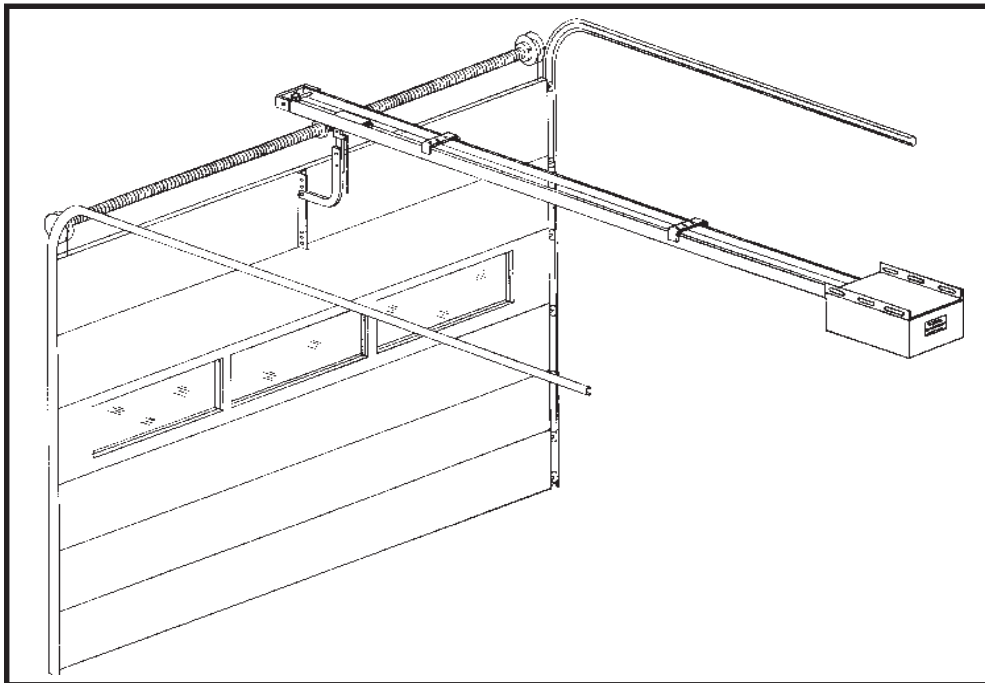


# Model M

## Commercial and Industrial Drawbar Door Operator Safety, Installation, and Service Manual



**OSCO requires use of an electric edge or photoelectric control for pedestrian protection on all automatic or remotely controlled door operators.**

# OSCO<sup>®</sup>

OPERATOR SPECIALTY CO., INC.  
P.O. BOX 128, CASNOVIA, MI 49318

**Safety Information and Warnings**

Read all of the following before beginning to install the Model M operator:

1. Read the green "SAFETY INSTRUCTIONS" sheet provided with the operator information. It's extremely important that the safety warnings and precautions be understood and followed by the installing contractor. Leave all instructions with the end user.
2. Do not attempt to operate the machine unless it is completely installed as instructed.
3. The installation must be made in a neat and professional manner, observing all rules of good workmanship and personal safety.
4. All electrical connections to the power supply must be made by a qualified and licensed electrician. All local and national codes must be observed.
5. A power-disconnect switch should be located within sight of the operator so that primary power can be turned off when necessary.
6. Do not remove the operator cover unless you are qualified to service this equipment and the power is turned off. There are no user-serviceable parts inside.
7. Install enclosed warning signs so as to be visible to all persons passing near or through the door.
8. Operate the door only when it is in full view.
9. Do not permit children to play on or around the door.
10. Never reach through or around a door frame to operate the door controls.
11. Install all recommended safety equipment.

**Features**

**Mechanical**

- 1/2 HP instant-reverse motor with capacitor, automatic reset thermal overload
- Fully covered power unit
- Dependable roller chain drive
- Efficient V-belt reduction
- Emergency disconnect for manual operation
- Double-angle track—2" X 1 1/2" X 1/8"
- Door speed 0.8–0.9 feet per second
- 4" Headroom required above high rise of door
- Designed to operate doors up to 16" high

**Electrical**

- Easily adjustable rotary limit switches
- Quick-disconnect door arm
- Heavy-duty contactor starter
- Adjustable cutoff switch
- 24V control circuit
- Adapted for pull cord, radio control, or single button control
- Adaptable for reversing door edge
- Available with adjustable plug-in timer to close
- UL listed on standard models (except 230 Volt Single Phase)

**CAUTION**

OSCO STRONGLY RECOMMENDS USE OF AN ELECTRIC EDGE OR PHOTOELECTRIC CONTROL FOR PEDESTRIAN PROTECTION ON ALL AUTOMATIC OR REMOTELY CONTROLLED DOOR OPERATORS.

