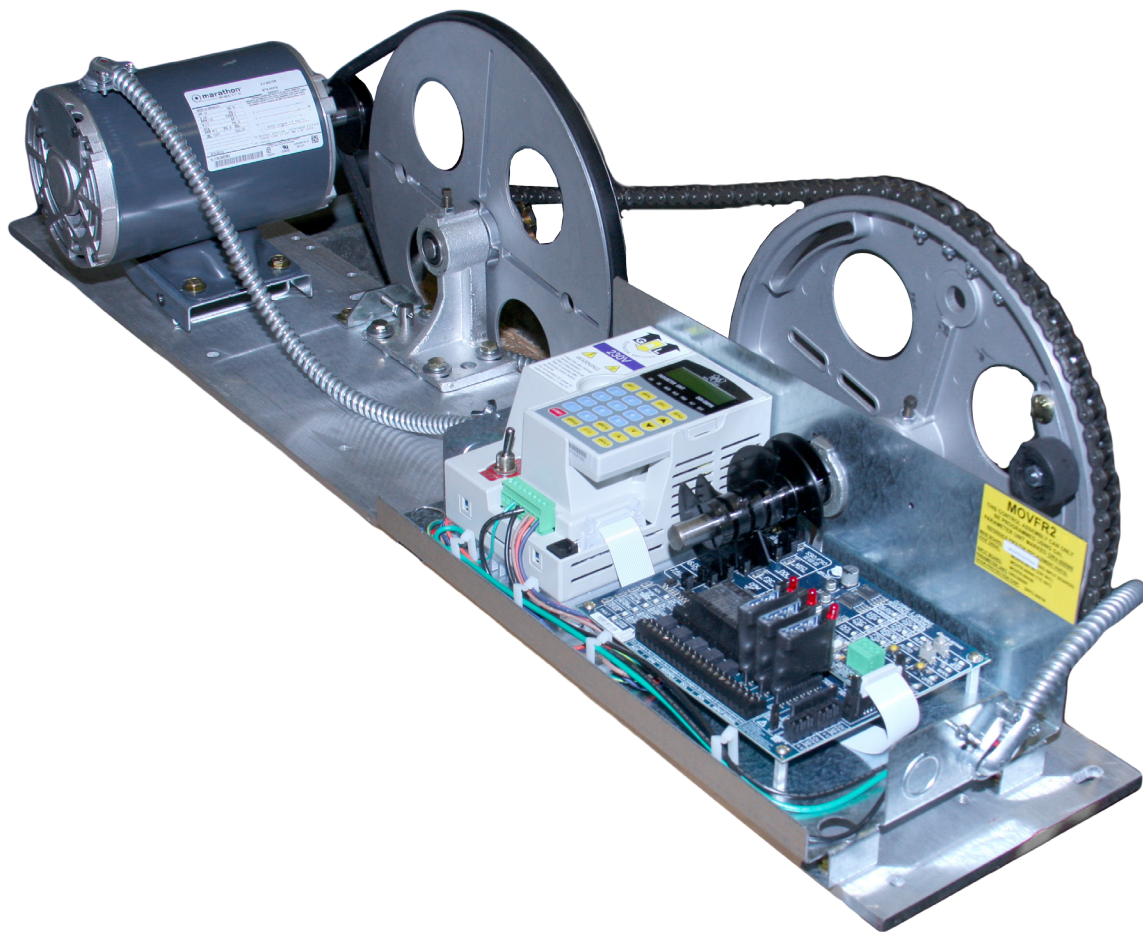


MOVFR

2017

DOOR OPERATOR



The fastest, easiest, quietest, and most dependable door operator ever available from GAL is now even better. If you are not installing MOVFR, you don't know how good a door operator can be.



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MOVFR

DOOR OPERATOR INSTALLATION AND ADJUSTING MANUAL

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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 Note

All equipment must be installed, adjusted, tested and maintained to comply with all Federal, State, and Local codes. See section 7.6, page 24 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.

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.

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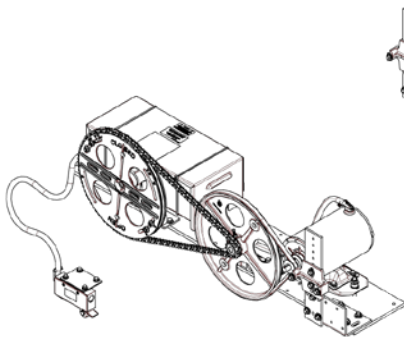
 7.1.5 How to replace the drive 45

MOVFR

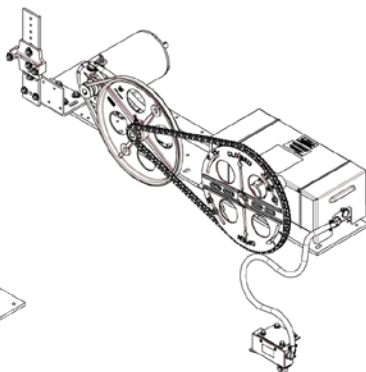
MECHANICAL ADJUSTMENTS

1. MOVFR OPERATORS

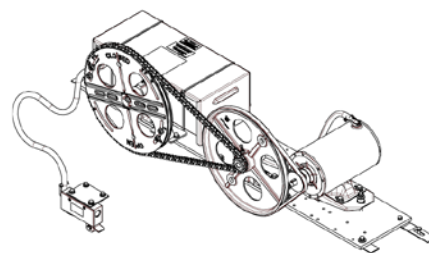
The MOVFR door operator utilizes a 1/2 HP AC motor. The controls include the AC motor, a VVVF drive and a PC board. The illustrations on this page show the three different versions available (Left Hand, Right Hand and Center Parting) and the clearance envelopes.



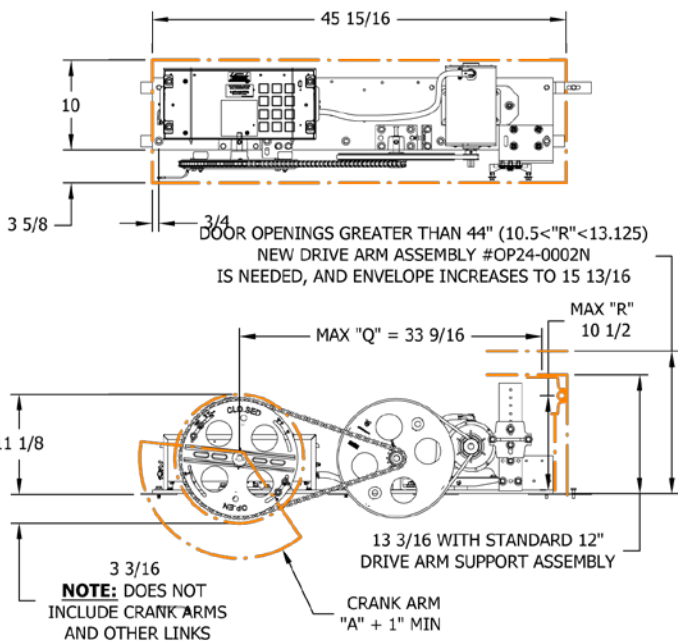
LEFT HAND SIDE OPENING



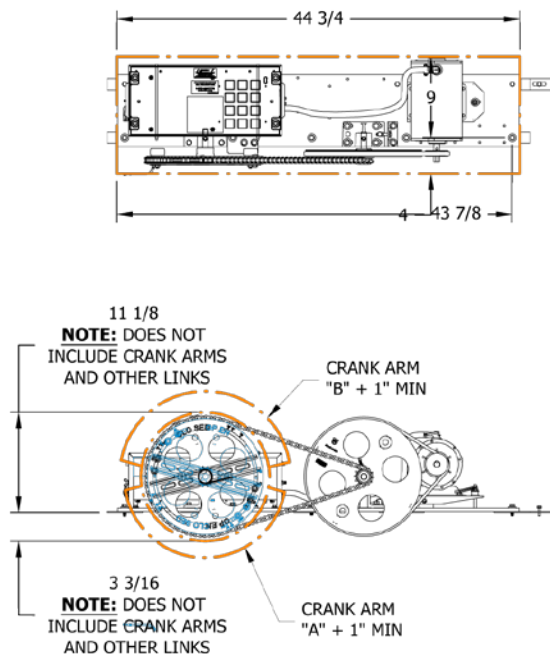
RIGHT HAND SIDE OPENING



CENTER PARTING OPENING



LEFT HAND ENVELOPE

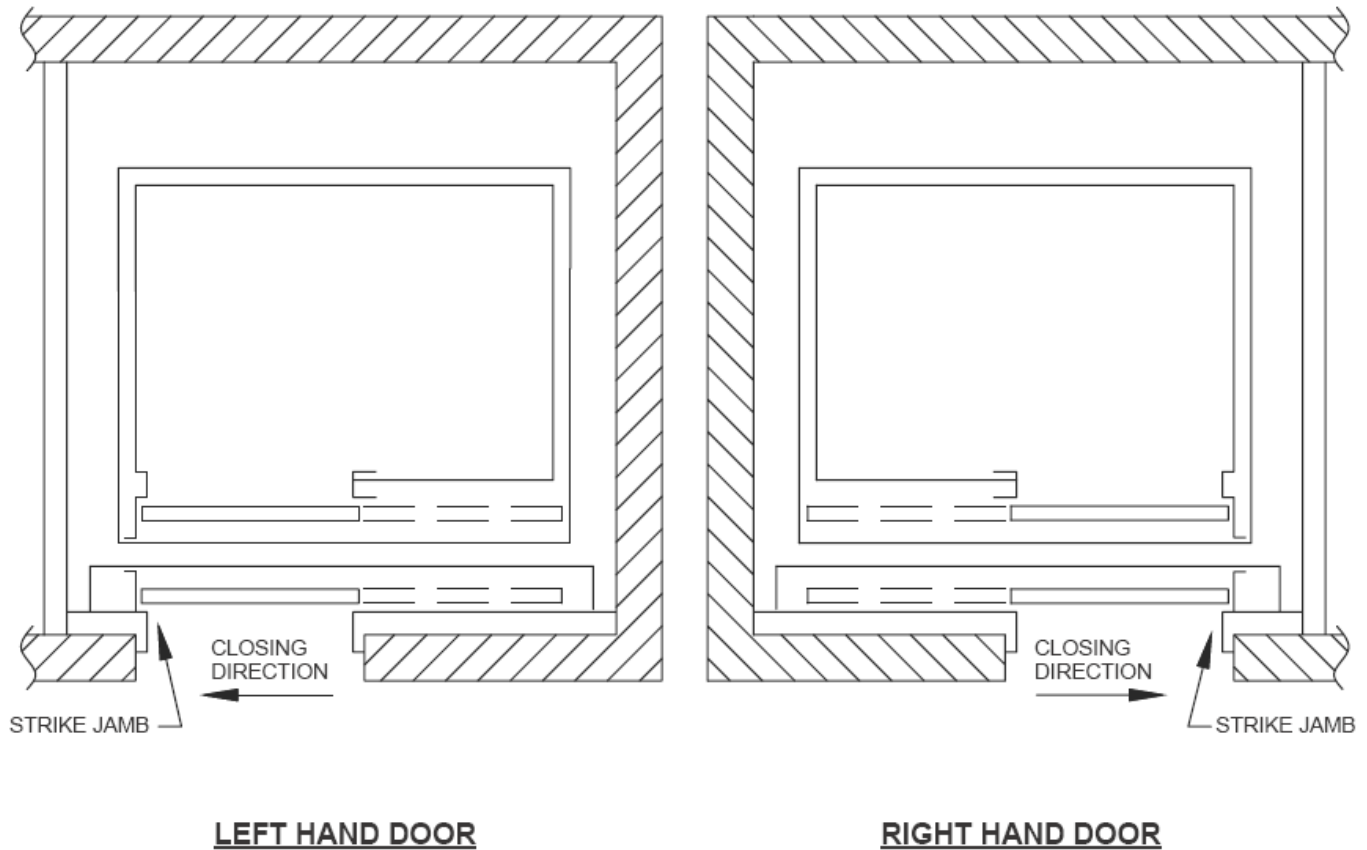


CENTER PARTING ENVELOPE

2. DETERMINING THE HAND OF THE DOOR

G.A.L. door operators are available for left and right 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 door closes to the left, it is a left hand door. If the door closes to the right, it is a right hand door.

