (Door Open) Signal from the Main Controller to Reopen the door.

C. Wiring diagram:





7.11 MOVFR connection diagram:



CLOSING	PARAMETER# REG.	PARAMETER# HVY.	RANGE	DEFAULT VALUE STANDARD C/P REG.	STANDARD C/P HVY.	STANDARD S/O REG.	STANDARD S/O HVY.	WATERPROOF C/P REG.	WATERPROOF C/P HVY.	WATERPROOF S/O REG.	WATERPROOF S/O HVY.
MAX. CLOSE SPEED	0	0	0–30	30	30	30	30	30	30	30	30
HOLDING TORQUE	1	11	0–30	3	3	3	3	3	3	3	3
HOLDING SPEED	2	12	0–400	2	2	2	2	1.5	1.5	1.5	1.5
CLOSE TORQUE ■	3	13	0–400	225	225	173	173	173	173	135	135
HIGH SPEED HSC	4	14	0–400	23	12	19	10	14	7	12	6
FINAL SPEED FSC	5	15	0–400	4	4	5	5	3	3	4	4
NUDGING SPD	6	16	0–400	8	8	9	9	5	5	6	6
ACCELERATION TIME	7	17	0–320	9	9	6	6	7	7	10	10
DECELERATION TIME	8	18	0–320	6	6	10	10	17	17	25	25
STALL REV. FORCE	9	19	0–2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
OVERLOAD	99	99	0–5	3	3	3	3	3	3	3	3

OPENING	PARAMETER# REG.	PARAMETER# HVY.	RANGE	DEFAULT VALUE STANDARD C/P REG.	STANDARD C/P HVY.	STANDARD S/O REG.	STANDARD S/O HVY.	WATERPROOF C/P REG.	WATERPROOF C/P HVY.	WATERPROOF S/O REG.	WATERPROOF S/O HVY.
QUICK STOP ON REV.	21	31	0–6	0.8	1.0	1.4	1.6	0.8	1.0	1.4	1.6
SLOW START SSO	22	32	0–400	5	5	5	5	5	5	5	5
HIGH SPEED HSO	23	33	0–400	31	16	45	23	24	12	35	18
MEDIUM SPEED MSO	24	34	0–400	14	14	20	20	10	10	15	15
FINAL SPEED FSO	25	35	0–400	3	3	5	5	2	2	3	3
ACCELERATION TIME	26	36	0–320	6	6	4	4	6	6	6	6
DECELERATION TIME	27	37	0–320	6	6	10	10	9	9	10	10
SLOW SPD TORQUE	28	38	0–30	4	4	4	4	4	4	4	4
OPEN TORQUE ■	29	39	0–400	120	100	120	100	100	80	100	80

OPENING AND CLOSING	PARAMETER#	RANGE	DEFAULT VALUE STANDARD C/P	STANDARD S/O	WATERPROOF C/P	WATERPROOF S/O
CARRIER FREQUENCY	51	2–15	10	10	10	10

INFRARED LIGHT CURTAIN CONNECTIONS									
TYPE	MFG.	TX (CN5) +V	TX (CN5) LC SE	TX (CN5) 0V	RX (CN4) +V	RX (CN4) LC SE	RX (CN4) 0V	CONNECTION BETWEEN TX & RX
DPFS	FORMULA SYSTEMS	BLU 1	BRN 2	GRN & YEL	BLU 1	BRN 2	GRN & YEL	NONE
		VERSION II						
		BRN	GRN & YEL	BLU	BRN	GRN & YEL	BLU	
		VERSION III						
DPJE	JANUS	RED	BLU	ORG			ORG	TX - WHT TO RX - WHT
DPTT	TRI TRONICS	RED	WHT	BLK				NONE

NOTES:
1-HEAVY LINES REPRESENT CONNECTIONS FROM ELEVATOR CONTROLLER TO DOOR OPERATOR PC BOARD.
2-MAKE SURE THAT THE ENABLE CHIP U5 IS INSERTED INTO THE SOCKET AS SHOWN.