Children should never be allowed to play on, near, or around a motorized door. Any control devices should be placed so as to be inaccessible to small children.

The door should never be operated unless it is in visual sight of the user.

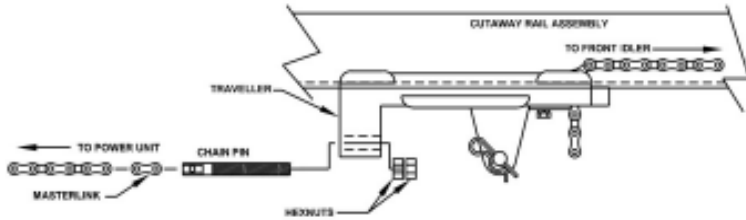
Warning signs must be installed on or near the door.

A pushbutton or keyswitch should not be installed within reach of the door or operator.

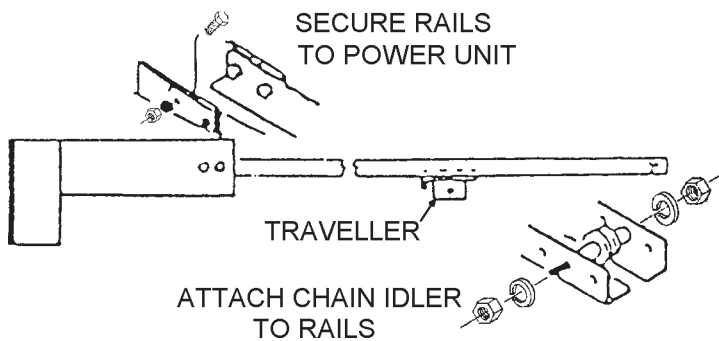
**Installation Instructions**

**Step 1: Operator Assembly**

Secure the rails to the power unit using the 5/16" bolts provided. Then slide the traveller onto the rails, making sure that the chain connection is away from the power unit and toward the front.



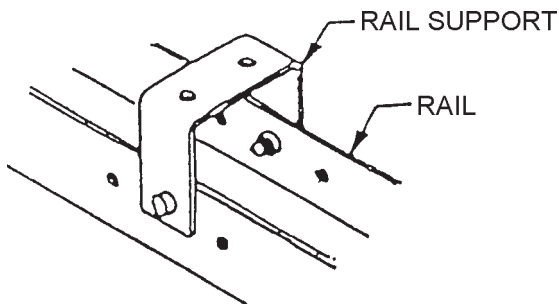
Attach the front idler assembly and shaft to the rails, using the appropriate holes (as shown) and tighten securely.



Unroll the chain in the direction of the chain idler, allowing the chain to loop around the pulley. Continue unrolling the chain and engage the sprocket at the power unit. Chain should be pulled tight before engaging the sprocket, but do not overtighten, as damage can result. Be sure the chain is strung through the hole from the top.

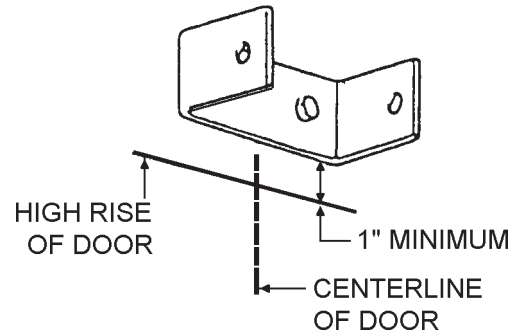
Locate the traveller near the center and attach the chain. Tighten the chain sufficiently to remove any slack but, once again, do not overtighten, as damage can result.

Using the 5/16" hardware provided, attach the center rail supports to the rails.