To swap hands in the field, see http://www.gal.com/downloads/Movfr/MOVFR_Hand_Swap_Procedures.pdf



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 on its own. The door operator should be mounted in the proper position with the drive arm plumb and the operator arms 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" from daylight 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 side 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 clutch assembly to the drive door linkage, and then attach the clutch to the drive door using the pre-tapped holes or key-slots 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.

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.

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 made in parallel planes to the 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 TIPS
(REFER TO FIGURE 1)

Note: The stop rollers are factory set and should not be adjusted. Make sure that in both directions the operator stops against the stop roller and the operator links and bearings are not under stress.

For easier setup during installation do not mount door restricting components until operator adjustments are made. Think of the drive pulley crank arm(s) and the connecting link(s) as each having its own function.

The crank arm determines the total door travel. The further the arm is away from the drive pulley centerline, the further the door travels.

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

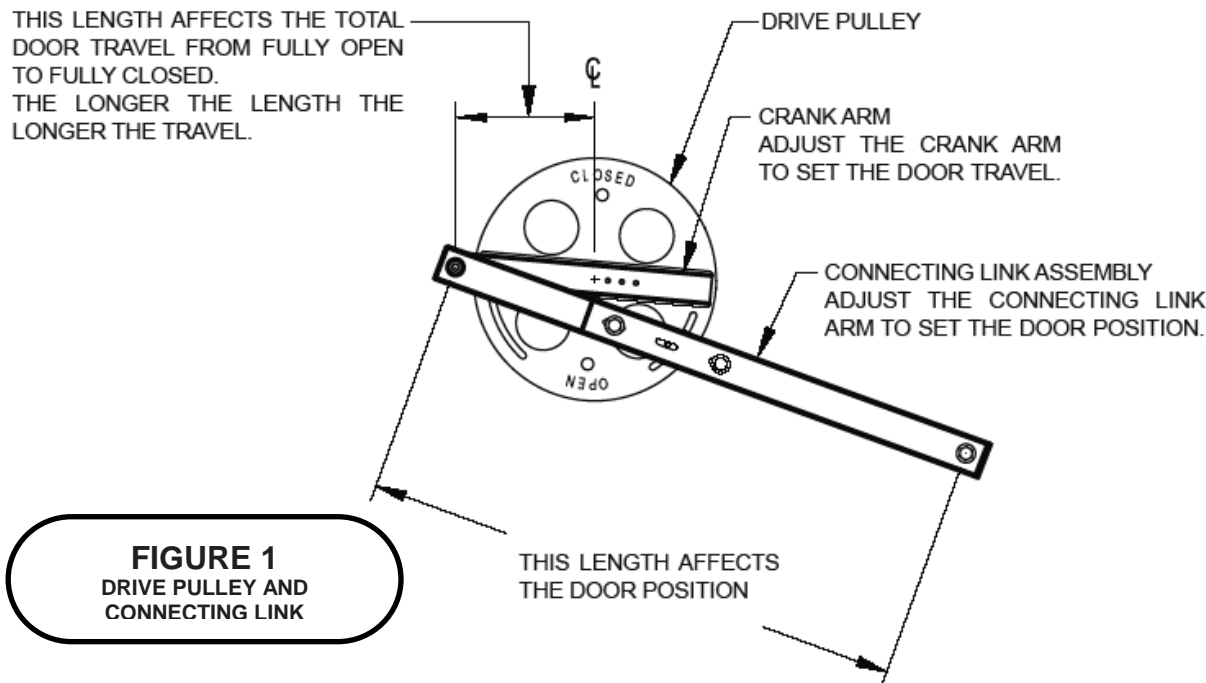
Example:

The door opening is 42” but the door travels only 40” as stopped by the open and close stop rollers.

To correct the under travel, when in the full open position extend the connecting link from the drive pulley to move the door half way to the desired open position and retighten bolts. Then close the operator onto the close stop roller, loosen the crank arm bolts, position the door in the closed position (1 inch past daylight) and tighten. This will lengthen the crank arm dimension, increasing the travel.

Open the door onto the open stop roller and check the door position. If the door is not in the proper open position, repeat the above steps until correct positions are reached and then ensure all the bolts are properly tightened.

Remember the stop rollers are factory set and should not be adjusted. Make sure that in both directions the operator stops against the stop roller and the operator links and bearings are not under stress.



5. ADJUSTING SIDE SLIDE DOORS - SINGLE SPEED AND TWO SPEED

5.1. Crank arm and clutch link positions with door closed

The door closed is the most important position. Always end adjustments by checking this position. With the door closed and overlaps checked, the car doors should not be closed against a bumper or the strike jamb. Clearance of 1/16" is recommended. Mark the door position on the header for easier reference and repeating.

Mount the operator arms per appropriate template. To adjust, ensure the operator is closed against the stop and loosen the connecting link and crank arm bolts. Position the door to the closed position and re-tighten all bolts. If necessary, move the bolts to new holes.

Referring to **Figure 2**, with the door fully closed, the crank arm should be a few degrees above the horizontal and the clutch link about 20 degrees above the horizontal. This setting will help prevent slamming, yet still allow manual opening of the doors when the car is stopped at a landing during a power failure.

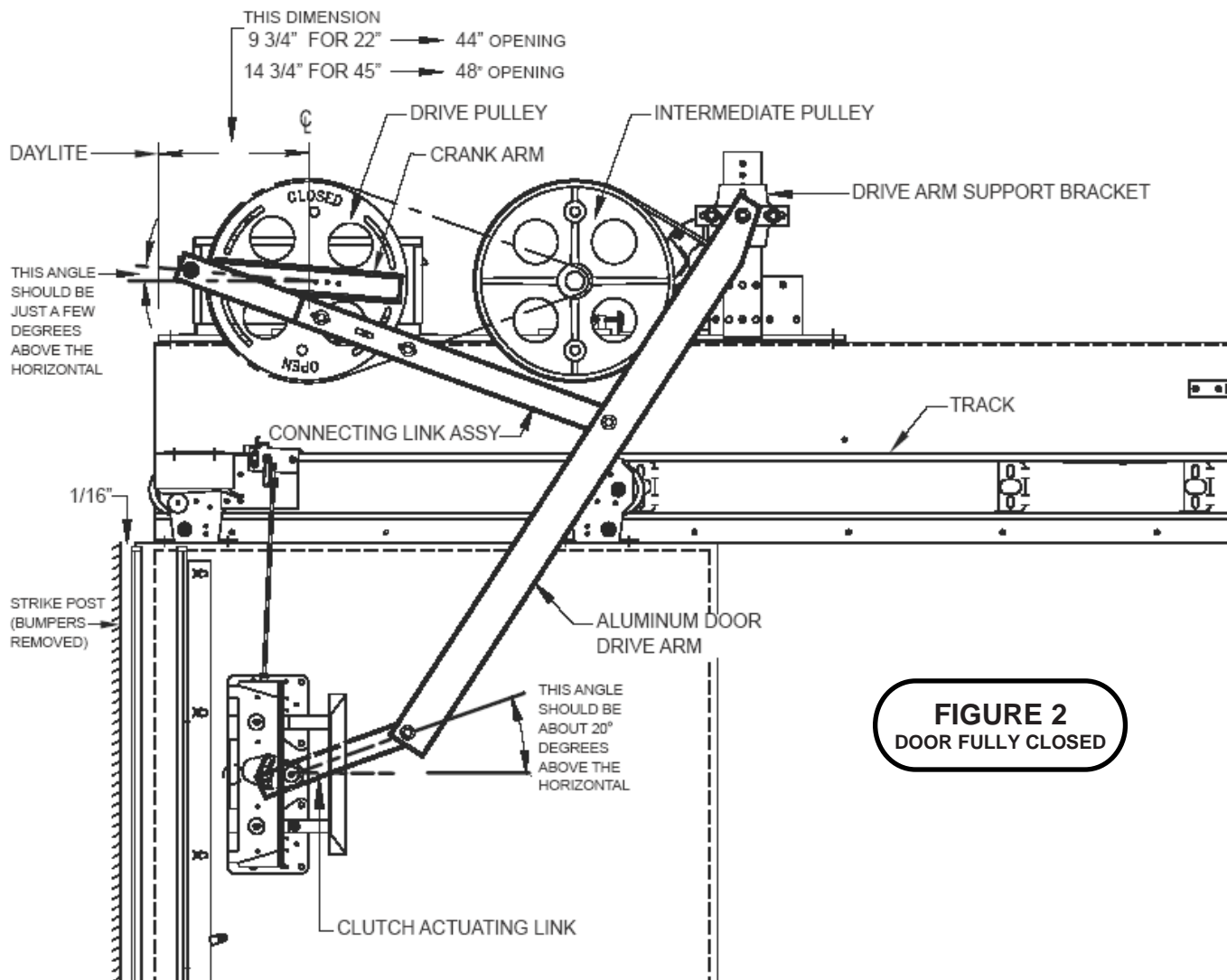
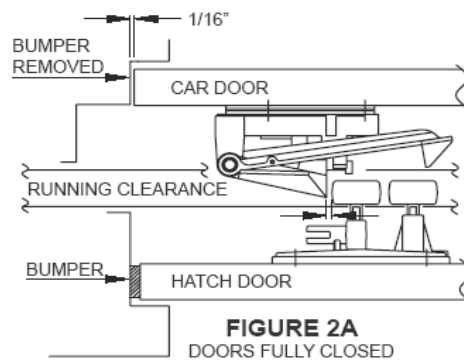


FIGURE 2
DOOR FULLY CLOSED

5.2. Crank arm and clutch link positions with door open

While opening and closing the door, please move the door manually. Check for binding to ensure maximum bearing life.

Referring to **Figure 3**, the best door opening operation occurs when the crank arm and the connecting link are roughly in a straight line (this holds the doors open against the force of the spring or reel closer). The clutch link is about horizontal and the car door is flush with the return jamb.

If the door does not open flush with the return jamb, adjust the connecting link to bring the door half way to the correct position. Then close the door and adjust the crank arm for door closed position (see previous section). Reopen door and check opening. Repeat as necessary.