WARNING:
ALL EQUIPMENT MUST BE INSTALLED AND ADJUSTED TO MEET FEDERAL, STATE, AND LOCAL CODES. TO PREVENT AN ELECTRICAL SHOCK, THE FLEXIBLE METALLIC CONDUIT MUST BE FASTENED FIRMLY TO THE MOTOR AND THE CONTROL BOX. THE CONTROL BOX MUST BE GROUNDED.

G.A.L. MANUFACTURING CORP.
50 E. 153rd STREET BRONX, N.Y. 10451
TEL. 718 292 9000 FAX 718 292 2034

MOVFR DOOR OPERATOR WITH MOVFR II LIMIT CONTROL CONNECTION DIAGRAM

DATE 1–24–05
DOC. No. 8032
REV M 12/09

7.12 Fault description and Fault reset:

F01 **HW Over Current**

The AC drive detects an abnormal increase in current. The maximum allowable hardware current is 300% (9A). When the drive output has exceeded this limit, the “F01” fault code will display on the parameter unit display.

F02 **Over Voltage**

The AC drive detects that the DC bus voltage has exceeded its maximum allowable value, 400V. When the DC bus voltage has exceeded this value, the “F02” fault code will display on the parameter unit display.

F03 **Heatsink OverTmp**

The AC drive temperature sensor detects excessive heat. When the Heat Sink temperature has exceeded 95^{o}C, the “F03” fault code will display on the parameter unit display.

F04 **Drive Overload**

The AC drive detects excessive drive output current. The AC drive can withstand up to 150% of rated current (4.5A) for 1 minute. When this limit has been exceeded, the “F04” fault code will display on the parameter unit display.

F07 **Motor Overload**

The AC drive detects an excessive motor load. When the value of maximum allowable motor load, which is the setting value of Pr.#99 multiplied by 150% for 1 minute, has been exceeded, the “F07” fault code will display on the parameter unit display.

F13 **Ground Fault**

The AC drive output is abnormal. When the output terminal is grounded (short circuit current is 50% more than the AC drive rated current), the AC drive power module may be damaged. The short circuit protection is provided for AC drive protection, not user protection.

F14 **Under Voltage**

The AC drive detects that the DC bus voltage has fallen below its minimum value, 150VAC. When the input voltage has fallen below this value, the “F14” fault code will display on the parameter unit display.

F33 **Auto Reset Trials**

When the AC drive auto-reset a fault unsuccessfully, the “F33” fault code will display on the parameter unit display.

F100 **EEPROM failure**

When the internal memory IC cannot be programmed, the “F100” fault code will display on the parameter unit display.

NOTE: All the above Faults are re-settable by change the Value of Parameter 110 to 1 and use the following procedure:

Set Par. 112 for the Number of Retries.
Default Value: 6 Range: 0 → 9 Increment: 1

After fault occurs, the AC drive can be reset/restarted automatically up to 10 times. Setting this parameter to 0 will disable the reset/restart operation after any fault has occurred.

Set Par.113 for the Retry Waiting Time.
Default Value: 2.5 Range: 0 → 120.0 Sec. Increment: 0.1 Sec.

Sets the time **between** restart attempts when Auto Rstrt Tries is set to a value other than zero.

Set Par. 114 for the Retry Selection.
Default Value: 1023 Range: 0 → 1023 Increment: 1

Settings 1: Ground Fault can be auto reset
2: Over Voltage can be auto reset
4: Over Current can be auto reset
8: Low Voltage can be auto reset
16: Motor Over Load can be auto reset
32: Drive Over Temperature can be auto reset
64: Drive Over Load can be auto reset
128: Current sensor Broken can be auto reset
256: EEPROM Broken can be auto reset
512: Software Over Voltage can be auto reset

Example:

If a “Ground Fault”, “Over Current” and “Drive Over Load” needs to be auto reset then Par 114 should be set to 69 (1+4+64). The default value is “1023” which means all faults can be auto reset.