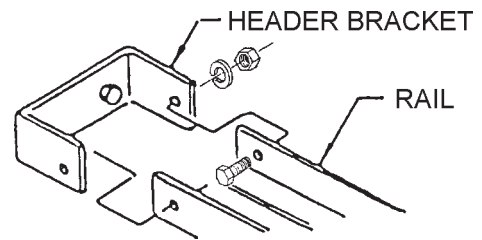
**Step 2: Header Bracket Positioning**

Locate the centerline of the door opening and draw a light pencil line on the door header and on the upper portion of the door. Then, by raising the door, determine the "high rise" of the door. This is the highest point to which the door will rise when the top section starts to go over the radius of the track. Using lag bolts provided, mount the front header bracket a minimum of one inch above the high rise on the centerline of the opening.

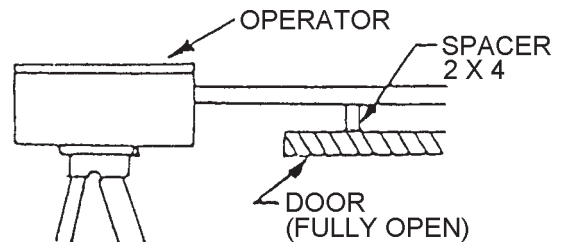


**Step 3: Operator Installation**

Using two 5/16" bolts, attach the operator to the header bracket.



Raise the power-unit end of the operator and open the door fully. Support the operator 3-4 inches above the door, using a ladder or other suitable substitute. Make sure the operator is in line with the door centerline.



*(Installation Instructions Continued on page 4)*

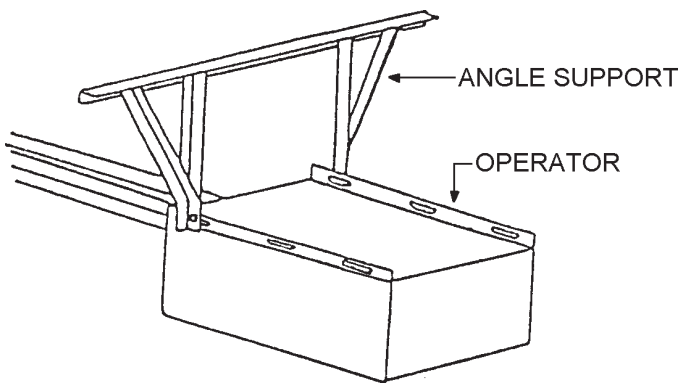
Installation Instructions (Cont'd)

**Step 3: Operator Installation (Cont'd)**

Secure the operator to the ceiling or overhead truss, ensuring stability and allowing the operator to rest above the path of the door track.

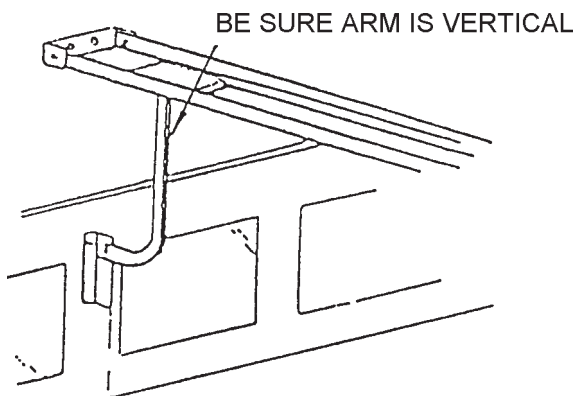
**Important:** During door travel, the operator must be a minimum of one inch above the door and be properly aligned.

Normally, angle iron of 1" X 1" X 1/8" size is ample for hanging the operator, provided sufficient rigidity can be obtained by diagonal bracing.



On doors over 10 feet high, it is necessary to support the center (approximately) of the rail with a hanger dropped from the ceiling. Holes are provided in the rail for this purpose.

Finally, manually close the door fully and secure the door bracket on the door centerline directly in line with the door rollers. For wood doors, use two carriage bolts. For metal or fiberglass doors, use two 5/16" bolts.



**Step 4: Electrical Connection**

A complete electrical circuit print is included with the operator information packet. The power supply must be of correct voltage and phase and should be brought into the operator with no smaller than No. 12 wire. For proper wire gauge, refer to "Wiring Specifications," on Page 10. Electrical power must be ample and not taken from an overloaded line, as faulty operation will result. Proper thermal protection is supplied with the operator. The motor contains a thermal overload protector to guard against overheating due to overload conditions.