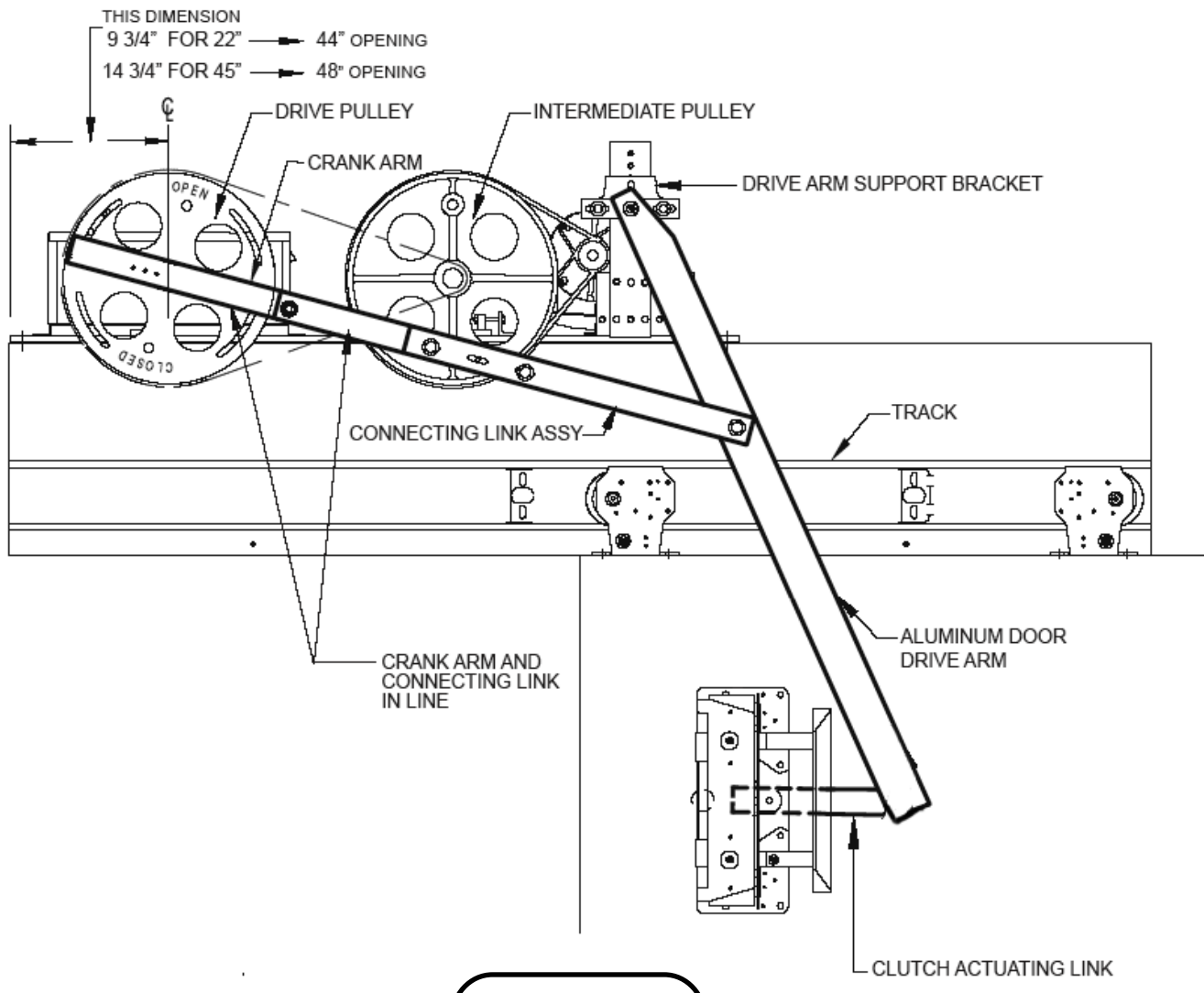
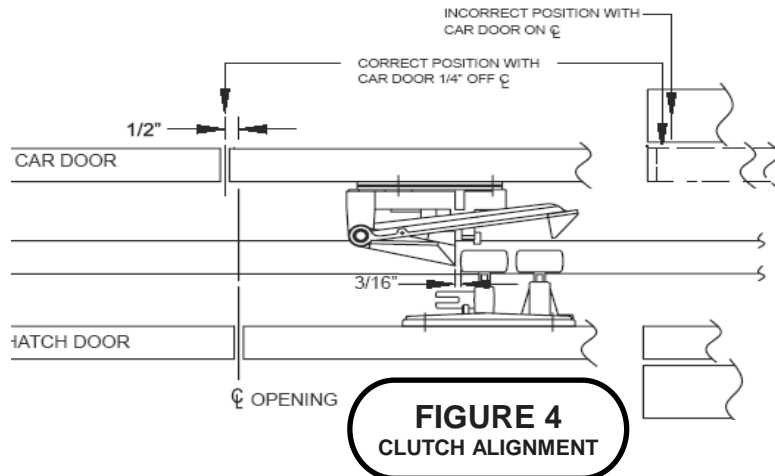


FIGURE 3
DOOR FULLY OPENED

6. ADJUSTING CENTER PARTING CAR DOORS

We recommend adjusting the driven car door so that it over travels the center of the opening by 1/2". This will allow the car door to match the hoistway door and jambs when fully open (if a double clutch system is used, center the doors). The car doors should not be closed hard against each other. Mark the door position on the header for easier reference and repeating.

NOTE: Center parting doors should be set up as two separate operations. First, set up the left (clutch side) door and then the right (driven side) door. The door closed is the most important position. Always end adjustments by checking this position.

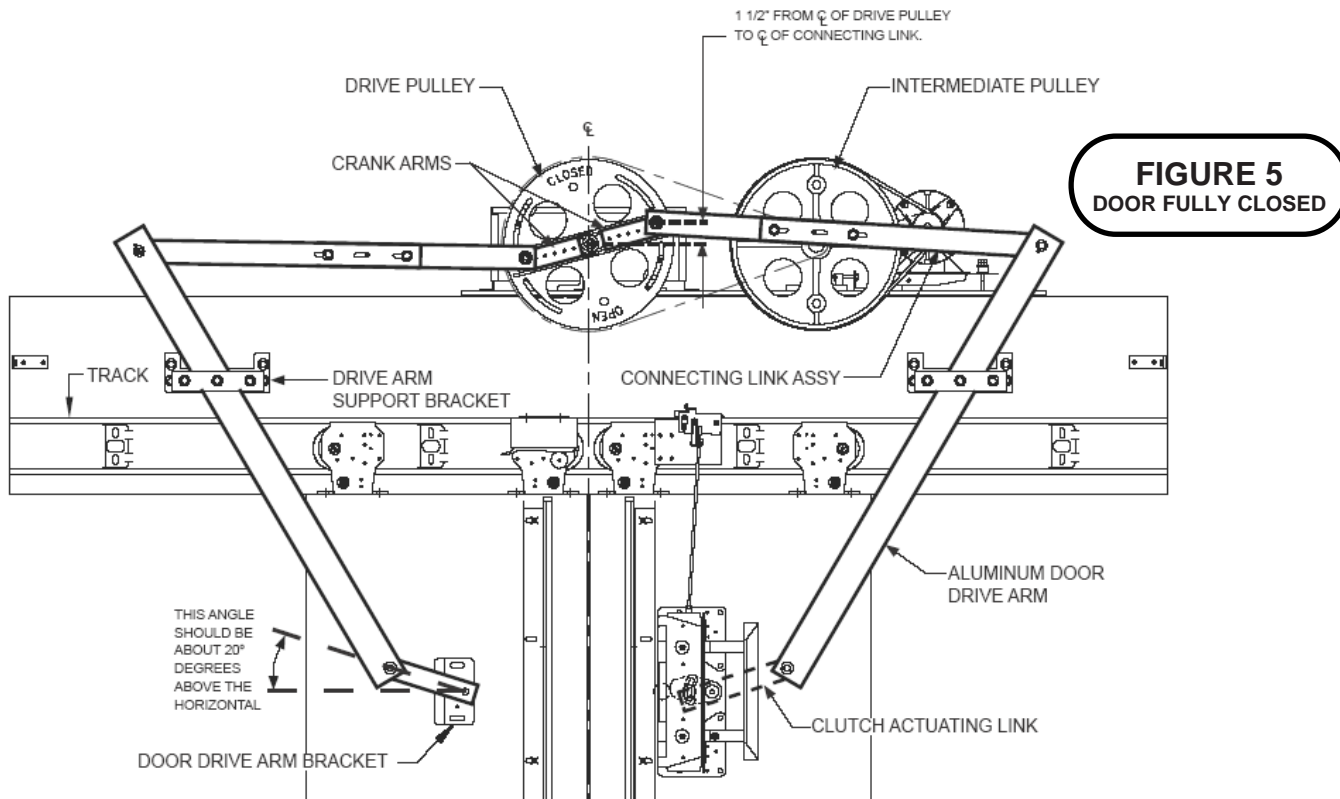


6.1. Crank arm and clutch link positions with door closed

Do not have pressure on the meeting car doors; otherwise it will place unwanted stress on the arms and bearings.

Mount the operator arms per appropriate template. To adjust, ensure the operator is closed against the stop and loosen the connecting link and crank arm bolts. Position the door being adjusted in the closed position and re-tighten all bolts. If necessary, move the bolts to new holes.

Referring to **Figure 5**, 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. This setting will help prevent slamming, yet still allow manual opening of the doors when the car is stopped at a landing during a power failure.



6.2. Crank arm and clutch link positions with doors open

While opening and closing the door, please move the door manually. Check for binding to ensure maximum bearing life.

As with side slide doors, the best door opening operation occurs when the crank arm and the connecting link are roughly in a straight line (this holds the doors open against the force of the spring or reel closer). The clutch link is about horizontal and the car door is flush with the return jamb.

If the door does not open flush with the return jamb, adjust the connecting link to bring the door half way to the correct position. Then close the door and adjust the crank arm for door closed position (see previous section). Reopen door and check opening. Repeat as necessary.

Referring to **Figure 6**, with the doors fully open, the connecting links should be about 1 1/2" apart. The clutch link should be no more than 10 degrees above the horizontal.