Set Par. 115 for Reset Fault
Default Value: 0 Range: 0 → 2 Increment: 1

Settings 0: Idle State
1: Resets the active fault but does not clear any fault buffer
2: Resets the active fault and clears all fault buffers to “0”

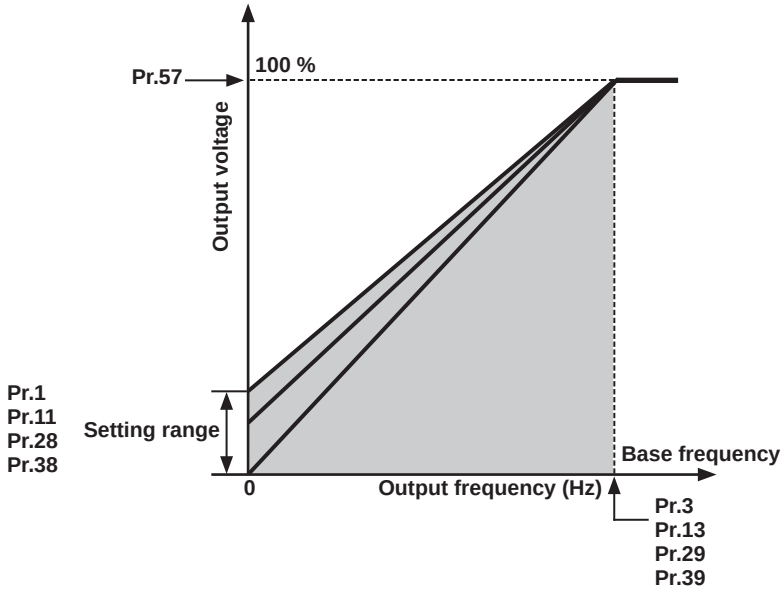
Resets a fault and clears the fault buffer. Used primarily to clear a fault over network communications.

7.13 Applications for the heavy input:

The door operator may operate two different hoist-way doors, one door is heavier than the other, in one elevator. As a result, the setting of Torque, and Speed of one door may not be applicable for the other door. More importantly, it may be a code violation issue due to the constraint of the kinetic energy and the Torque allowance. The HEAVY input will resolve this issue. When the HEAVY input is activated, the Drive will operate with a different set of Parameters for the heavier door.

In order to gain the access to the HEAVY set of Parameters, change the value of the Parameter 110 from 0 to 1. The HEAVY set of Parameters is located as follows:

Pr.11 Heavy Door Close Holding Torque
Unit: 0.1 %
Default: 3 %
Range: 0 ~ 30 %
Increase the setting when the motor torque in low speed range is insufficient.



Pr.12 Heavy Door Close Holding Speed
Unit: 0.1 Hz
Default: 2.0 Hz
Range: 0 ~ 400.0 Hz

Pr.13 Heavy Door Close Torque (Base Freq.)
Unit: 0.1 Hz
Default: 173.0 Hz
Range: 0 ~ 400.0 Hz
This parameter is used to adjust the AC drive output (voltage, frequency) to the motor rating.

Pr.14 Heavy Door High Speed Close (HSC)
Unit: 0.1 Hz
Default: 19.0 Hz
Range: 0 ~ 400.0 Hz

Pr.15 Heavy Final Speed Close (FSC)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.16 Heavy Door Nudging Speed
Unit: 0.1 Hz
Default: 9.0 Hz
Range: 0 ~ 400.0 Hz

Pr.17 Heavy Door Close Acceleration Time
Unit: 0.1 Sec
Default: 6.0
Range: 0 ~ 320.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

Pr.18 Heavy Door Close Deceleration Time
Unit: 0.1 Sec
Default: 10.0
Range: 0 ~ 320.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.19 Heavy Door Stall Reverse Force (output current detection level)
Unit: (0.1 %)
Default: 1.2A
Range: 0 ~ 200.0 %rated
If the output current remains higher than this setting during AC drive operation, the output current detection signal is on from the open collector output terminal of the AC drive.

Pr.31 Heavy Door Quick Stop on Reverse
Unit: 0.1 A
Default: 2.0A
Range: 0~180 %rated
This parameter determines the level of the DC braking current output to the motor during stopping.