**IMPORTANT**

- A. Power supply must be of correct voltage and phase.
- B. Always disconnect power from the operator before servicing.
- C. Keep clear of the door during operation.

**IMPORTANT NOTICE**

This operator is supplied with a 3-button control station (OPEN-CLOSE-STOP) accompanied by a precautionary sign:

**WARNING**  
**TO PREVENT ENTRAPMENT**  
**DO NOT START DOOR**  
**DOWNWARD UNLESS DOORWAY**  
**IS CLEARED**

It is vital that the 3-button station be mounted within sight but out of reach of the door and that the warning sign be mounted adjacent to the 3-button station.

**The 3-button station must be connected so the STOP circuit between terminals #2 & #4 is not bypassed. Also, if additional 3-button stations are to be connected, the STOP buttons must be wired in series.**

**NOTE:** A STOP button must be used when the installation has radio controls or a single button.

<u>Desired Function</u>	<u>Connecting Terminals</u>
OPENING DEVICE	#1 & #4
STOP	#2 & #4
CLOSE	#3 & #4
OPEN & CLOSE	#4 & #5
SAFETY TO REVERSE	#1 & #6
24VAC POWER	#2 & #10

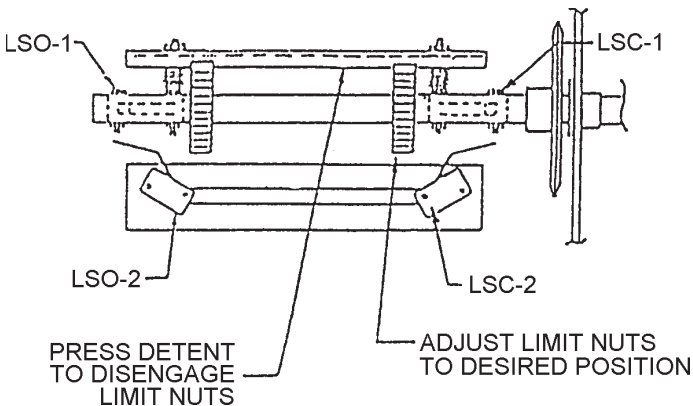
### Limit Switch Adjustment

Limit switches are factory set for short travel. Travellers should be at least two feet from either end of the rails when the unit is assembled.

1. Disconnect the door from the traveller.
2. Turn the power on and push the OPEN or CLOSE button. The traveller should move approximately two feet.

**TURN OFF POWER TO THE OPERATOR BEFORE MAKING ADJUSTMENTS!**

3. Adjust the limit nuts (found in the electrical control panel) by releasing the spring-loaded detent plate and turning the nuts in the desired direction. One complete turn will allow the traveller (or door) to move approximately four inches.



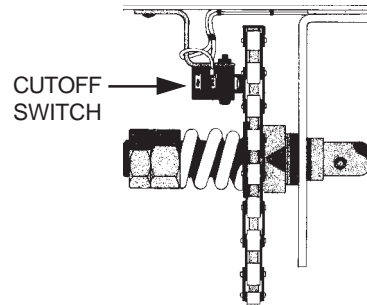
**IMPORTANT:** LSO-2 and LSC-2 must be actuated before LSO-1 and LSC-1. LSO-2 should be actuated three revolutions of limit shaft before LSO-1.

4. Be sure the detent plate is properly locked into both limit nuts when adjustment is complete.

**NOTE:** On 3-phase equipment, direction can be wrong. If the door closes when the OPEN button is pressed or vice versa, any two of three motor leads must be reversed. **DO NOT REVERSE THE PUSHBUTTON LEADS.**

### Clutch and Cutoff Switch Adjustment

The clutch is set light at the factory and must be properly adjusted in the field for the size and weight of the door. Adjust the clutch spring tension so the operator will drive the door closed without activating the cutoff switch prematurely. It is best to start with a light adjustment and tighten one-half turn at a time.



Because the device works in both directions, it is best to do a preliminary test in the open direction. If the unit is not sensitive enough, bend the cutoff switch bracket.