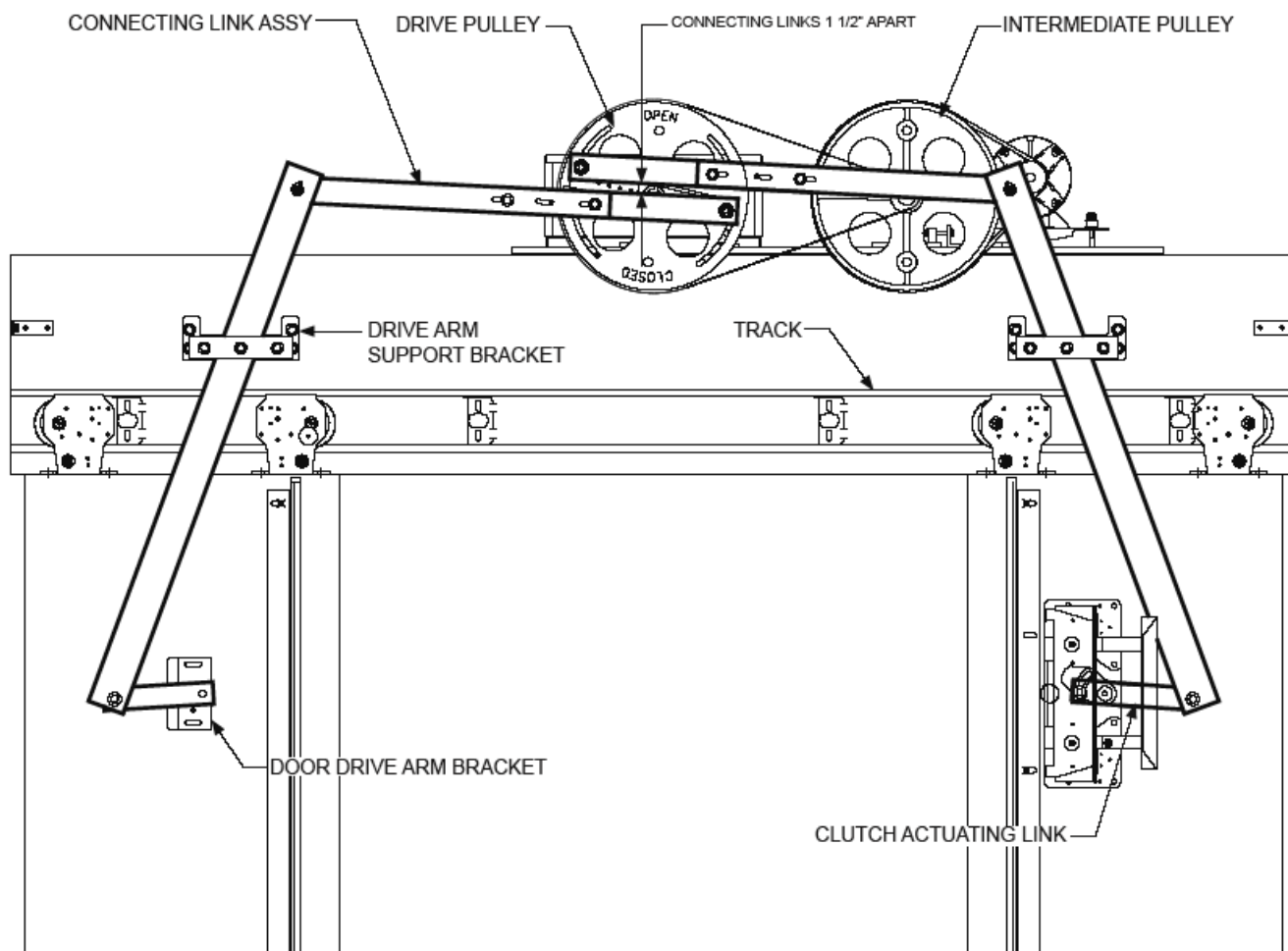
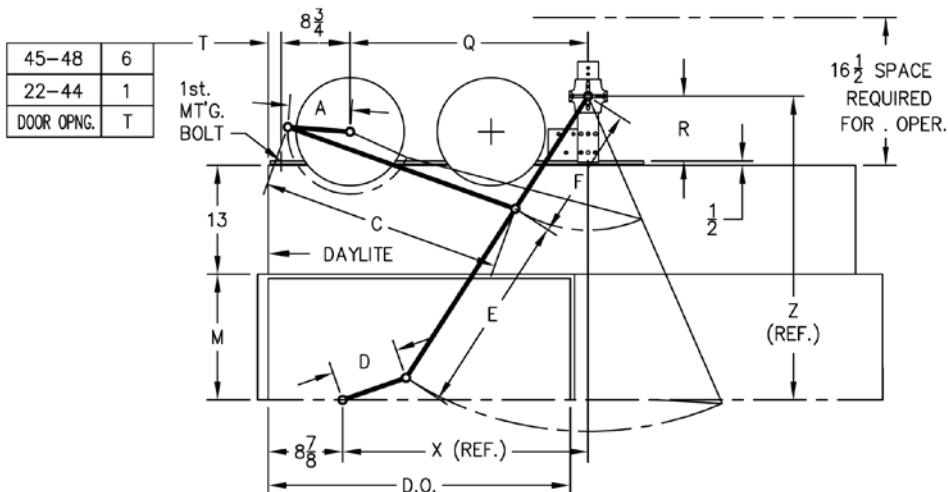


FIGURE 6
DOOR FULLY OPENED

6.3. Operator Data Tables for Side Slide and Center Parting doors



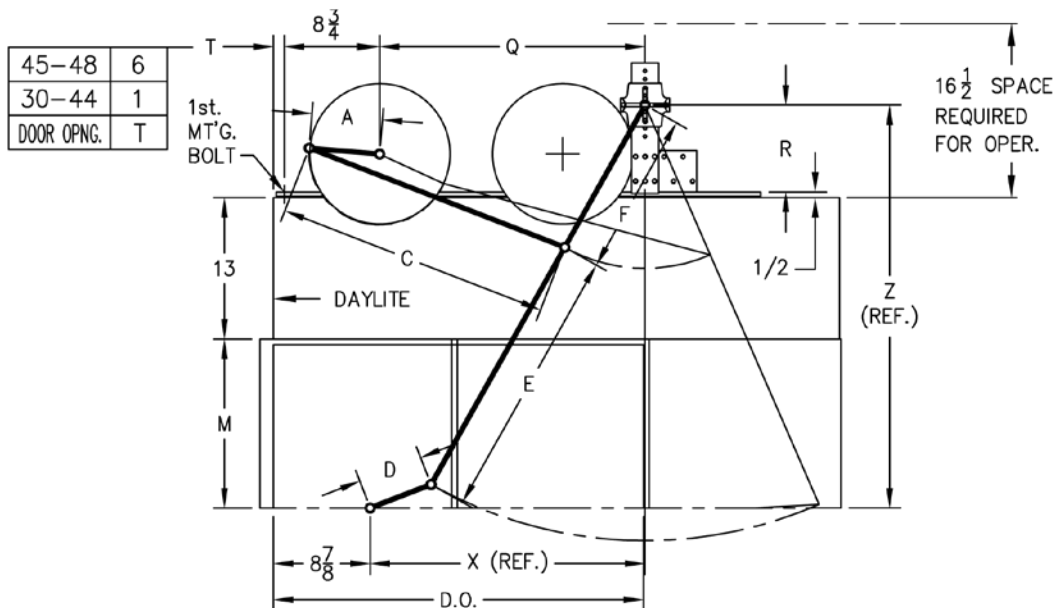
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47	9 7/8	34 1/8	12	31	21	23	39 5/8	47 1/2	33 3/4	11
46	9 11/16	33 15/16	12	31	21	23	39 5/8	47 1/2	33 3/4	11
45	9 1/2	33 3/4	12	31	21	23	39 5/8	47 1/2	33 3/4	11
44	9 7/8	34 3/4	10	26	20	19	34 5/8	42	33 3/4	9 1/2
43	9 11/16	34 9/16	10	26	20	19	34 5/8	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	



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

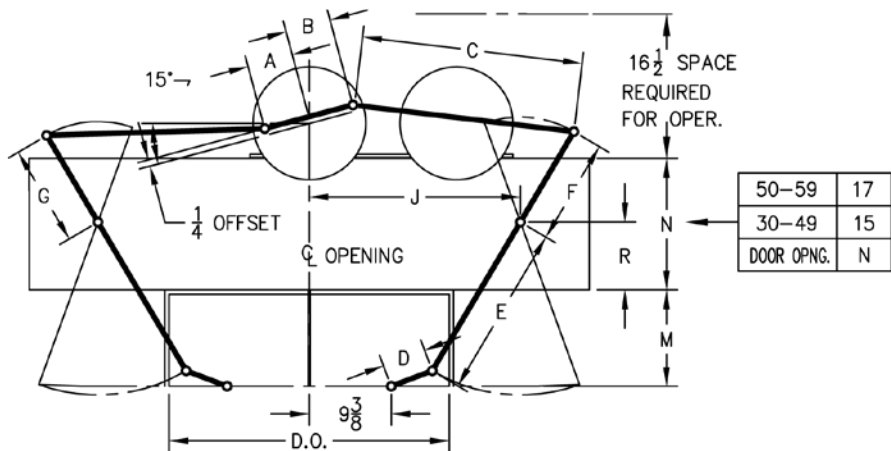
DOOR OPENING	OPERATOR ARMS	DOOR ARMS	CLUTCH	PIVOT	OPERATOR
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TWO SPEED 30-48 D.O. OPERATOR DATA TABLE

AUG. 23 1994

DATA22



59	7 3/4	8 3/16	35	8	29 1/2	15	14 1/2	19	7 3/4	34
58	7 5/8	8 1/16	35 1/8	8	29 1/2	15	14 1/2	19	7 3/4	34
57	7 1/2	7 15/16	35 1/4	8	29 1/2	15	14 1/2	19	7 3/4	34
56	7 3/8	7 13/16	35 3/8	8	29 1/2	15	14 1/2	19	7 3/4	34
55	7 1/4	7 11/16	35 1/2	8	29 1/2	15	14 1/2	19	7 3/4	34
54	6 7/16	7 1/2	34	8	29 1/2	15	13	19	8 1/2	33
53	6 5/16	7 3/8	34 3/16	8	29 1/2	15	13	19	8 1/2	33
52	6 3/16	7 1/4	34 5/16	8	29 1/2	15	13	19	8 1/2	33
51	6 1/16	7 1/8	34 7/16	8	29 1/2	15	13	19	8 1/2	33
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49	5 13/16	6 1/4	29 5/8	6	25 1/2	12	11 1/2	15	8 1/4	29
48	5 11/16	6 1/8	29 3/4	6	25 1/2	12	11 1/2	15	8 1/4	29
47	5 9/16	6	29 7/8	6	25 1/2	12	11 1/2	15	8 1/4	29
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31	4 15/16	5 1/4	25 3/8	5	19 3/4	12	11 1/2	11	7 3/4	24 1/8
30	4 13/16	5 1/8	25 1/2	5	19 3/4	12	11 1/2	11	7 3/4	24 1/8

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

MOVFR

ELECTRICAL ADJUSTMENTS

7. ELECTRICAL ADJUSTMENTS

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

7.1. Overview

MOVFR door operator can be purchased for either 115VAC or 230VAC. It is controlled by a variable voltage, variable frequency (VVVF) closed loop drive. The control includes a ½ HP 3-Ph AC 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 input control signals, Door Close Command (CLOSE), Door Open Command (OPEN), Nudging Command (NUDG.), Heavy Door Command (HEAVY) 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, Jumpers on Input Modules must be removed.

7.2. Adjustment aids

Switches, LEDs, small pushbuttons, and a Parameter Unit are available to aid the adjustment of the operator (see **Figure 7**).

Two toggle switches and four small pushbuttons are provided to facilitate the adjusting procedure as described 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 LEDs without applying power to the motor.
2. **AUTO/MAN. Switch** - AUTO position is for Normal operation. The MAN. position allows opening and closing the door by means of the OPEN or CLOSE pushbutton.
3. **OPEN or CLOSE pushbutton** - These are used to open or close doors when the AUTO/MAN. switch is in the MAN. position.
4. **NUDG. Pushbutton** - This allows closing the door at a reduced speed (nudging speed) when the AUTO/MAN. switch is in the MAN. position and constant pressure is applied to CLOSE pushbutton & NUDG pushbutton.
5. **HEAVY pushbutton** - When the AUTO/MAN. switch is in the MAN. position, if a constant pressure is applied to the HEAVY pushbutton, it will work in conjunction with OPEN, CLOSE, or NUDG. pushbuttons to open, close or nudge the door.
6. On the drive, the **Green LED** indicates the 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 and press the RESET key on the Parameter unit to Reset the MOVFR Drive. Then re-cycle power with the Main switch on the MOVFR drive.