Pr.32 Heavy Door Slow Start Open (SSO)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.33 Heavy Door High Speed Open (HSO)
Unit: 0.1 Hz
Default: 45.0 Hz
Range: 0 ~ 400.0 Hz

Pr.34 Heavy Door Medium Speed Open (MSO)

Unit: 0.1 Hz
Default: 20.0 Hz
Range: 0 ~ 400.0 Hz

Pr.35 Heavy Door Final Speed Open (FSO)

Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.36 Heavy Door Open Acceleration Time

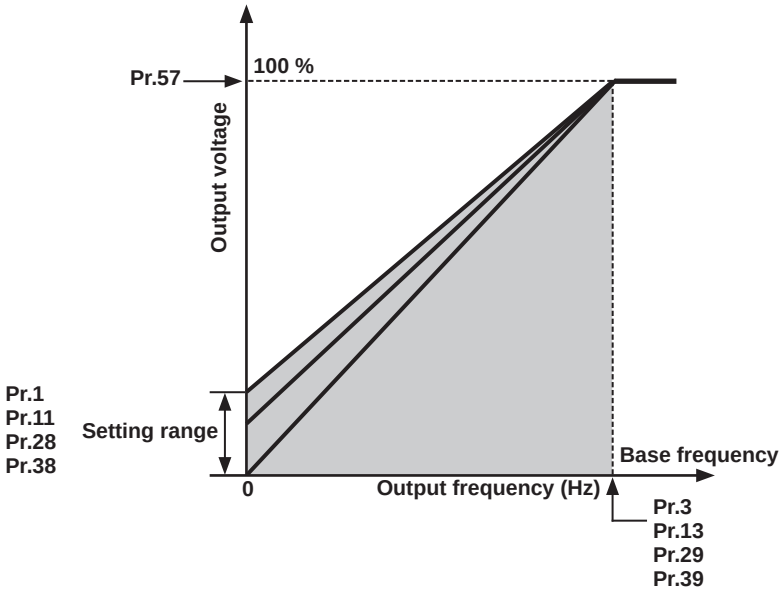
Unit: 0.1 Sec
Default: 4.0 Sec
Range: 0~400.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

Pr.37 Heavy Door Open Deceleration Time

Unit: 0.1 Sec
Default: 10.0 Sec
Range: 0 ~ 400.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.38 Heavy Door Open Slow Speed Torque

Unit: 0.1 %
Default: 0 %
Range: 0 ~ 30 %
Increase the setting when motor torque in low speed range is insufficient.



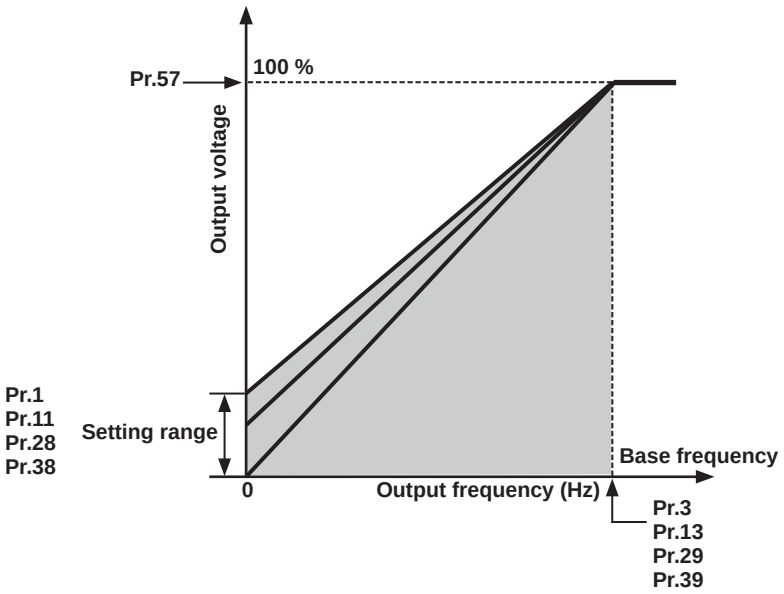
Pr.39 Heavy Door Open Torque (Second V/F (base frequency)

Unit: 0.1 Hz

Default: 80.0 Hz

Range: 0 ~ 400 Hz

Increase the setting when motor torque in low speed range is insufficient.