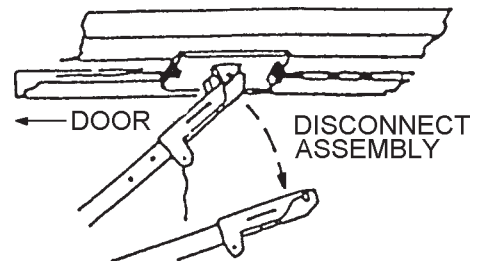
### Lubrication

The operator bearings and motor are factory lubricated for life. It may be advisable to oil the roller chain to prevent excessive dryness or rusting under humid conditions.

### Manual Disconnect

For your safety and protection, this operator is provided with a manual disconnect system. It is recommended that all persons be well informed of its purpose and operation.

To disconnect the operator, pull the disconnect cord as shown. To re-engage the operator, pull the disconnect cord down and manually connect the door arm to the traveller.



**Troubleshooting**

***Door will not operate from OPEN or CLOSE pushbutton:***

- A. The motor overload kicked out. Wait 15 minutes; the overload will automatically reset. Be sure the door is not binding.
- B. The fuse or overload in the main box is blown. Replace the fuse or reset the overload.
- C. Check for a defective transformer.
- D. Check for a defective STOP button or loose connection in the stop circuit.

***Door will not open from OPEN button but will close from CLOSE button:***

- A. Make sure the open limit switch is not hung up.
- B. Check for loose wiring on the open limit switch or the open relay coil.
- C. Check for a defective open relay coil.

***Door will not close from CLOSE but will open:***

Same as preceding, but in reverse.

***Door runs in wrong direction on 3 phase:***

Reverse the two motor leads.

***Door not closing properly:***

Be sure the detent plate is properly engaging the travelling limit nuts.

***Motor runs but door doesn't move:***

- A. Tighten the clutch.
- B. Check the set screw in the motor pulley.
- C. Check the V belt.

***Operator vibrates and bows:***

If the door is 10 feet or higher, be sure center support is used.

***Operator stops when you release button (makes rocking noise):***

The clutch spring is too loose. Tighten the clutch nuts.

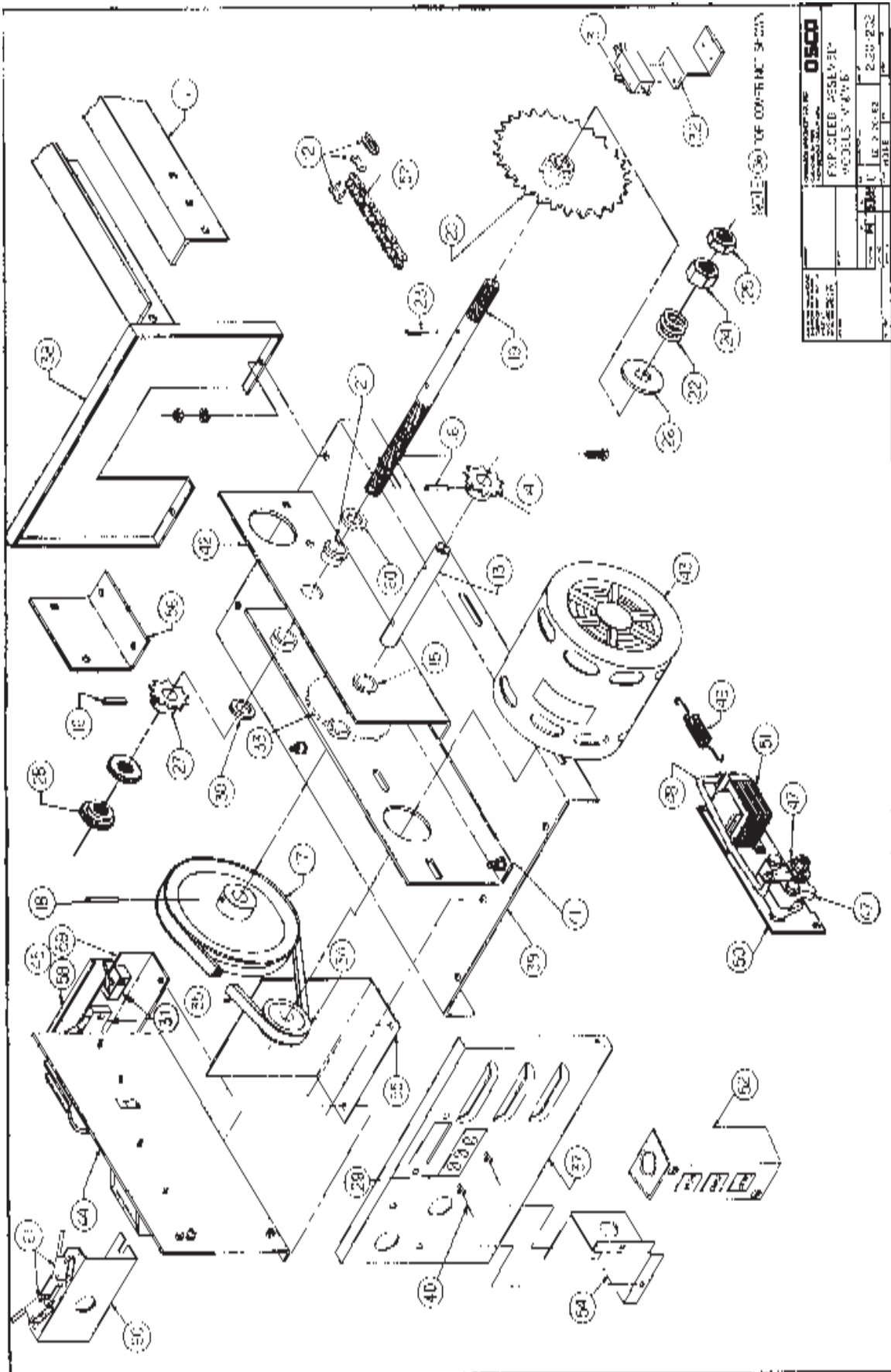
***Operator requires constant pressure on OPEN or CLOSE button:***