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

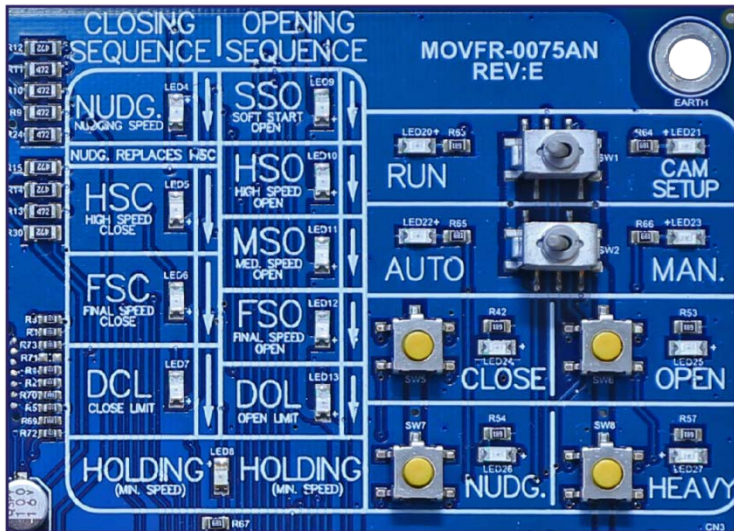
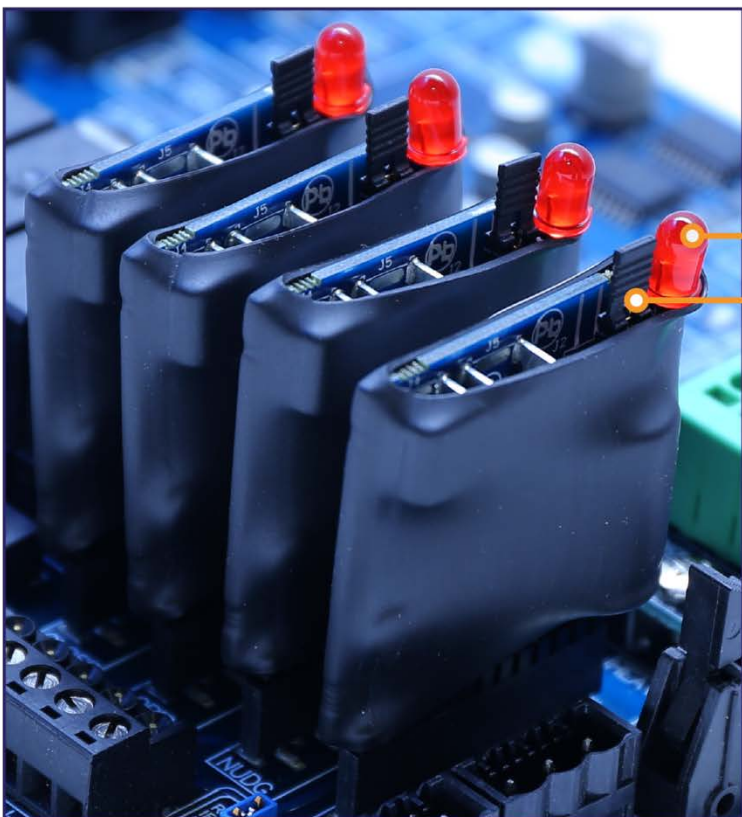


FIGURE 7
ADJUSTMENT TOGGLES
AND PUSHBUTTONS

LED pilot lights:

A Red LED is provided on each of the four input modules (OPEN, CLOSE, NUDG., HEAVY). Heavy input is optional and only available if ordered. Jumpers on the input modules must be removed if input signal voltage is 60 volts or less (see Figure 8).



Red LEDs for inputs
Control signal
Indicators

The input jumpers must
be removed if the input
signal voltage is 60v or
less.

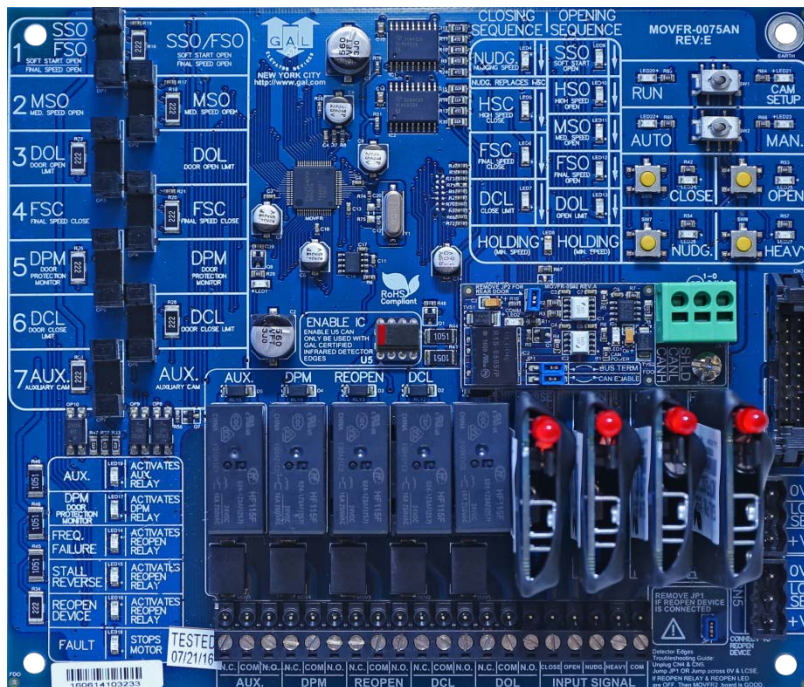
FIGURE 8
INPUT MODULES

Note! LEDs on input modules use the power of the Elevator controller to turn them on, **not the power of the MOVFR**. In AUTO mode, appropriate LEDs must be lit for door(s) to open or close.

Other LEDs described below 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 turns on (**see Figure 9**). These LEDs 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 turns on).
 9. HOLDING: Door is in DOL or DCL. (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 (the RE-OPEN LED light turns on when RE-OPEN output relay is energized from Light Curtain, Stall Reverse, or Frequency Failure).
 12. STALL REVERSE: In the close direction, if the door exceeds the Torque Limit set by Par. 9, the STALL REVERSE LED turns on and the RE-OPEN relay is 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 (Door Protection Monitor): A car door closed contact for safety features such as G.A.L. Fault monitor (DPM LED light turns on when DPM relay is energized).
 15. FAULT: If the FAULT LED light is on, it indicates that there is a Fault in the drive.
 16. AUX: The AUX. LED & AUX Relay will turn on when the AUX cam is blocked. AUX. Cam and AUX. Relay are optional and available upon request.
 17. RUN: For normal operation
 18. CAM SETUP: For setup
 19. AUTO: For auto mode
 20. MAN: For manual mode
 21. CLOSE: For manual close
 22. OPEN: For manual open
 23. NUDG: For manual nudge
 24. HEAVY: For manual heavy door
 25. LED1: Will be blinking with patterns described below

FIGURE 9
MOVFR BOARD



Toggle Switches	RUN	CAM SETUP
AUTO	Blinking 1 time for every second	Blinking 3 times for every second
MAN.	Blinking 3 times for every second	Blinking 3 times for every second

*Slow blinking, once for every second, indicates that the heartbeat of MCU is OK.
Fast blinking, 3 times for every second, reminds users to switch back to AUTO mode before closing the enclosure.*

Parameter unit:

Plug Parameter unit into the drive to change values of pertinent parameters (see **Figure 11**).

CANbus module:

If Controller Area Network (CAN) Protocol (only used for GALaxy Controllers) is employed to communicate with the MOVFR, then a CANbus Module MOVFR-0502AN must be used. Input modules, output Relays and connector CN1 are no longer needed.



FIGURE 10
CANbus MODULE

The green LED1, on the MOVFR-0502AN, is used to indicate that Power is provided to the CANbus Module.

COMM LED2: Will be blinking with patterns described below

Status→	COMMUNICATION IS OK	NO COMMUNICATION
Blinking Pattern→	Blinking 1 time for every second	ON (Solid)

7.3. Preliminary checks

This procedure is to ensure 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, press and hold the OPEN pushbutton while observing the door movement. If the motor turns in the wrong direction, turn Power OFF, swap any two of the three motor leads (U,V,W). The door should change speed as the various cams operate the speed controlling speed sensors.
- C. 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.
- D. When the door is fully opened, press and hold the CLOSE pushbutton. 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. 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.

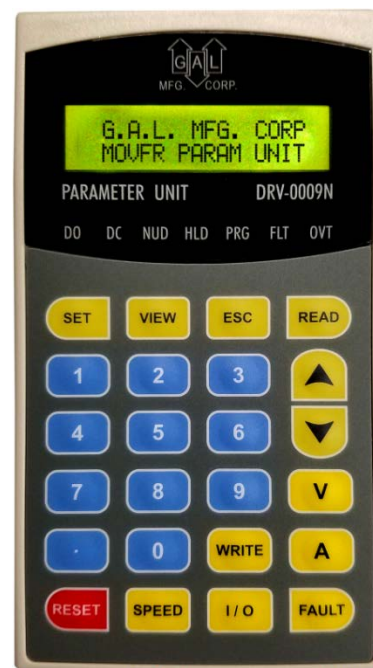
7.5. Parameter unit navigation

A. How to change parameters:

Press . Enter a Parameter Number.

Press . Enter a new Value. Press .
Wait for the Completed Signal from the Display.

FIGURE 11
PARAMETER UNIT



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

Note 1 : The Parameter Unit is capable to store four Sets of Default Parameters and one 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 . Press .

Press . Wait for the Completed Signal from the Display.

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

Set RUN/CAM setup switch to CAM setup.

Press . Press .

Press . Wait for the Completed Signal from the Display.

D. Default settings for the MOVFR drive:

CLOSING	PARAMETER #		RANGE	DEFAULT VALUE							
				STANDARD				WATERPROOF			
	REG.	HVY.		C/P		S/O		C/P		S/O	
				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			
	REG.	HVY.		C/P		S/O		C/P		S/O	
				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
 REG. = Regular Doors

S/O = Side Opening Door
 HVY. = Heavy Doors

E. Convenience keys:

Press  to check the Speed in Hz

Example:

Output	Frequency
HSC	19Hz

Press  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:


Z	C	O	R	V	L	M	H	S	T	F
0	1	0	0	0	1	0	0	0	0	0

Press  to check the recent Faults.

Press  or  to view all the Faults


Example:

Present	Fault
Under	Voltage

Press  to check the Output Voltage.

Example:


Output	Voltage
	132.00v


Press  to check the Output Current.

Example:

Output	Current
	0.78A

Press  to Reset the Drive.

F. The  keys:

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

- 1st. **V//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 **Convenience keys** in part E)
- 3rd. **Faults.** (See the **Convenience 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 (Center Parting)

Standard S/O (Side Opening)

Waterproof C/P (Center Parting)

Waterproof S/O (Side Opening)

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/Provincial, 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 the section of **Kinetic Energy & G.A.L. Door Operators** of the link: <http://www.gal.com/content/products/downloads/doors/operators/default.htm>

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. MOVFR 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):

Nudging Speed is the reduced speed that is equal or less than 60% of the max. HSC. Nudging Speed only happens when DC (Door Close) and NUDG. (Nudging) input signals take place simultaneously.

CLOSE ACCELERATION TIME (Par. 7):

A higher value produces a slower acceleration rate for smoother operation. A lower value produces a faster acceleration rate for faster opening times.

CLOSE DECELERATION TIME (Par. 8):

Close 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 increased slightly.

OVERLOAD (Par. 99)

This is the Maximum Limit of the Motor Current. If the Motor Current exceeds this Limit, the Drive will be shutdown, generate the OVER CURRENT FAULT, and turn on the FAULT LED. Recycling the Power to MOVFR or pressing the RESET key of the Parameter Unit to 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.

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 to unlock the hoistway door. A slower speed produces a smoother and quieter unlock.

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):

A higher value produces a slower acceleration rate for smoother operation. A lower value produces a faster acceleration rate for faster opening times.

OPEN DECELERATION TIME (Par. 27).