Pr.45 Heavy Door DC Injection Brake Operation Frequency

Unit: 0.1 Hz

Default: 60 Hz

Range: 0 ~ 400.0 Hz

This parameter determines the frequency that the DC braking will begin to output once frequency is reached during deceleration.

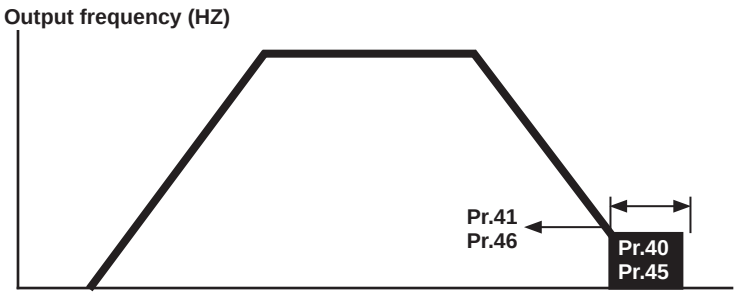
Pr.46 Heavy Door DC Injection Brake Operation Time

Unit: 0.1 Sec

Default: 1.0 Sec

Range: 0 ~ 10.0 Sec

This parameter determines the duration that the DC braking current will be applied to the motor during stopping.



7.14 Parameters list:

Pr.0 Max. Close Speed (Close Speed detection)
Unit: 0.1 Hz
Default: 30.0 Hz
Range: 0 ~ 400.0 Hz
The output frequency detection signal is on when the output frequency reaches or exceeds the setting value.

Pr.1 Close Holding Torque (torque boost)
Unit: 0.1 %
Default: 3 %
Range: 0 ~ 30 %
Increase the setting when motor torque in low speed range is insufficient.

Pr.2 Close Holding Speed
Unit: 0.1 Hz
Default: 2.0 Hz
Range: 0 ~ 400.0 Hz

Pr.3 Close Torque (Base Freq.)
Unit: 0.1 Hz
Default: 173.0 Hz
Range: 0 ~ 400.0 Hz
This parameter is used to adjust the AC drive output (voltage, frequency) to the motor rating.

Pr.4 High Speed Close (HSC)
Unit: 0.1 Hz
Default: 19.0 Hz
Range: 0 ~ 400.0 Hz

Pr.5 Final Speed Close (FSC)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.6 Nudging Speed
Unit: 0.1 Hz
Default: 9.0 Hz
Range: 0 ~ 400.0 Hz

Pr.7 Close Acceleration Time
Unit: 0.1 Sec
Default: 6.0
Range: 0 ~ 320.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

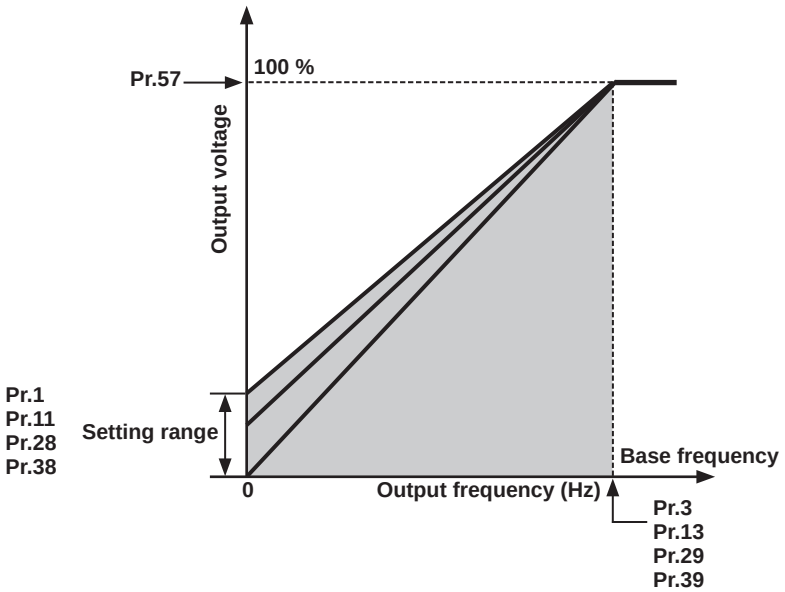
Pr.8 Close Deceleration Time
Unit: 0.1 Sec
Default: 10.0
Range: 0 ~ 320.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.9 Stall Reverse Force (output current detection level)
Unit: (0.1 %)
Default: 1.2A
Range: 0 ~ 200.0 %rated
If the output current remains higher than this setting during AC drive operation, the output current detection signal is on from the open collector output terminal of the AC drive.