- A. Adjust the cutoff switch.
- B. Check that the clutch sprocket is properly seated.

**Ordering Replacement Parts**

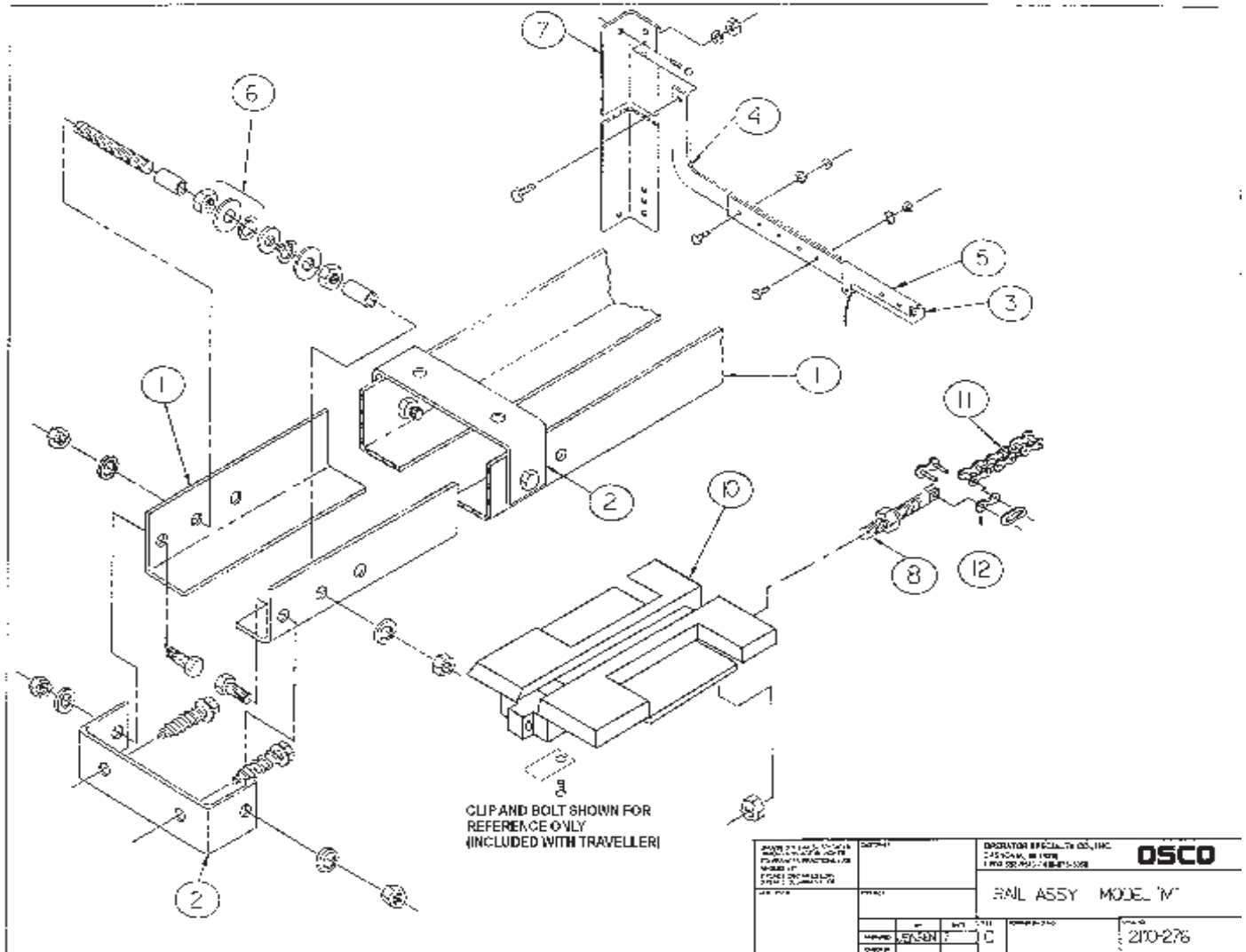
Use the numbers shown in the lists on the following pages to order all replacement parts.