Open 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)

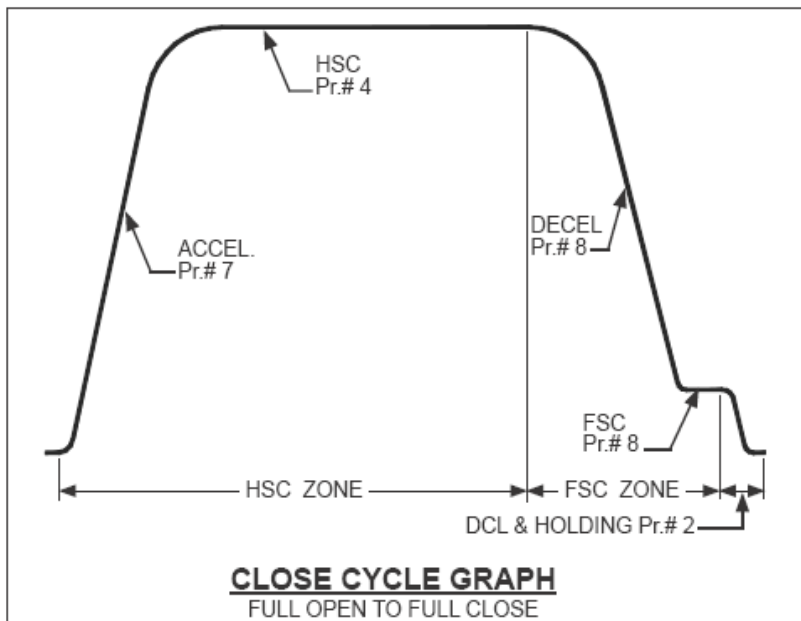
The Default value of this Parameter should be suitable for most doors. Nevertheless, the rule for adjustment for this Parameter is: A higher value will produce less torque, and vice versa.

C. Carrier frequency:**CARRIER FREQUENCY (Par. 51)**

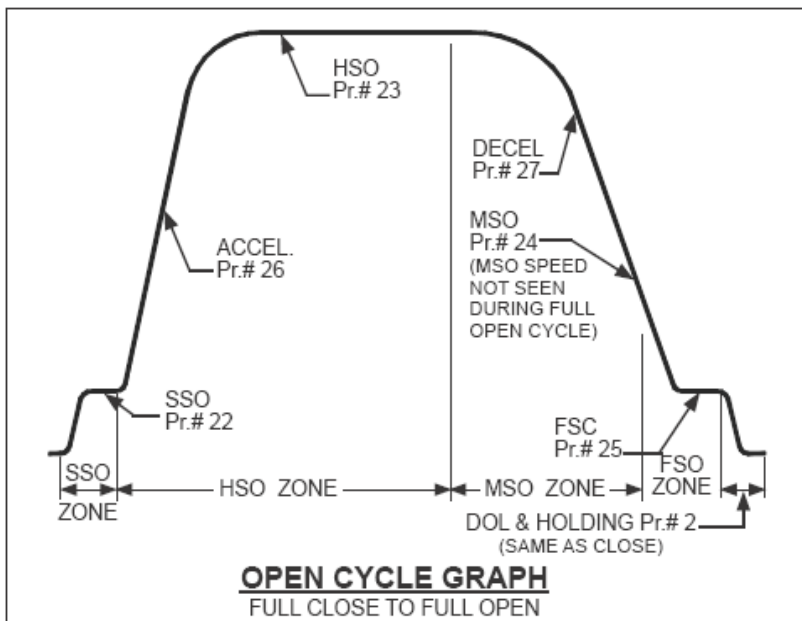
The nominal frequency of the carrier wave is set by Parameter 51. The Default value is 10KHz. The MOVFR Drive is compliant with the CE regulation. However, if adjacent electronics, with poor EMI immunity, are affected by EMI of the MOVFR, users can lower the value of this Parameter to reduce the EMI 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

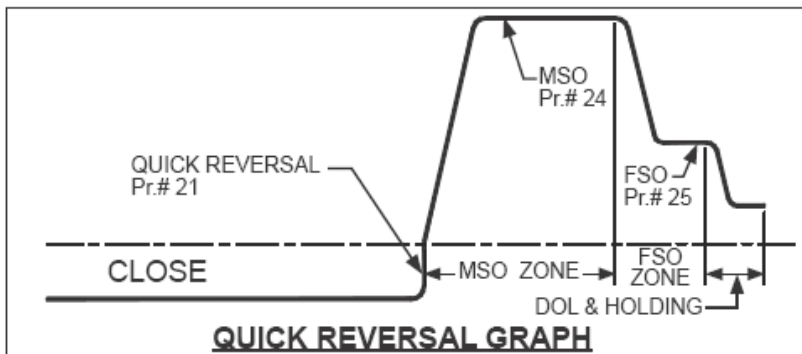
A. Closing Cycle:















B. Opening Cycle:

















C. Quick Reversal:



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				

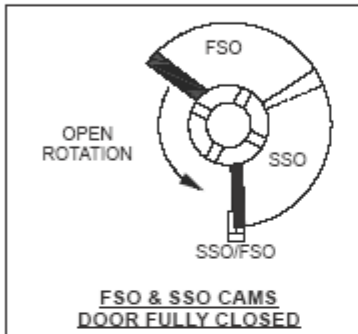
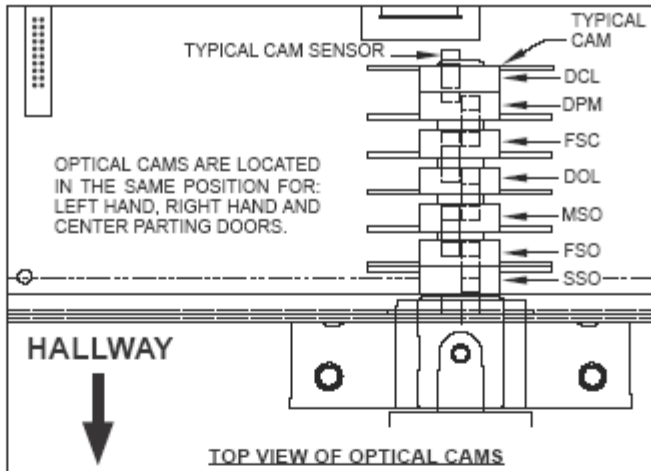
OPENING DIRECTION						
→						
SPEED	SSO	HSO			MSO	FSD
DISTANCE	Until the clutch makes up (first 1/2 inch)	From the clutch made up (approx. 1/2) in to 3/4 of the total door width			Last 1/4 of the total door width	Last 4 inches
CAM 1 SSO/FSD						
CAM 2 MSO						
CAM 3 DOL						

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

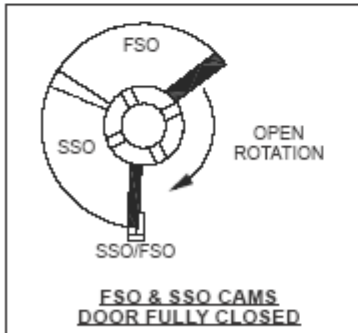
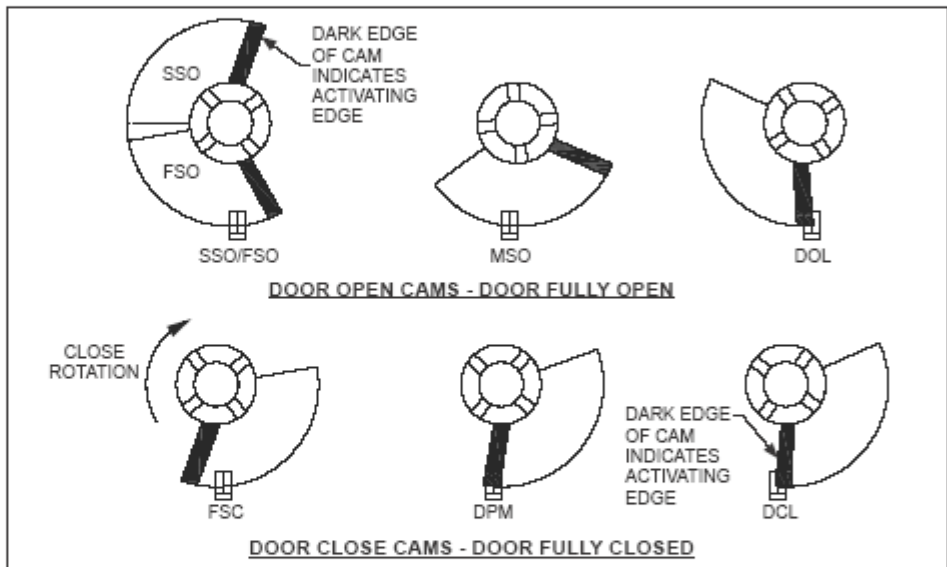
 = CAM BLOCKED

 = CAM UNBLOCKED

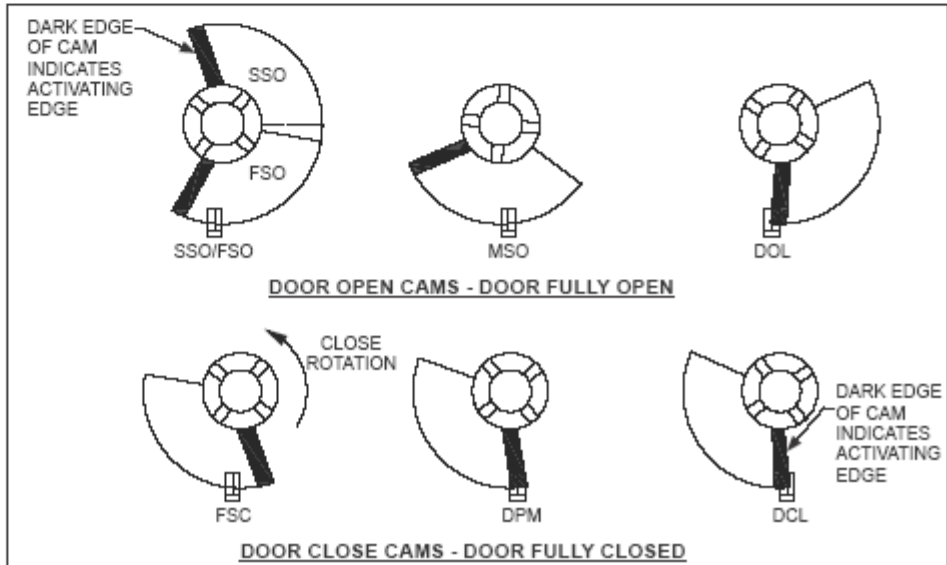
7.9. Rotational cam setting



RIGHT HAND CAMS



**LEFT HAND
AND
CENTER PARTING
CAMS**



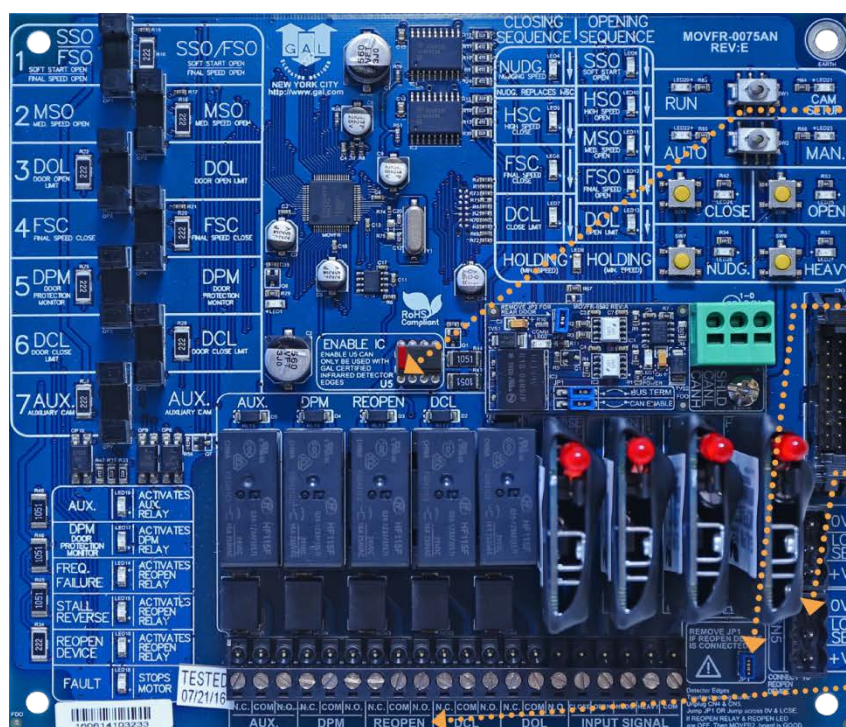
7.10. Interfacing between G.A.L. certified light curtain and MOVFR

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. Regarding 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.