Pr.11 Heavy Door Close Holding Torque
Unit: 0.1 %
Default: 3 %
Range: 0 ~ 30 %
Increase the setting when the motor torque in low speed range is insufficient.

Pr.12 Heavy Door Close Holding Speed
Unit: 0.1 Hz
Default: 2.0 Hz
Range: 0 ~ 400.0 Hz

Pr.13 Heavy Door Close Torque (Base Freq.)
Unit: 0.1 Hz
Default: 173.0 Hz
Range: 0 ~ 400.0 Hz
This parameter is used to adjust the AC drive output (voltage, frequency) to the motor rating.



Pr.14 Heavy Door High Speed Close (HSC)
Unit: 0.1 Hz
Default: 19.0 Hz
Range: 0 ~ 400.0 Hz

Pr.15 Final Speed Close (FSC)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.16 Heavy Door Nudging Speed
Unit: 0.1 Hz
Default: 9.0 Hz
Range: 0 ~ 400.0 Hz

Pr.17 Heavy Door Close Acceleration Time
Unit: 0.1 Sec
Default: 6.0
Range: 0 ~ 320.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

Pr.18 Heavy Door Close Deceleration Time
Unit: 0.1 Sec
Default: 10.0
Range: 0 ~ 320.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.19 Heavy Door Stall Reverse Force (output current detection level)
Unit: (0.1 %)
Default: 1.2A
Range: 0 ~ 200.0 %rated
If the output current remains higher than this setting during AC drive operation, the output current detection signal is on from the open collector output terminal of the AC drive.

Pr.20 Open Speed detection
Unit: 0.1 Hz
Default: 30.0 Hz
Range: 0 ~ 400.0 Hz
The output frequency detection signal is on when the output frequency reaches or exceeds the setting value.

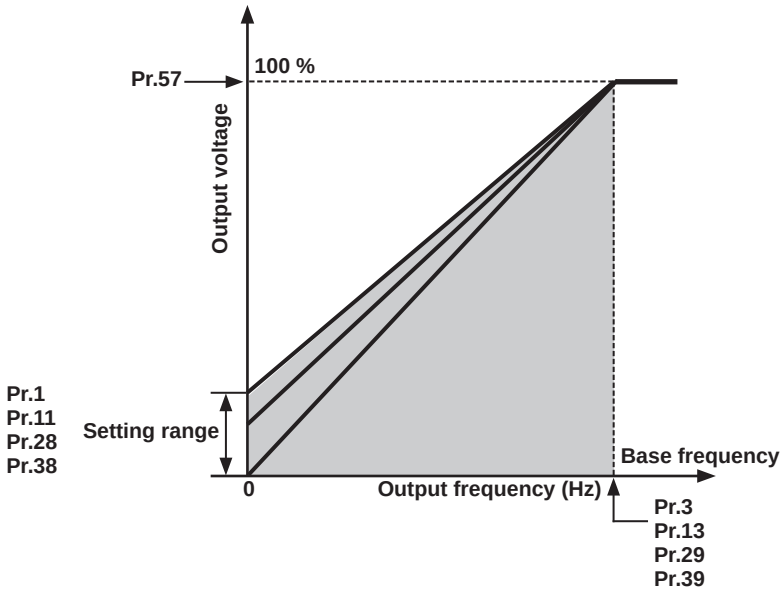
Pr.21 Quick Stop on Reverse
Unit: 0.1 A
Default: 2.0A
Range: 0~180 %rated
This parameter determines the level of the DC braking Current output to the motor during stopping.