1. Supply the serial number of your operator.
2. Specify the quantity of pieces needed.
3. Order by part number and name of part.
4. State whether to ship by freight, truck, parcel post, UPS, or air express.
5. State whether transportation charges are to be prepaid or collect.
6. Specify name and address of person or company to whom parts are to be shipped.
7. Specify name and address of person or company to whom the invoice is to be sent.



**Models M and MB  
Parts List  
OSCO Drawing #2120-202**

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
	2110-289	Intermediate Shaft Assembly		2110-360	Auxiliary Limit Switch Assembly
15	2200-195	Flange Bearing, 5/8"	60	2100-339	Limit Switch Bracket
17	2200-074	Pulley, 6" diameter	61	2500-440	Limit Switch, SPDT
18	2400-088	Roll Pin, 3/16" x 1 3/8"			
33	2100-546	Brake Disc (MB only)	52	2500-033	Standard 3-Button Station
	2400-206	Spring Pin, 3/16" x 1 1/4" (for Disc, MB only)			
	2110-361	Shaft and Sprocket Assembly	43	2510-416	<b>Motors</b> 1/2 HP, 115V, 1 Phase
13	2100-685	Intermediate Shaft		2510-417	1/2 HP, 208/230V, 1 Phase
14	2200-218	Sprocket, 48-B-10		2500-682	1/2 HP, 208/230/460V, 3 Phase
16	2400-026	Spring Pin, 3/16" x 1"			
	2110-290	Clutch and Cutoff Switch Assembly	44	2520-207	<b>Control Panels</b> 115V, 1 Phase
27	2200-218	Sprocket, 48-B-10, 5/8" bore			(WD #2600-222)
28	2200-030	Limit Nut		2500-212	Transformer, 115/24V, 40VA
30	2400-187	Thrust Washer, 1/8"		2500-2084	Contact, 24VAC, 4-Pole
16	2400-026	Spring Pin, 3/16" x 1"		2500-086	Terminal Strip, 9-141
21	2200-195	Flange Bearing, 5/8"		2500-113	Capacitor, 64-67 MFD, 330V
	2110-371	Clutch Assembly		2100-113	Capacitor Clamp
19	2100-668	Shaft		2500-541	Relay, 3PDT, 24VAC enclosed
20	2110-181	Sprocket, 48-B-30			
22	2200-306	Clutch Spring	44	2520-208	208/230V, 1 Phase
23	2400-237	Shear Pin, 3/16" x 1 1/4"			(WD #2600-154)
24	2400-061	Hex Nut, 5/8"-18		2500-791	Transformer, 208/230/24V, 40VA
25	2400-062	Jam Nut, 5/8"-18		2500-552	Capacitor, 20 MFD, 370V
26	2400-066	Flat Washer, 5/8"			
	2510-181	Cutoff Switch Assembly	44	2520-209	208/230V, 3 Phase
31	2500-030	Cutoff Switch			(WD #2600-155)
32	2100-781	Switch Bracket		2500-791	Transformer, 208/230/24V, 40VA
					(Note: This panel has no capacitor.)
34	2200-132	Motor Pulley, 2" diameter			
35	2200-151	V-Belt, 25"	44	2520-210	460V, 3 Phase
36	2100-797	Cover			(WD #2600-155)
37	2100-608	Louvered end		2500-214	Transformer, 460/24V, 40VA
29	2500-442	Radio Terminal Strip			(Note: This panel has no capacitor.)
40	2400-472	Pop Rivet			
38	2100-848	Open end			
39	2100-744	Main Frame		2510-068	<b>Brake Assemblies (Model MB only)</b> 115V
41	2100-1630	Bearing Bracket		2510-069	230V
42	2100-117	Bearing Bracket		2510-316	460V
56	2100-702	Rail Mounting Bracket	46	2220-004	Brake and Puck Assembly
57	2200-039	#48 Chain, 21 Links	47	2100-614	Lever
12	2200-010	#48 Master Link	48	2100-548	Rod
54	2100-105	Junction Box	49	2200-243	Spring
55	2100-749	Baffle Panel	50	2100-541	Mounting Plate
			51	2500-178	Solenoid, 115VAC
45	2110-278	Limit Switch Assembly	51	2500-177	Solenoid, 230VAC
58	2100-769	Detent Plate		2500-1351	Solenoid, 460VAC
59	2100-771	Limit Switch Bracket		2400-150	Set Collar, 1/4"
31	2500-030	Limit Switch, SPDT		2400-169	Kep Nut, 1/4"