1 Plug the enable chip into the socket U5 as shown. Make sure the RED mark is positioned in pin1 on left as shown. Call G.A.L. Mfg. Corp. to obtain the programmable DPPC-0001N enable chip.

2 Remove jumper JP1

3 Plug the light curtain connectors into the mating connector CN4 & CN5. **Note:** connectors CN4 & CN5 are swappable.

4 Make sure that REOPEN contacts of the MOVFR are connected to the Main Controller.

The following 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>).

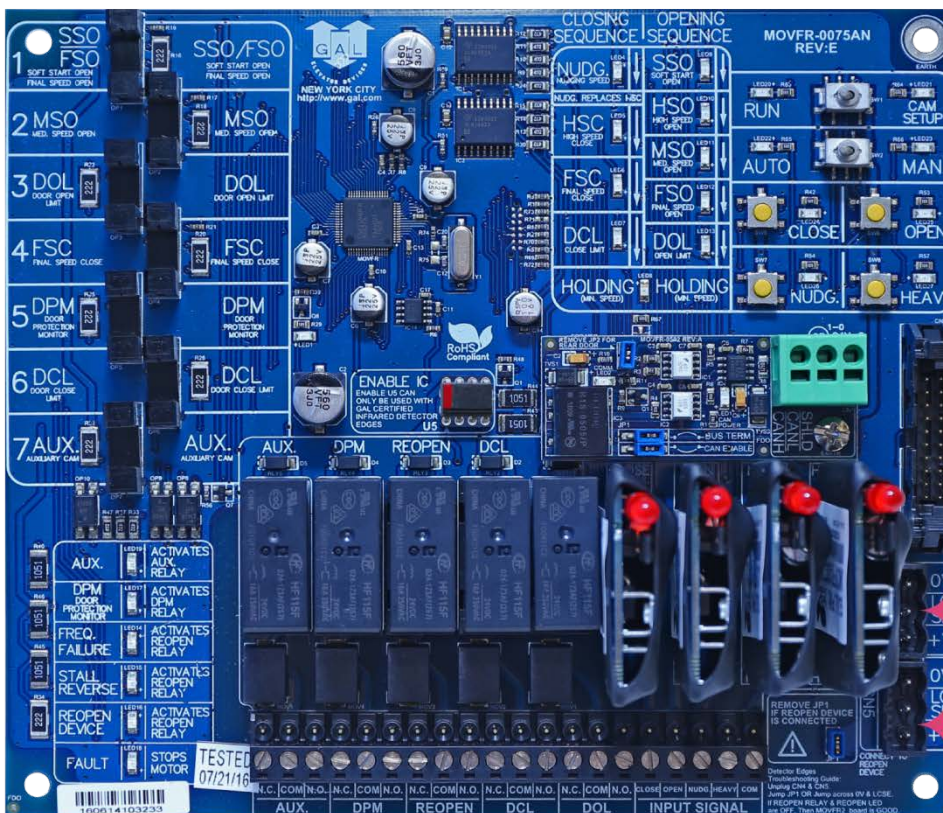
Toll Free Phone: 1-877-425-3538 (877-GAL-ELEV)



- Formula Systems
- Janus
- Scanguard
- 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. G.A.L. Certified Infrared Detector Edges Connection



MFG.	MFG. P/N	 CN5			 CN4			CONNECTION BETWEEN TX & RX
		V+	LCSE	0V	V+	LCSE	0V	
JANUS	E40/32/GAL	RED		BLACK	RED	BLUE	BLACK GREEN	NONE
FORMULA SYSTEMS	FCU0547US21	BLUE	BROWN	GREEN YELLOW	BLUE	BROWN	GREEN YELLOW	NONE
		1	2		1	2		
FORMULA SYSTEMS V.2	VS3 1447US01	BROWN	GREEN YELLOW	BLUE	BROWN	GREEN YELLOW	BLUE	NONE
SCANGUARD	DPSG-0001N	BROWN		BLUE	BROWN	BLACK	BLUE	GRAY-GRAY
TRITRONICS	6W	RED	WHITE	BLACK				NONE

7.11. **MOVFR connection diagram**

INSTRUCTIONS FOR THE G.A.L. PARAMETER UNIT

CAUTION: To Transfer data from one Drive to another, user must READ (COPY) from the first Drive.

HOW TO READ (COPY) FROM THE DRIVE: Press SET, Press Up Arrow, Press READ, Wait for the Completed Signal from the Display.
 HOW TO WRITE (DOWNLOAD) TO THE DRIVE: Press SET, Press Up Arrow, Press WRITE, Wait for the Completed Signal from the Display.
 HOW TO CHANGE PARAMETERS: Press SET, Enter Par. number, Press READ, Enter a new Value, Press WRITE, Wait for the Completed Signal from the Display.

CLOSING	PARAMETER#		DEFAULT VALUE								OPENING		PARAMETER#		DEFAULT VALUE								
	REG.	HVY.	STANDARD				WATERPROOF						REG.	HVY.	STANDARD				WATERPROOF				
			C/P	S/O	C/P	S/O	C/P	S/O	C/P	S/O					C/P	S/O	C/P	S/O					
MAX. CLOSE SPEED	0	0	0-30	30	30	30	30	30	30	30	30	30	21	31	0-6	0.8	1.0	1.4	1.6	0.8	1.0	1.4	1.6
HOLDING TORQUE	1	11	0-30	3	3	3	3	3	3	3	3	3	22	32	0-400	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	1.5	23	33	0-400	31	16	45	23	24	12	35	18
CLOSE TORQUE	3	13	0-400	225	173	173	173	173	135	135	135	24	34	0-400	14	14	20	20	10	10	15	15	15
HIGH SPEED HSC	4	14	0-400	23	12	19	10	14	7	12	6	25	35	0-400	3	3	5	5	2	2	3	3	3
FINAL SPEED FSC	5	15	0-400	4	4	5	5	3	3	4	4	26	36	0-320	6	6	4	4	6	6	6	6	6
NUDGING SPD	6	16	0-400	8	8	9	9	5	5	6	6	27	37	0-320	6	6	10	10	9	9	10	10	10
ACCELERATION TIME	7	17	0-320	9	9	6	6	7	7	10	10	28	38	0-30	4	4	4	4	4	4	4	4	4
DECELERATION TIME	8	18	0-320	6	6	10	10	17	17	25	25	29	39	0-400	120	100	120	100	100	80	100	80	80
STALL REV. FORCE	9	19	0-2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	OPENING AND CLOSING		PARAMETER#		RANGE		DEFAULT VALUE					
OVERLOAD	99	99	0-5	3	3	3	3	3	3	3	3	CARRIER FREQUENCY		51		2-15		STANDARD		WATERPROOF			
			C/P = CENTER PARTING DOOR				REG. = REGULAR DOOR						C/P		S/O		C/P		S/O				
			S/O = SIDE OPENING DOOR				HVY. = HEAVY DOOR																
			■ TO LOWER TORQUE, INCREASE TORQUE PARAMETER VALUE																				

200/230 VAC IF 230VAC DRIVE IS USED & 500 VA MIN.

100/115 VAC IF 115VAC DRIVE IS USED & 500 VA MIN.

RECOMMENDED FUSE SIZES

4 AMP SLOW BLOW FUSES FOR 230VAC DRIVE. (8 AMP MAX.)

8 AMP SLOW BLOW FUSES FOR 115VAC DRIVE. (12 AMP MAX.)

CONNECT TO GAL PARAMETER UNIT

C/P = CENTER PARTING DOOR REG. = REGULAR DOOR S/O = SIDE OPENING DOOR HVY. = HEAVY DOOR ■ TO LOWER TORQUE, INCREASE TORQUE PARAMETER VALUE

ALL TERMINALS ARE PLUGGABLE (SEE NOTE 1)

RELAY CONTACTS ARE RATED AT 10 AMP, 250 VAC

AUX. RELAY IS CONTROLLED BY CAM # 7. AUX. RELAY IS OPTIONAL AND AVAILABLE UPON REQUEST.

DPM N.O. CONTACT TO MAKE JUST BEFORE GATE SWITCH MAKES FOR G.A.L. FAULT MONITOR TO MEET ANSI A17.1 AND CAN/CSA-844. DPM RELAY IS CONTROLLED BY CAM # 5.

REOPEN RELAY ENERGIZES SUBJECT TO DETECTION OF:
 -INFRARED DETECTOR EDGES; CONTROLLED BY US
 -STALL REVERSE; CONTROLLED BY PARAMETER 9
 -FREQUENCY FAILURE; CONTROLLED BY PARAMETER 0

N.C. CONTACT OPENS WHEN THE DOOR REACHES THE LIMIT. DCL RELAY IS CONTROLLED BY CAM # 6.

N.C. CONTACT OPENS WHEN THE DOOR REACHES THE LIMIT. DOL RELAY IS CONTROLLED BY CAM # 3.

REMOVE THIS RESISTOR IF THE INPUT SIGNAL VOLTAGE IS 60V OR LESS

DOOR CLOSE INPUT INDICATOR

DOOR OPEN INPUT INDICATOR

NUDGING INPUT INDICATOR

HEAVY DOOR INPUT IS OPTIONAL AND AVAILABLE UPON REQUEST. WHEN HEAVY INPUT IS ACTIVATED, A DIFFERENT PARAMETER SET IS USED FOR OPEN, CLOSE, AND NUDGING.

CONNECT TO G.A.L. CERTIFIED LIGHT DETECTOR EDGES

CONNECT TO ANY VOLTAGE SOURCE FROM 24-230 VOLTS AC OR DC, 30mA MIN. (OPTIONAL)

METHOD 1

METHOD 2

CONTROLLER RELAYS MUST HAVE THE SAME COMMON AND RELAY COIL VOLTAGE MUST BE FROM 24V TO 230V AC OR DC.

DRIVE OVERLOAD FACTORY SET AT 2.5 A

SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 5000 RMS SYMMETRICAL AMPERES 230 VOLTS MAXIMUM

MFG.	MFG. P/N	CN3 V+	LCSE	OV	CN4 V+	LCSE	OV	CONNECTION BETWEEN TX & RX
JANUS	E4032/GAL	RED		BLACK	RED	BLUE	BLACK GREEN	NONE
FORMULA SYSTEMS	FCU0547US21	1	BLUE	BROWN	1	BLUE	BROWN	NONE
		2		GREEN	2	GREEN	GREEN	
FORMULA SYSTEMS	V53 1447US01	1	BROWN	YELLOW	1	BROWN	YELLOW	NONE
		2		GREEN	2	GREEN	BLUE	
SCANGUARD TRITRONICS	DPSG-001N 6W	BROWN		BLUE	BROWN	BLACK	BLUE	GRAY-GRAY

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 GROUNDING.