Pr.22 Slow Start Open (SSO)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.23 High Speed Open (HSO)
Unit: 0.1 Hz
Default: 45.0 Hz
Range: 0 ~ 400.0 Hz

Pr.24 Medium Speed Open (MSO)
Unit: 0.1 Hz
Default: 20.0 Hz
Range: 0 ~ 400.0 Hz

Pr.25 Final Speed Open (FSO)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz



Pr.26 Open Acceleration Time
Unit: 0.1 Sec
Default: 4.0 Sec
Range: 0~400.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

Pr.27 Open Deceleration Time
Unit: 0.1 Sec
Default: 10.0 Sec
Range: 0 ~ 400.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.28 Open Slow Speed Torque
Unit: 0.1 %
Default: 0 %
Range: 0 ~ 30 %
Increase the setting when motor torque in low speed range is insufficient.

Pr.29 Open Torque (Second V/F (base frequency)
Unit: 0.1 Hz
Default: 80.0 Hz
Range: 0 ~ 400 Hz
Increase the setting when motor torque in low speed range is insufficient.

Pr.31 Heavy Door Quick Stop on Reverse
Unit: 0.1 A
Default: 2.0A
Range: 0~180 %rated
This parameter determines the level of the DC braking Current output to the motor during stopping.

Pr.32 Heavy Door Slow Start Open (SSO)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.33 Heavy Door High Speed Open (HSO)
Unit: 0.1 Hz
Default: 45.0 Hz
Range: 0 ~ 400.0 Hz

Pr.34 Heavy Door Medium Speed Open (MSO)
Unit: 0.1 Hz
Default: 20.0 Hz
Range: 0 ~ 400.0 Hz

Pr.35 Heavy Door Final Speed Open (FSO)
Unit: 0.1 Hz
Default: 5.0 Hz
Range: 0 ~ 400.0 Hz

Pr.36 Heavy Door Open Acceleration Time
Unit: 0.1 Sec
Default: 4.0 Sec
Range: 0~400.0 Sec
The Acceleration time is used to determine the time required for the AC drive to ramp from 0 Hz to its reference frequency (Pr.50).

Pr.37 Heavy Door Open Deceleration Time
Unit: 0.1 Sec
Default: 10.0 Sec
Range: 0 ~ 400.0 Sec
The Deceleration time is used to determine the time required for the AC drive to decelerate from the reference frequency (Pr.50) down to 0 Hz.

Pr.38 Heavy Door Open Slow Speed Torque
Unit: 0.1 %
Default: 0 %
Range: 0 ~ 30 %
Increase the setting when motor torque in low speed range is insufficient.

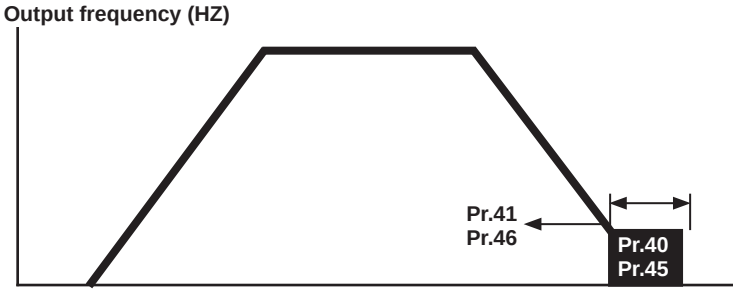
Pr.39 Heavy Door Open Torque (Second V/F (base frequency)
Unit: 0.1 Hz
Default: 80.0 Hz
Range: 0 ~ 400 Hz
Increase the setting when motor torque in low speed range is insufficient.

Pr.40 DC Injection Brake Operation Frequency
Unit: 0.1 Hz
Default: 60 Hz
Range: 0 ~ 400.0 Hz
This parameter determines the frequency that the DC braking will begin to output once frequency is reached during deceleration.

Pr.41 DC Injection Brake Operation Time
Unit: 0.1 Sec
Default: 1.0 Sec
Range: 0 ~ 10.0 Sec
This parameter determines the duration that the DC braking current will be applied to the motor during stopping.