**Model M**  
**Parts List #112**  
**OSCO Drawing #2110-276**

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
2	2100-801	Header/Rail Support Bracket	1	2100-628	<b>Rail Pairs 1 1/2" x 2"</b> 10' 8" Long — for 8' Door
3	2110-275	Complete Door Arm Assembly		2100-629	12' 8" Long — for 10' Door
5	2110-328	Upper Door Arm Assembly		2100-630	14' 8" Long — for 12' Door
4	2100-768	Lower Door Arm		2100-631	16' 8" Long — for 14' Door
6	2110-266	Front Idler Assembly		2100-632	18' 8" Long — for 16' Door
7	2100-767	Door Bracket			<b>#48 Drive Chain Assembly</b> <b>(chain, master link, chain bolt, nuts)</b>
10	2200-887	Traveler		2110-486	22' — for 8' Door
8	2110-533	Chain Tension Bolt with Hex Nuts		2110-456	26' — for 10' Door
11	2200-654	#48 Chain, per foot		2110-457	30' — for 12' Door
12	2200-010	#48 Master Link		2110-458	34' — for 14' Door
				2110-459	38' — for 16' Door

**Wiring Specifications**

1. From the top chart below, find the section corresponding to the voltage and phase of your operator.
2. The distance shown in the chart is measured in feet from the operator to the power source. **DO NOT EXCEED THE MAXIMUM DISTANCE.**
3. When large-gauge wire is used, a separate junction box (not supplied) may be needed for the operator power connection.
4. Select the gauge for control wiring from the bottom chart. For distances of more than 350 feet, a long-distance interface is required.
5. Wire run calculations are based on the National Electrical Code, Article 430, allowing 5 percent voltage drop.
6. Supply voltage must be within 10 percent of the operator rating under load conditions (not applicable for 208V).
7. Connect power in accordance with local codes.
8. The wire tables are based on standard copper wire. Wire insulation must be suitable to the application.

**USE COPPER WIRE ONLY**

<b>Power Wiring</b>						
	Volts & HP	Max Distance (ft)	Wire Gauge	Volts & HP	Max Distance (ft)	Wire Gauge
Single Phase	115V	281	12	208V	1213	12
		448	10	230V	1928	10
		713	8		3066	8
	1/2HP	1133	6	1/2HP	4875	6
		1802	4		7753	4
Three Phase	208V	620	12	460V	2705	12
	230V	985	10		4305	10
		1565	8		6850	8
	1/2HP	2485	6	1/2HP	10895	6

<b>Control Wiring</b>		
Volts	Max Distance (ft)	Wire Gauge
24V	250	14
	350	12
For distances of more than 350 feet, a long-distance interface is required.		