DATE 1-24-05

DOC. No. 8032

REV N 01/17

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

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ELECTRICAL ADJUSTMENTS

DOC-0015N

G.A.L. Manufacturing Corp.

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 95oC, 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-resets 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 changing the Value of Parameter 110 to 1 and using 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 Restart 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:

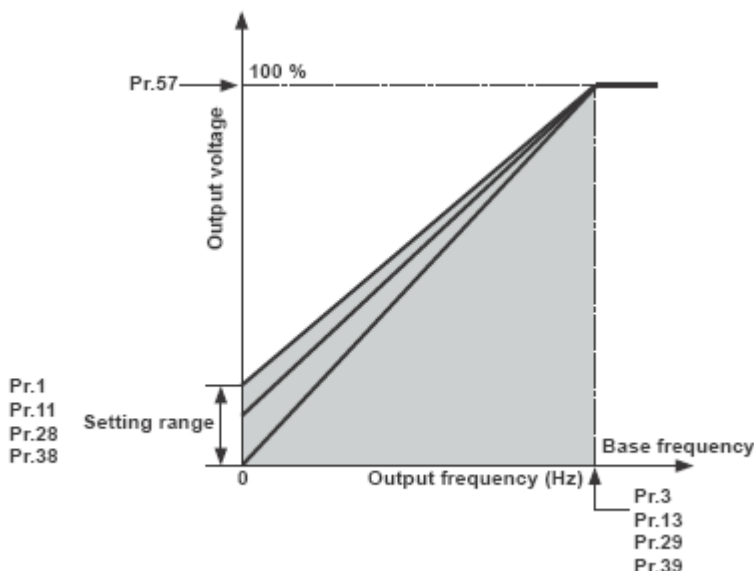
Pr.11 Heavy Door Close Holding Torque

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.

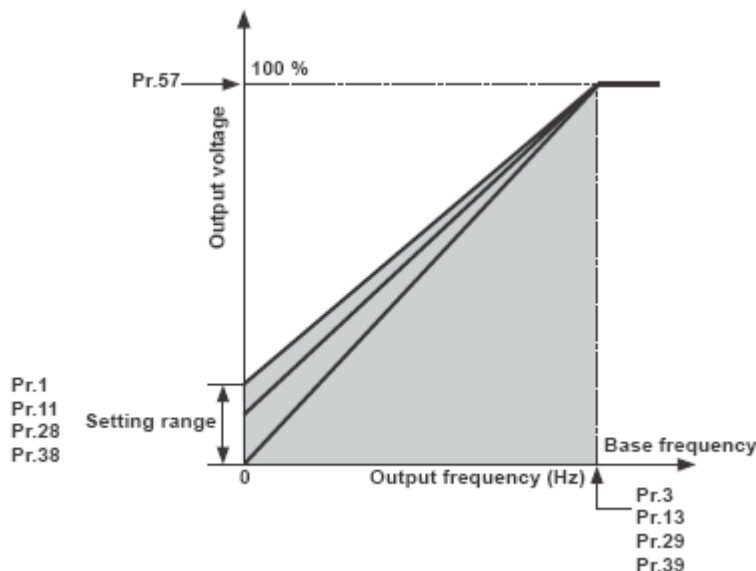
Pr.38 Heavy Door Open Slow Speed Torque

Unit: 0.1 %

Default: 0 %

Range: 0 ~ 30 %

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



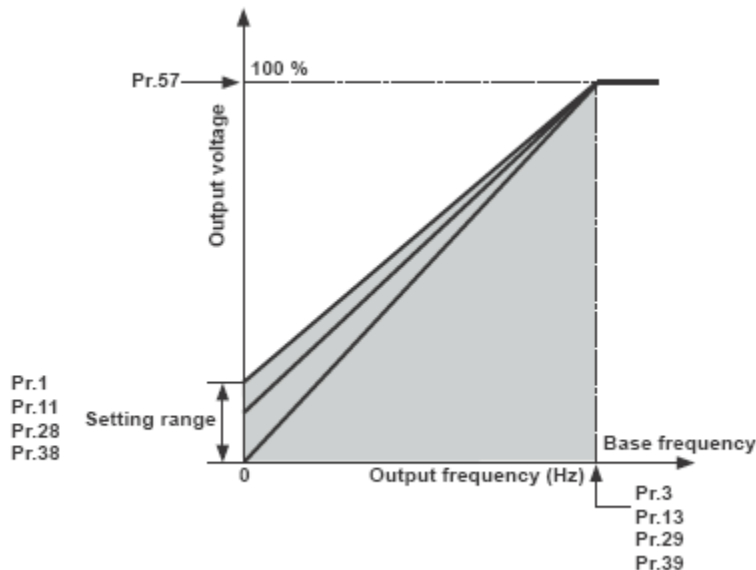
Pr.39 Heavy Door Open Torque (Second V/F (base frequency))

Unit: 0.1 Hz

Default: 80.0 Hz

Range: 0 ~ 400 Hz

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

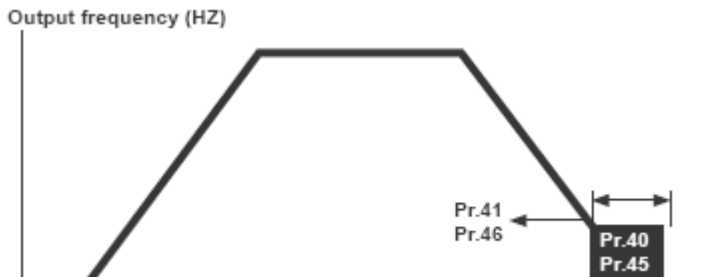


Pr.45 Heavy Door DC Injection Brake Operation Frequency
 Unit: 0.1 Hz
 Default: 60 Hz
 Range: 0 ~ 400.0 Hz

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.



7.1.4 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

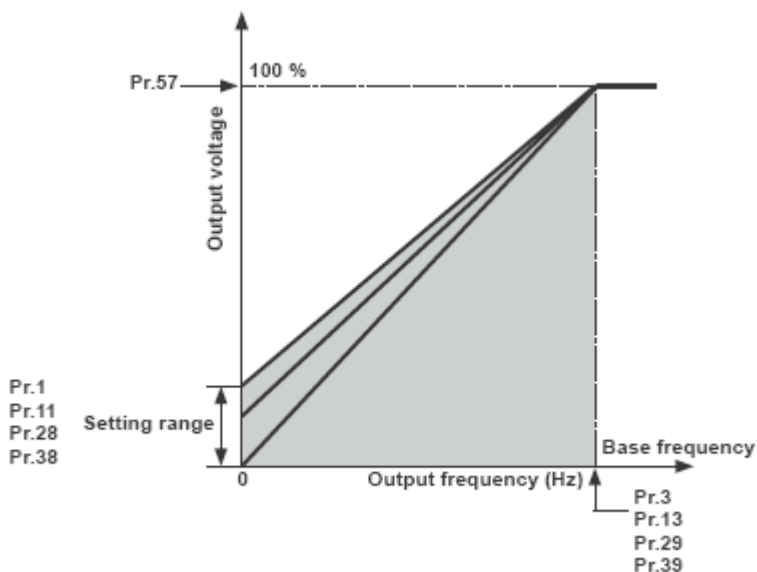
Pr.16 Heavy Door Nudging Speed
 Unit: 0.1 Hz
 Default: 9.0 Hz
 Range: 0 ~ 400.0 Hz

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.

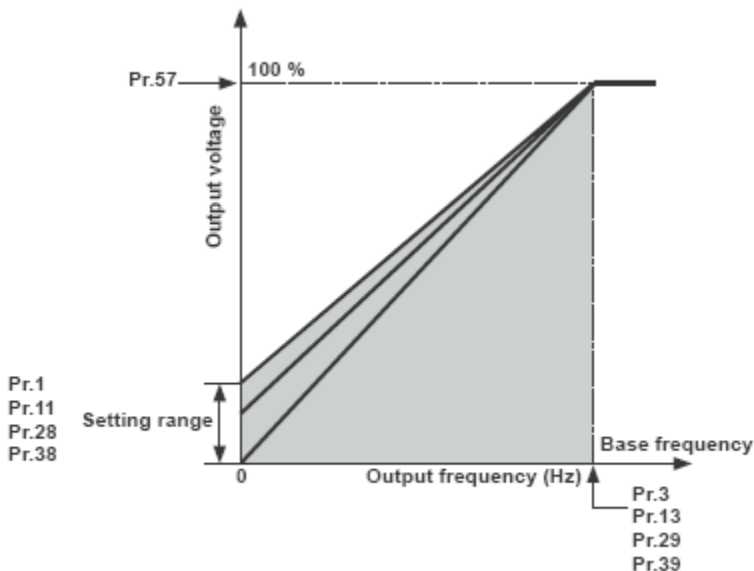
- Pr.22 Slow Start Open (SSO)
 Unit: 0.1 Hz
 Default: 5.0 Hz
 Range: 0 ~ 400.0 Hz

- 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.

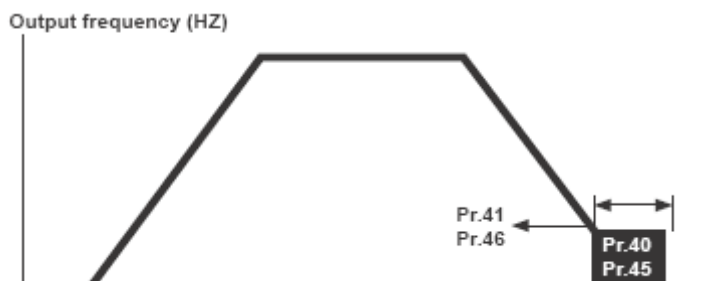
Pr.46 Heavy Door DC Injection Brake Operation Time

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.

7.1.5 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 in the green power connector.
8. Plug in 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.

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GAL Quality • GAL Dependability • GAL Support

Parameter Unit with built-in diagnostics. Information now in plain English. Capable of holding 5 complete sets of parameters. Contractors can store one working set and all 4 GAL defaults (SS/2 SP/CP/2 SPCP).

Optional 'heavy door' input. Now you can maximize door performance and still meet the kinetic energy requirements found in ASME A17.1 - 2000 + codes.

Plug & Play Door Protection. No longer a need to locate, mount, or wire a power supply on the car top. GAL offers Formula Systems and Tri-Tronics edges at very attractive prices. Edges bought from GAL plug directly into the MOVFR operator, saving hours on installation.

Closed Loop regulated speed via motor performance feedback. Perfect consistency from floor to floor. Automatically adjusts for wind and door conditions.

Keypad Programming allows complete control for all speeds, torques, acceleration, and deceleration. Download all operating parameters from one operator for easy upload to all others. Incredibly fast and easy fine tuning, especially on multi-car banks.

LED indication of all inputs and outputs. Mechanic friendly. Eliminates time spent trouble shooting. LED indication for every speed zone during open and close cycles.

Test Push Buttons for open, close, and nudging. Allows testing of the mechanical set up before running on automatic.

Only 3 Inputs needed: Door Open, Door Close, and Nudging (optional input for 'heavy door'). Minimize wiring time.

Universal Voltage Inputs will accept 24 to 300 volts, AC, DC, or dry set contacts. Can adapt to the output of virtually any elevator control. Perfect for modernizations.

Water Resistant model available. Controls encased in gasketed housing. Motor rated for 'wash down' duty. Water resistant grommets for all wiring.

Heavy Duty 1/2 HP motor. Can handle any application.

Non Contact optical couplers (with available spare for extra functions). Substantially lowers routine maintenance.



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