Pr.45 Heavy Door DC Injection Brake Operation Frequency
Unit: 0.1 Hz
Default: 60 Hz
Range: 0 ~ 400.0 Hz
This parameter determines the frequency that the DC braking will begin to output once frequency is reached during deceleration.

Pr.46 Heavy Door DC Injection Brake Operation Time
Unit: 0.1 Sec
Default: 1.0 Sec
Range: 0 ~ 10.0 Sec
This parameter determines the duration that the DC braking current will be applied to the motor during stopping.



Pr.51 Max. Carrier Frequency
Carrier frequency for the PWM output waveform
Unit: 0.1k Hz
Default: 11.0k Hz
Range: 2.0 ~ 15.0kHz
This parameter determines the maximum carrier frequency of the AC drive.

Carrier Frequency	Acoustic Noise	Electromagnetic Noise, Leakage Current	Heat Dissipation
2KHz ↕ 15KHz	Significant ↕ Minimal	Minimal ↕ Significant	Minimal ↕ Significant

From the table, the PWM carrier frequency has a significant influence on the electromagnetic noise, heat dissipation of the AC drive, and the acoustic noise to the motor.

Pr.67 Door Zone Functionality
Unit: 1
Default: 0
Range: 0 ~ 1
0: Disable Door Zone Functionality
1: Enable Door Zone Functionality

Pr.99 Motor Over Load Current
Unit: 0.1 A
Default: 2.5 A
Range: 0 ~ 6 A
The setting is proportional to the rated current of motor.

Pr.110 User Group Read Selection
Unit: 1
Default: 0
Range: 0 ~ 9999
When the setting value is 1, user can view and select parameters Pr.0~46, 51, 67, 99, 110 and 112~115. If the setting value is set to any other value (not 1), user can view and select parameters Pr.0~9, 20~29, 51 and 110 only.

Pr.112 Number of Retries
Unit: 1
Default: 6
Range: 0 ~ 9
After a fault occurs, the AC drive can be reset/restarted automatically up to 10 times. Setting this parameter to 0 will disable the reset/restart operation after any fault has occurred.

Pr.113 Retry Waiting Time
Unit: 0.1 Sec
Default: 2.5 Sec
Range: 0 ~ 120.0 Sec
Sets the time between restart attempts when Auto Restart Tries is set to a value other than zero.

Pr.114 Retry Selection
Unit: 1
Default: 1023
Range: 0 ~ 1023
1: Ground Fault can be auto reset
2: Over Voltage can be auto reset
4: Over Current can be auto reset
8: Low Voltage can be auto reset
16: Motor Over Load can be auto reset
32: Drive Over Temperature can be auto reset
64: Drive Over Load can be auto reset
128: Current sensor Broken can be auto reset
256: EEPROM Broken can be auto reset
512: Software Over Voltage can be auto reset
If a “Ground Fault”, “Over Current” and “Drive Over Load” needs to be auto reset then Par114 should be set to 69 (1+4+64). The default value is “1023” which means all faults can be auto reset.

Pr.115 Reset Fault
Unit: 1
Default: 0
Range: 0 ~ 2
0: Idle State
1: Resets the active fault but does not clear any fault buffer
2: Resets the active fault and clears all fault buffers to “0”
Resets a fault and clears the fault buffer. Used primarily to clear a fault over network communications.

7.15 How to replace the drive:

1. Disconnect the door operator power from the machine room
2. Flip ON-OFF switch on operator board to OFF position and the AUTO-MAN switch to the MAN position Wait 10 minutes for the drive’s internal capacitor to completely discharge.
3. Unplug the ribbon cable from the drive.
4. Unplug the green power connector.
5. Remove drive mounting screws.
6. Install the new drive
7. Plug the green power connector
8. Plug the ribbon cable to the drive
9. Reapply power to the drive but leave the switch in the MAN position for now.
10. WRITE the parameters from the parameter unit into the drive as explained in section 7.5
11. Check door operation with the OPEN-CLOSE switch before returning the system to AUTO.

Copyright © 2004, G.A.L. Manufacturing Corporation
All rights reserved.
No part of this document may be reproduced in any form, machine or natural, without the express written consent of G.A.L Manufacturing Corporation.